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(радиодетали) СО СКЛАДА И ПОД ЗАКАЗ

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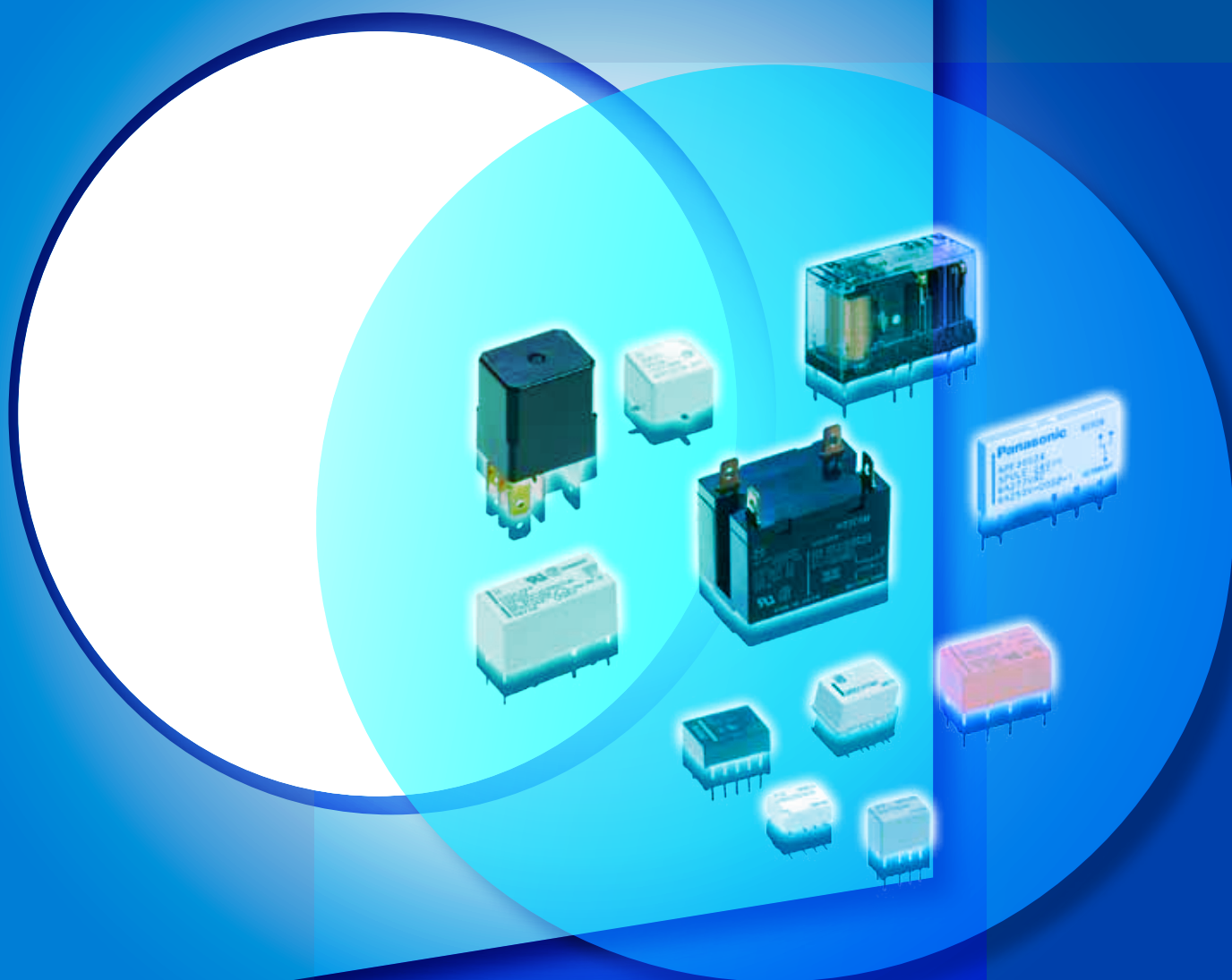
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рис. маркировка габариты размер параметры применение

RELAY CATALOG PART 1

ELECTROMECHANICAL RELAYS

PART2: PHOTOMOS & SOLID STATE RELAYS



Notes and Guidelines

Panasonic is part of a large worldwide group selling relays and associated switching products under different brand names in different territories. The conditions of use in some territories may differ from those customary in Europe. In particular there are often major differences in regard to national and international specifications, such as UL, CSA, VDE, SEV, EVE, SEMKO, etc. Thus, when considering contact loads as stated in this catalogue (e.g. 10 A, 30 VDC for the SP relay) it should be understood that these values are not necessarily an absolute maximum but tested ratings. Mostly the stated value has been tested for a certain life expectancy as stated by the manufacturer or the respective test house. Thus, under different conditions, the stated "maximum" may, in practice, be safely exceeded.

