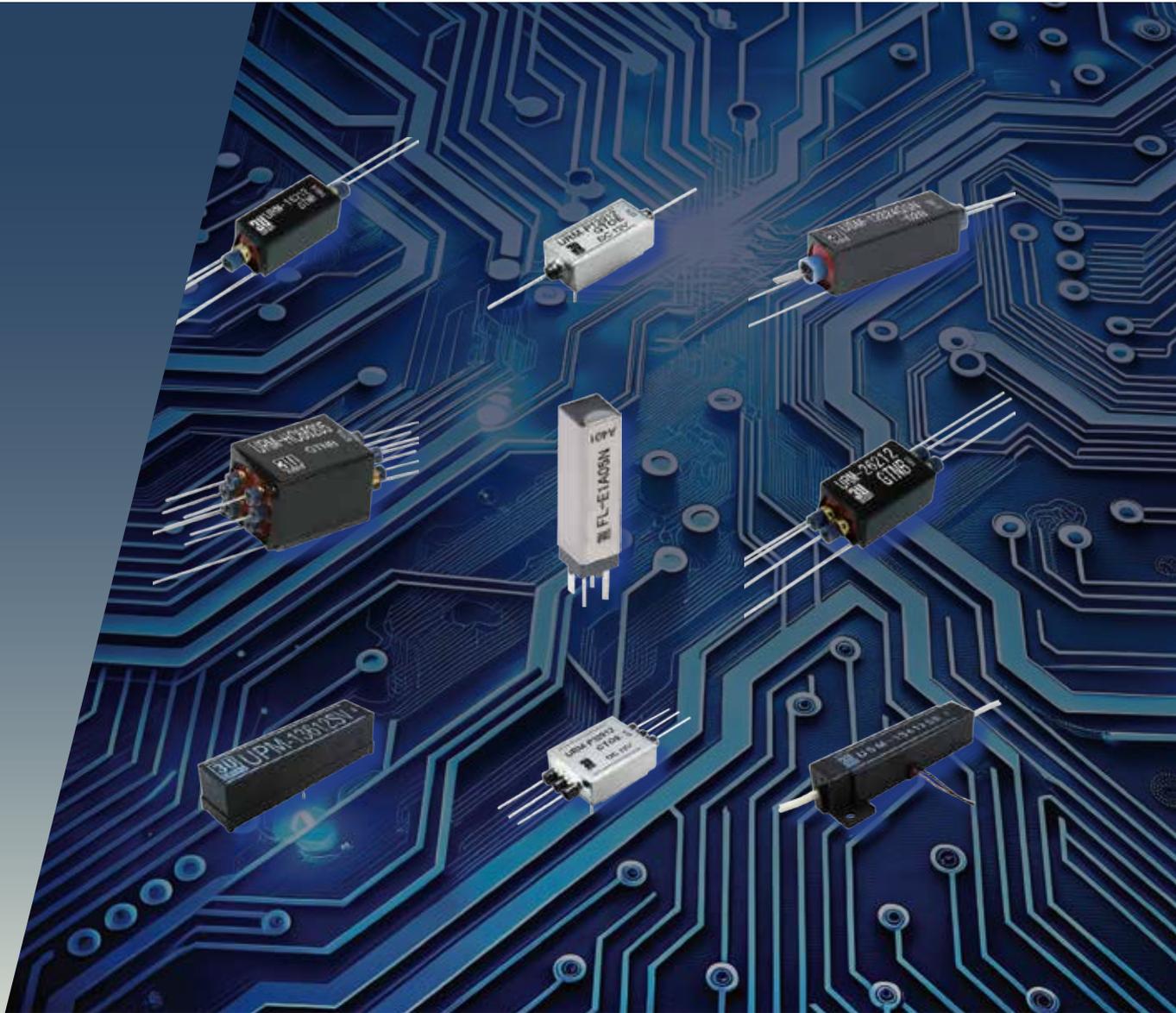


Sanyu THT Reed Relays

Product Line Brochure



Customer-Centric T&M Innovation: Standex Electronics Acquires Sanyu Switch

On Feb. 20, 2024, Standex acquired Sanyu Switch Co., Ltd., a Japanese company specializing in reed relays for automated test equipment (ATE) and high-frequency applications. This partnership brings together the strengths of both companies, further enhancing Standex's capabilities.

The acquisition of Sanyu Switch by Standex Electronics brings several benefits to our customers:

- **Enhanced Product Performance:** Efficient, reliable products with improved miniaturization and high-frequency capabilities.
- **Broader Solutions:** Wider range of advanced ATE and high-frequency applications.
- **Customization:** Tailored solutions to meet specific needs.
- **Innovation:** Cutting-edge technology and ongoing advancements.

Overall, customers can expect higher quality, more reliable, and innovative solutions from Standex Electronics.

Standex Electronics is a trusted and innovative leader in the T&M market. Their dedication to customer satisfaction, global presence, engineering expertise, and ongoing innovation enables them to deliver high-quality, reliable, and customized reed relay solutions tailored to the specific needs of various T&M applications.

Greeting

Sanyu Switch continues to understand and adapt to modern needs.

Since our establishment in 1972, we have been a leading relay manufacturer, supplying essential switching elements for semiconductor testing equipment, measuring instruments, communication equipment, and more, thereby contributing to a variety of industries. Currently, we are expanding beyond reed relays into high-performance applied products to respond to the wide range of demands in the fields of testing, measurement, and instrumentation. In order to meet the demands of various industries, we are constantly engaged in the R&D of new technologies and products, and we strive to provide products globally that will become industry standards.

About Standex

A subsidiary of Standex International Corporation (NYSE: SXI), Standex Electronics has been providing high-performance product solutions since 1950. Through growth, acquisitions, and strategic collaborations with customers, Standex Electronics' technology has delivered high-quality products to customers by applying the latest engineering designs to meet the ever-changing demands of the world. This has been achieved by closely collaborating with our customers and customizing and designing solutions and products according to their individual needs. Standex Electronics is headquartered in Ohio, USA, with production facilities in the USA, Germany, China, Mexico, the UK, and Japan.

About the 3U logo



- UPGRADE Using upgraded systems
- UNIQUE Using uniquely superior concepts
- UNIVERSAL Providing services to customers around the world

Sanyu Switch provides trust and value to customers who use our products.



Contents

High Carry Current	Axial Type NEW	USM-1A	_____	6
High Parallel Carry Current	Axial Type	URM-6A	_____	8
High Breakdown Voltage	10KV/15KV Axial Type	USM-1A	_____	10
	10KV PCB Type	UPM-1A	_____	12
	5KV Axial Type	USM-1A, 2A	_____	12, 16
	3KV Axial Type	USM-1A, 2A	_____	18, 20
	2KV Compact PCB Type	UPM-1A	_____	22
	2.5KV Compact PCB Type	SL-1A	_____	24
High Breakdown Voltage & High Insulation Resistance	Compact Axial Type	URM-1A, 2A	_____	26, 28
High Insulation Resistance	PCB & Axial Type	URM-1A, 2A ,3A	_____	30, 32, 34
High Temperature Resistance	Ultra-Compact Vertical PCB Type	MFS-1A	_____	36
	Compact Vertical PCB Type	UF-2A	_____	38
	Compact Vertical PCB Type	UF-1A1B	_____	40
	Ultra-Compact PCB Type	UC-2A2B	_____	42
	Ultra-Compact PCB Type	UC-4A	_____	44
LED Equipped	Ultra-Compact Vertical PCB Type	FS-1A, 2A, 1A1B	_____	46, 48, 50
	Compact Vertical PCB Type	UF-1A, 2A, 1A1B	_____	52, 54, 56
	Compact PCB Type	SC-1A, 2A, 1A1B	_____	58, 60, 62
	Compact PCB Type	SMT-1A, 2A, 1A1B	_____	64, 66, 68
High Density NEW	Ultra-Compact Vertical PCB Type	FL-1A	_____	70
	Ultra-Compact PCB Type	UC-2A2B	_____	72, 74
	Ultra-Compact PCB Type	UC-4A	_____	76
Dual Coil	Compact PCB Type	SCH-2A	_____	78
	Compact PCB Type	SUH-2A	_____	80
Pulsed current reduction curve/high breakdown voltage switching data			_____	82
Overview of Reed Relays			_____	84-98

USM-1A: High Carry Current Axial Relay

NEW



This product achieves a high carry current in a small package. In controlling high currents, this product offers overwhelming superiority in electrical lifespan and rated current. It is effective as a contact point in power device and power module testing.

<Characteristics>

- Carry current: 13A
- Breakdown voltage: 3000VDC
- Insulation resistance: $\geq 10^{13}\Omega$

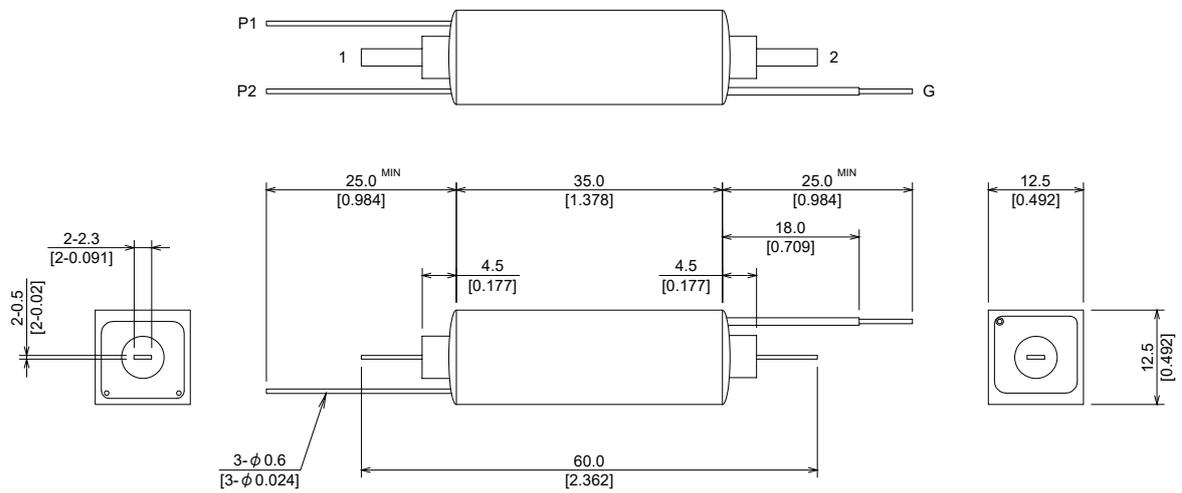


USM 1A Series		USM-12805GSN-02B			USM-12812GSN-02B			USM-12824GSN-02B				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	$\pm 10\%$ @20°C		30			160			550		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.5			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							1000	V		
Switching Current		DC/Peak AC resistance							1.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							13.0	A		
Contact Rating		DC/Peak AC resistance							60	W		
Life Expectancy		at 1V 10mA					100			$\times 10^6$ Cycle		
Contact Resistance		Max Initial Operete Voltage							250	m Ω		
Contact Resistance Stability		Max Initial Operete Voltage							10	m Ω		
Insulation Resistance		Between Contacts					10^{13}			Ω		
		Contacts to Shield					10^{13}			Ω		
		Contacts to Coil					10^{13}			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					3000			VDC		
		Contacts to Shield					3000			VDC		
		Contacts to Coil					3000			VDC		
		Shield to Coil					1000			VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 50Hz Square Wave							4.0	msec		
Release Time		Diode Suppression							4.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

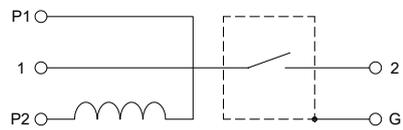
※ This product was developed to achieve high carry current and, as such, contact resistance may be unstable at small currents (100mA or less).

※ Contact breakdown voltage: With Terminal 1 (-), Terminal 2 (+) polarities

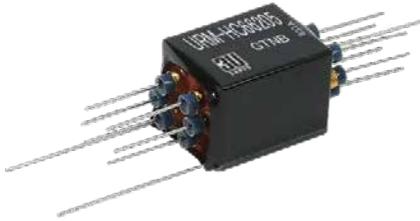
Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



URM-6A: Parallel High Carry Current Axial Relay



This product offers 6 Form A contacts in a small 29.0mm x 19.5mm x 15.5mm package. Having six make contacts in parallel allows for pulsed currents up to 25.0A. The product also achieves operating and recovery times of 1.5ms.

<Characteristics>

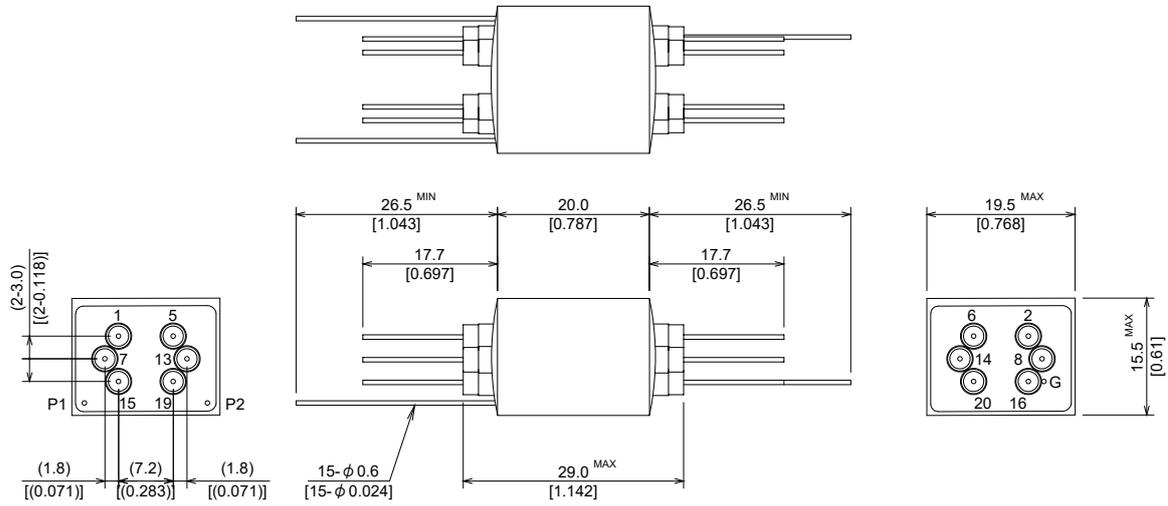
- Breakdown voltage: 2500VDC
- Insulation resistance: $\geq 10^{13}\Omega$
- Six contacts in parallel: 25.0 max (1ms ON/99ms OFF) at 30°C



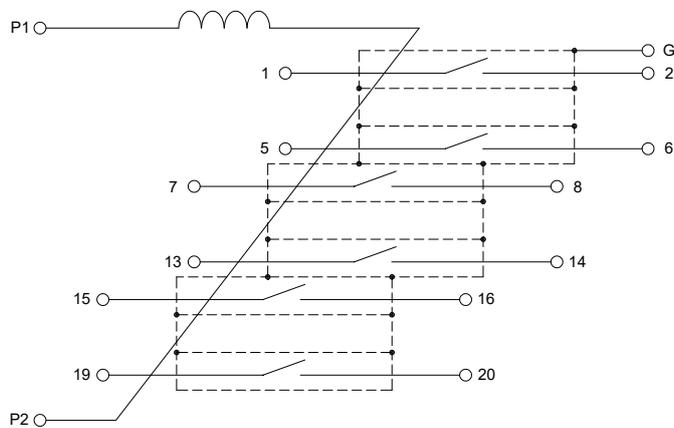
URM 6A Series		URM-HC66205GTNB			URM-HC66212GTNB			URM-HC66224GTNB			
Contact Configurations		6 Form A									
Coil Specifications											
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0			24.0		VDC
Coil Resistance	$\pm 10\%$ @20°C		70			400			1600		Ω
Must Operate	@20°C			3.75			8.8			17.6	VDC
Must Release	@20°C	0.7			1.2			2.4			VDC
Contact Ratings / Product Specifications											
Test Parameters		Test Conditions					Min	Nom	Max	Units	
Switching Voltage		DC/Peak AC resistance							*1	V	
Switching Current		DC/Peak AC resistance							1.0	A	
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A	
Contact Rating		DC/Peak AC resistance							100	W	
Life Expectancy		at 1V 10mA					100			$\times 10^6$ Cycle	
Contact Resistance		Max Initial Operete Voltage							150	m Ω	
Contact Resistance Stability		Max Initial Operete Voltage							5	m Ω	
Insulation Resistance		Between Contacts					10^{13}			Ω	
		Contacts to Shield					10^{13}			Ω	
		Contacts to Coil					10^{13}			Ω	
		Shield to Coil (at 100V 20°C 65%)								Ω	
Dielectric Strength (Static)		Between Contacts					2500			VDC	
		Contacts to Shield					2500			VDC	
		Contacts to Coil					2500			VDC	
		Shield to Coil								VDC	
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.5	msec	
Release Time		Diode Suppression							1.5	msec	
Measurement Reference Condition						Environmental Ratings					
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C				
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C				
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz				
						Shock	: 50G's				

*1 Switching voltage: 1000V (max 1mA)

Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



USM-1A: High Breakdown Voltage (10KV/15KV) Axial Relay



This series features breakdown voltages between conductors of 10.0/15.0KV DC, max contact capacity of 50W, and max switching voltages of 7.5/10.0KV. We use high-voltage cables and a resin case to improve implementability and safety. The USM-140xxSB-15 is the successor to USM-139xxSB.

<Characteristics>

- Max contact rating: 50W
- Max switching voltage:
USM-136xxSB / 7.5KVDC, USM-140xxSB-15 / 10KVDC
- Breakdown voltage:
USM-136xxSB / 10KVDC, USM-140xxSB-15 / 15KVDC



USM 1A Series		USM-13605SB USM-14005SB-15			USM-13612SB USM-14012SB-15			USM-13624SB USM-14024SB-15				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		*1			*2			*3		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							*4	V		
Switching Current		DC/Peak AC resistance							3.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							4.0	A		
Contact Rating		DC/Peak AC resistance							50	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							500	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage								mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					*5			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					*5			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							5.0	msec		
Release Time		Diode Suppression							5.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +60°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

	*1	*2	*3	*4	*5
★ USM-136xxSB	80 Ω	250 Ω	600 Ω	7500 V	10000 V
★ USM-140xxSB-15	30 Ω	120 Ω	400 Ω	10000 V	15000 V

UPM-1A: High Breakdown Voltage 10KV PCB Relay



This product is for PCB mounting, with a guaranteed breakdown voltage of 10KVDC between each conductor. Using a resin casing provides improved safety and ease in manufacturing for customers when mounted on a PCB.

<Characteristics>

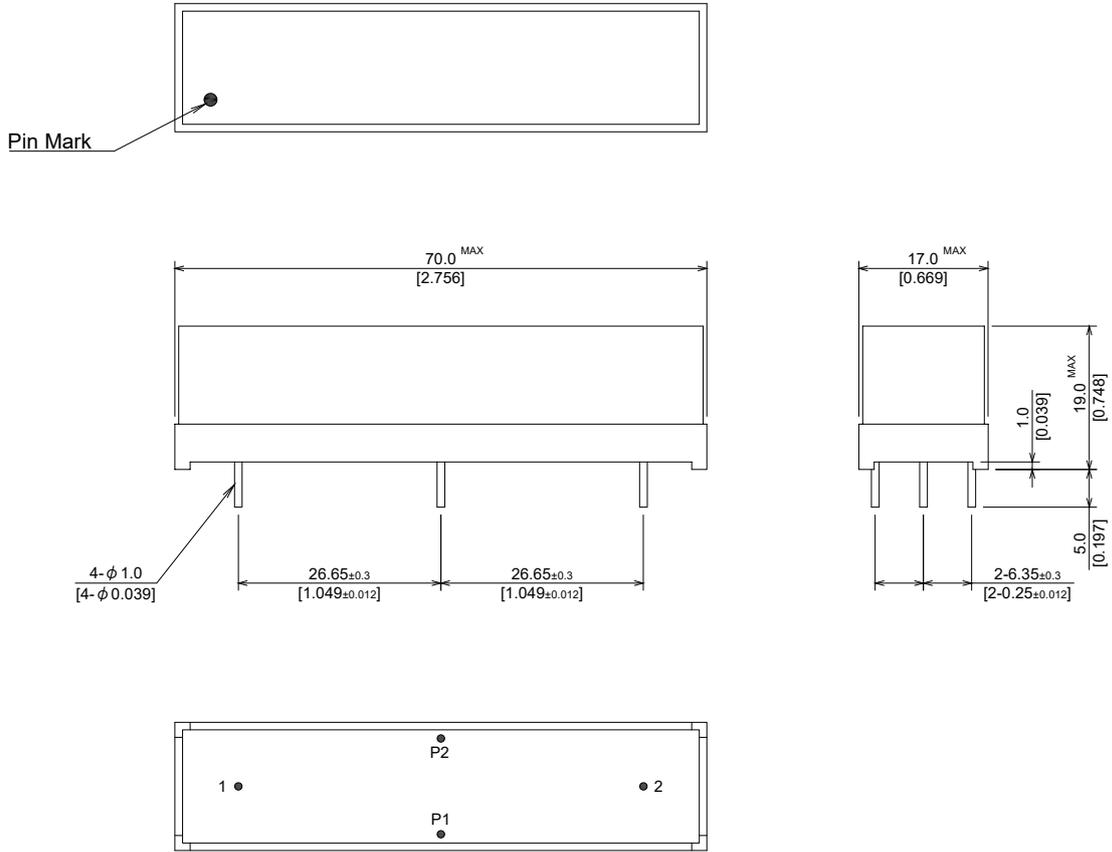
- Max contact rating: 50W
- Max switching voltage: 7.5KVDC
- Breakdown voltage: 10KVDC



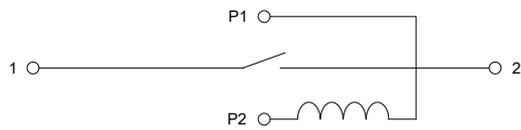
UPM 1A Series		UPM-13605SV			UPM-13612SV			UPM-13624SV				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		35			180			650		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							7500	V		
Switching Current		DC/Peak AC resistance							3.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							4.0	A		
Contact Rating		DC/Peak AC resistance							50	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							500	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage								mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					10000			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					10000			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							5.0	msec		
Release Time		Diode Suppression							5.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +60°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.



Schematic <Top View>



USM-1A: High Breakdown Voltage 5KV Axial Relay



This product is our popular high breakdown voltage axial reed relay in a 1 Form A contact configuration. In response to market demands, this product guarantees a breakdown voltage of 5000VDC between conductors.

<Characteristics>

- Max contact rating: 50W
- Max switching voltage: 3500VDC
- Breakdown voltage: 5000VDC



USM 1A Series		USM-11505			USM-11512			USM-11524				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		60			200			800		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							3500	V		
Switching Current		DC/Peak AC resistance							3.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							4.0	A		
Contact Rating		DC/Peak AC resistance							50	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							200	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							20	mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					5000			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					5000			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							4.0	msec		
Release Time		Diode Suppression							3.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +60°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

USM-2A: High Breakdown Voltage 5KV Axial Relay



This product is our popular high breakdown voltage axial reed relay in a 2 Form A contact configuration. In response to market demands, this product guarantees a breakdown voltage of 5000VDC between conductors.

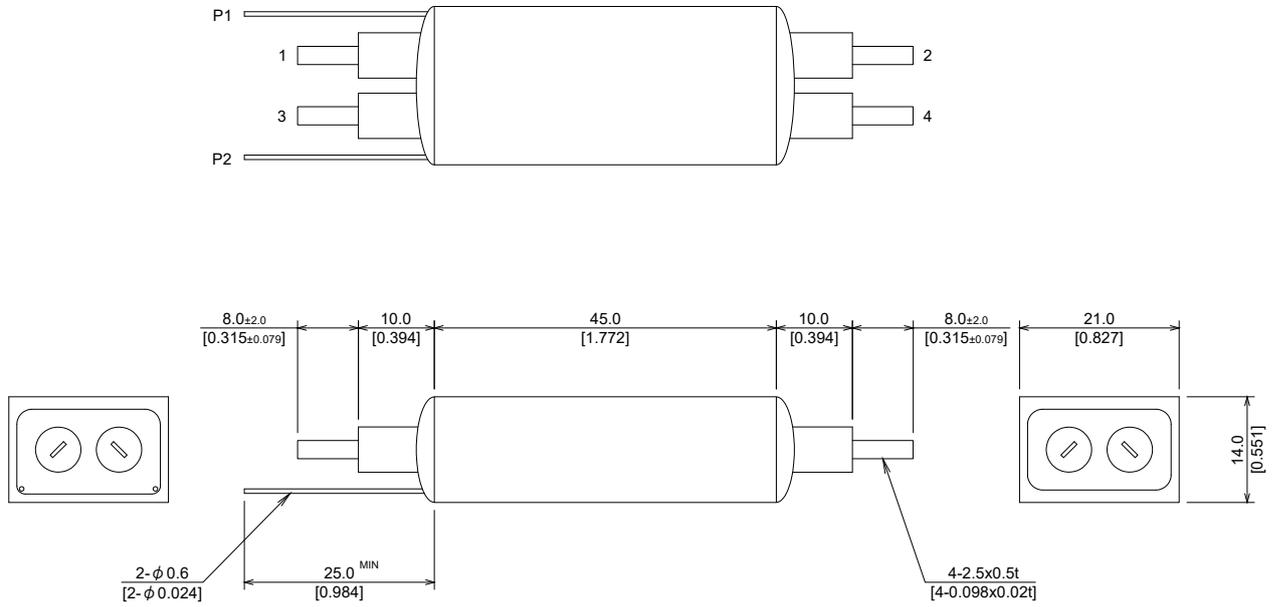
<Characteristics>

- Max contact rating: 50W
- Max switching voltage: 3500VDC
- Breakdown voltage: 5000VDC

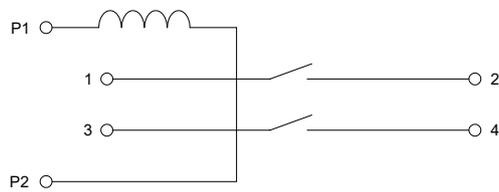


USM 2A Series		USM-21505			USM-21512			USM-21524				
Contact Configurations		2 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		45			160			600		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.5			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							3500	V		
Switching Current		DC/Peak AC resistance							3.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							4.0	A		
Contact Rating		DC/Peak AC resistance							50	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							200	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							20	mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					5000			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					5000			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							4.0	msec		
Release Time		Diode Suppression							3.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +60°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



USM-1A: High Breakdown Voltage 3KV Axial Relay



This product is our popular high breakdown voltage axial reed relay in a 1 Form A contact configuration.

In response to market demands, this product guarantees a breakdown voltage of 3000VDC between conductors.

<Characteristics>

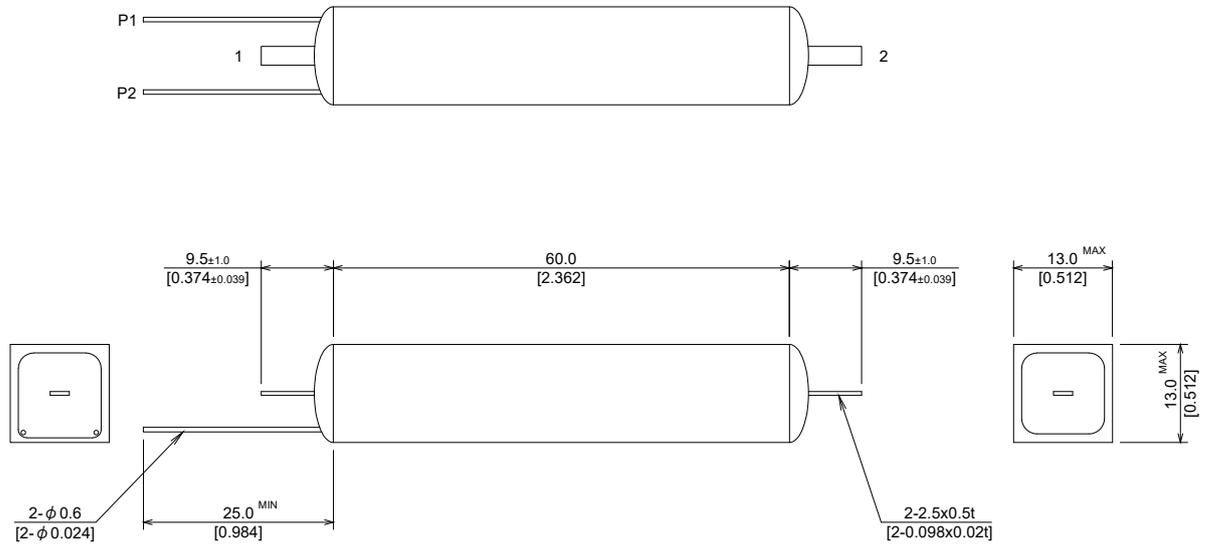
- Max contact rating: 15W
- Max switching voltage: 1000VDC
- Breakdown voltage: 3000VDC



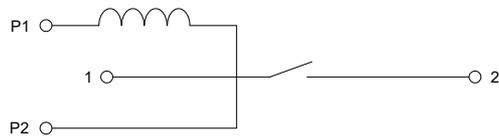
USM 1A Series		USM-12705			USM-12712			USM-12724				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		90			300			1200		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							*1	V		
Switching Current		DC/Peak AC resistance							3.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							5.0	A		
Contact Rating		DC/Peak AC resistance							15	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							200	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage								mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					3000			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					3000			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							5.0	msec		
Release Time		Diode Suppression							5.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +60°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

*1 Switching voltage: 1000V (max 1mA)

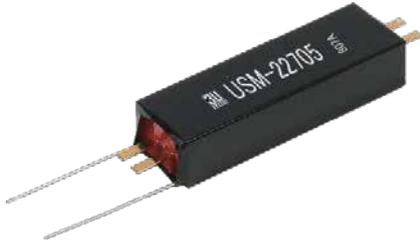
Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



USM-2A: High Breakdown Voltage 3KV Axial Relay



This product is our popular high breakdown voltage axial reed relay in a 2 Form A contact configuration. In response to market demands, this product guarantees a breakdown voltage of 3000VDC between conductors.

<Characteristics>

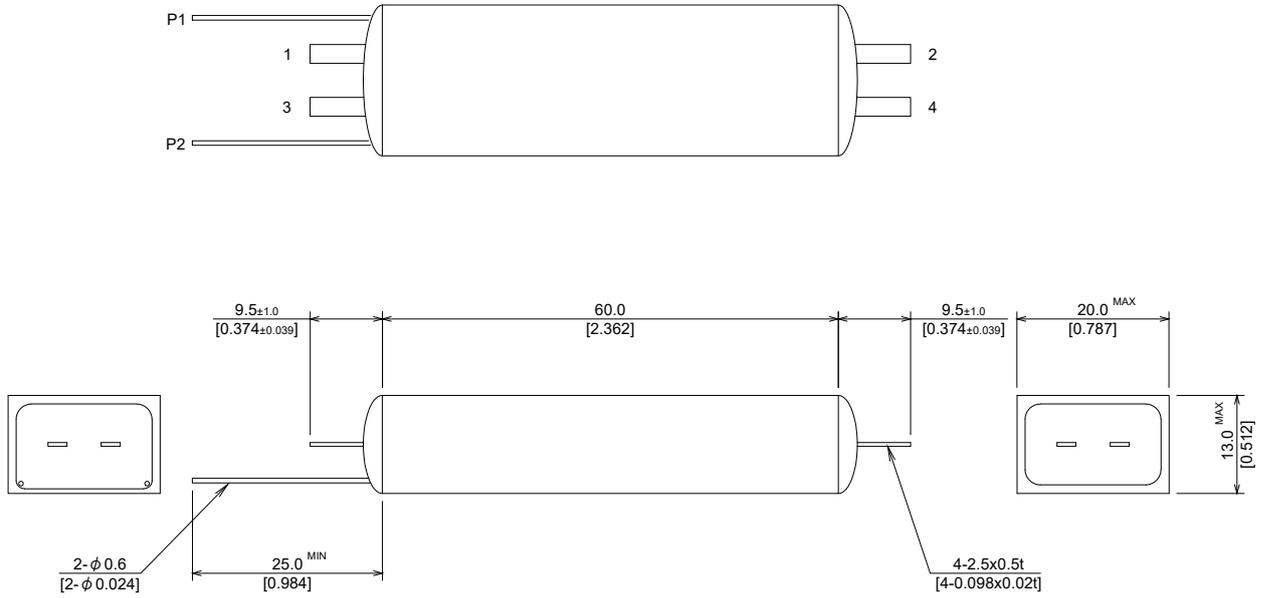
- Max contact rating: 15W
- Max switching voltage: 1000VDC
- Breakdown voltage: 3000VDC



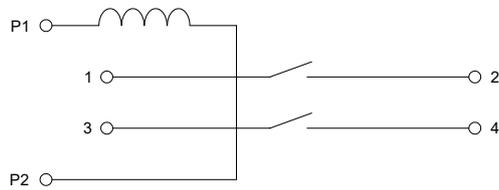
USM 2A Series		USM-22705			USM-22712			USM-22724				
Contact Configurations		2 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		70			250			900		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							*1	V		
Switching Current		DC/Peak AC resistance							3.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							5.0	A		
Contact Rating		DC/Peak AC resistance							15	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							200	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage								mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					3000			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					3000			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							5.0	msec		
Release Time		Diode Suppression							5.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +60°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

*1 Switching voltage: 1000V (max 1mA)

Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



UPM-1A: High Breakdown Voltage 2.5KV Compact PCB Relay



This product was developed to guarantee a breakdown voltage of 3000VDC between conductors (2500VDC between contacts). The maximum contact capacity of 100W is among the highest in reed relays. The max switching voltage and current are comparable to those of mercury relays.

<Characteristics>

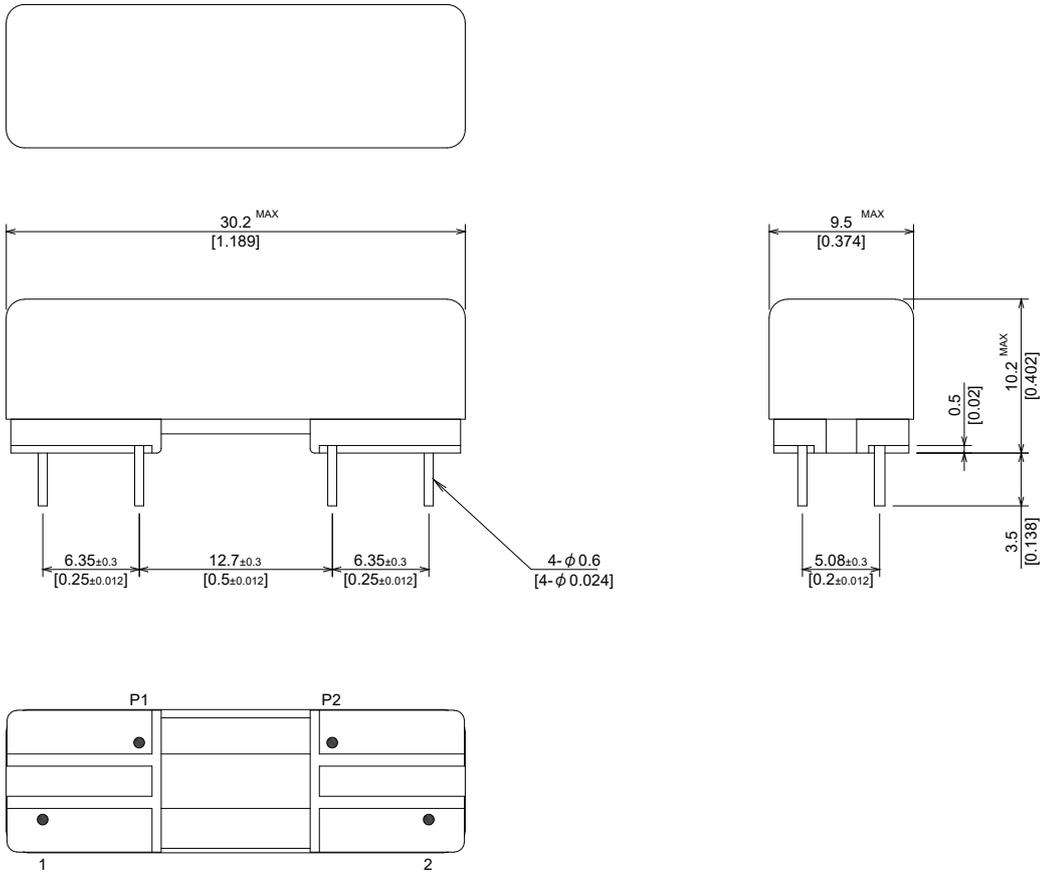
- Mount area: 30.2mm x 9.5mm
- Max contact rating: 100W
- Max switching voltage: 1000VDC
- Breakdown voltage: 3000VDC (2500VDC between contacts)



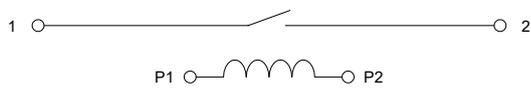
UPM 1A Series		UPM-16205YHL			UPM-16212YHL			UPM-16224YHL				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		120			600			1800		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							*1	V		
Switching Current		DC/Peak AC resistance							1.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A		
Contact Rating		DC/Peak AC resistance							100	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					2500			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					3000			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.5	msec		
Release Time		Diode Suppression							1.5	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

*1 Switching voltage: 1000V (max 1mA)

Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



SL-1A High Breakdown Voltage 2KV Compact PCB Relay



This product is one of our smallest PCB reed relays developed to guarantee breakdown voltage between conductors of 2000V. The maximum contact capacity of 100W is among the highest in reed relays. The max switching voltage and current are comparable to those of mercury relays.

<Characteristics>

- Mount area: 35.5mm x 6.3mm
- Max contact rating: 100W
- Max switching voltage: 1000VDC
- Breakdown voltage: 2000VDC

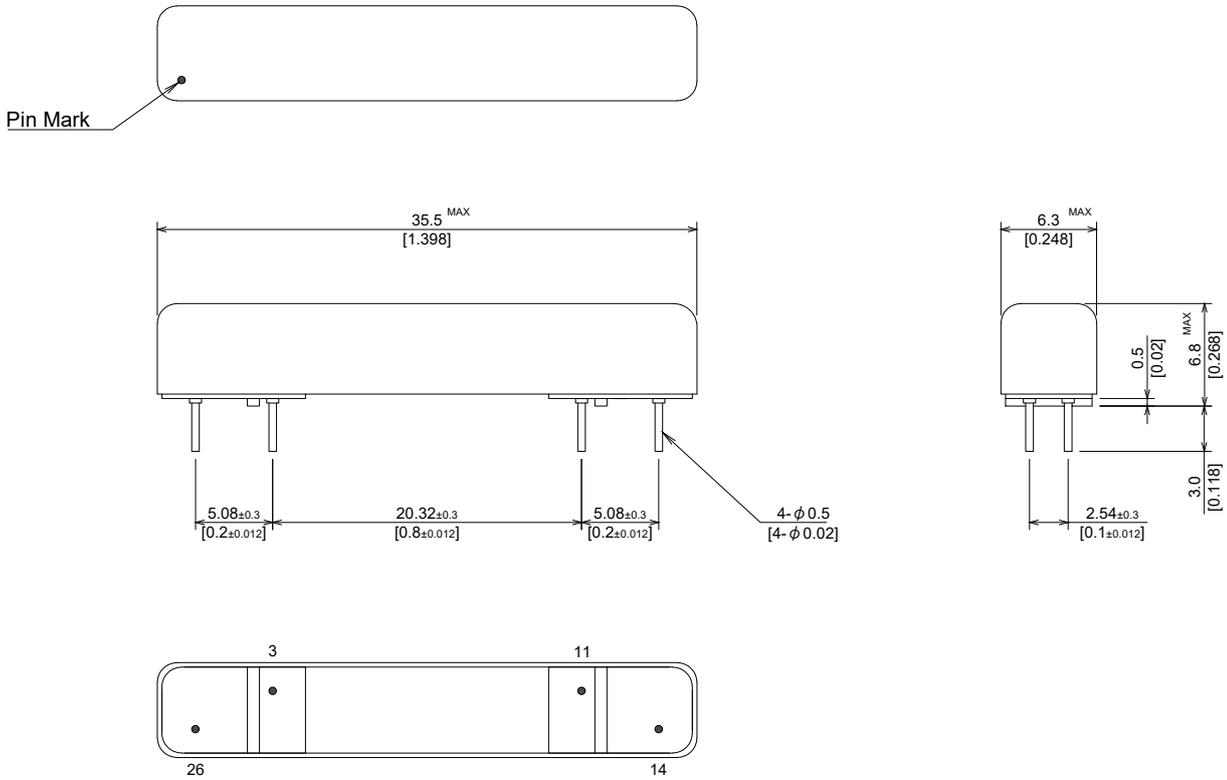


SL 1A Series		SL-16205			SL-16212			SL-16224				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		100			550			2000		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							*1	V		
Switching Current		DC/Peak AC resistance							1.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A		
Contact Rating		DC/Peak AC resistance							100	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield								Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					2000			VDC		
		Contacts to Shield								VDC		
		Contacts to Coil					2000			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.0	msec		
Release Time		Diode Suppression							1.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

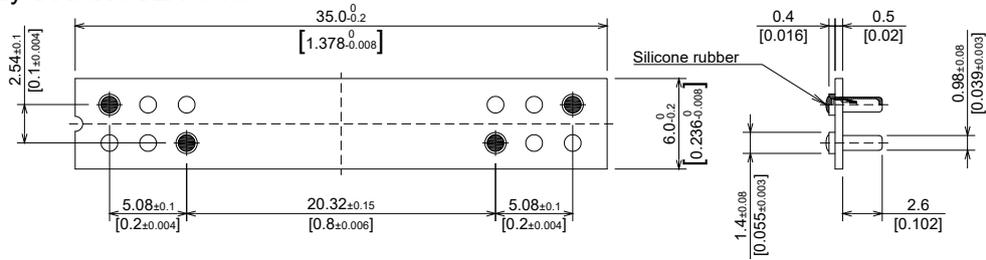
*1 Switching voltage: 1000V (max 1mA)

Dimensions < All Dimensions are mm [inch] >

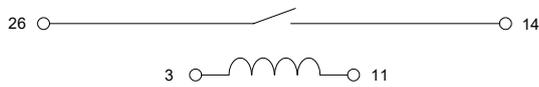
* Pin mark (●) corresponds to the terminal number 1.



Relay Socket : SLX-4-1.6



Schematic <Top View>



URM-1A: High Breakdown Voltage & Insulation Resistance Compact Axial Relay



This series of 1 Form A contact axial relays guarantees breakdown voltage between contacts of 2500V and insulation resistance of at least $10^{13}\Omega$. The maximum contact capacity of 100W is among the highest in reed relays. The max switching voltage and current are comparable to those of mercury relays.

Also, because the lead wire is flexible, they can be used in things like aerial wiring.

<Characteristics>

- Max contact rating: 100W
- Max switching voltage: 1000VDC
- Breakdown voltage: 2500VDC
- Insulation resistance: $10^{13}\Omega$, $10^{14}\Omega$

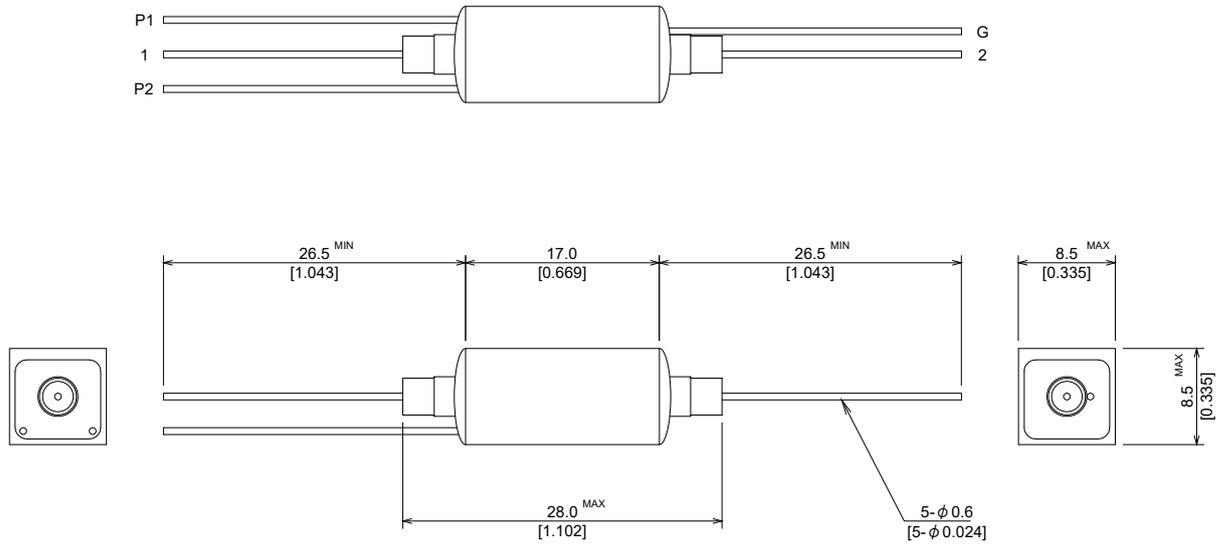


URM 1A Series		URM-16205GT□B			URM-16212GT□B			URM-16224GT□B			
Contact Configurations		1 Form A									
Coil Specifications											
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0			24.0		VDC
Coil Resistance	±10% @20°C		250			1000			4000		Ω
Must Operate	@20°C			3.75			8.8			17.6	VDC
Must Release	@20°C	0.7			1.2			2.4			VDC
Contact Ratings / Product Specifications											
Test Parameters		Test Conditions					Min	Nom	Max	Units	
Switching Voltage		DC/Peak AC resistance							*1	V	
Switching Current		DC/Peak AC resistance							1.0	A	
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A	
Contact Rating		DC/Peak AC resistance							100	W	
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle	
Contact Resistance		Max Initial Operete Voltage							150	mΩ	
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ	
Insulation Resistance		Between Contacts					*2			Ω	
		Contacts to Shield					*2			Ω	
		Contacts to Coil					*2			Ω	
		Shield to Coil (at 100V 20°C 65%)								Ω	
Dielectric Strength (Static)		Between Contacts					2500			VDC	
		Contacts to Shield					2500			VDC	
		Contacts to Coil					2500			VDC	
		Shield to Coil								VDC	
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.0	msec	
Release Time		Diode Suppression							1.0	msec	
Measurement Reference Condition						Environmental Ratings					
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C				
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C				
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz				
						Shock	: 50G's				

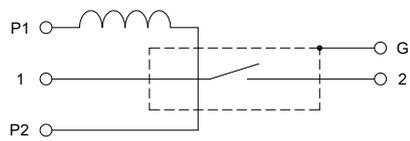
*1 Switching voltage: 1000V (max 1mA)

*2 GTNB : $10^{13}\Omega$ (□ : Insulation resistance classification)
GTOB : $10^{14}\Omega$

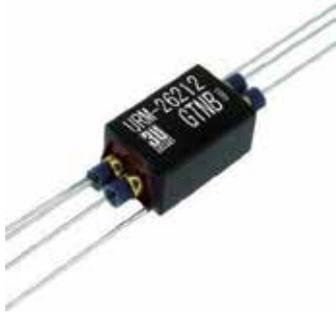
Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



URM-2A: High Breakdown Voltage & Insulation Resistance Compact Axial Relay



This series of 2 Form A contact axial relays guarantees breakdown voltage between contacts of 2500V and insulation resistance of at least $10^{13}\Omega$. The maximum contact capacity of 100W is among the highest in reed relays. The max switching voltage and current are comparable to those of mercury relays.

Also, because the lead wire is flexible, they can be used in things like aerial wiring.

<Characteristics>

- Max contact rating: 100W
- Max switching voltage: 1000VDC
- Breakdown voltage: 2500VDC
- Insulation resistance: $10^{13}\Omega$, $10^{14}\Omega$

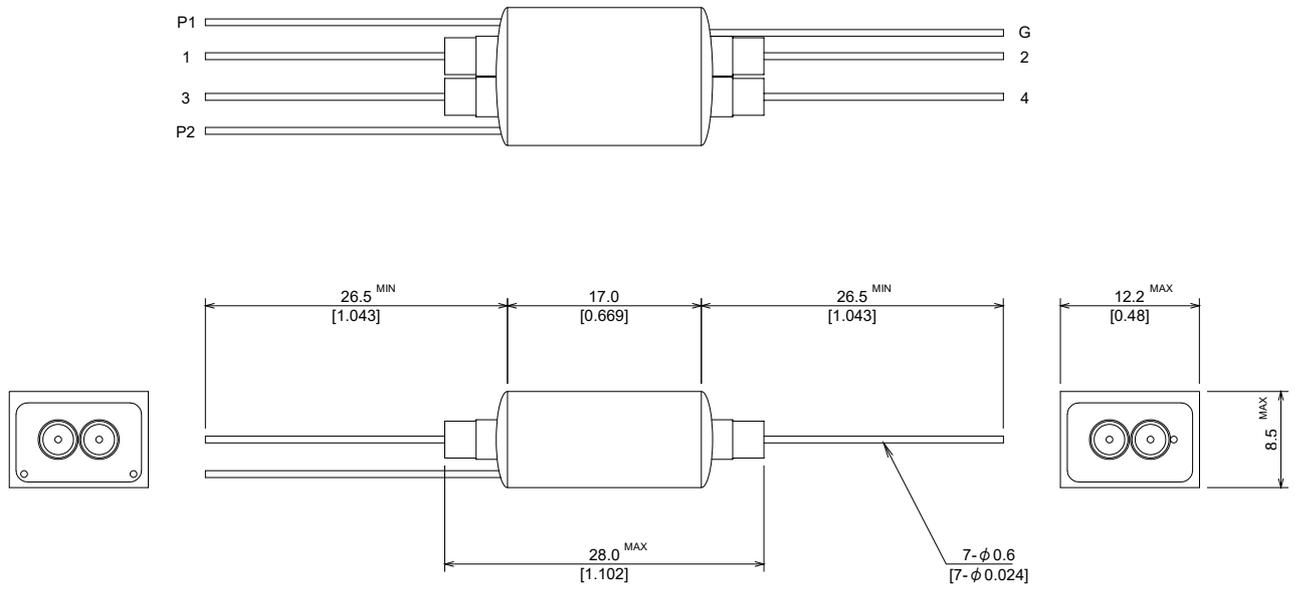


URM 2A Series		URM-26205GT□B			URM-26212GT□B			URM-26224GT□B				
Contact Configurations		2 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		160			800			3200		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							*1	V		
Switching Current		DC/Peak AC resistance							1.0	A		
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A		
Contact Rating		DC/Peak AC resistance							100	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					*2			Ω		
		Contacts to Shield					*2			Ω		
		Contacts to Coil					*2			Ω		
		Shield to Coil (at 100V 20°C 65%)								Ω		
Dielectric Strength (Static)		Between Contacts					2500			VDC		
		Contacts to Shield					2500			VDC		
		Contacts to Coil					2500			VDC		
		Shield to Coil								VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.0	msec		
Release Time		Diode Suppression							1.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

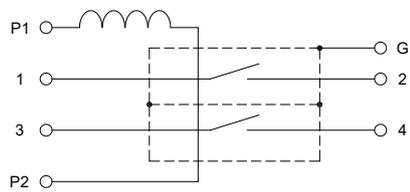
*1 Switching voltage: 1000V (max 1mA)

*2 GTNB : $10^{13}\Omega$ (□ : Insulation resistance classification)
 GTOB : $10^{14}\Omega$

Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



URM-P1A: High Breakdown Voltage PCB & Axial Relay



This series of 1 Form A pcb & axial reed relays employs dual electromagnetic and electrostatic shielding. These are some of our flagship products that could set the standard in the high insulation resistance market.

<Characteristics>

- Insulation resistance: 1000VDC (500VDC between contacts)
- Insulation resistance: $\geq 10^{13}\Omega$
- Electrical lifespan: 1 billion (@ 1V 10mA)

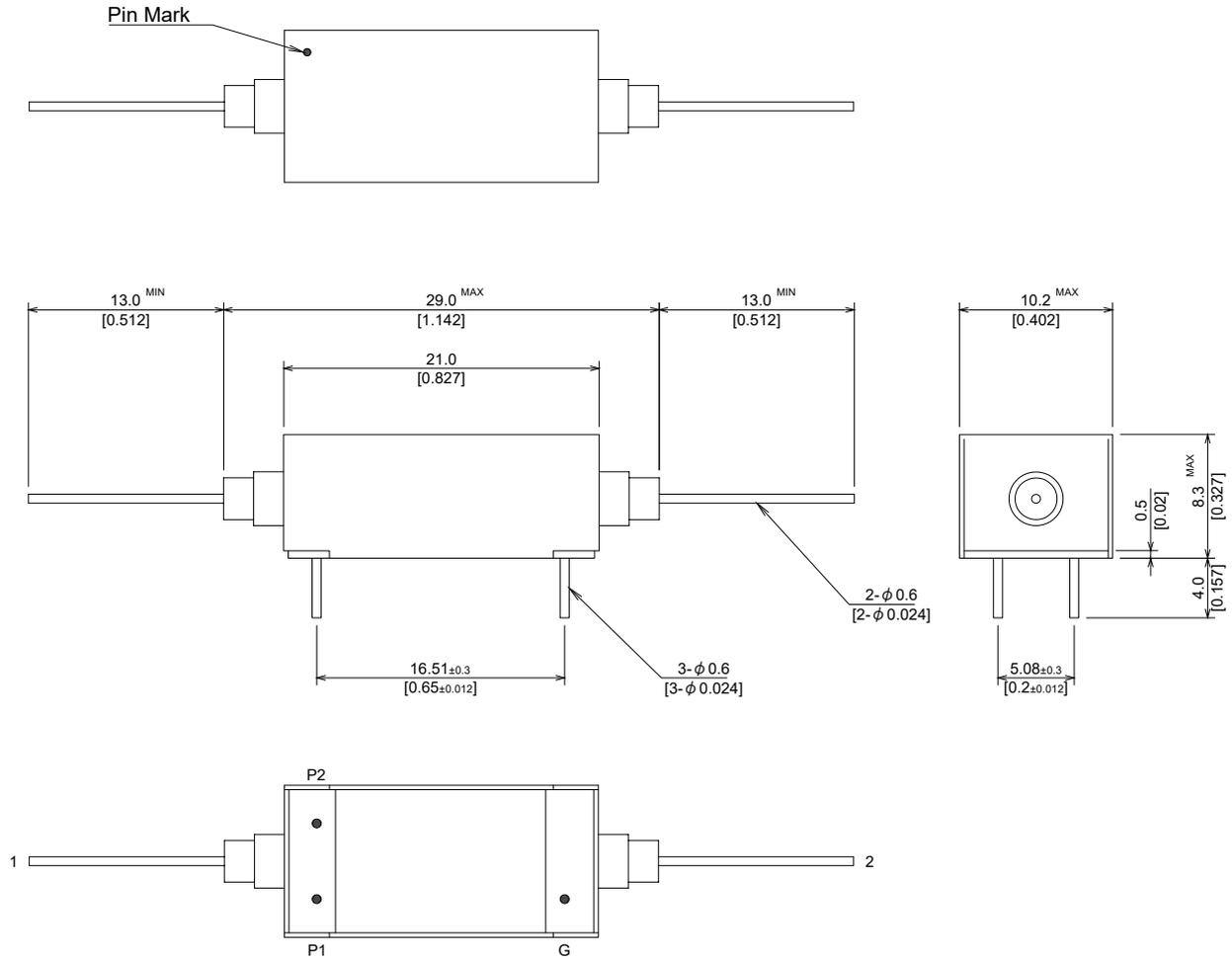


URM 1A Series		URM-P12905GT□E			URM-P12912GT□E			URM-P12924GT□E				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	$\pm 10\%$ @20°C		450			2500			8000		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							350	V		
Switching Current		DC/Peak AC resistance							0.5	A		
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A		
Contact Rating		DC/Peak AC resistance							50	W		
Life Expectancy		at 1V 10mA					1000			$\times 10^6$ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	m Ω		
Contact Resistance Stability		Max Initial Operete Voltage							5	m Ω		
Insulation Resistance		Between Contacts					*1			Ω		
		Contacts to Shield					10^{13}			Ω		
		Contacts to Coil					10^{13}			Ω		
		Shield to Coil (at 100V 20°C 65%)					10^{11}			Ω		
Dielectric Strength (Static)		Between Contacts					500			VDC		
		Contacts to Shield					1000			VDC		
		Contacts to Coil					1000			VDC		
		Shield to Coil					1000			VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.0	msec		
Release Time		Diode Suppression							1.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

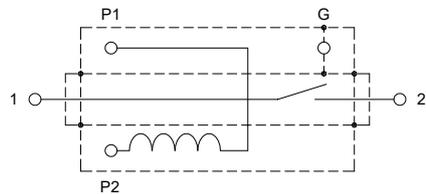
*1 GTNE : $10^{13}\Omega$ (□ : Insulation resistance classification)
 GTOE : $10^{14}\Omega$

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.