Therefore consideration should be given to each specific application for:

- rating and type of load
- switching frequency - cycles per second (or minute)
- environmental conditions

A general statement of compliance on data sheets, publicity, etc. concerning industrial standards, approvals or certification may imply compliance to a certain standard is available. However, because of the multiplicity of types available, in general not all types within the product family are covered to the same extent by the standard. Thus, in the event of a specific query regarding a particular product and its compliance with the standard, users are asked to refer to Panasonic for detailed information.

In case of uncertainty, contact should be made with Panasonic locally to ascertain the likelihood of the relay meeting the required life expectancy in the specific planned operational circumstances. It is also pointed out that in this book, and in deviation from EN / IEC 61810-1, operational life data is given under a normal ambient temperature of about 25°C.

The features and specifications quoted have been carefully tested using modern methods and represent the values which are to be expected with a product in new condition at room temperature. They are not guaranteed values and may change during operational life or due to ambient influences. Statistical test information covering major operating features is available on request. Panasonic reserves the right to make alterations and changes to specifications without notice from time to time as may be deemed necessary.

Application of the EC Directives to All-or-Nothing Relays

1 EMC Directive

The EMC Directive concerns primarily the finished products. In applying the Directive to components, the Guidelines¹ should be consulted to determine whether the component in question has a “direct function”. Electric motors, power supply units or temperature controls represent examples of such components with “direct function”. These types of components must be provided with a CE marking.

Components which are integrated into a device, such as relays, do not have an independent function of their own. A given relay may perform differing functions in different devices. Consequently, all-or-nothing relays must be considered components without “direct function” which are not subject to the EMC Directive.

All-or-nothing - be they electro-mechanical relays or solid state relays - shall not be labeled with a CE marking nor shall a declaration of conformity be issued within the scope of the EMC Directive.

2 Low Voltage Directive

Relays with terminals for printed boards/plug-and-socket connections do not come within the purview of the Low Voltage Directive.

The Low Voltage Directive concerns electrical equipment intended for incorporation into a device as well as equipment intended for direct use. In the case of electrical equipment which is considered a basic component intended for incorporation into other electrical equipment, the properties and safety of the final product will be largely dependent on how it is integrated: as such, these components do not fall within the Low Voltage Directive and shall not be CE marked. The Guidelines² specifically cite electro-mechanical basic components such as connectors, relays with terminals for printed circuit boards and micro switches. They are therefore not subject to the scope of the Low Voltage Directive.

Except for larger relays which may, for example, find application in switching cabinets, the same

considerations apply to common-place relays with plug-in connections available also with printed board terminals. Here again, safety is a function of the individual application. In evaluating these relays' performance from the perspective of the Low Voltage Directive, the same conclusion is reached as with the printed board relay. As such, CE marking is not mandatory for this type of relay.

3 Machinery Directive

The Machinery Directive differentiates between machines, machine parts and safety components. Relays are not part of any of these categories. The listing of safety components in Appendix IV is conclusive and does not include relays.

Consequently, a CE marking shall not be affixed nor shall a declaration of conformity or manufacturer's declaration be issued under the Machinery Directive.

As of this moment, none of the aforementioned directives require CE marking for all-or-nothing relays³.

4 RoHS Directive

The substances prohibited by the RoHS Directive (Pb, Hg, Cd, Cr⁺⁶, PBB, PBDE) concern 10 categories of devices that are mostly, but not entirely, intended for private use. Components such as relays are not listed in these categories. Therefore they do not directly fall within the scope of this directive. However, if the user employs relays in devices that fall within the scope of this directive, the user must also acknowledge the substances prevented. In order to adapt to this situation in good time, all Panasonic relays are generally RoHS compliant.

1. Guidelines (version dated March 22, 2007) for the Application of the Council Directive 2004/108/EC.

2. Guidelines (version dated August 2007) for the Application of the Council Directive 2006/95/EC.

3. This writing deals exclusively with “non-specified-time all-or-nothing relays”. The abbreviated term “all-or-nothing relay” has been introduced merely for purposes of convenience. The term includes solid state all-or-nothing relays.