Schematic <Top View>



URM-P2A: High Breakdown Voltage PCB & Axial Relay



This series of 2 Form A pcb & axial reed relays employs dual electromagnetic and electrostatic shielding. These are some of our flagship products that could set the standard in the high insulation resistance market.

<Characteristics>

- Insulation resistance: 1000VDC (500VDC between contacts)
- Insulation resistance: $\geq 10^{13}\Omega$
- Electrical lifespan: 1 billion (@ 1V 10mA)

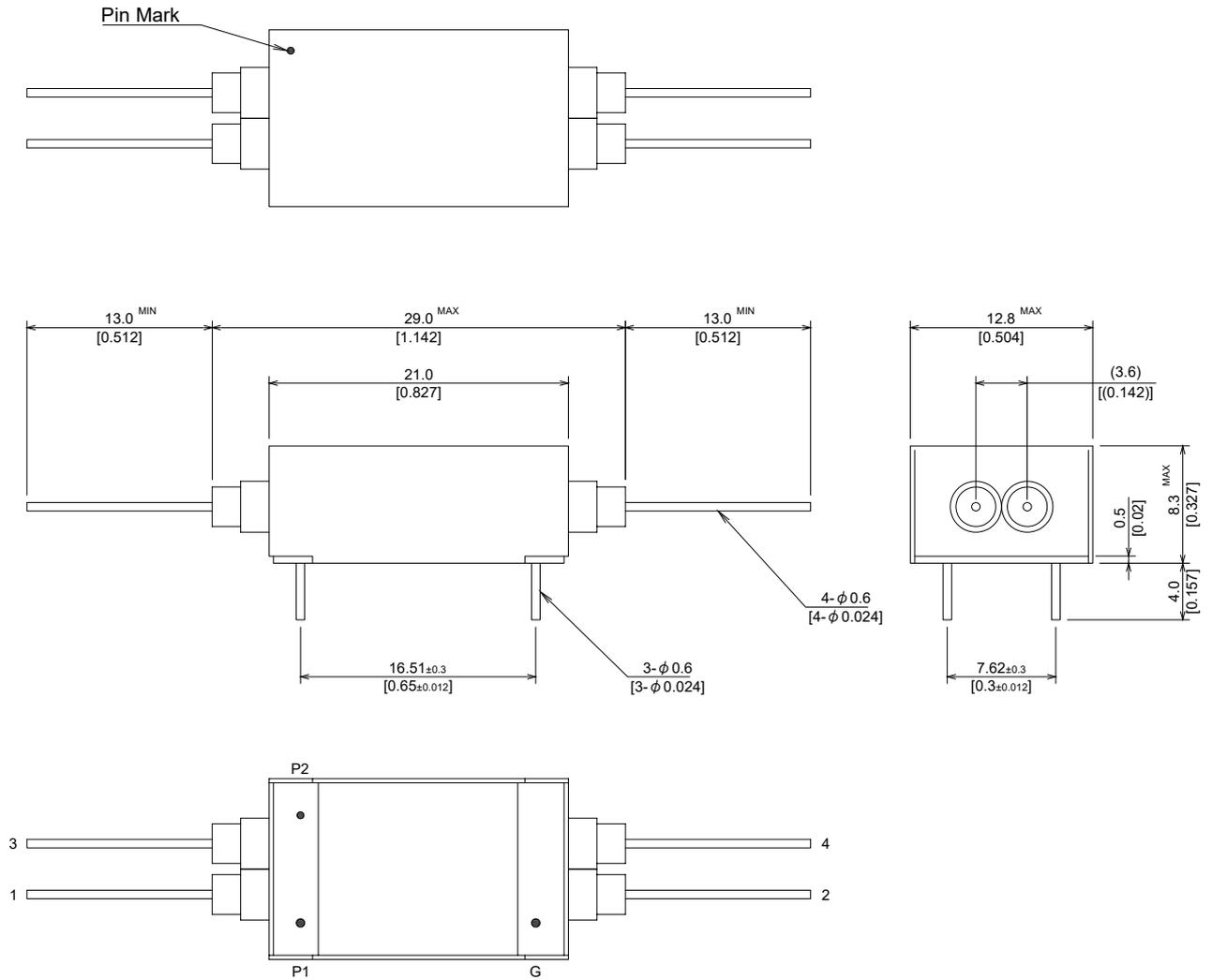


URM 2A Series		URM-P22905GT□E			URM-P22912GT□E			URM-P22924GT□E				
Contact Configurations		2 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		260			1500			6000		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							350	V		
Switching Current		DC/Peak AC resistance							0.5	A		
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A		
Contact Rating		DC/Peak AC resistance							50	W		
Life Expectancy		at 1V 10mA					1000			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					*1			Ω		
		Contacts to Shield					10 ¹³			Ω		
		Contacts to Coil					10 ¹³			Ω		
		Shield to Coil (at 100V 20°C 65%)					10 ¹¹			Ω		
Dielectric Strength (Static)		Between Contacts					500			VDC		
		Contacts to Shield					1000			VDC		
		Contacts to Coil					1000			VDC		
		Shield to Coil					1000			VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.0	msec		
Release Time		Diode Suppression							1.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

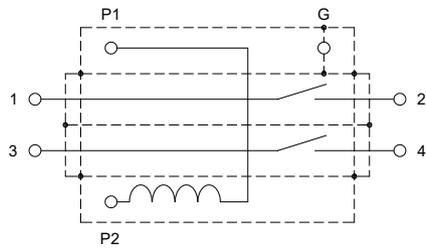
*1 GTNE : 10¹³ Ω (□ : Insulation resistance classification)
 GTOE : 10¹⁴ Ω

Dimensions < All Dimensions are mm [inch] >

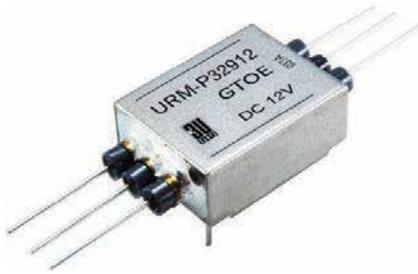
* Pin mark (●) corresponds to the terminal number 1.



Schematic <Top View>



URM-P3A: High Breakdown Voltage PCB & Axial Relay



This series of 3 Form A pcb & axial reed relays employs dual electromagnetic and electrostatic shielding. These are some of our flagship products that could set the standard in the high insulation resistance market.

<Characteristics>

- Insulation resistance: 1000VDC (500VDC between contacts)
- Insulation resistance: $\geq 10^{13}\Omega$
- Electrical lifespan: 1 billion (@ 1V 10mA)

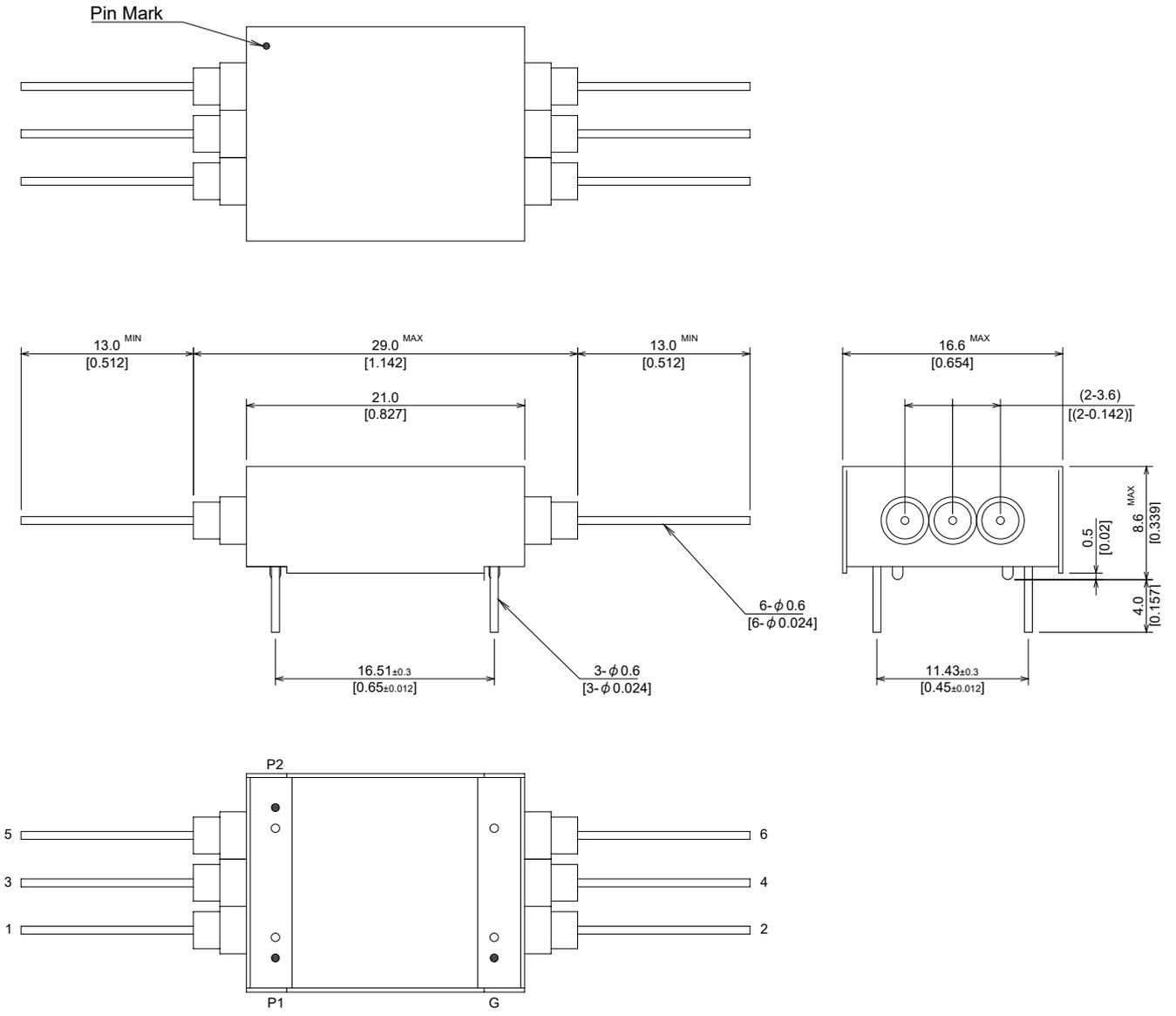


URM 3A Series		URM-P32905GT□E			URM-P32912GT□E			URM-P32924GT□E				
Contact Configurations		3 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		180			1000			4000		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							350	V		
Switching Current		DC/Peak AC resistance							0.5	A		
Carry Current		DC/Peak AC resistance(@30°C)							2.8	A		
Contact Rating		DC/Peak AC resistance							50	W		
Life Expectancy		at 1V 10mA					1000			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					*1			Ω		
		Contacts to Shield					10 ¹³			Ω		
		Contacts to Coil					10 ¹³			Ω		
		Shield to Coil (at 100V 20°C 65%)					10 ¹¹			Ω		
Dielectric Strength (Static)		Between Contacts					500			VDC		
		Contacts to Shield					1000			VDC		
		Contacts to Coil					1000			VDC		
		Shield to Coil					1000			VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.0	msec		
Release Time		Diode Suppression							1.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

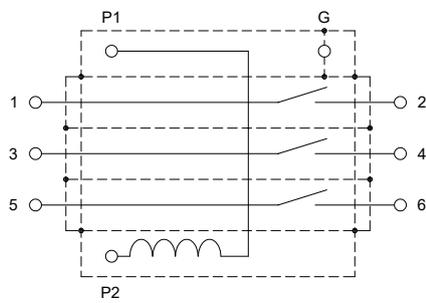
*1 GTNE : 10¹³ Ω (□ : Insulation resistance classification)
 GTOE : 10¹⁴ Ω

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.



Schematic <Top View>



MFS-1A: High Temperature Resistant Ultra-Compact Vertical PCB Relay



This series is oriented vertically to take up minimal mount area. This series is highly praised by probe card manufacturers who need maximum mount density. Furthermore, these relays can also be used in high temperature environments.

<Characteristics>

- Mount area: 4.9mm x 4.9mm
- High temperature range: -20°C to +155°C
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



MFS 1A Series		MFS-E105□-53			MFS-E112□-53			
Contact Configurations		1 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		100			450		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage	DC/Peak AC resistance					100		V
Switching Current	DC/Peak AC resistance					0.5		A
Carry Current	DC/Peak AC resistance(@30°C)					1.0		A
Contact Rating	DC/Peak AC resistance					10		W
Life Expectancy	at 1V 10mA			300				x10 ⁶ Cycle
Contact Resistance	Max Initial Operete Voltage					150		mΩ
Contact Resistance Stability	Max Initial Operete Voltage					5		mΩ
Insulation Resistance	Between Contacts			10 ¹⁰				Ω
	Contacts to Shield			*1				Ω
	Contacts to Coil			10 ¹⁰				Ω
	Shield to Coil			*1				Ω
Dielectric Strength (Static)	Between Contacts			200				VDC
	Contacts to Shield			*2				VDC
	Contacts to Coil			250				VDC
	Shield to Coil			*2				VDC
Operate Time (Including Bounce)	at Nominal Coil Voltage					0.3		msec
Release Time	100Hz Square Wave							
Diode Suppression						0.3		msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +155°C			
Humidity	: 25% to 75%RH			Storage temp	: -25°C to +155°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

★ □ : N No electrostatic shielding Fig. 1
 G With electrostatic shielding Fig. 2

*1 Insulation Resistance: 10¹⁰Ω *2 Breakdown voltage: 250V

Dimensions < All Dimensions are mm [inch] >

Fig.1

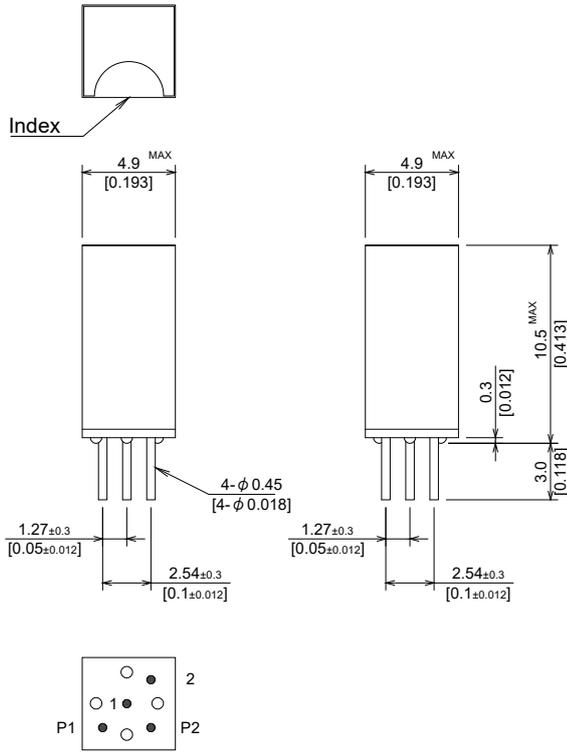
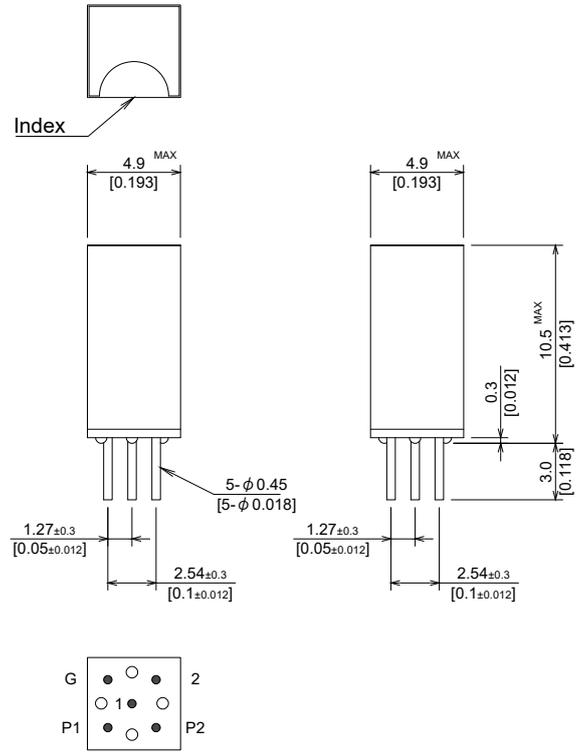
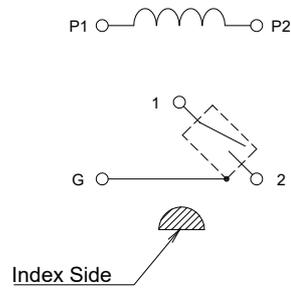
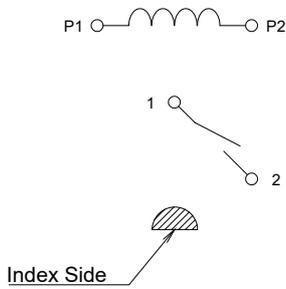


Fig.2



Schematic <Top View>



UF-2A: High Temperature Resistant Compact Vertical PCB Relay



This 2 Form A product maintains the characteristics of standard PCB mount relays (mount area: 20.32 x 5.08mm) while accomplishing a 50% reduction in mount area by configuring the relay vertically. Furthermore, these relays can also be used in high temperature environments.

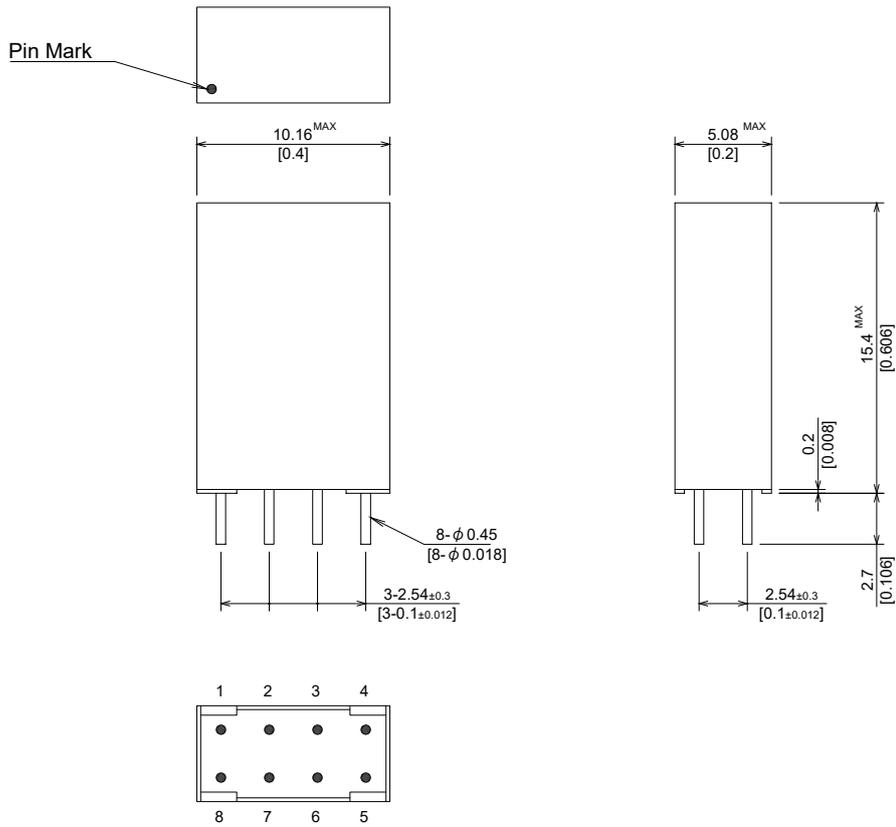
- <Characteristics>
- Mount area: 10.16mm x 5.08mm
 - High temperature range: -20°C to +125°C
 - Max contact rating: 10W
 - Electrical lifespan: 300 million (@ 1V 10mA)



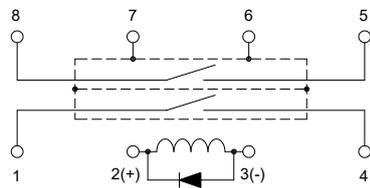
UF 2A Series		UF-E2A05Z-0150			UF-E2A12Z-0150			
Contact Configurations		2 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		180			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield			10 ¹⁰			Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹⁰			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			200			VDC
		Contacts to Coil			200			VDC
		Shield to Coil			200			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.5	msec
Release Time		Diode Suppression					0.5	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +125°C			
Humidity	: 25% to 75%RH			Storage temp	: -25°C to +130°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.



Schematic <Top View>



* Coil polarities, (+) and (-).

UF-1A1B: High Temperature Resistant Compact Vertical PCB Relay



This 1A1B product maintains the characteristics of standard PCB mount relays (mount area: 20.32 x 5.08mm) while accomplishing a 50% reduction in mount area by configuring the relay vertically. Furthermore, these relays can also be used in high temperature environments.

<Characteristics>

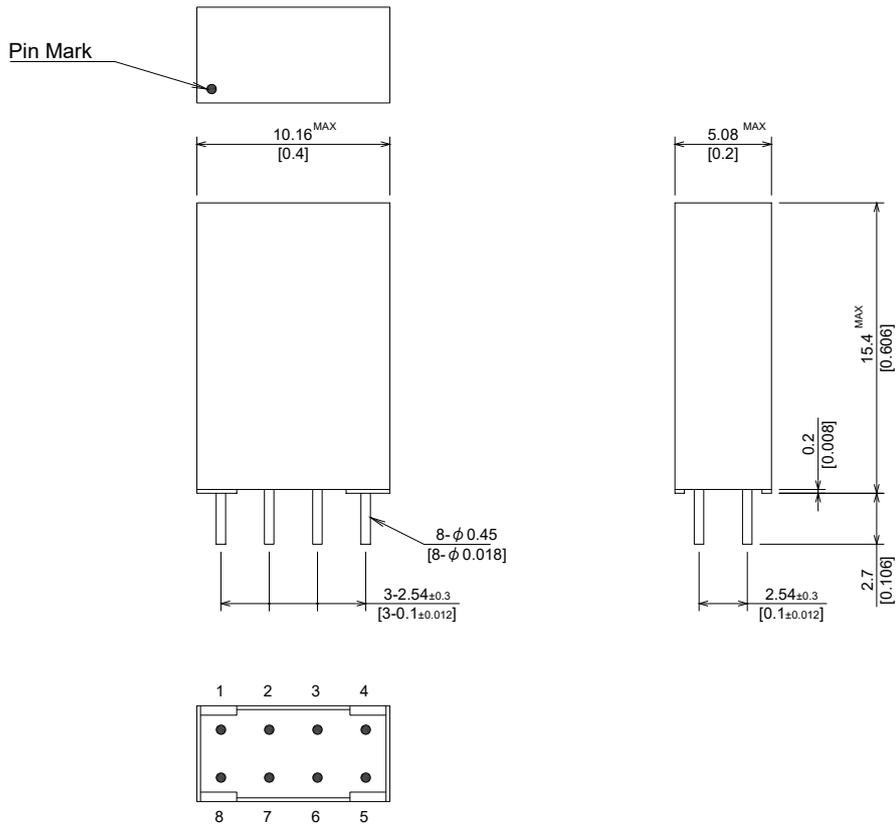
- Mount area: 10.16mm x 5.08mm
- High temperature range: -20°C to +125°C
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



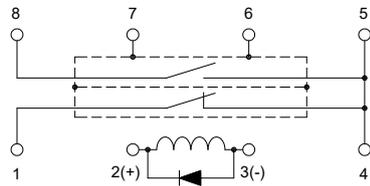
UF 1A1B Series		UF-E1T05Z-0150			UF-E1T12Z-0150			
Contact Configurations		1 Form C (A + B)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0	5.5		12.0	13.2	VDC
Coil Resistance	±10% @20°C		130			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield			10 ¹⁰			Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹⁰			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			200			VDC
		Contacts to Coil			200			VDC
		Shield to Coil			200			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.5	msec
Release Time		Diode Suppression					0.5	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +125°C			
Humidity	: 25% to 75%RH			Storage temp	: -25°C to +130°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

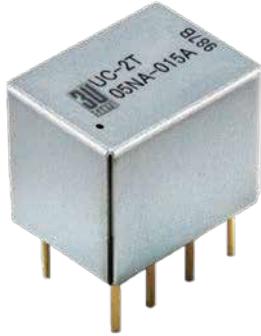


Schematic <Top View>



* Coil polarities, (+) and (-).

UC-2A2B: High Temperature Resistant Ultra-Compact PCB Relay



This series solves the contact resistance stability and lifespan problems of mechanical relays by using reed switches and can act as direct replacements for mechanical switches. The contact configuration is 2A2B, and this series is our smallest PCB relay. Furthermore, these relays can also be used in high temperature environments.

<Characteristics>

- Mount area: 10.16mm x 7.62mm
- High temperature range: -20°C to +105°C
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



UC 2A2B Series		UC-2T05NA-015A UC-2T05NAY-015A		UC-2T12NA-015A UC-2T12NAY-015A		UC-2T24NA-015A UC-2T24NAY-015A					
Contact Configurations		2 Form C (A + B)									
Coil Specifications											
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0	5.5		12.0	13.2		24.0	26.4	VDC
Coil Resistance	±10% @20°C		180			800			2400		Ω
Must Operate	@20°C			3.75			8.8			17.6	VDC
Must Release	@20°C	0.7			1.2			2.4			VDC
Contact Ratings / Product Specifications											
Test Parameters		Test Conditions				Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance						100	V		
Switching Current		DC/Peak AC resistance						0.5	A		
Carry Current		DC/Peak AC resistance(@30°C)						1.0	A		
Contact Rating		DC/Peak AC resistance						10	W		
Life Expectancy		at 1V 10mA				300			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage						200	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage						5	mΩ		
Insulation Resistance		Between Contacts				10 ¹¹			Ω		
		Contacts to Shield							Ω		
		Contacts to Coil				10 ¹¹			Ω		
		Shield to Coil (at 100V 20°C 65%)							Ω		
Dielectric Strength (Static)		Between Contacts				200			VDC		
		Contacts to Shield							VDC		
		Contacts to Coil				500			VDC		
		Shield to Coil							VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave						0.3	msec		
Release Time		Diode Suppression						0.3	msec		
Measurement Reference Condition					Environmental Ratings						
Temp	: 15°C to 35°C				Operate temp	: -20°C to +105°C					
Humidity	: 25% to 75%RH				Storage temp	: -40°C to +115°C					
Atmospheric Pressure	: 860 to 1060hpa				Vibration	: 20G's to 2000Hz					
					Shock	: 50G's					

- ★ UC-2TxxNA-015A Fig.1
- UC-2TxxNAY-015A Fig.2

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

Fig.1

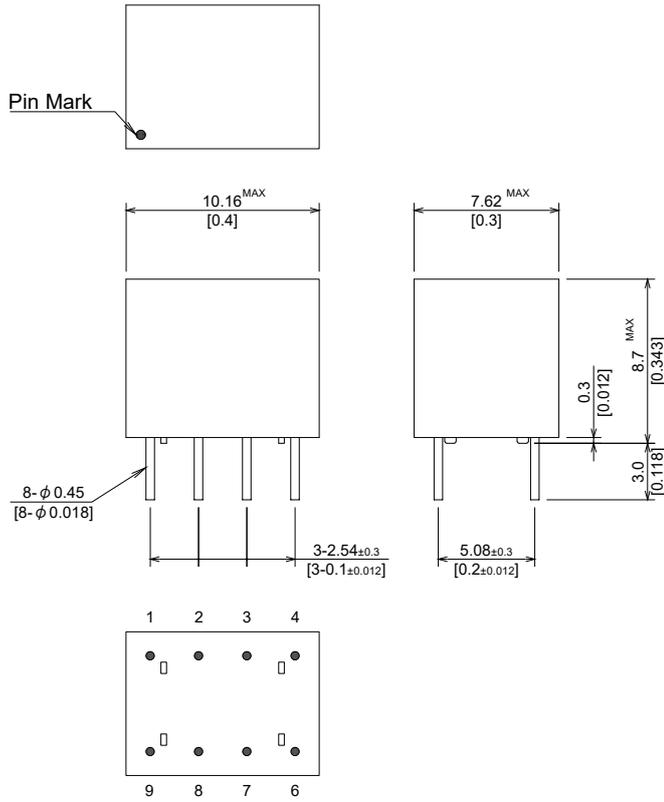
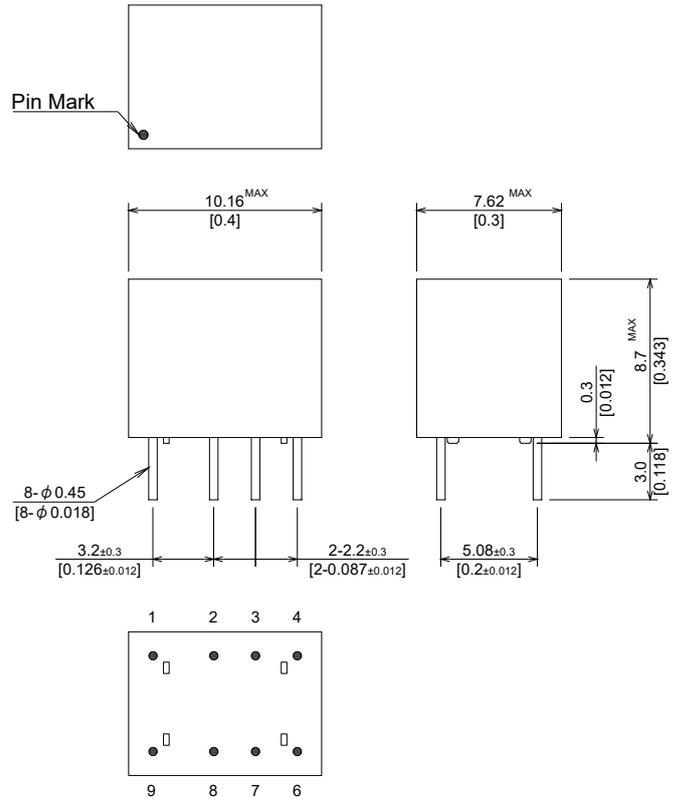
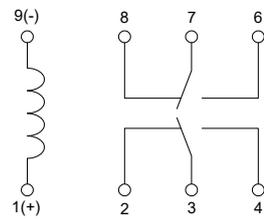
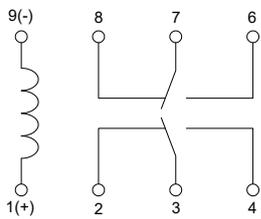


Fig.2



Schematic <Top View>



* Coil polarities, (+) and (-).

UC-4A: High Temperature Resistant Ultra-Compact PCB Relay



This product was developed with the aim of achieving high density while also utilizing multiple contacts. This relay has a 4 Form A contact configuration, and is our smallest PCB relay. This product is widely used for measurements of communication boards and parallel pulsed transmissions.

<Characteristics>

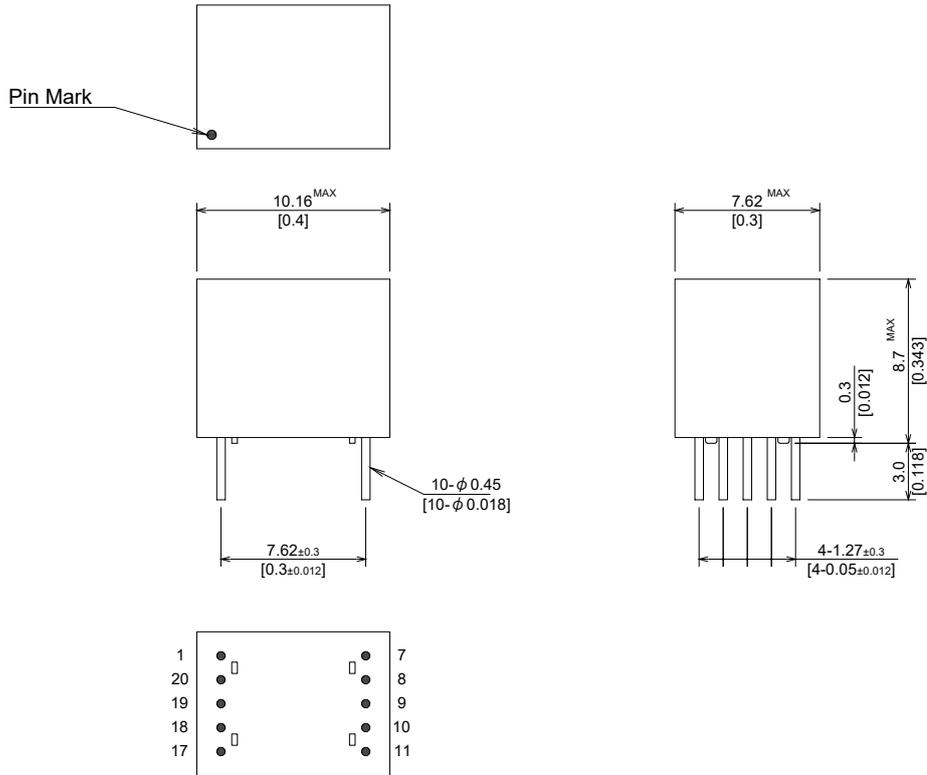
- Mount area: 10.16mm x 7.62mm
- High temperature range: -20°C to +105°C
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



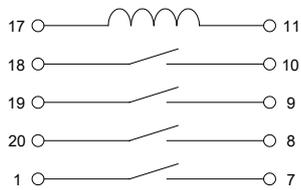
UC 4A Series		UC-4A05N-50			UC-4A12N-50			
Contact Configurations		4 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		150			800		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage	DC/Peak AC resistance					100		V
Switching Current	DC/Peak AC resistance					0.5		A
Carry Current	DC/Peak AC resistance(@30°C)					1.0		A
Contact Rating	DC/Peak AC resistance					10		W
Life Expectancy	at 1V 10mA			300				x10 ⁶ Cycle
Contact Resistance	Max Initial Operete Voltage					150		mΩ
Contact Resistance Stability	Max Initial Operete Voltage					5		mΩ
Insulation Resistance	Between Contacts			10 ¹¹				Ω
	Contacts to Shield							Ω
	Contacts to Coil			10 ¹¹				Ω
	Shield to Coil (at 100V 20°C 65%)							Ω
Dielectric Strength (Static)	Between Contacts			200				VDC
	Contacts to Shield							VDC
	Contacts to Coil			500				VDC
	Shield to Coil							VDC
Operate Time (Including Bounce)	at Nominal Coil Voltage 100Hz Square Wave					0.3		msec
Release Time	Diode Suppression					0.2		msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +105°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +115°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.



Schematic <Top View>



FS-1A: Ultra-Compact Vertical PCB Relay with LED



This product is oriented vertically to take up minimal mount area. This series is highly praised by probe card manufacturers who need maximum mount density. It has a 1 Form A contact configuration and the LED makes it easier to check on when debugging.

<Characteristics>

- Mount area: 4.9mm x 4.9mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



FS 1A Series		FS-E1A05			FS-E1A12			
Contact Configurations		1 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		150			600		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield			10 ¹⁰			Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹⁰			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			250			VDC
		Contacts to Coil			250			VDC
		Shield to Coil			250			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.3	msec
Release Time		Diode Suppression					0.3	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

FS-2A: Ultra-Compact Vertical PCB Relay with LED



This product is oriented vertically to take up minimal mount area. This series is highly praised by probe card manufacturers who need maximum mount density. It has a 2 Form A contact configuration and the LED makes it easier to check on when debugging.

<Characteristics>

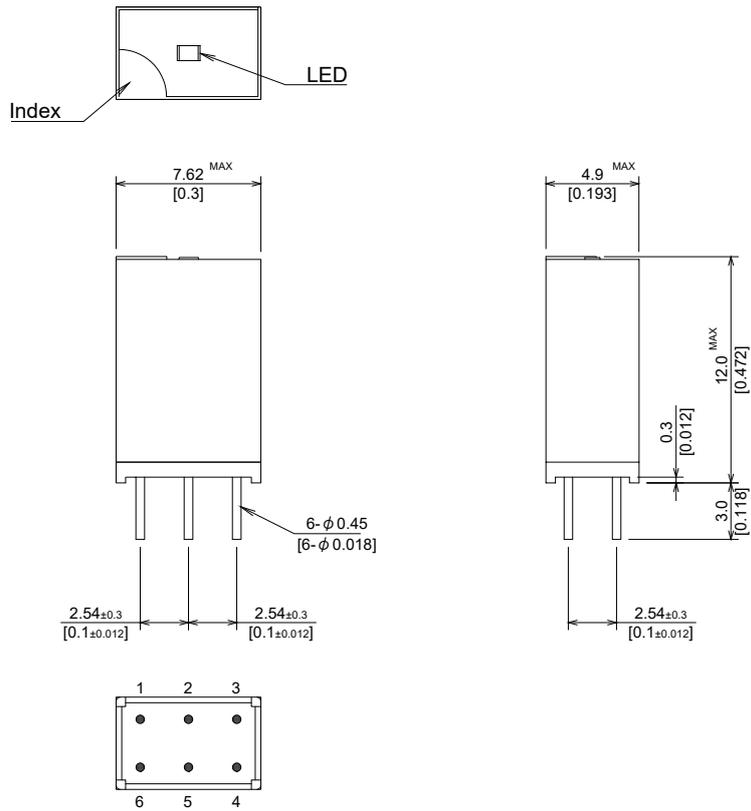
- Mount area: 7.62mm x 4.9mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



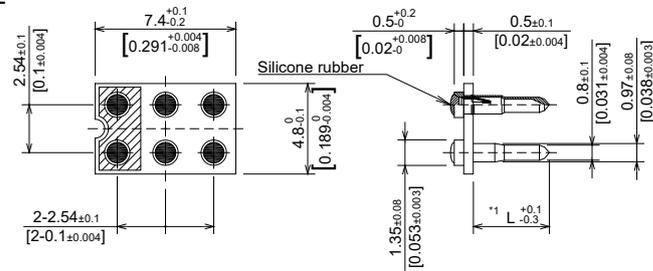
FS 2A Series		FS-E2A05			FS-E2A12			
Contact Configurations		2 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		110			550		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					170	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield						Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)						Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield						VDC
		Contacts to Coil			250			VDC
		Shield to Coil						VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.5	msec
Release Time		Diode Suppression					0.5	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +60°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Index corresponds to the terminal number 1.

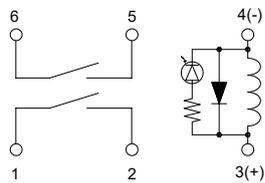


Relay Socket : MSX-6-L



- *1 L = 3.3 MSX-6-1.6
- L = 4.0 MSX-6-3.2
- L = 5.3 MSX-6-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

FS-1A1B: Ultra-Compact Vertical PCB Relay with LED



This product is oriented vertically to take up minimal mount area. This series is highly praised by probe card manufacturers who need maximum mount density. It has a 1A1B contact configuration and the LED makes it easier to check on when debugging.

<Characteristics>

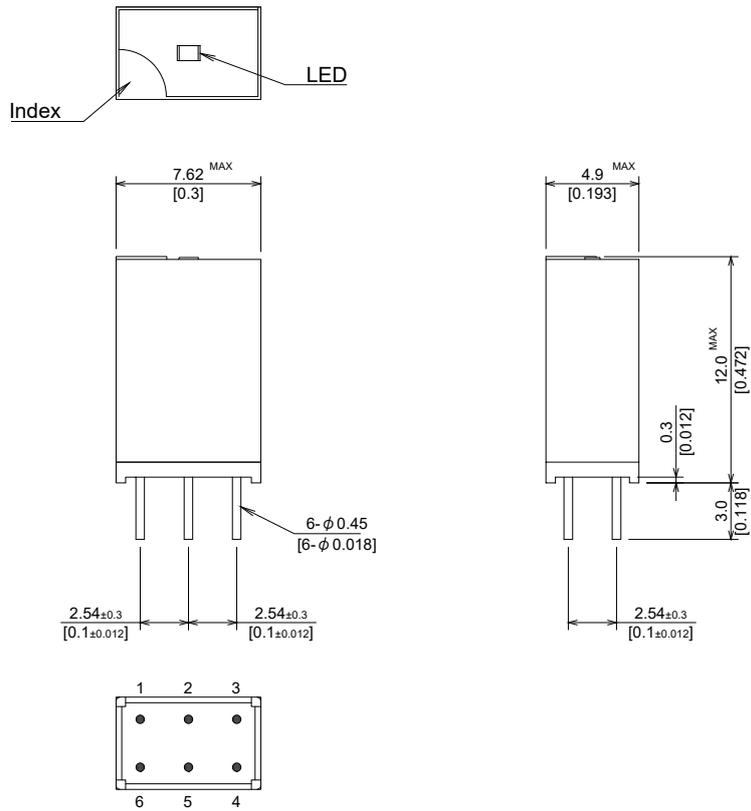
- Mount area: 7.62mm x 4.9mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



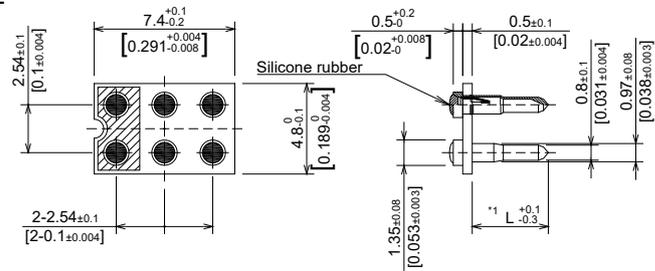
FS 1A1B Series		FS-E1T05			FS-E1T12			
Contact Configurations		1 Form C (A + B)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0	5.5		12.0	13.2	VDC
Coil Resistance	±10% @20°C		110			550		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					170	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield			10 ¹⁰			Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹⁰			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			250			VDC
		Contacts to Coil			250			VDC
		Shield to Coil			250			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.5	msec
Release Time		Diode Suppression					0.5	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +60°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Index corresponds to the terminal number 1.

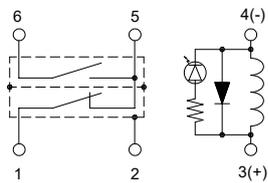


Relay Socket : MSX-6-L



- *1 L = 3.3 MSX-6-1.6
- L = 4.0 MSX-6-3.2
- L = 5.3 MSX-6-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

UF-1A: Compact Vertical PCB Relay with LED



This 1 Form A product maintains the characteristics of standard PCB mount relays (mount area: 20.32 x 5.08mm) while accomplishing a 50% reduction in mount area by configuring the relay vertically. The LED also makes it easier to check on when debugging.

<Characteristics>

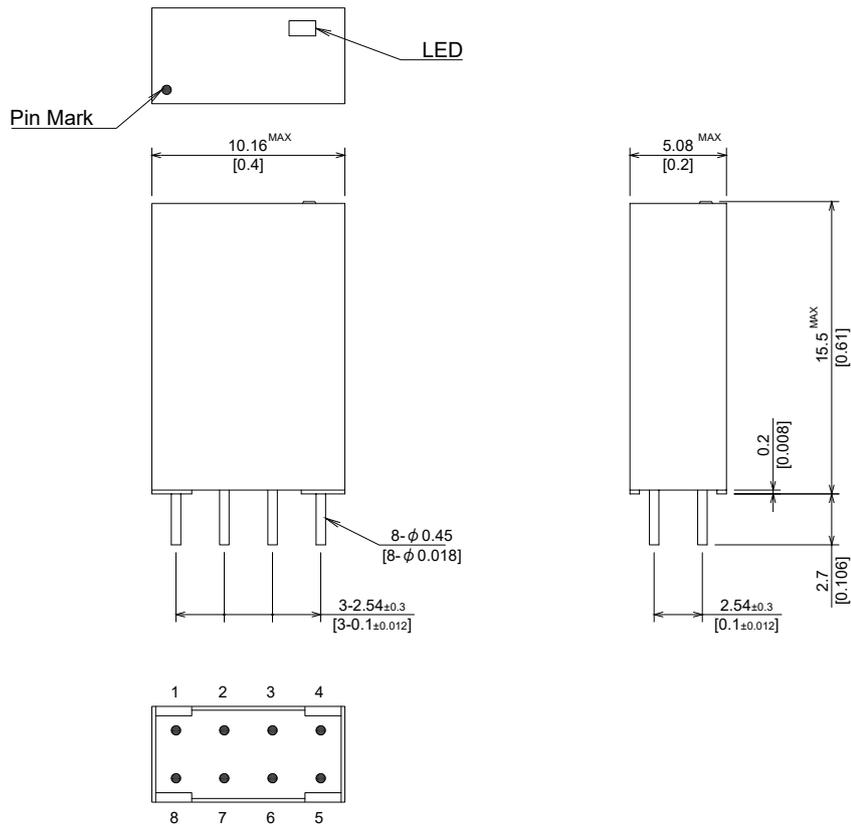
- Mount area: 10.16mm x 5.08mm
- Max contact rating: 10W
- Max switching voltage: 200VDC



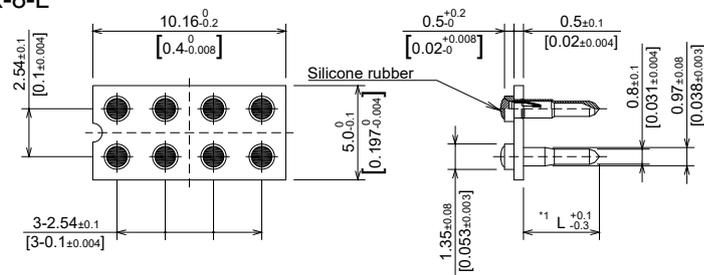
UF 1A Series		UF-1A05			UF-1A12			
Contact Configurations		1 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		180			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					200	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			100			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield			10 ¹⁰			Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹⁰			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			200			VDC
		Contacts to Coil			200			VDC
		Shield to Coil			200			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.5	msec
Release Time		Diode Suppression					0.5	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

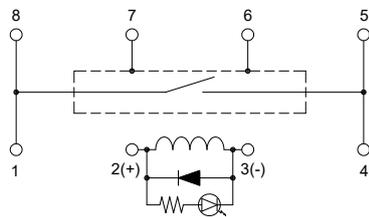


Relay Socket : UFX-8-L



- *1
- L = 3.3 UFX-8-1.6
 - L = 4.0 UFX-8-3.2
 - L = 5.3 UFX-8-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

UF-2A: Compact Vertical PCB Relay with LED



This 2 Form A product maintains the characteristics of standard PCB mount relays (mount area: 20.32 x 5.08mm) while accomplishing a 50% reduction in mount area by configuring the relay vertically. The LED also makes it easier to check on when debugging.

<Characteristics>

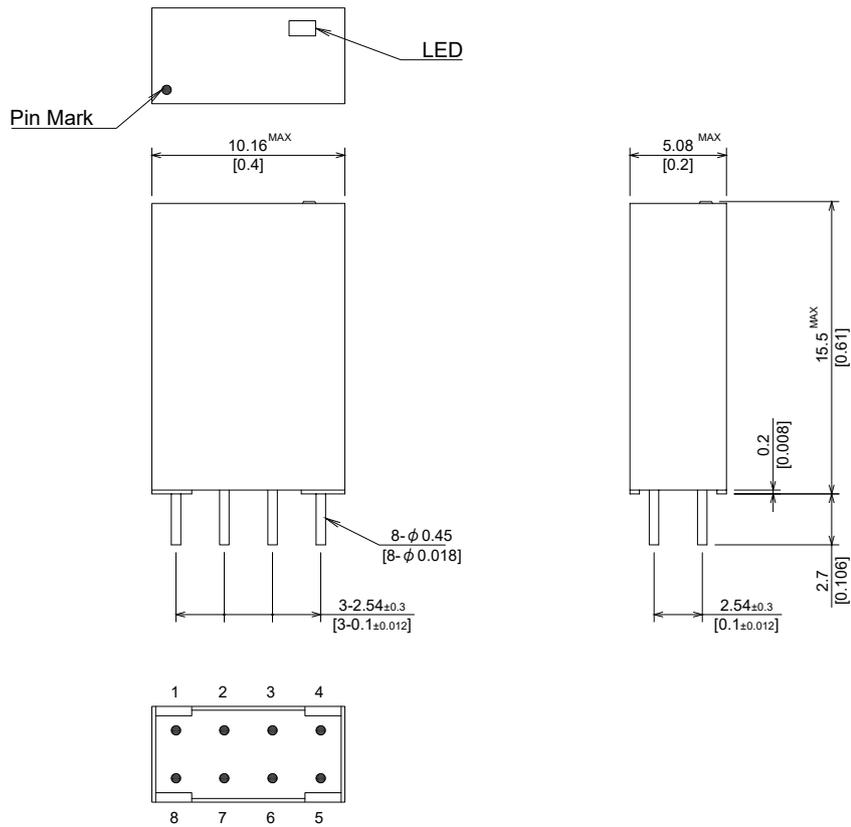
- Mount area: 10.16mm x 5.08mm
- Max contact rating: 10W
- Max switching voltage: 200VDC



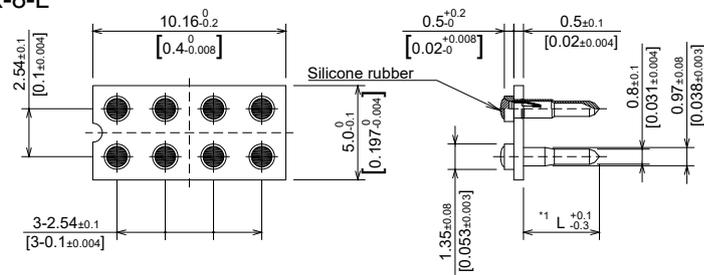
UF 2A Series		UF-2A05			UF-2A12			
Contact Configurations		2 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		180			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					200	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			100			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield			10 ¹⁰			Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹⁰			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			200			VDC
		Contacts to Coil			200			VDC
		Shield to Coil			200			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.5	msec
Release Time		Diode Suppression					0.5	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

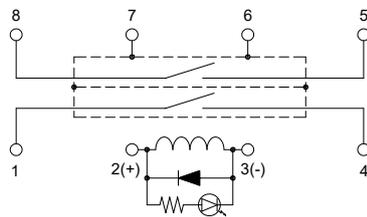


Relay Socket : UFX-8-L



- *1 L = 3.3 UFX-8-1.6
- L = 4.0 UFX-8-3.2
- L = 5.3 UFX-8-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

UF-1A1B: Compact Vertical PCB Relay with LED



This 1A1B product maintains the characteristics of standard PCB mount relays (mount area: 20.32 x 5.08mm) while accomplishing a 50% reduction in mount area by configuring the relay vertically. The LED also makes it easier to check on when debugging.

<Characteristics>

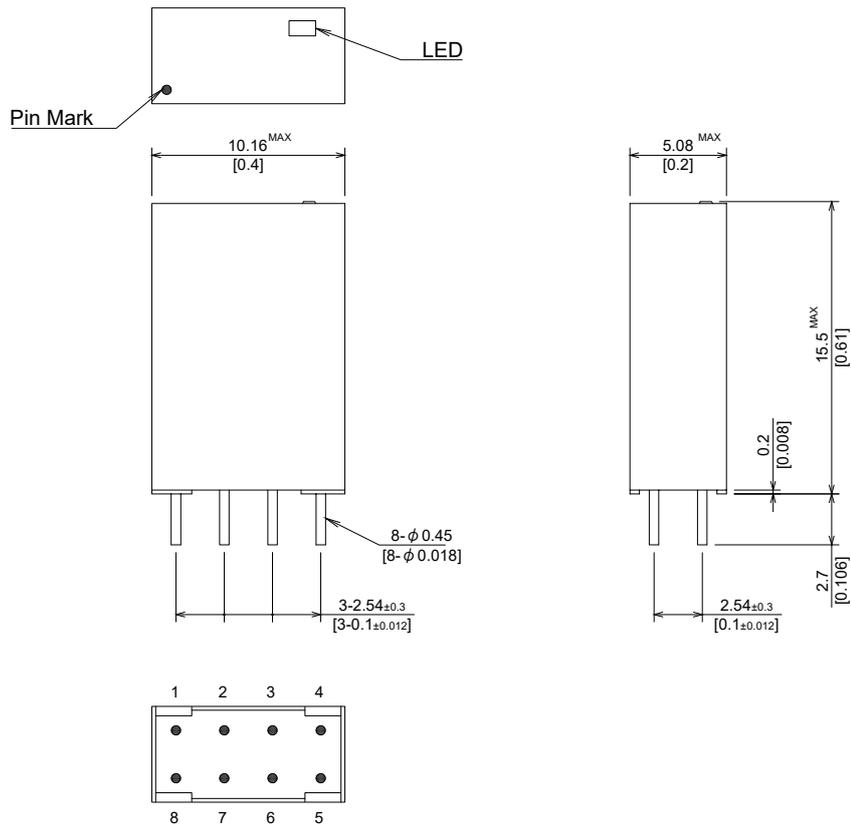
- Mount area: 10.16mm x 5.08mm
- Max contact rating: 10W
- Max switching voltage: 200VDC



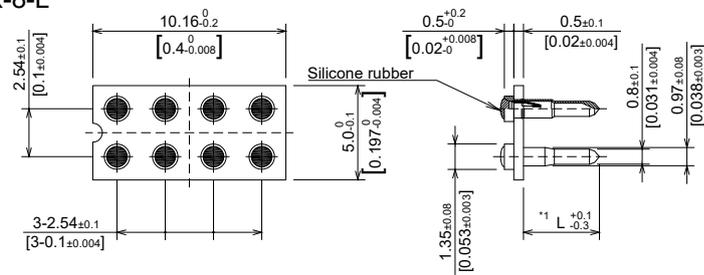
UF 1A1B Series		UF-1T05			UF-1T12			
Contact Configurations		1 Form C (A + B)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0	5.5		12.0	13.2	VDC
Coil Resistance	±10% @20°C		130			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					200	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			100			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹⁰			Ω
		Contacts to Shield			10 ¹⁰			Ω
		Contacts to Coil			10 ¹⁰			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹⁰			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			200			VDC
		Contacts to Coil			200			VDC
		Shield to Coil			200			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					1.0	msec
Release Time		Diode Suppression					1.0	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +60°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

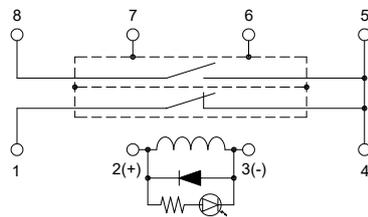


Relay Socket : UFX-8-L



- *1 L = 3.3 UFX-8-1.6
- L = 4.0 UFX-8-3.2
- L = 5.3 UFX-8-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

SC-1A: Compact PCB Relay with LED



This product has a 1 Form A contact configuration plus an LED and an electrostatic shield in a compact through-hole package. This product is 0.1" (2.54mm) larger than our UF series. It is suitable for AC/DC function characteristic testing and the LED also makes it easier to check on when debugging.

<Characteristics>

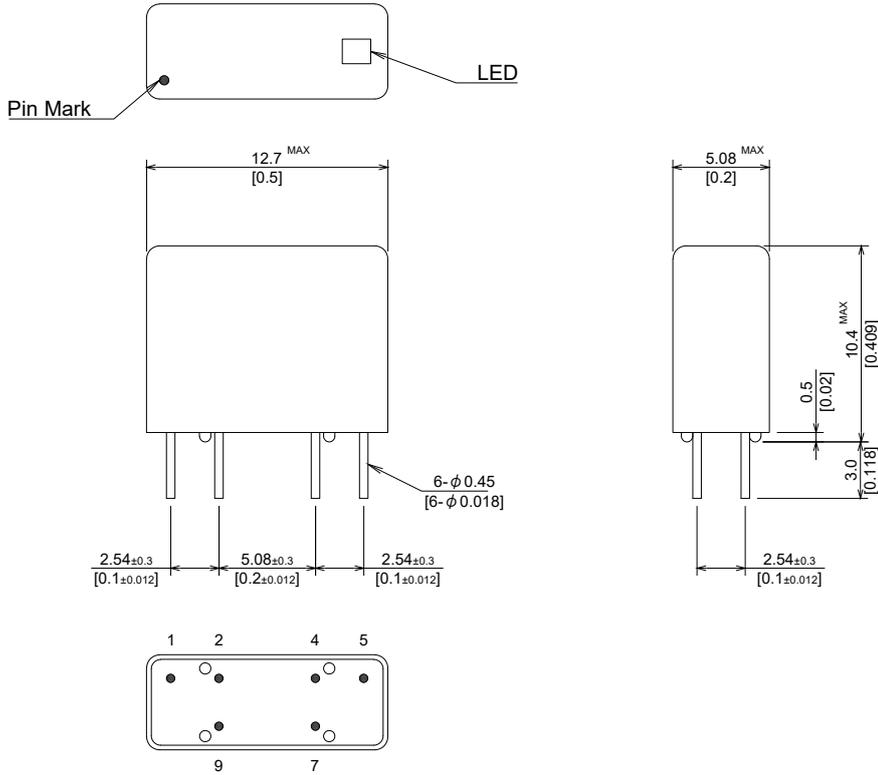
- Mount area: 12.7mm x 5.08mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



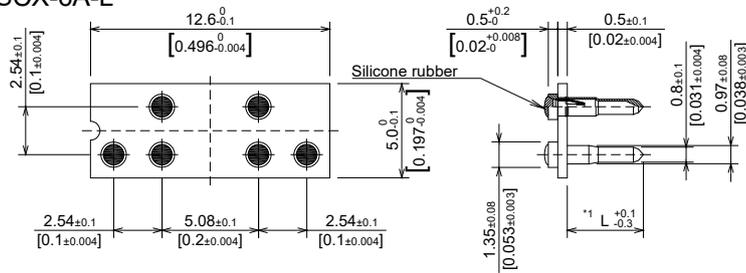
SC 1A Series		SC-1A05X			SC-1A12X			
Contact Configurations		1 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		180			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					200	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹¹			Ω
		Contacts to Shield			10 ¹¹			Ω
		Contacts to Coil			10 ¹¹			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹¹			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			500			VDC
		Contacts to Coil			500			VDC
		Shield to Coil			500			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.3	msec
Release Time		Diode Suppression					0.2	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

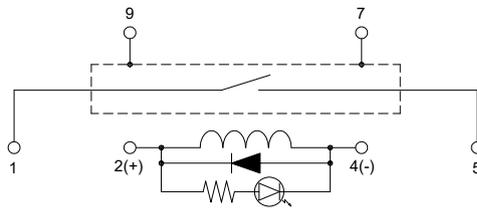


Relay Socket : SCX-6A-L



- *1 L = 3.3 SCX-6A-1.6
- L = 4.0 SCX-6A-3.2
- L = 5.3 SCX-6A-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

SC-2A: Compact PCB Relay with LED



This product has a 2 Form A contact configuration plus an LED and an electrostatic shield in a compact through-hole package. This product is 0.1" (2.54mm) larger than our UF series. It is suitable for AC/DC function characteristic testing and the LED also makes it easier to check on when debugging.

<Characteristics>

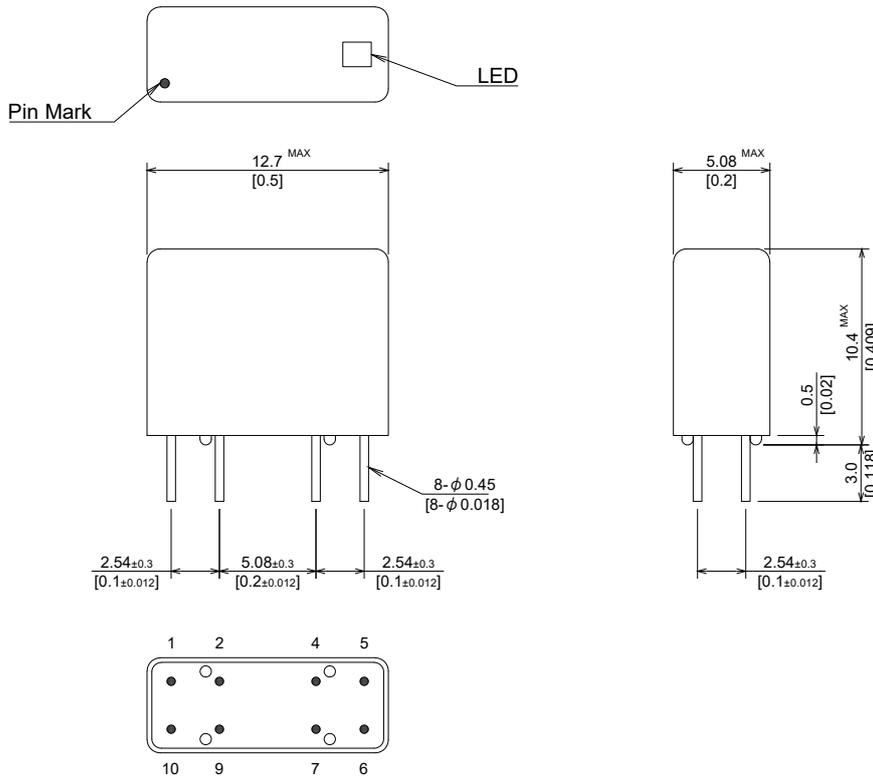
- Mount area: 12.7mm x 5.08mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



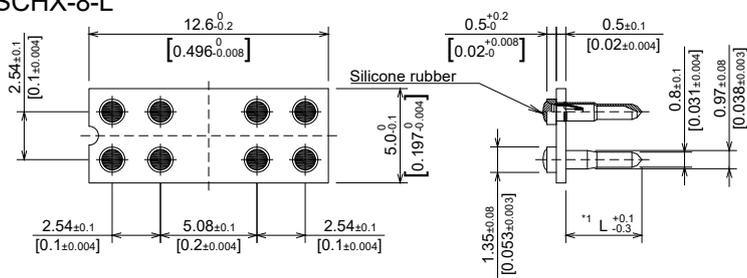
SC 2A Series		SC-2A05X			SC-2A12X			
Contact Configurations		2 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		180			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					200	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹¹			Ω
		Contacts to Shield			10 ¹¹			Ω
		Contacts to Coil			10 ¹¹			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹¹			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			500			VDC
		Contacts to Coil			500			VDC
		Shield to Coil			500			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.3	msec
Release Time		Diode Suppression					0.2	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

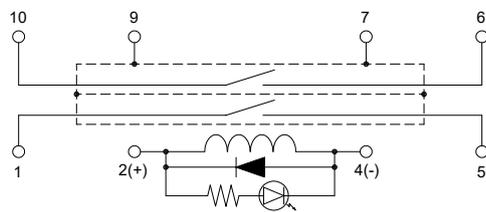


Relay Socket : SCHX-8-L



- *1 L = 3.2 SCHX-8-1.6
- L = 4.0 SCHX-8-3.2
- L = 5.3 SCHX-8-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

SC-1A1B: Compact PCB Relay with LED



This product has a 1A1B contact configuration plus an LED and an electrostatic shield in a compact through-hole package. This product is 0.1" (2.54mm) larger than our UF series. It is suitable for AC/DC function characteristic testing and the LED also makes it easier to check on when debugging.

<Characteristics>

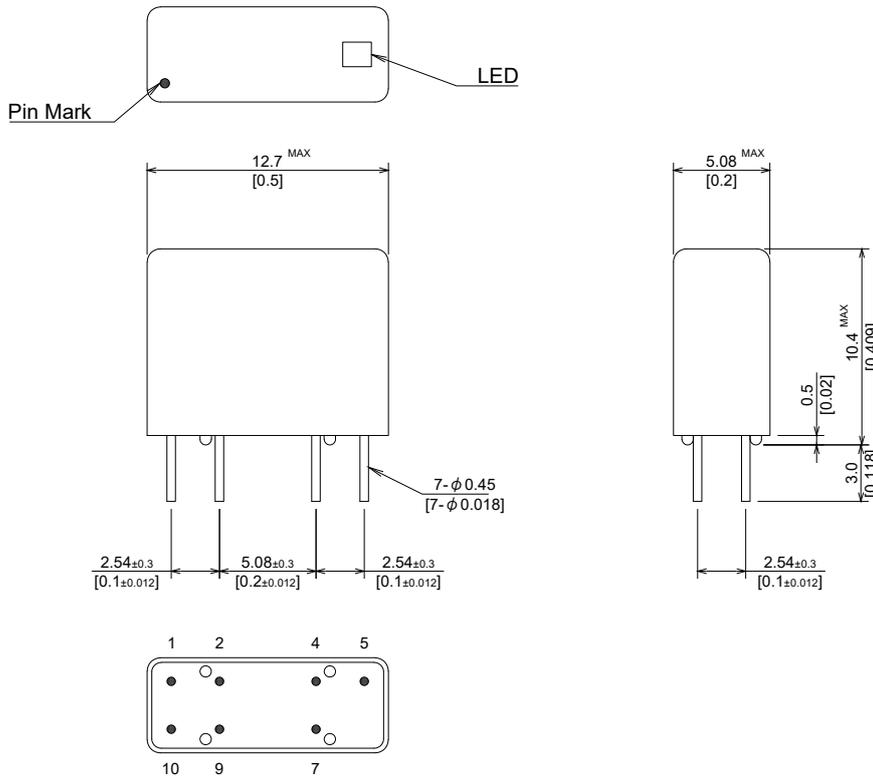
- Mount area: 12.7mm x 5.08mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



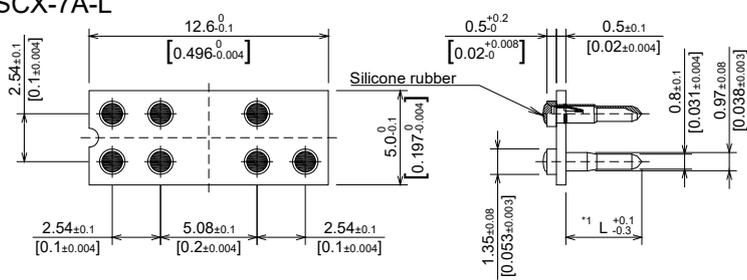
SC 1A1B Series		SC-1T05X			SC-1T12X			
Contact Configurations		1 Form C (A + B)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0	5.5		12.0	13.2	VDC
Coil Resistance	±10% @20°C		180			680		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					200	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹¹			Ω
		Contacts to Shield			10 ¹¹			Ω
		Contacts to Coil			10 ¹¹			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹¹			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			500			VDC
		Contacts to Coil			500			VDC
		Shield to Coil			500			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.3	msec
Release Time		Diode Suppression					0.3	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +60°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

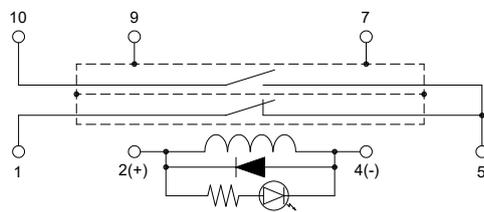


Relay Socket : SCX-7A-L



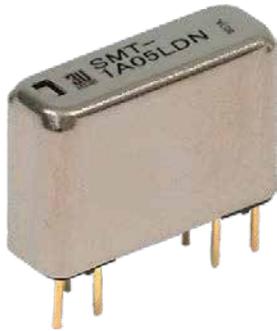
- *1 L = 3.3 SCX-7A-1.6
- L = 4.0 SCX-7A-3.2
- L = 5.3 SCX-7A-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

SMT-1A: Compact PCB Relay with LED



This product is 0.1" (2.54mm) larger than the SC series and 0.2" (5.08mm) larger than the UF series. The relay has a 1 Form A contact configuration and has an electrostatic shield and LED.

<Characteristics>

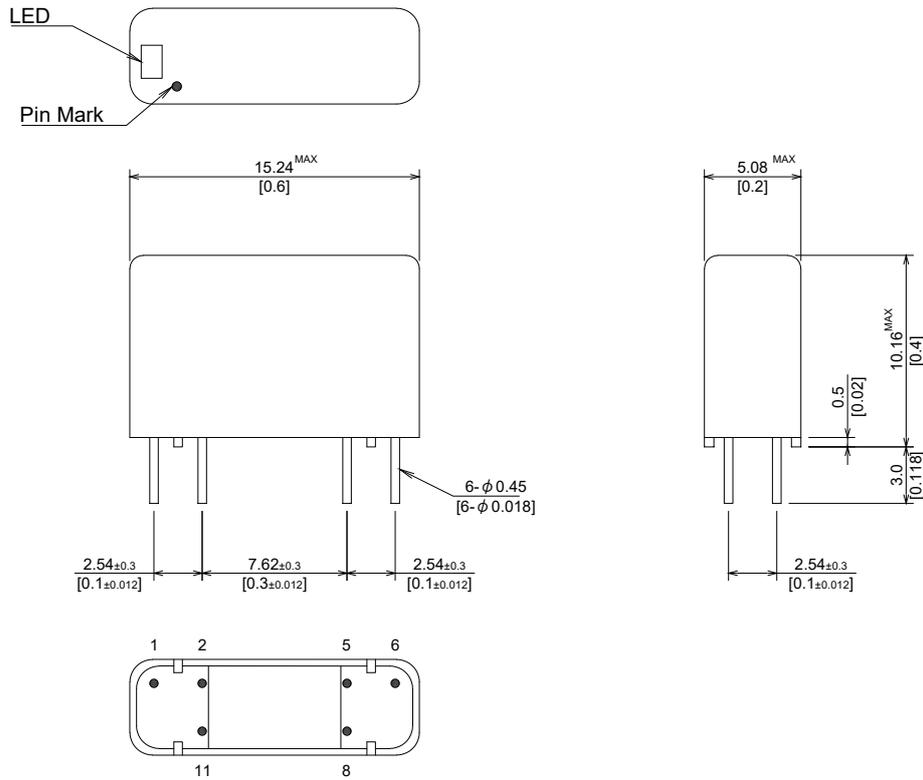
- Mount area: 15.24mm x 5.08mm
- Max contact rating: 10W
- Max switching voltage: 200VDC



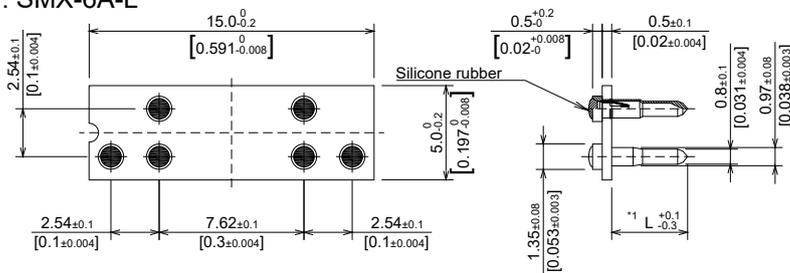
SMT 1A Series		SMT-1A05LDN			SMT-1A12LDN			SMT-1A24LDN				
Contact Configurations		1 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		180			680			2000		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							200	V		
Switching Current		DC/Peak AC resistance							0.5	A		
Carry Current		DC/Peak AC resistance(@30°C)							1.0	A		
Contact Rating		DC/Peak AC resistance							10	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield					10 ¹⁰			Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)					10 ¹⁰			Ω		
Dielectric Strength (Static)		Between Contacts					200			VDC		
		Contacts to Shield					200			VDC		
		Contacts to Coil					200			VDC		
		Shield to Coil					200			VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							0.5	msec		
Release Time		Diode Suppression							0.5	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

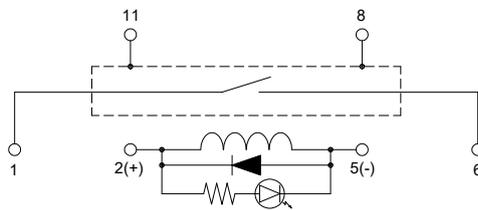


Relay Socket : SMX-6A-L



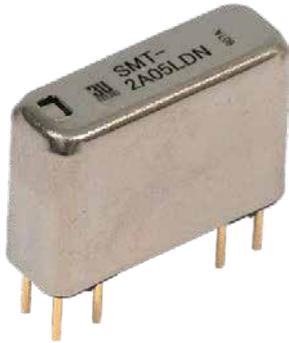
- *1 L = 3.3 SMX-6A-1.6
- L = 4.0 SMX-6A-3.2
- L = 5.3 SMX-6A-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

SMT-2A: Compact PCB Relay with LED



This product is 0.1" (2.54mm) larger than the SC series and 0.2" (5.08mm) larger than the UF series. The relay has a 2 Form A contact configuration and has an electrostatic shield and LED.

<Characteristics>

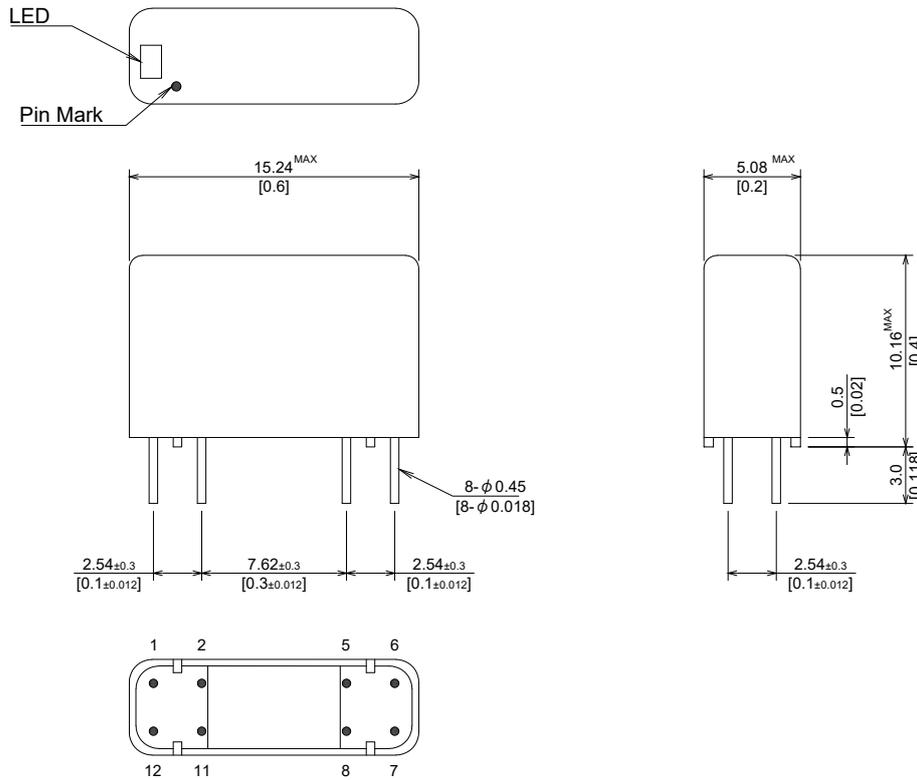
- Mount area: 15.24mm x 5.08mm
- Max contact rating: 10W
- Max switching voltage: 200VDC



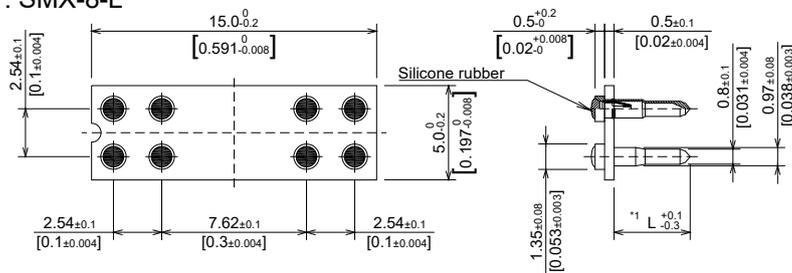
SMT 2A Series		SMT-2A05LDN			SMT-2A12LDN			SMT-2A24LDN				
Contact Configurations		2 Form A										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0			12.0			24.0		VDC	
Coil Resistance	±10% @20°C		180			680			2000		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							200	V		
Switching Current		DC/Peak AC resistance							0.5	A		
Carry Current		DC/Peak AC resistance(@30°C)							1.0	A		
Contact Rating		DC/Peak AC resistance							10	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield					10 ¹⁰			Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)					10 ¹⁰			Ω		
Dielectric Strength (Static)		Between Contacts					200			VDC		
		Contacts to Shield					200			VDC		
		Contacts to Coil					200			VDC		
		Shield to Coil					200			VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							0.5	msec		
Release Time		Diode Suppression							0.5	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +80°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

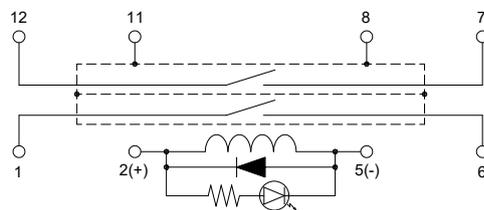


Relay Socket : SMX-8-L



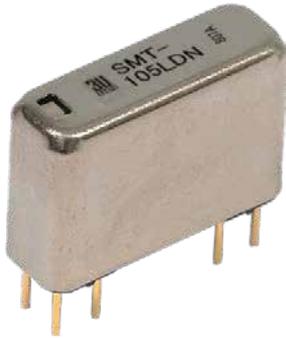
- *1 L = 3.3 SMX-8-1.6
- L = 4.0 SMX-8-3.2
- L = 5.3 SMX-8-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

SMT-1A1B: Compact PCB Relay with LED



This product is 0.1" (2.54mm) larger than the SC series and 0.2" (5.08mm) larger than the UF series. The relay has a 1A1B contact configuration and has an electrostatic shield and LED.

<Characteristics>

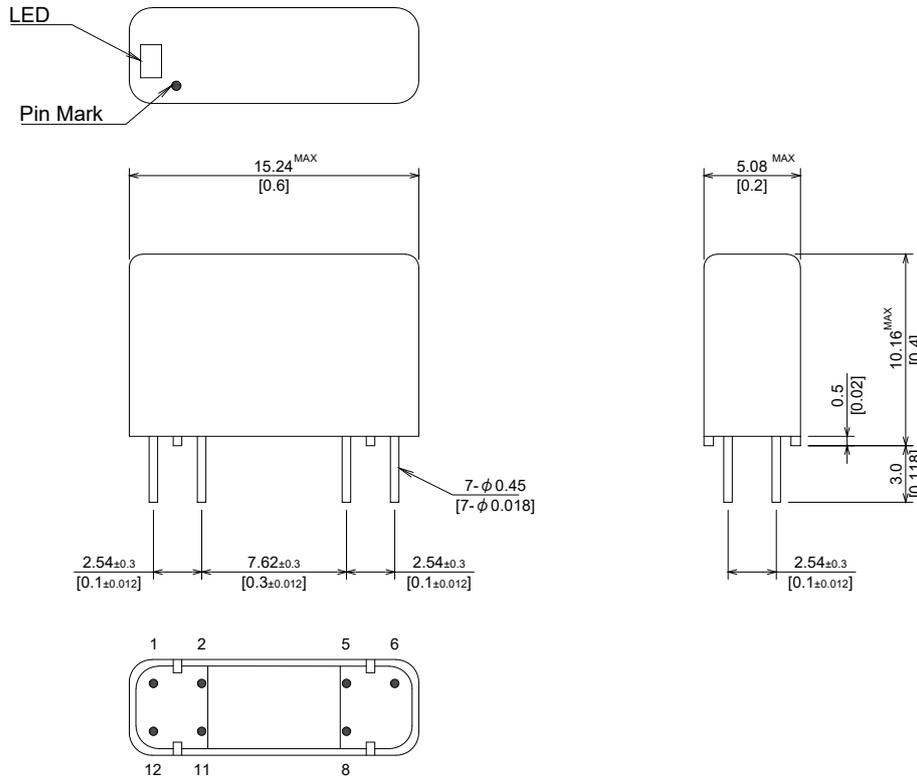
- Mount area: 15.24mm x 5.08mm
- Max contact rating: 10W
- Max switching voltage: 200VDC



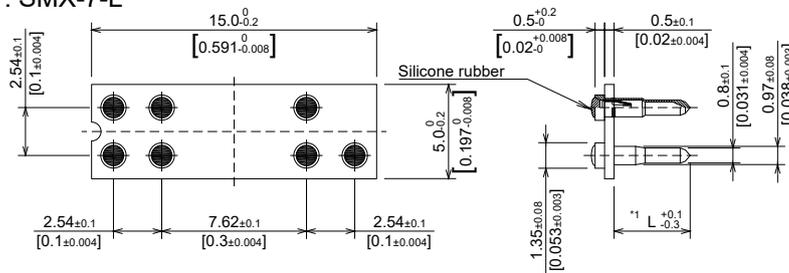
SMT 1A1B Series		SMT-105LDN			SMT-112LDN			SMT-124LDN				
Contact Configurations		1 Form C (A + B)										
Coil Specifications												
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Units	
Coil Voltage			5.0	5.5		12.0	13.2		24.0	26.4	VDC	
Coil Resistance	±10% @20°C		180			680			2000		Ω	
Must Operate	@20°C			3.75			8.8			17.6	VDC	
Must Release	@20°C	0.7			1.2			2.4			VDC	
Contact Ratings / Product Specifications												
Test Parameters		Test Conditions					Min	Nom	Max	Units		
Switching Voltage		DC/Peak AC resistance							200	V		
Switching Current		DC/Peak AC resistance							0.5	A		
Carry Current		DC/Peak AC resistance(@30°C)							1.0	A		
Contact Rating		DC/Peak AC resistance							10	W		
Life Expectancy		at 1V 10mA					100			x10 ⁶ Cycle		
Contact Resistance		Max Initial Operete Voltage							150	mΩ		
Contact Resistance Stability		Max Initial Operete Voltage							5	mΩ		
Insulation Resistance		Between Contacts					10 ¹⁰			Ω		
		Contacts to Shield					10 ¹⁰			Ω		
		Contacts to Coil					10 ¹⁰			Ω		
		Shield to Coil (at 100V 20°C 65%)					10 ¹⁰			Ω		
Dielectric Strength (Static)		Between Contacts					200			VDC		
		Contacts to Shield					200			VDC		
		Contacts to Coil					200			VDC		
		Shield to Coil					200			VDC		
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave							1.0	msec		
Release Time		Diode Suppression							1.0	msec		
Measurement Reference Condition						Environmental Ratings						
Temp	: 15°C to 35°C					Operate temp	: -20°C to +60°C					
Humidity	: 25% to 75%RH					Storage temp	: -40°C to +85°C					
Atmospheric Pressure	: 860 to 1060hpa					Vibration	: 20G's to 2000Hz					
						Shock	: 50G's					

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

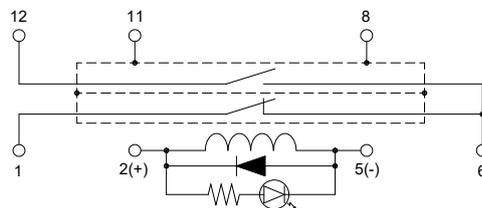


Relay Socket : SMX-7-L



- *1 L = 3.3 SMX-7-1.6
- L = 4.0 SMX-7-3.2
- L = 5.3 SMX-7-4.8

Schematic <Top View>



* Coil polarities, (+) and (-).

FL-1A: High Density Ultra-Compact Vertical PCB Relay

NEW



This product is designed in a vertical configuration to minimizing mount area and ensure contact capacity. This product achieves a carry capacity of 1.3A at 30°C in a mount area of 3.9mm x 3.9mm. The electrical lifespan is 1.5 billion cycles.

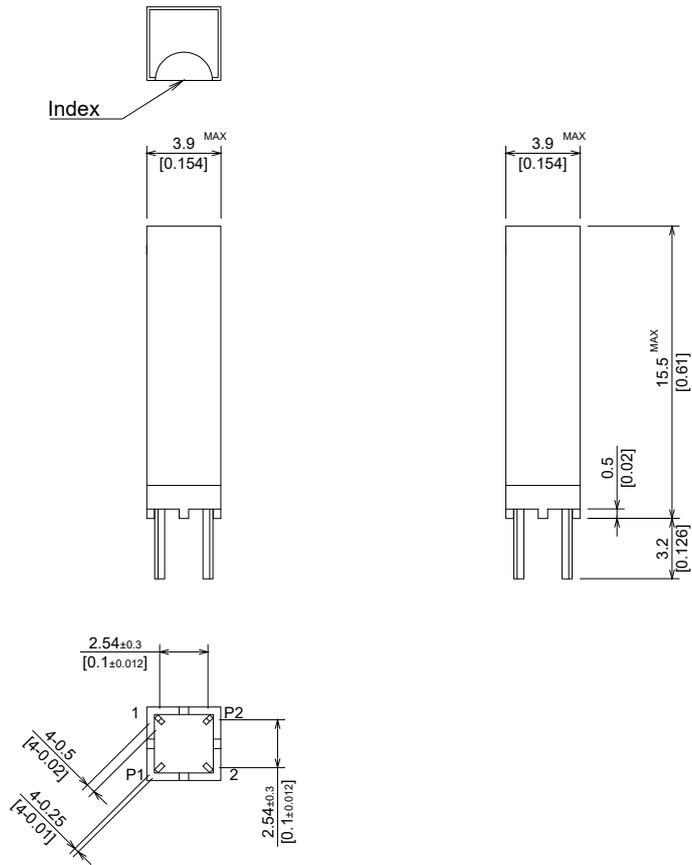
<Characteristics>

- Mount area: 3.9mm x 3.9mm
- Max contact rating: 30W
- Max switching voltage: 200VDC
- Electrical lifespan: 1.5 billion (@ 1V 10mA)

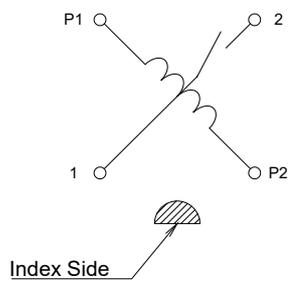


FL 1A Series		FL-E1A05N			FL-E1A12N			
Contact Configurations		1 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		200			600		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					200	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.3	A
Contact Rating		DC/Peak AC resistance					30	W
Life Expectancy		at 1V 10mA			1500			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹²			Ω
		Contacts to Shield						Ω
		Contacts to Coil						Ω
		Shield to Coil						Ω
		(at 100V 20°C 65%)						
Dielectric Strength (Static)		Between Contacts			300			VDC
		Contacts to Shield						VDC
		Contacts to Coil			300			VDC
		Shield to Coil						VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage					0.5	msec
Release Time		100Hz Square Wave						
		Diode Suppression					0.2	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >



Schematic <Top View>



UC-2A2B: High Density Ultra-Compact PCB Relay



This series solves the contact resistance stability and lifespan problems of mechanical relays by using reed switches and can act as direct replacements for mechanical switches. The contact configuration is 2A2B, and this series is our smallest PCB relay.

<Characteristics>

- Mount area: 10.16mm x 7.62mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



UC 2A2B Series		UC-2T05NA-01 UC-2T05NAY-01			UC-2T12NA-01 UC-2T12NAY-01			
Contact Configurations		2 Form C (A + B)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0	5.5		12.0	13.2	VDC
Coil Resistance	±10% @20°C		150			600		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹¹			Ω
		Contacts to Shield						Ω
		Contacts to Coil			10 ¹¹			Ω
		Shield to Coil (at 100V 20°C 65%)						Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield						VDC
		Contacts to Coil			500			VDC
		Shield to Coil						VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.3	msec
Release Time		Diode Suppression					0.3	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +60°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

- ★ UC-2TxxNA-01 Fig.1
- UC-2TxxNAY-01 Fig.2

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

Fig.1

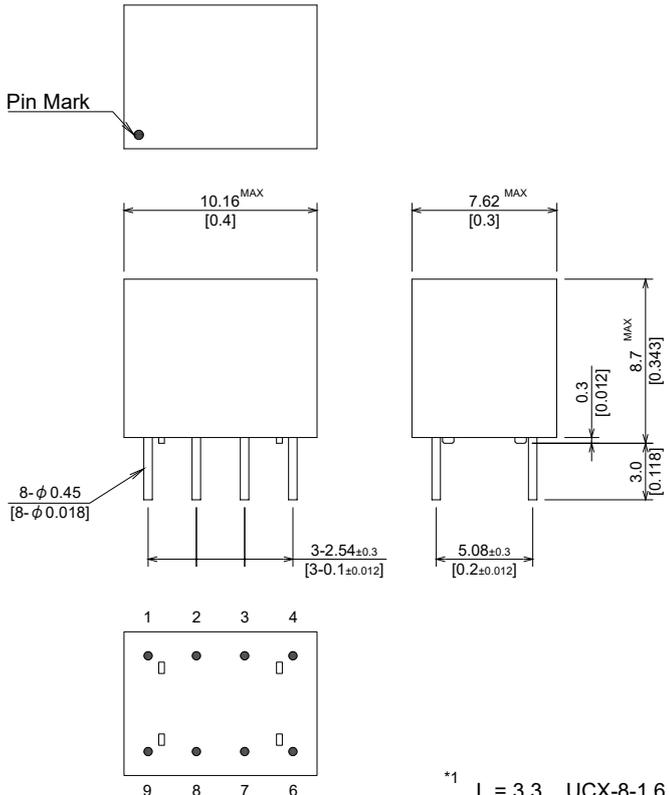
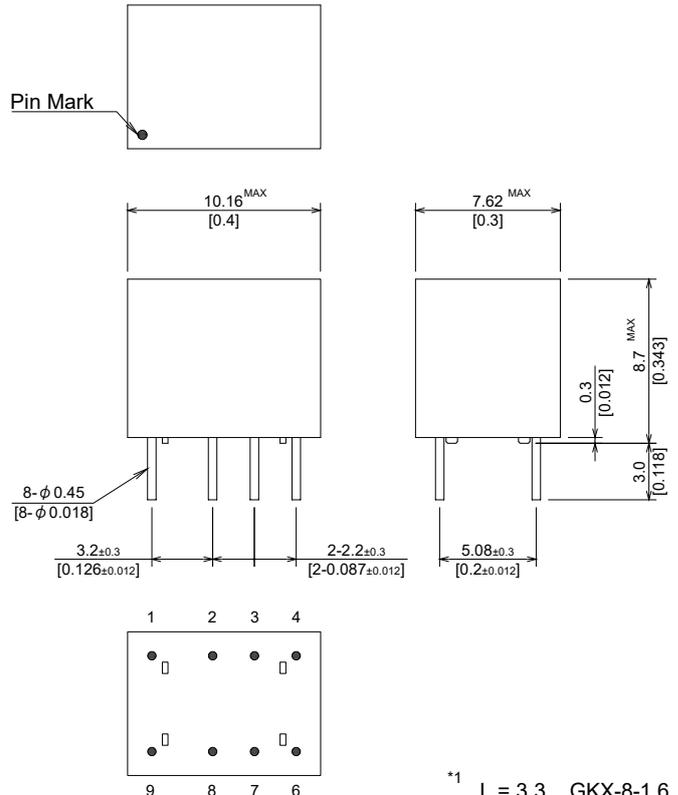


Fig.2

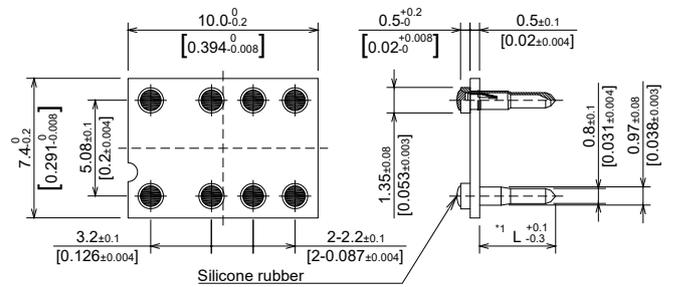
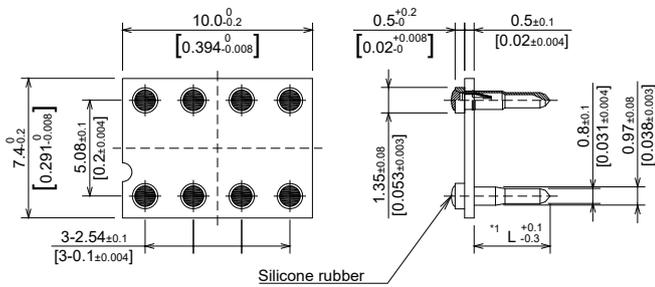


Relay Socket : UCX-8-L

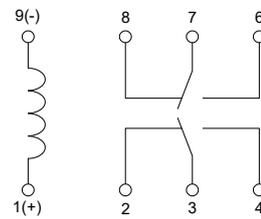
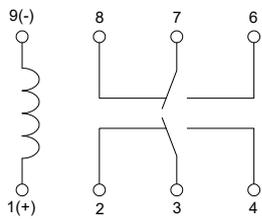
- *1 L = 3.3 UCX-8-1.6
- L = 4.0 UCX-8-3.2
- L = 5.3 UCX-8-4.8

Relay Socket : GKX-8-L

- *1 L = 3.3 GKX-8-1.6
- L = 4.0 GKX-8-3.2
- L = 5.3 GKX-8-4.8

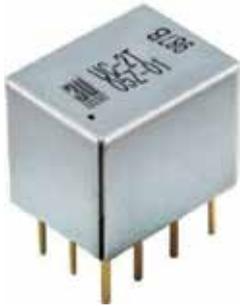


Schematic <Top View>



* Coil polarities, (+) and (-).

UC-2A2B: High Density Ultra-Compact PCB Relay



This series solves the contact resistance stability and lifespan problems of mechanical relays by using reed switches and can act as direct replacements for mechanical switches. The contact configuration is 2A2B, and this series is our smallest PCB relay. These relays also include an electrostatic shield and diode.

<Characteristics>

- Mount area: 10.16mm x 7.62mm
- Max contact rating: 10W
- Electrical lifespan: 300 million (@ 1V 10mA)



UC 2A2B Series		UC-2T05Z-01 UC-2T05ZA-01			UC-2T12Z-01 UC-2T12ZA-01			
Contact Configurations		2 Form C (A + B)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0	5.5		12.0	13.2	VDC
Coil Resistance	±10% @20°C		150			600		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹¹			Ω
		Contacts to Shield			10 ¹¹			Ω
		Contacts to Coil			10 ¹¹			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹¹			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			500			VDC
		Contacts to Coil			500			VDC
		Shield to Coil			500			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.3	msec
Release Time		Diode Suppression					0.3	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +60°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

★ UC-2TxxZ-01 Fig.1
UC-2TxxZA-01 Fig.2

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

Fig.1

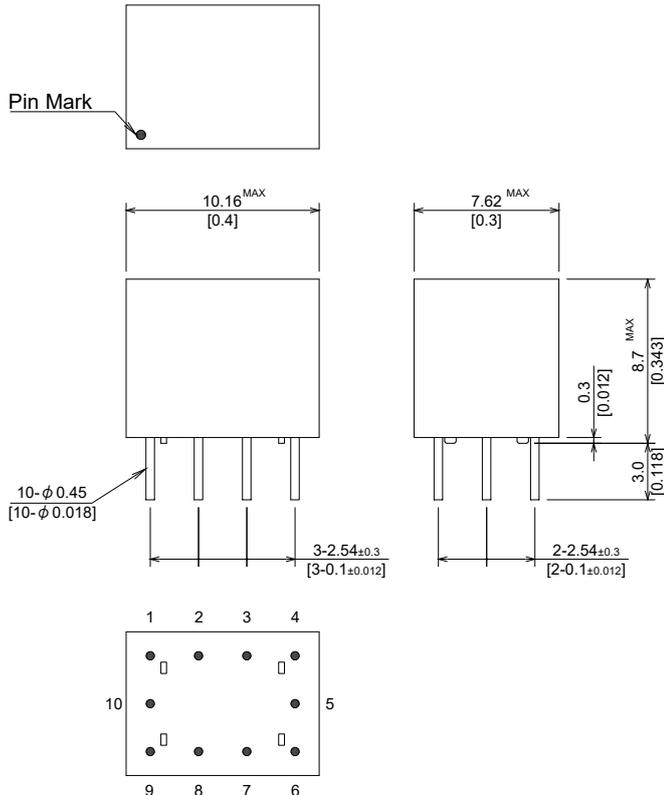
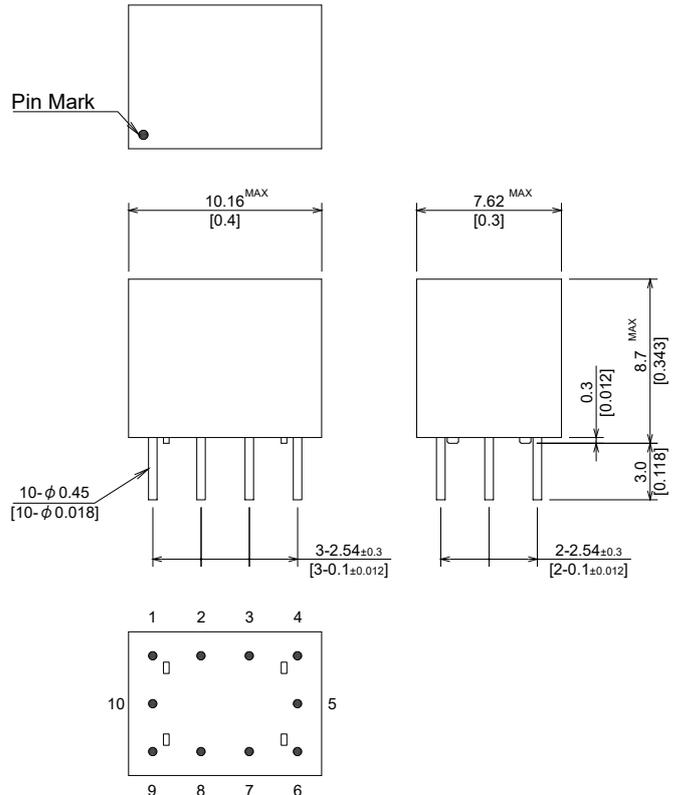
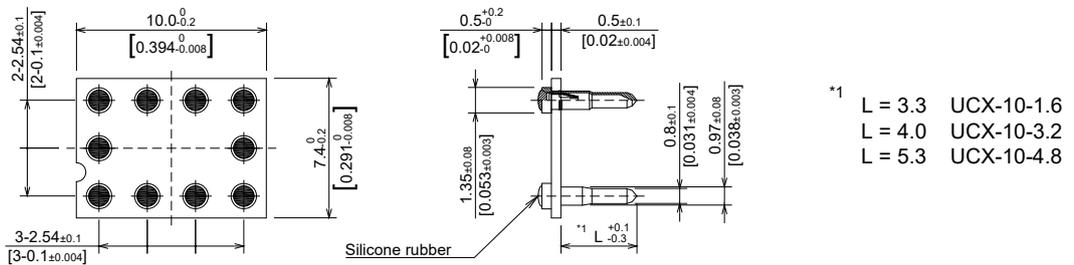


Fig.2



Relay Socket : UCX-10-L



Schematic <Top View>



* Coil polarities, (+) and (-).

UC-4A: High Density Ultra-Compact PCB Relay



This product was developed with the aim of achieving high density while also utilizing multiple contacts. This relay has a 4 Form A contact configuration, and is our smallest PCB relay. This product is widely used for measurements of communication boards and parallel pulsed transmissions.

<Characteristics>

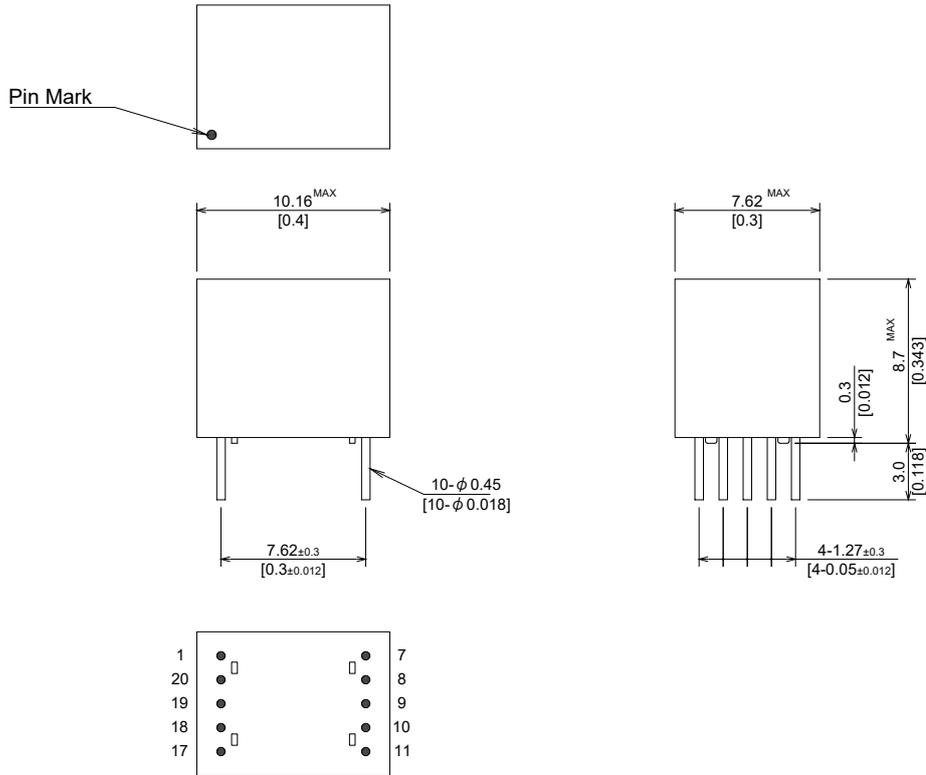
- Mount area: 10.16mm x 7.62mm
-
- Electrical lifespan: 300 million (@ 1V 10mA)



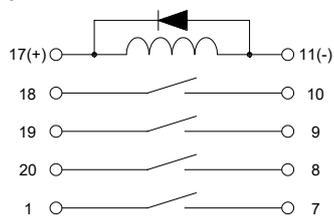
UC 4A Series		UC-4A05D			UC-4A12D			
Contact Configurations		4 Form A						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		150			800		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage	DC/Peak AC resistance					100		V
Switching Current	DC/Peak AC resistance					0.5		A
Carry Current	DC/Peak AC resistance(@30°C)					1.0		A
Contact Rating	DC/Peak AC resistance					10		W
Life Expectancy	at 1V 10mA			300				x10 ⁶ Cycle
Contact Resistance	Max Initial Operete Voltage					150		mΩ
Contact Resistance Stability	Max Initial Operete Voltage					5		mΩ
Insulation Resistance	Between Contacts			10 ¹¹				Ω
	Contacts to Shield							Ω
	Contacts to Coil			10 ¹¹				Ω
	Shield to Coil (at 100V 20°C 65%)							Ω
Dielectric Strength (Static)	Between Contacts			200				VDC
	Contacts to Shield							VDC
	Contacts to Coil			500				VDC
	Shield to Coil							VDC
Operate Time (Including Bounce)	at Nominal Coil Voltage 100Hz Square Wave					0.3		msec
Release Time	Diode Suppression					0.2		msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.



Schematic <Top View>



* Coil polarities, (+) and (-).

SCH-2A: Dual Coil Compact PCB Relay



This product uses two independently driven coils and is mainly used by manufacturers of probe cards for testing wafers for flash memory and RAM. Independently controlling the coils allows each contact point to switch different signals. This product is 0.2" (5.08mm) smaller than our SUH series.

<Characteristics>

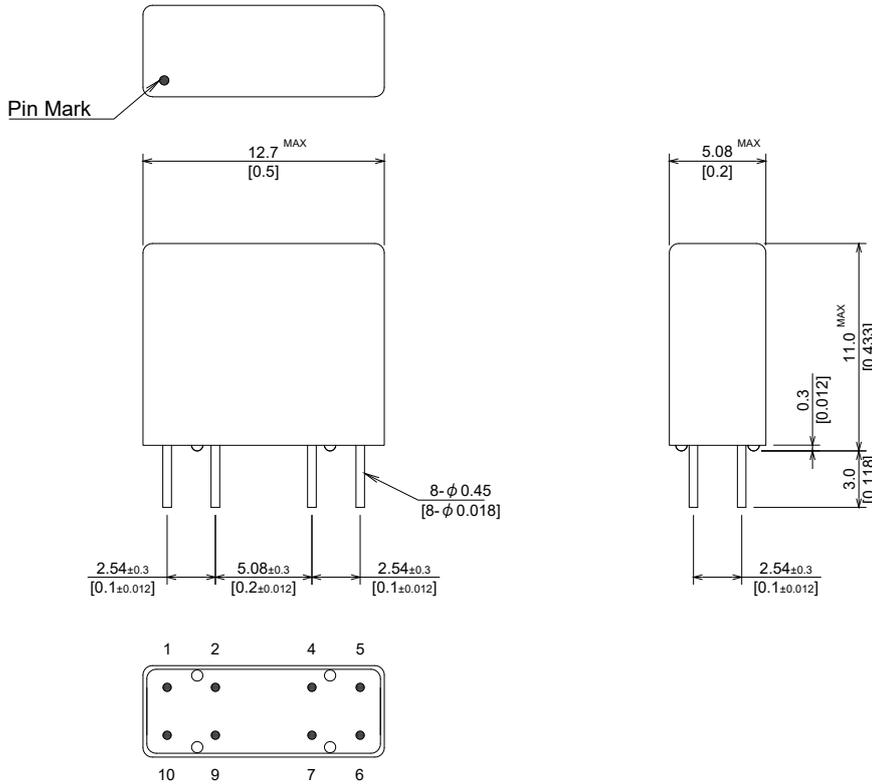
- Mount area: 12.7mm x 5.08mm
-
- Electrical lifespan: 300 million (@ 1V 10mA)

RoHS
表記

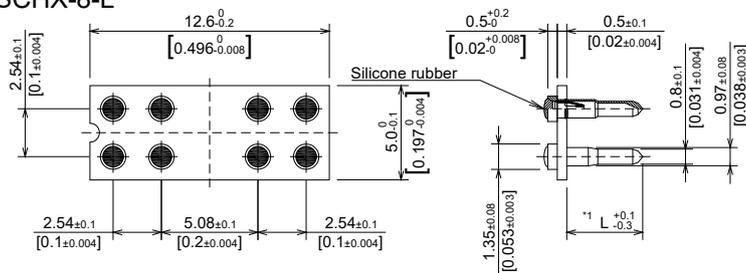
SCH 2A Series		SCH-2205G			SCH-2212G			
Contact Configurations		2 Form A (2 - 2)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		160			600		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			300			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹¹			Ω
		Contacts to Shield			10 ¹¹			Ω
		Contacts to Coil			10 ¹¹			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹¹			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			500			VDC
		Contacts to Coil			500			VDC
		Shield to Coil			500			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.35	msec
Release Time		Diode Suppression					0.2	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

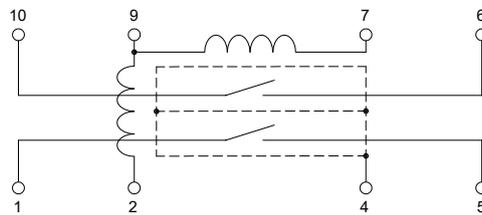


Relay Socket : SCHX-8-L



- *1 L = 3.2 SCHX-8-1.6
- L = 4.0 SCHX-8-3.2
- L = 5.3 SCHX-8-4.8

Schematic <Top View>



Contact
Pin5 and Pin1 ON
Pin6 and Pin10 ON

Coil
Pin2 and Pin9 impress current
Pin7 and Pin9 impress current

SUH-2A: Dual Coil Compact PCB Relay



This product uses two independently driven coils and is mainly used by manufacturers of probe cards for testing wafers for flash memory and RAM. Independently controlling the coils allows each contact point to switch different signals.

<Characteristics>

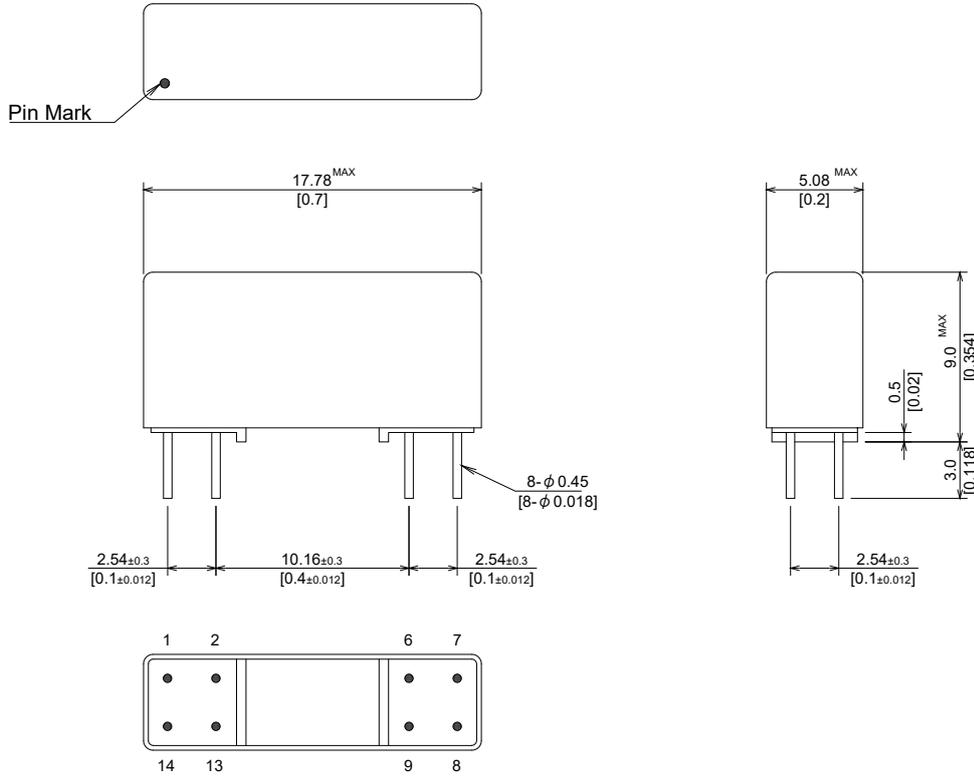
- Mount area: 17.78mm x 5.08mm
-
- Electrical lifespan: 1 billion (@ 1V 10mA)



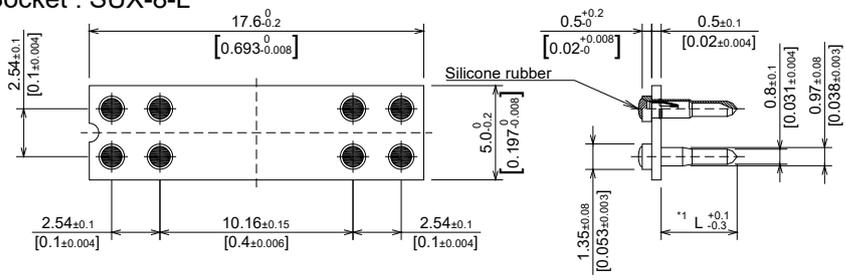
SUH 2A Series		SUH-2205G			SUH-2212G			
Contact Configurations		2 Form A (2 - 2)						
Coil Specifications								
Parameters	Conditions	Min	Nom	Max	Min	Nom	Max	Units
Coil Voltage			5.0			12.0		VDC
Coil Resistance	±10% @20°C		200			600		Ω
Must Operate	@20°C			3.75			8.8	VDC
Must Release	@20°C	0.7			1.2			VDC
Contact Ratings / Product Specifications								
Test Parameters		Test Conditions			Min	Nom	Max	Units
Switching Voltage		DC/Peak AC resistance					100	V
Switching Current		DC/Peak AC resistance					0.5	A
Carry Current		DC/Peak AC resistance(@30°C)					1.0	A
Contact Rating		DC/Peak AC resistance					10	W
Life Expectancy		at 1V 10mA			1000			x10 ⁶ Cycle
Contact Resistance		Max Initial Operete Voltage					150	mΩ
Contact Resistance Stability		Max Initial Operete Voltage					5	mΩ
Insulation Resistance		Between Contacts			10 ¹¹			Ω
		Contacts to Shield			10 ¹¹			Ω
		Contacts to Coil			10 ¹¹			Ω
		Shield to Coil (at 100V 20°C 65%)			10 ¹¹			Ω
Dielectric Strength (Static)		Between Contacts			200			VDC
		Contacts to Shield			500			VDC
		Contacts to Coil			500			VDC
		Shield to Coil			500			VDC
Operate Time (Including Bounce)		at Nominal Coil Voltage 100Hz Square Wave					0.35	msec
Release Time		Diode Suppression					0.2	msec
Measurement Reference Condition				Environmental Ratings				
Temp	: 15°C to 35°C			Operate temp	: -20°C to +80°C			
Humidity	: 25% to 75%RH			Storage temp	: -40°C to +85°C			
Atmospheric Pressure	: 860 to 1060hpa			Vibration	: 20G's to 2000Hz			
				Shock	: 50G's			

Dimensions < All Dimensions are mm [inch] >

* Pin mark (●) corresponds to the terminal number 1.

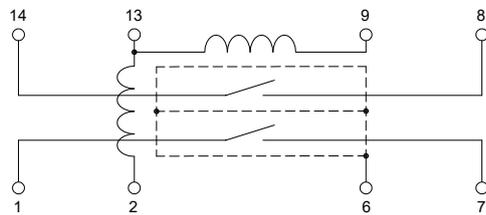


Relay Socket : SUX-8-L



- *1 L = 3.3 SUX-8-1.6
- L = 4.0 SUX-8-3.2
- L = 5.3 SUX-8-4.8

Schematic <Top View>

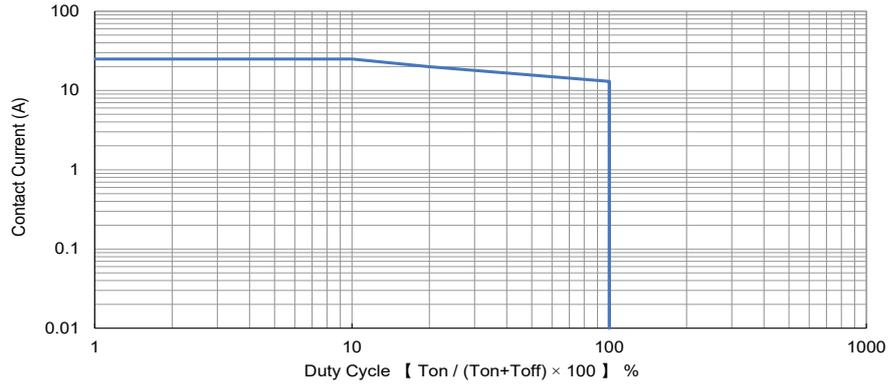


Contact
Pin1 and Pin7 ON
Pin8 and Pin14 ON

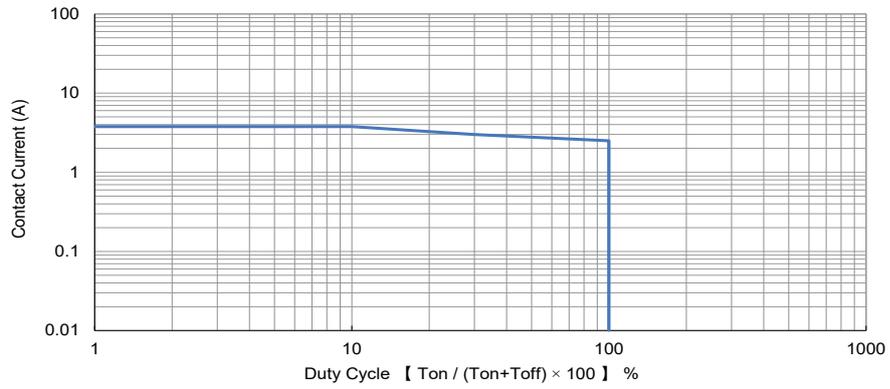
Coil
Pin2 and Pin13 impress current
Pin9 and Pin13 impress current

Pulsed current reduction curve

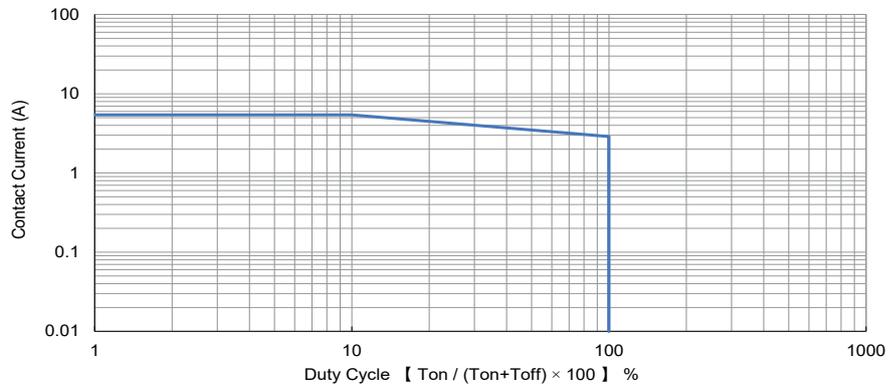
USM-128 Series



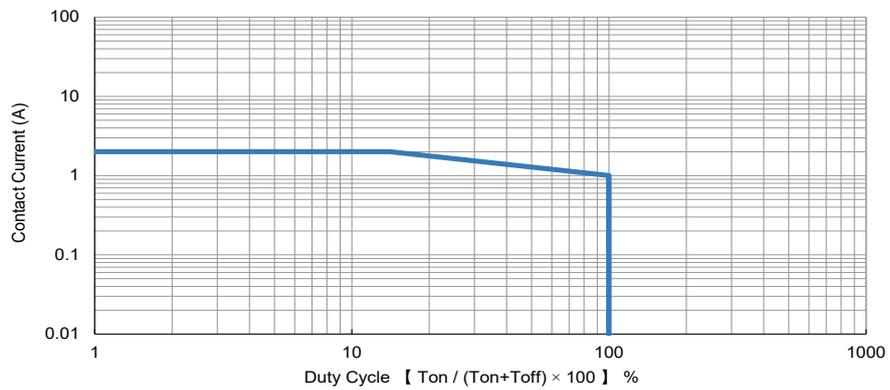
UPM / SL / URM-(HC, 162, 262) Series

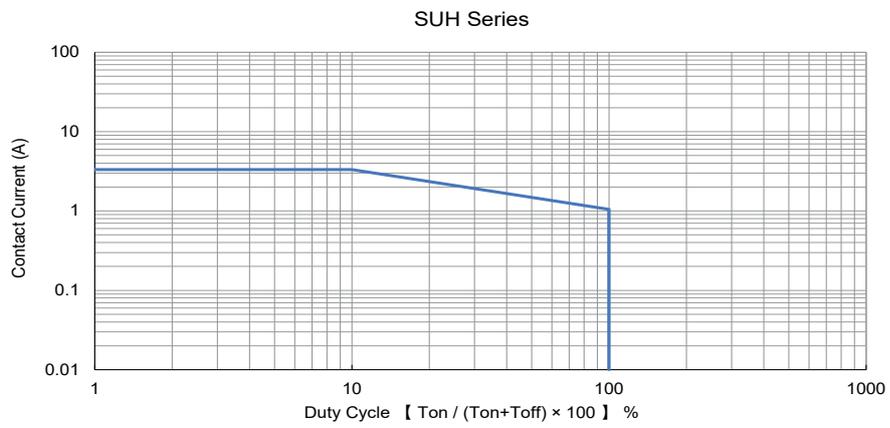
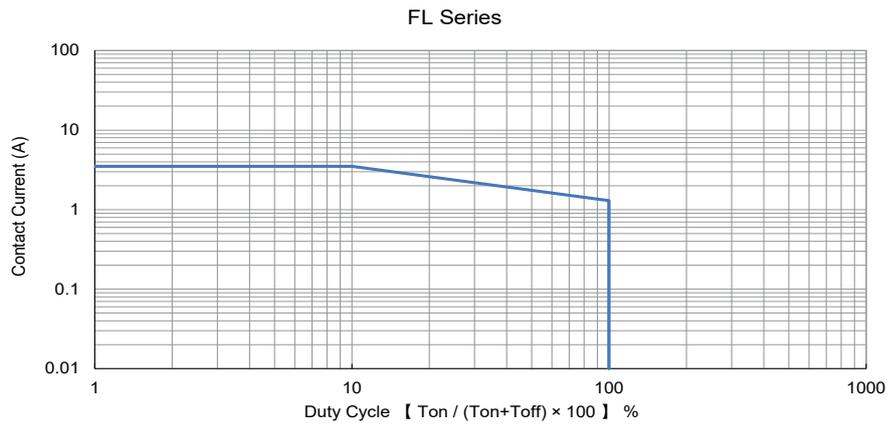
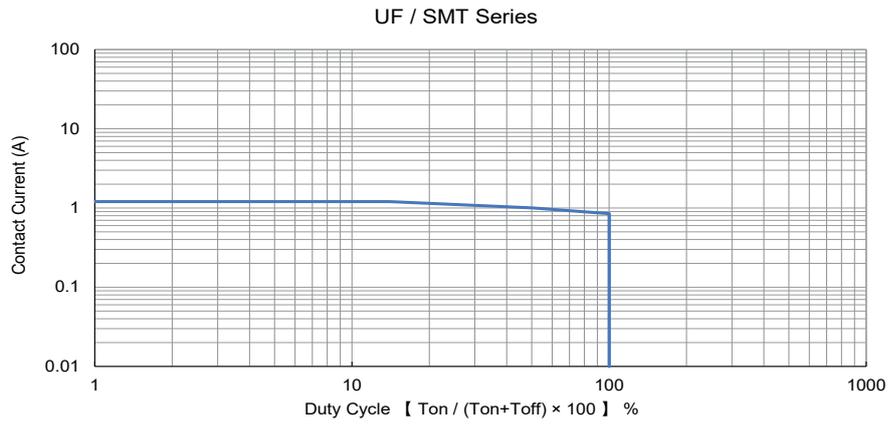


URM-P Series



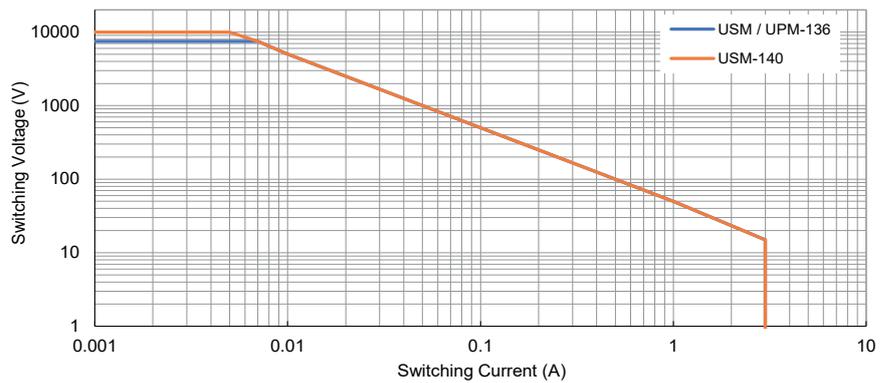
MFS / UF-E / UC / FS / SC/ SCH Series





High breakdown voltage relay switching data

USM/UPM-136, USM-140 Series
Switch voltage vs Switching Current

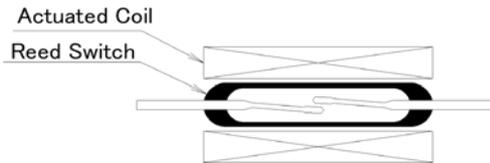


Overview of Reed Relays

1) What are reed relays

A reed relay is based around a reed switch. A reed switch contains two ferromagnetic reeds sealed inside a glass tube facing each other with a small gap between them. The glass tube is filled with an inert gas to prevent the contacts from being activated, and the contacts are plated with a special metal.

The relay opens and closes the contacts by moving the switch reeds with the magnetic force generated from a coil wound around the glass tube of the switch.



2) Comparison of reed relays and other relays

Item	Reed Relay	Mechanical (hinged) Relay	Mechanical (plunger) Relay	SSR	Optical MOS
Appearance	⊙	⊙	△	○	⊙
Number of contact poles	○	○	⊙	△	△
Power consumption	○	○	△	⊙	⊙
Response speed	○	△	△	⊙	○
Contact reliability	○	△	△	⊙	⊙
Bounce	○	△	△	⊙	⊙
Insulation	○	○	⊙	△	○
Durability	○	○	△	⊙	⊙
Transient response	⊙	⊙	⊙	△	△
Operation noise	○	△	△	⊙	⊙
Vibration and shock resistance	△	△	△	⊙	⊙
Surrounding environment	○	△	△	○	⊙
Contact resistance	⊙	⊙	⊙	△	△
Current leakage	⊙	⊙	⊙	△	○
Opening and closing capacity	○	○	⊙	⊙	△

3) Terminology

Terms	Explanation		
	Non-operating state	Operating state	
1 Contact types	Form A (1 make)		
	Form B (1 break)		
	Form C (transfer)		
	Form C (A+B) (make-break)		
	Form (A+B) (make-break)		
2 Rated voltage	This is the specified voltage that is applied to the coil to operate the relay. The allowable fluctuation of the rated voltage is within $\pm 10\%$ (at 20°C).		
3 Coil resistance	The coil resistance of the relay is expressed in Ω .		
4 Operate voltage	This is the minimum coil voltage required to operate the relay. For example, if a voltage of 3.3V is applied to a relay with an operating voltage of 3.75V, it will not operate.		
5 Release voltage	This is the coil voltage required to return an activated relay to a deactivated state. For example, if a voltage of 0.5V is applied to a relay with a release voltage of 1.2V, it will assume a deactivated state. If a voltage of 1.5V is applied, it will not assume a deactivated state.		
6 Maximum switching voltage	This is the max voltage (at 1mA) that can open/close the contacts when a load is connected. ("peak voltage value" for AC) However, please use within the maximum contact capacity (see 9. below). Using a voltage that exceeds the maximum switching voltage may cause the contacts to melt or accelerate deterioration.		
7 Maximum switching current	This is the max current that can open/close the contacts when a load is connected to the contacts. ("peak current value" for AC) However, please use within the maximum contact capacity (see 9. below). Using a current that exceeds the maximum switching current may cause the contacts to melt or accelerate deterioration.		
8 Maximum carry current	This is the maximum current that can flow continuously after the contacts are closed. When opening the contacts, do so at a current value less than the maximum switching current.		
9 Maximum contact capacity	This is the maximum load capacity (switching voltage x switching current) that can be switched without practical problems. Using a capacity value that exceeds the maximum contact capacity may cause the contacts to melt or accelerate deterioration.		
10 Electrical lifespan	This is the lifespan when a load is applied to the contacts. The lifespan of a relay varies depending on the size and type of load, and frequency of use.		
11 Contact resistance (initial value)	This is the resistance between the terminals when the contacts are closed.		
12 Contact resistance variation (initial value)	The contact resistance is measured 5 times and a range between the min and max values is set to ensure stability of the value.		
13 Insulation resistance	This is the resistance of the insulated parts between contacts/coils/conductive terminals and non-conductive terminals (such as an iron core frame or iron core), or between contacts themselves.		
14 Electrostatic capacitance	This is the capacitance between contacts, coils, and conductive terminals.		
15 Breakdown voltage	This is the limit value at which insulation breakdown does not occur between each conductor of the relay. This is the voltage that can be withstood even if a surge is applied between the contacts when the contacts are not operating. For a voltage pulse applied immediately after the contacts operate, the maximum switching voltage is the standard value.		
16 Operate time	This is the time from when the rated voltage is applied to the coil until the contacts operate. (Including bounce. Form A/Form C/FORM (A+B))		
17 Release time	This is the time it takes for the contacts to reset after the rated voltage is removed from the coil. (Including bounce. Form B/Form C/FORM (A+B))		
18 Vibration	This is the vibration resistance value that does not cause changes in properties.		
19 Shock	This is the shock resistance value that does not cause changes in properties.		

4) Precautions for use

4-1) Adding a surge absorbing diode

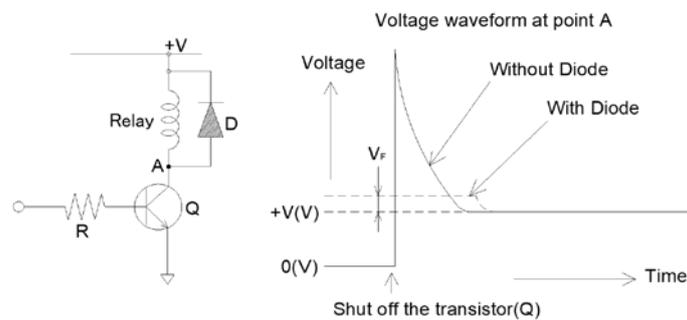
When driving a coil, please add a clamp diode in parallel to the coil as shown in the diagram on the right.



4-2) Back electromotive force (EMF) of the coil

This is the voltage that occurs in an inductive circuit when the current changes and the polarity of the induced voltage at each instant is opposite to the polarity of the applied voltage. This phenomenon does not occur during direct current flow where the current does not change; however, care must be taken as back EMF occurs when the current begins to flow or is cut off.

The voltage waveform at point A in the diagram can be as much as 10 times the applied voltage, and when a reed relay (coil) on/off is controlled by a transistor, this can exceed the transistor's withstand voltage (V_{CE}) and destroy the transistor. For this reason, a protection circuit of a diode in parallel with the reed relay (coil) is effective in absorbing the back EMF.



* If a diode is installed, the release time will be slower due to the influence of V_F (diode forward voltage).

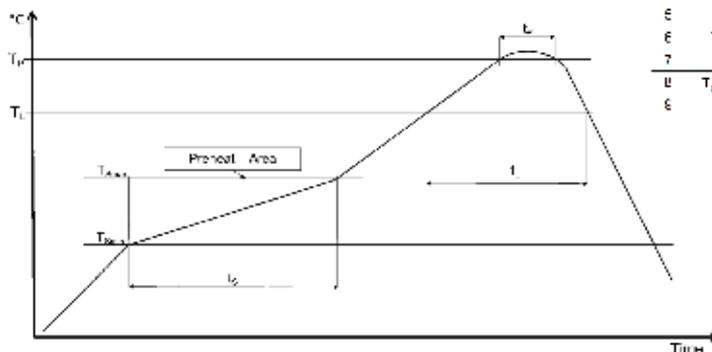
4-3) Terminal bending

When bending the relay terminals for installation, hold the terminals in place with lead pliers before bending them. When bending, be careful not to put undue stress on the base of the terminal.

4-4) Soldering conditions

- a) Soldering iron: 300 to 350°C
- b) Automatic soldering: 230 to 260°C
- c) For reflow soldering

No	Symbol	Content	Condition
1	T_p	Peak temperature	260°C
2	t_p	Time in peak temperature	50s max
3	T_L	Liquidus temperature	≥177°C
4	t_L	Time (t_L) maintained above T_L	60s~150s
5	T_{max}	Preheat Max temperature	200°C
6	T_{min}	Preheat Min temperature	150°C
7	t_L	Preheating time	60s~120s
8	$T_2 - T_{177}$	Cooling rate	6°C/s max
9		Number of reflow cycles	Three times



4-5) Cleaning

If, after soldering the relay, the board is washed with a solvent (alcohol-based, freon-based) or pure water to remove flux, please note the following:

- a) Cleaning with solvents may cause markings to fade, chip, or disappear.
- b) Avoid ultrasonic cleaning
- c) Do not perform cleaning in a bath with a large magnetic field as this will change the properties of the relay.

* Please contact us regarding whether cleaning is possible.

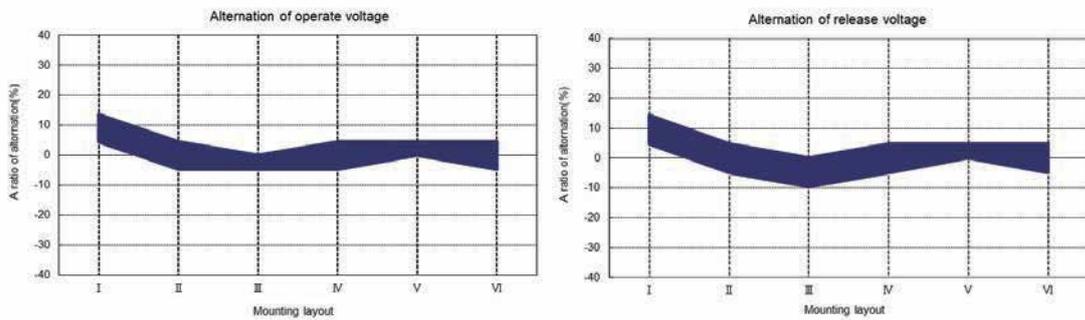
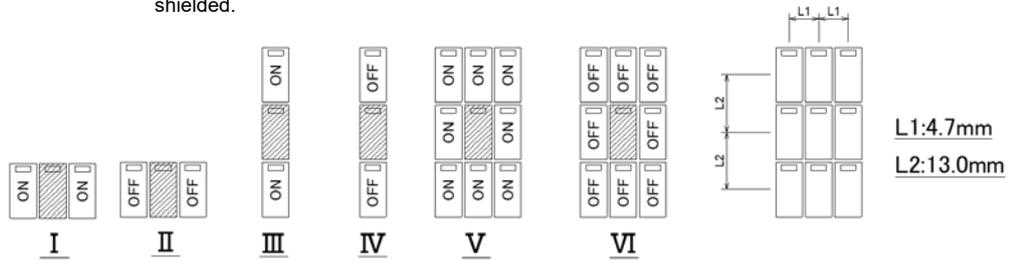
4-6) Magnetic interference

When multiple reed relays are mounted close together, mutual magnetic interference occurs, causing operating and release voltage fluctuations. The diagrams below illustrate how different configurations of surrounding reed relays can magnetically interfere with the reed relay in the center. This value changes depending on whether or not electricity is applied.

The graphs shows the variations in operation of the central reed relay.

A magnetic shield is an effective way to suppress these fluctuations.

Note: Using a relay in an environment where a strong magnetic field is generated by an external transformer or permanent magnet may cause the relay to malfunction even if it is magnetically shielded.



4-7) Mechanical shock

The properties of the relay may change if it is subjected to mechanical shock, such as being dropped

4-8) Contact protection

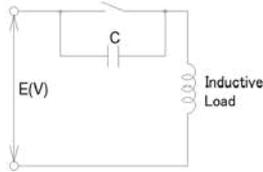
The use of contact protection elements and protection circuits can keep back EMF low, but note that using them incorrectly can have the opposite effect.

The table below shows some typical examples of contact protection circuits.

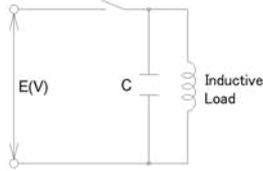
a) Inductive load

Category	Item	Circuit Example	Applications AC DC	Properties, etc.	Component selection
CR Method	CR		AC DC	When used with AC voltage, the load impedance must be significantly smaller than the CR impedance. When the contacts are opened, current flows through the capacitor and resistor to the inductive load.	CR & R values: Capacitor 0.5 to 1 μF per 1A of contact current. Resistor 0.5 to 1 Ω per 1V of contact voltage. This method is due to the nature of the inductive load and variations in relay characteristics. Please confirm this through experiments, keeping in mind that the capacitor is responsible for the discharge control effect when the contacts are opened and the resistor is responsible for limiting the current when the contacts are not latched on. Generally, the withstand voltage of the capacitor should be 200 to 300V. For AC circuits, use AC capacitors (no polarity).
	CR		AC DC	If the load is a relay or solenoid, the release time will be delayed. When the power supply voltage is 24 or 48V, it is better to connect between the loads. When it is 100 to 200V, connecting between the contacts is better.	
Diode Method	Diode		AC DC	The energy stored in the inductive load is released in the form of current to the coil via a parallel diode, and is dissipated as heat by the resistance of the inductive load.	Use a diode with a reverse withstand voltage of 10 times or more than the circuit voltage and a forward current equal to or greater than the inductive load current. If a Schottky diode is used, the circuit voltage is one-way high, depending on the reverse withstand voltage of about 1.2 to 3 times the power supply voltage (AC or DC).
	Diode + Zener Diode Method		AC DC	Use when the release time is not slow with the diode method.	The zener voltage of the zener diode should be approximately the same as the power supply voltage.
Varistor Method	Varistor		AC DC	This method uses the constant voltage characteristics of the varistor to prevent too high a voltage from being applied across the contacts. When the power supply voltage is 24 or 48V, it is better to connect between the loads. When it is DC or 200V or more, connecting between the contacts is better.	

Avoid using circuits like those shown below.



Very effective in extinguishing the arc when cut off, but because capacitance is stored in C when the contacts are opened, a short-circuit current flows in C when the contacts are closed, making them susceptible to becoming fused together.

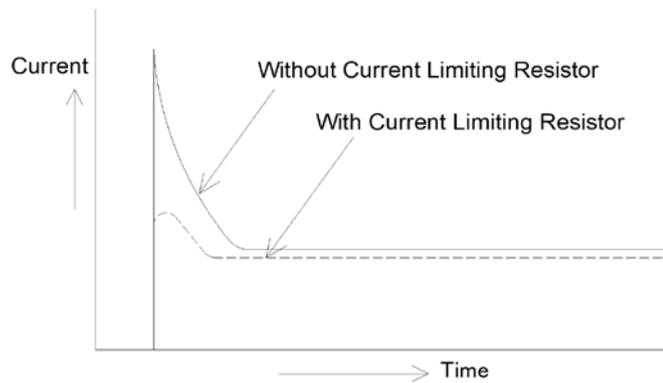


Very effective in extinguishing the arc when cut off, but a charging current flows in C when the contacts are closed, making them susceptible to becoming fused together.

b) Lamp load (inrush current), etc

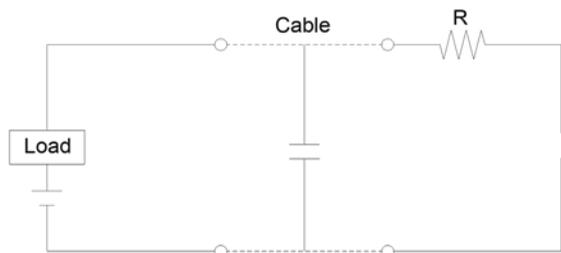
When the contact load is a lamp, motor, solenoid, capacitor, etc., an inrush current several times to several dozen times the steady-state current flows when the contact is closed. If this inrush current exceeds the allowable range, it can cause contact failure due to contact fusion or transfer of contact metal. The allowable inrush current of a reed relay is determined by factors such as the magnitude of the inrush current, its waveform, and the number of cycles required of the reed relay contacts.

Inserting a current-limiting resistor in series with the contacts is an effective way to suppress the inrush current below the maximum switching current. Please refer to the diagram to check whether the product can be used under the actual conditions.



c) Line-to-line stray capacitance

Inrush current that occurs when line-to-line stray capacitance is large can be a problem. As shown in the figure, the charge stored in the stray capacitance between the lines is discharged when the contacts are closed. The smaller the impedance of the wiring cable and the longer the cable, the greater the contact wear. Please insert a current-limiting resistor in series with the contact as a protection circuit to suppress the inrush current.



4-9) Thermoelectromotive force

When dissimilar metals are connected and the junction is kept at different temperatures, a current flows through the circuit due to the Seebeck effect. The electromotive force that generates this current is called thermoelectromotive force. For reed relays, thermal electromotive forces are generated between the dissimilar metals of the terminals, contact pieces, and contact points.

When a thermocouple is switched using a reed relay, this thermoelectromotive force can cause a difference between the measured temperature and actual temperature.

Seebeck effect :

A phenomenon when different metals A and B are bonded in a ring to create a closed circuit. The two junctions are kept at different temperatures, generating an electromotive force at the junctions and causing an electric current to flow. This is the opposite of the Peltier effect. If the temperature is reversed, the electromotive force (current) will also be reversed. This phenomenon is the mechanism behind thermocouples because it allows measurement over a relatively wide temperature range.

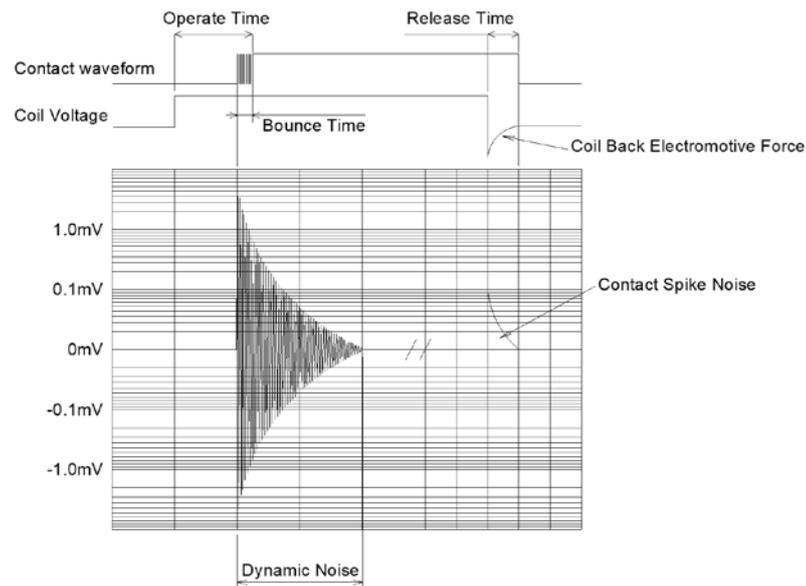
4-10) Dynamic properties of reed relays

When current flows through a reed relay, there is a consistent sequence of events that occur.

These phenomena occur regardless of the type of reed relay.

Details of these contact phenomena are shown in the figure below.

Figure: Overview of dynamic properties



Dynamic noise is a noise component that is generated mainly due to the wavering of the contacts that continues even after the bounce has ended.

Dynamic Noise

After the contacts close, the energy dissipates with damped oscillation similar to that of a plucked harp string.

During damped vibration, some areas on the contacts are stressed and generate an electrical signal.

This electrical signal is an AC audible signal with a very wide frequency range that oscillates with damped sine waves, with the amplitude and duration of the noise depending on the following conditions.

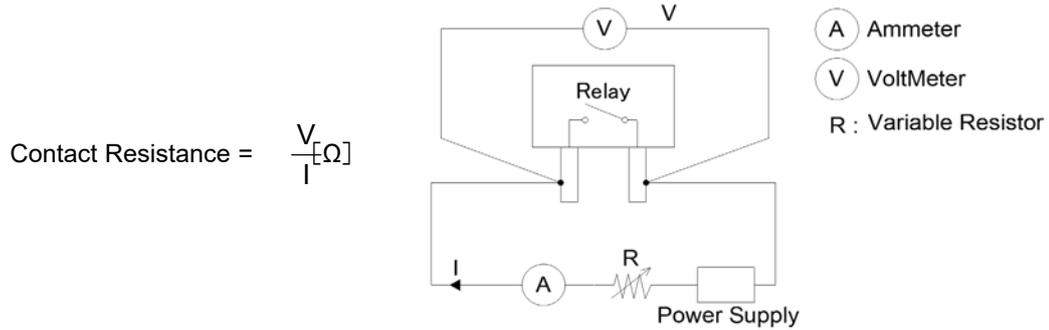
- * Contact spike noise occurs when the contacts try to separate from each other after the applied voltage on the coil is removed.
- Spring strength
- Seal glass properties
- Contact material
- Coil drive power

5) Explanation of operation and measurement

5-1) Contact resistance

Contact resistance is the combined value of the inherent resistance of the conductors that make up the circuit, such as the movable parts, terminals, and contacts, and the resistance at the point where the contacts come into contact. The contact resistance value is an initial value, and the level of this value does not indicate whether the relay will be good or bad in actual use. The contact resistance is measured using the voltage drop method (four terminal method) as shown in the figure, with a measurement current of 1mA.

Contact measurement schematic diagram



5-2) Operate and release voltage

a) Operate voltage

This is the minimum voltage required for all contacts to operate when the coil voltage is increased either suddenly or gradually.

b) Release voltage

This is the voltage at which all contacts return to their original position when the coil voltage is decreased either suddenly or gradually.

5-3) Operate time

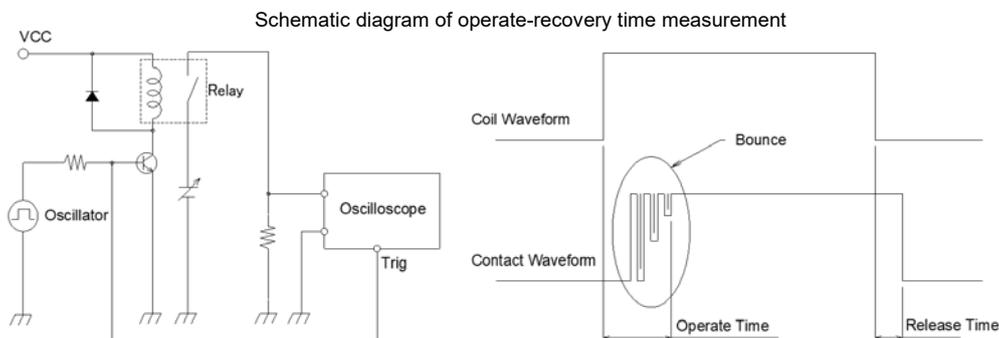
The time from when the rated voltage is applied to the coil until the contacts operate.

In the case of a reed relay with multiple contacts, unless otherwise specified, it will be the time it takes for the slowest contact to operate.

5-4) Release time

The time it takes for the contacts to return to their original position after the rated voltage is removed from the coil.

In the case of a reed relay with multiple contacts, unless otherwise specified, it will be the time it takes for the slowest contact to return to its original position.



* What is bounce?

An intermittent switching phenomenon between contacts caused by vibration from the collision of the moving part of a contact with the moving part of the opposing contact or the backstop.

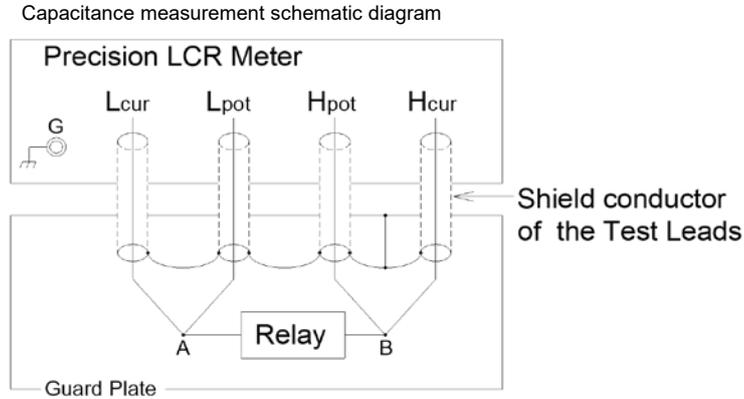
5-5) Capacitance

In a reed relay, capacitance occurs between each conductor.
The conditions for measuring capacitance are listed below.

a) Measurement conditions

Bias voltage : 1VDC

Measurement frequency : 1MHz



* When measuring capacitance, the object to be measured is suspended above the shield plate.

b) Measurement method

b-1) Points A and B are positioned based on the distance between the terminals of the relay to be measured.

b-2) The LCR Meter is calibrated.

b-3) Points A and B are connected to the relay and capacitance is measured.

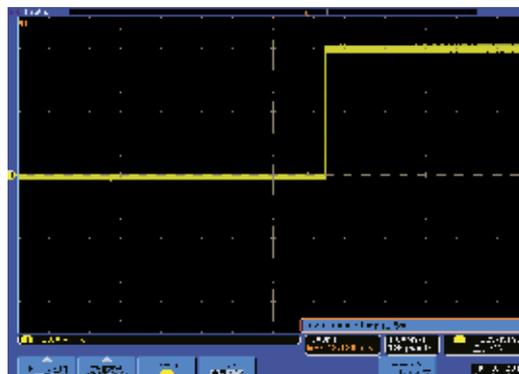
(If an electrostatic shield is attached, the terminal is connected to the GND terminal of the LCR Meter to measure the capacitance.)

5-6) Breakdown voltage

This is the limit value at which no dielectric breakdown occurs when voltage is applied for one minute to the insulated parts between contacts, coils, between conductive terminals and non-current-carrying metal parts (such as an iron core frame or iron core), or between contacts.

Testing is done in a dark room with no radiation (light or X-rays) and a leakage current (current for detecting dielectric breakdown) of 1mA.

A distinctive feature of this test is that it is performed using a fast rising waveform when measuring the breakdown voltage. (The voltage waveform during a breakdown voltage test is shown below.)



Oscilloscope Settings
Voltage range : 50V/div
Frequency range : 1ms/div

Example of voltage waveform when 200V is applied

5-7) Insulation resistance

This refers to the resistance of the insulated parts between contacts/coils/conductive terminals and non-current-carrying metal parts (such as an iron core frame or iron core), or between contacts themselves.

This value is for the relay alone and does not include the lands on the PCB, etc.

5-8) High-frequency properties

At Sanyu, when testing high-frequency properties, we mainly evaluate the following.

TDR(Time Domain Reflectometry)

TDT(Time Domain Transmission)

Isolation

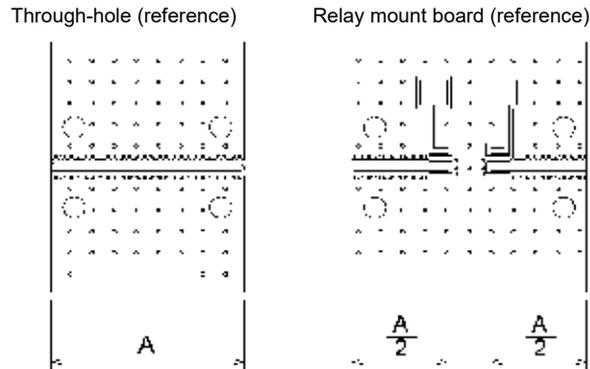
Insertion Loss

Return Loss

a) Measurement board

We use the following types of boards for evaluation.

Please note that the wiring on the board may differ depending on the product shape.



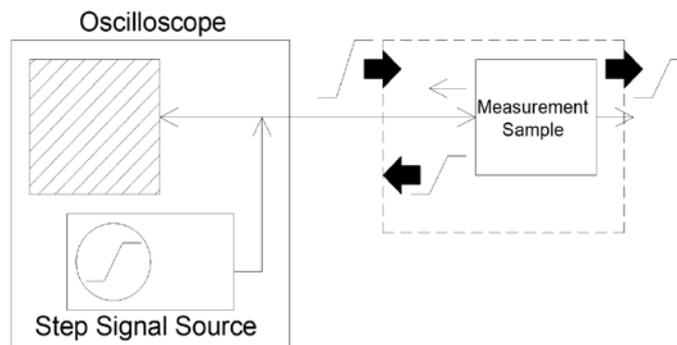
The characteristic impedance of the transmission line is 50 Ω.

(Board specifications used are an example.)

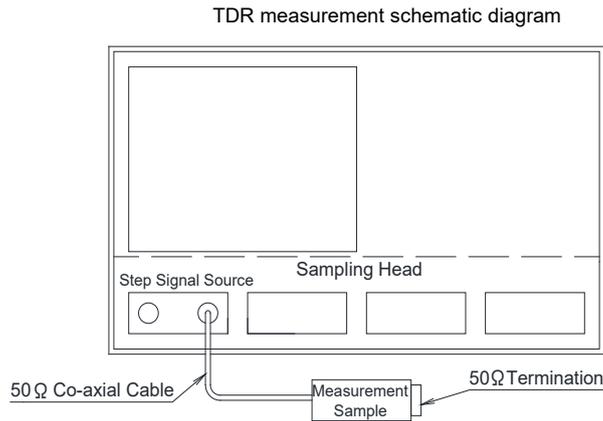
b) TDR/TDT

TDR measurements consist of a step signal source and a wideband oscilloscope to capture the reflected signal at the impedance discontinuity in the transmission line and display the voltage and impedance values of the reflected signal as a function of time. Additionally, measurement of the propagated transmission signal is called TDT and is used to measure propagation delay.

Since transmitted signals are distorted by reflections and delays, TDR/TDT provide intuitive measurement results and are essential evaluation criteria.

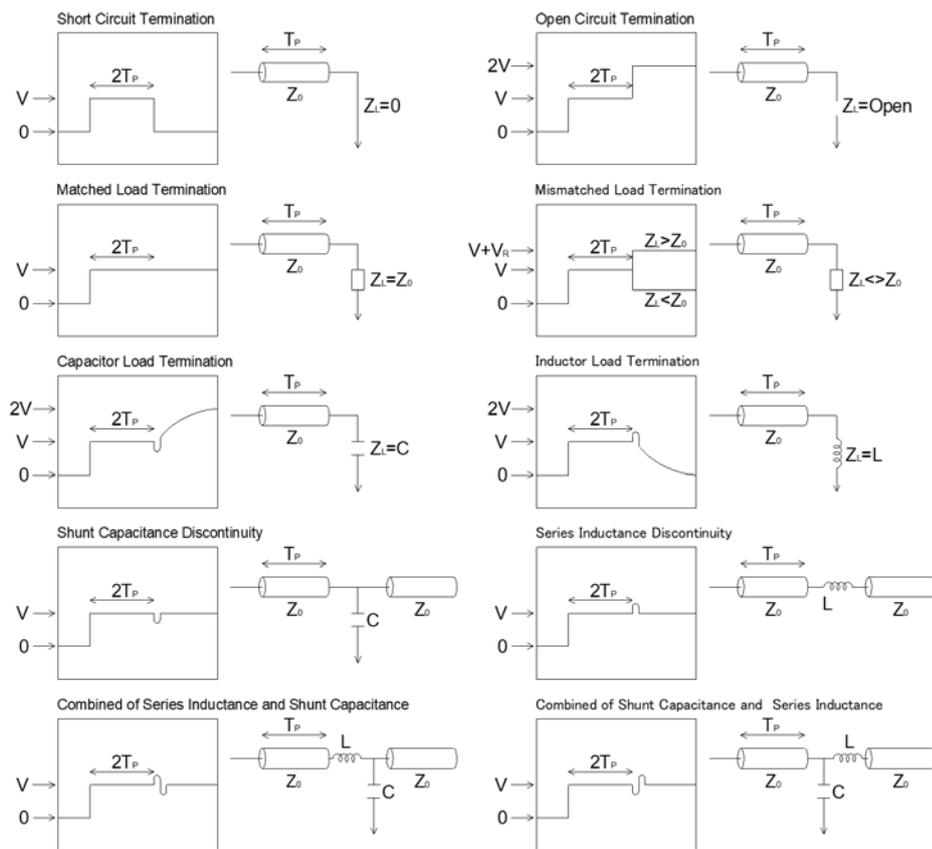


b-1) TDR measurement overview

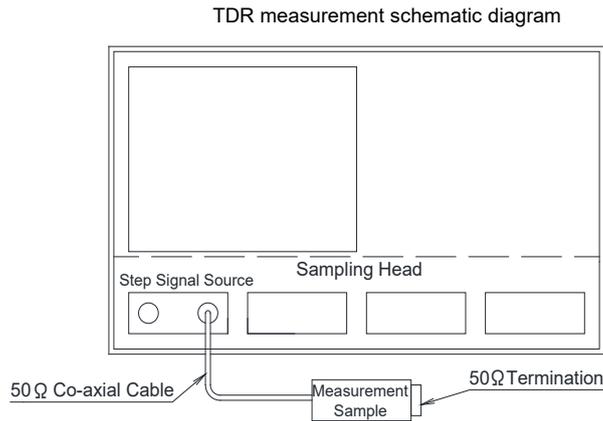


b-2) Measurement method

When the device under test is connected to the measurement equipment and output is started from the TDR signal source channel, a waveform appears on the wideband oscilloscope screen. The impedance state of the measurement sample can be understood from the waveform. An example of a TDR measurement waveform is shown below.

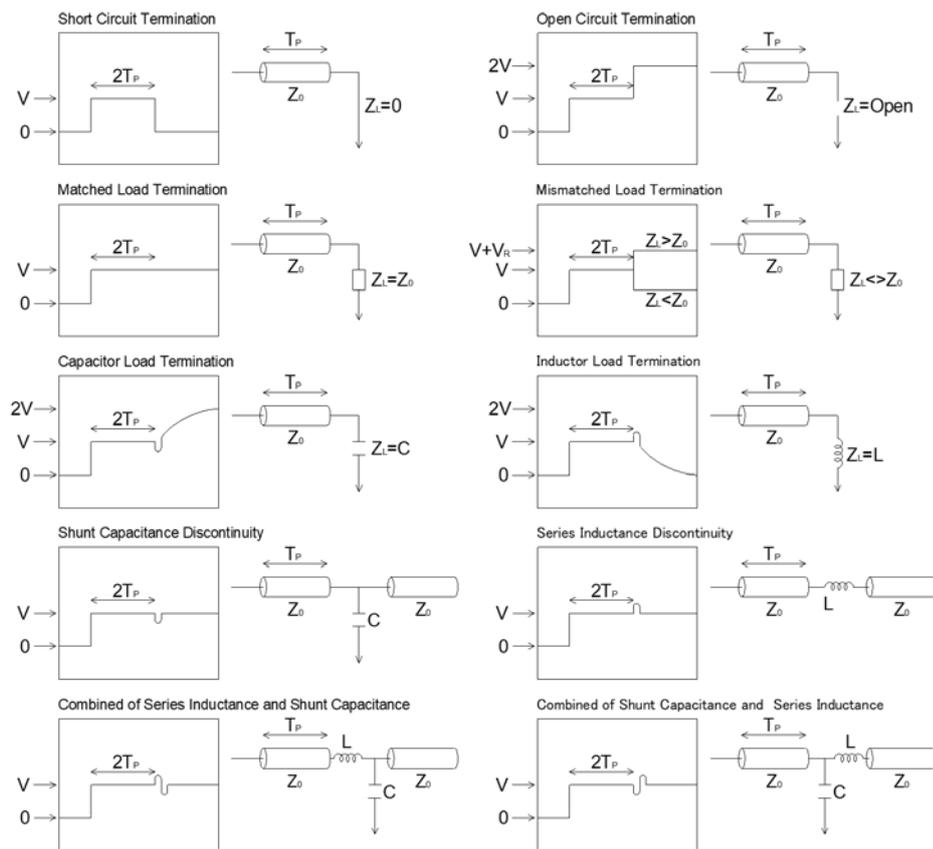


b-1) TDR measurement overview

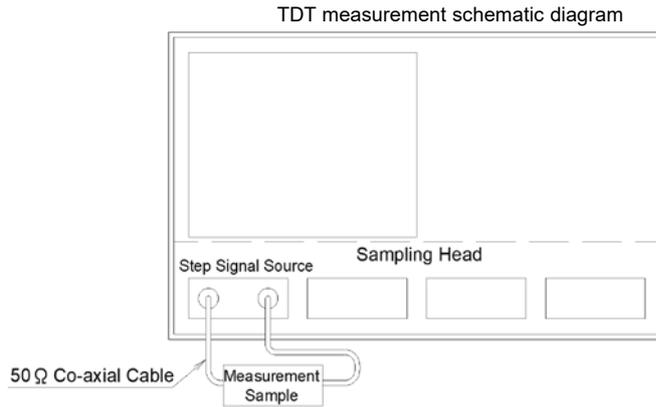


b-2) Measurement method

When the device under test is connected to the measurement equipment and output is started from the TDR signal source channel, a waveform appears on the wideband oscilloscope screen. The impedance state of the measurement sample can be understood from the waveform. An example of a TDR measurement waveform is shown below.

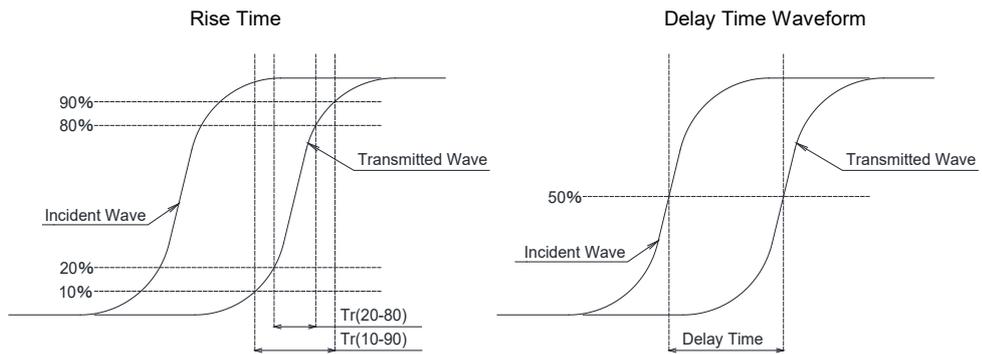


b-3) TDT measurement overview



b-4) Measurement method

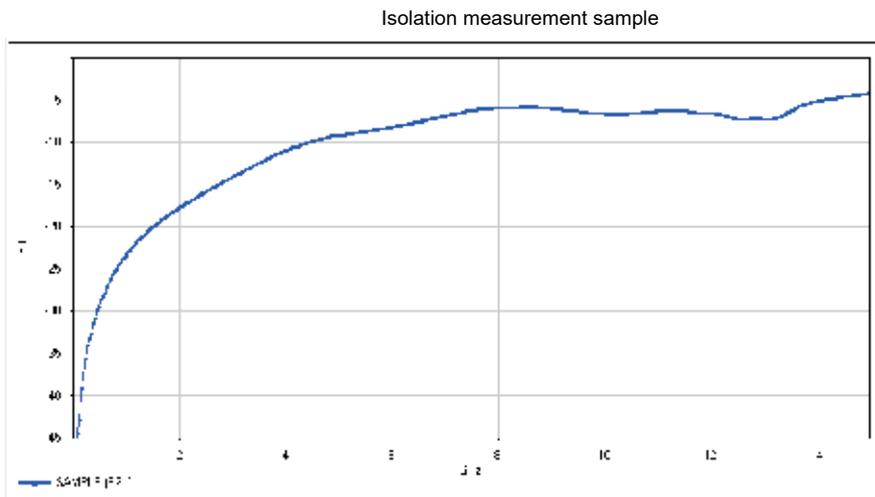
The voltage output from the step signal source is applied to the measurement sample and the transmitted wave is monitored. An example of a TDT measurement waveform is shown below.



c) Isolation

This indicates the degree of insulation for high-frequency signals.

Even when the relay contacts are open, high-frequency signals can leak due to stray capacitance. The insulation that suppresses this leakage is called isolation. An example of an isolation measurement result is shown below.



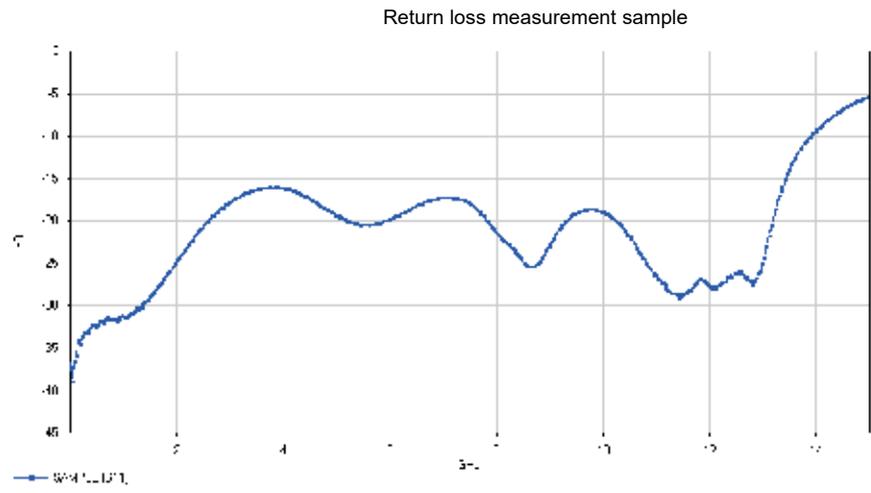
d) What is insertion loss?

This refers to the high-frequency signal insertion loss in the transmission line (when the relay is closed). It represents the loss due to impedance mismatch in the circuit of the device under test.



e) What is return loss?

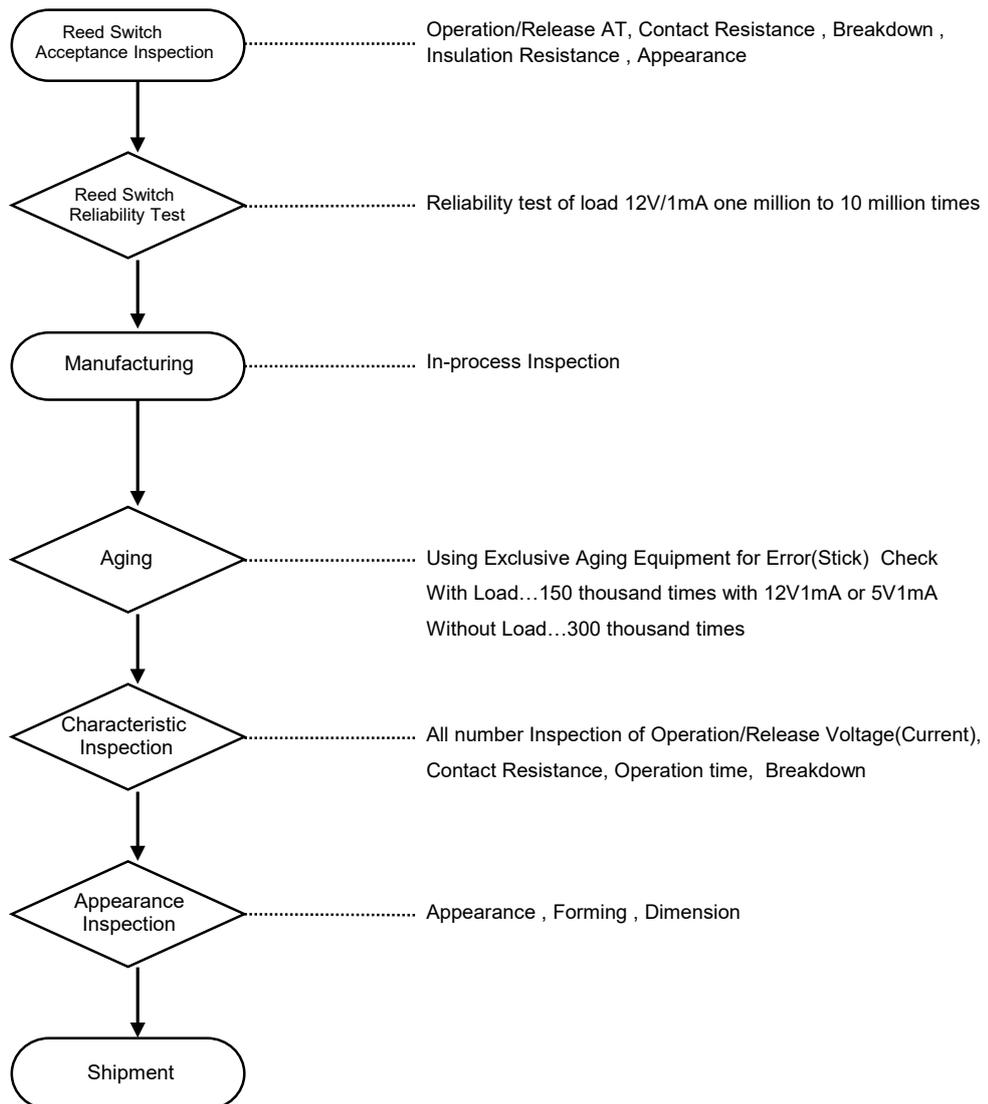
This refers to the reflection from the device under test (when the relay is closed). When an incident wave in a transmission line encounters an impedance mismatch, a reflected wave is generated. If the impedance is matched, there will be no reflections.



f) Regarding of high frequency data
We can provide a high frequency data of our products with De-embedding.
Please feel free to ask our sales team.

6) Reed and mercury relay quality

Quality control is carried out according to the following flow chart.



6-1) Aging (with and without load)

Although the contact points are plated, the surfaces are covered in countless tiny irregularities.

If left in this state, the contact resistance will become slightly unstable, so aging is done to smooth and stabilize the contact surface.

Terms of Use Agreement

We sincerely thank you, our valued customer, for your continued patronage and use of our products. Unless otherwise agreed upon at the time of purchase of Our Products, the conditions based on these terms of acceptance will apply to the contents listed in the Catalogs, Etc. Please be sure to read and understand these terms of acceptance before using or ordering.

1. Terms

The terms referred to in this agreement are as follows:

- 1) Our Products:
Refers to the relay products manufactured and sold by our company.
- 2) Catalogs, Etc.:
Refers to comprehensive catalogs, individual catalogs, specifications, manuals, etc. related to Our Products. This also includes what is provided through electronic media.
- 3) Suitability, Etc.:
Refers to (a) suitability, (b) operation, (c) non-infringement of third-party intellectual property, (d) compliance with laws and regulations, and (e) compliance with various rules regarding customer use of Our Products.

2. Request for Use

Our company strives to improve quality and reliability, but we cannot reduce the probability of failure to zero. Therefore, when using our products, please design for safety so that no damages such as personal injury or fire accidents occur.

3. Conditions listed in Catalogs, Etc.

- 1) Rated and performance values are based on individual tests, these values under combined conditions are not guaranteed.
- 2) The reference data is provided strictly for reference, and it is not a guarantee of the same results.
- 3) The usage examples are for reference only, and our company does not guarantee "Suitability, Etc."
- 4) "Catalogs, Etc." are provided for customers to consider ordering Our Products and, except in cases where it is permitted by law, unauthorized reproduction or use of the content for purposes other than intended is strictly prohibited.
- 5) The contents of this catalog may be subject to change without notice due to product improvements or other circumstances.



[Inquiries] Japan e-mail: sanyusales@standexelectronics.com
 Singapore e-mail: sales@sanyu-sg.com

Head Office/Tokyo Sales Office/Overseas Sales
Maruwa building 3-9-23 Nishigotanda, Shinagawa-ku, Tokyo, Japan 141-0031
TEL: +81-3-3490-2251 FAX: +81-3-3490-5677

Osaka Sales Office
Krepis21 4-6-3 Toyosaki, Kita-ku, Osaka-shi, Osaka, Japan 531-0072
TEL: +81-6-6377-5502 FAX: +81-6-6377-5588

Kyushu Sales Office
1639-2 Muro Ozu-machi, Kikuchi-gun, Kumamoto, Japan 869-1235
TEL: +81-96-213-4550 FAX: +81-96-213-4551

Singapore Sanyu Electric Pte. Ltd.
Block 4010, Ang Mo Kio Ave.10, #05-14, Techplace1, Singapore 569626
TEL: +65-6458-2377



A Standex **Electronics** Business