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DY RELAYS (ADY)	157	CT RELAYS <POWER TYPE>	462
DW RELAYS (ADW1)	162	CV RELAYS (ACV)	467
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CB RELAYS	413	JT-V RELAYS	274
CJ RELAYS (ACJ)	424	JV-N RELAYS	278
CM RELAYS	430	JW RELAYS	281
CN-H RELAYS (ACNH)	435	LA RELAYS (ALA)	287
CN-M RELAYS (ACNM)	439	LD RELAYS (ALD)	291
CP RELAYS <POWER TYPE>	448	LD-P RELAYS (ALDP)	294
CP RELAYS	444	LE RELAYS (ALE)	298
CQ RELAYS	452	LF RELAYS (ALF)	308
CT RELAYS (ACT)	456	LF-G RELAYS (ALFG)	303
CT RELAYS <POWER TYPE>	462	LK-G RELAYS	312
CV RELAYS (ACV)	467	LK-P RELAYS	316
CW RELAYS (ACW)	472	LK-Q RELAYS	319
DE RELAYS (ADE)	122	LK-T RELAYS	323
DJ RELAYS (ADJ)	127	LQ RELAYS (ALQ)	327
DK RELAYS	136	LZ RELAYS (ALZ)	332
DQ RELAYS (ADQ)	143	PA RELAYS	336
DQ-M RELAYS (ADQM)	146	PF RELAYS (APF)	341
DS RELAYS	56	PQ RELAYS	347
DS2Y RELAYS	61	RA RELAYS (ARA)	352
DS-P RELAYS	150	RD COAXIAL SWITCHES (ARD)	357
DW RELAYS (ADW1)	162	RE RELAYS (ARE)	371
DY RELAYS (ADY)	157	RJ RELAYS (ARJ)	375
EB RELAYS (AEB)	475	RN RELAYS (ARN)	380
EP RELAYS (AEP)	166	RS RELAYS (ARS)	387
EV RELAYS (AEV)	480	RV COAXIAL SWITCHES (ARV)	398
EV RELAYS (AEVS) Quiet Type	488	S RELAYS	174
GN RELAYS (AGN)	64	SF2D RELAY	506
GQ RELAYS (AGQ)	69	SF3 RELAY	509
HC RELAYS	194	SF4D RELAY	512
HE RELAYS PV Type	224	SFN4D RELAY	516
HE RELAYS	216	SF-RELAYS Slim type	524
HJ RELAYS	230	SF-Y RELAY	533
HL RELAYS	241	SP RELAYS	180
HN RELAYS (AHN)	249	ST RELAYS	188
HY RELAYS	74	TQ RELAYS	78
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JJ-M RELAYS	494	TX RELAYS	90
JM RELAYS	259	TX-D RELAYS	97
JQ RELAYS	263	TX-S RELAYS	109
JS RELAYS	269		

Electromechanical Relays

Selector Chart

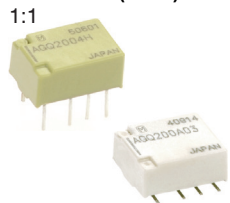

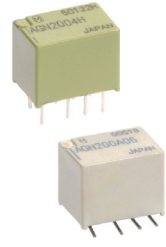
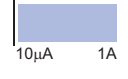
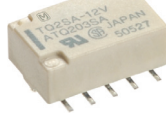

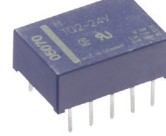
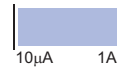
Signal Relays

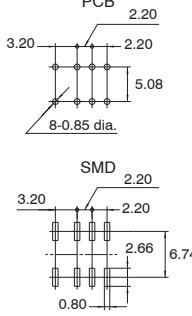
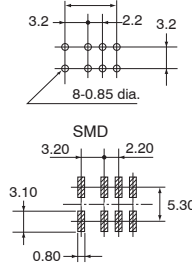
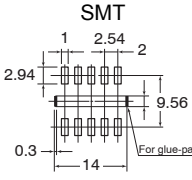
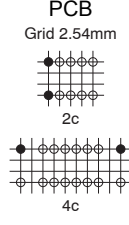
Mechanical Relays Selector Chart

About the Selector Chart

This selector chart is designed to help you quickly select a relay best suited for your needs. Please note: the values given for switching current and switching voltage do not necessarily indicate standard operating conditions. For the nominal switching





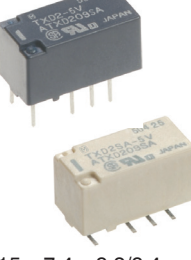

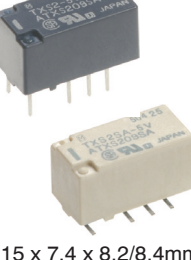

capacity and other critical values, please refer to the respective data sheet or contact your Panasonic representative.

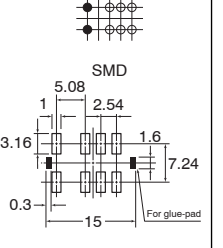
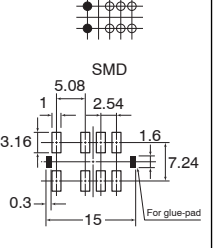
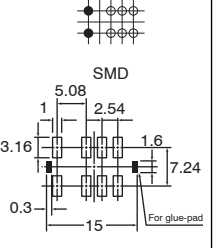
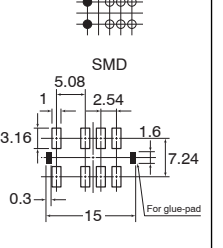
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
<p>★ GQ (SMD)</p> <p>1:1</p>  <p>10.6 x 7.2 x 5.2/5.4mm</p>	<ul style="list-style-type: none"> Compact flat body saves space Outstanding surge resistance The use of twin crossbar contacts ensures high contact reliability High sensitivity 100mW type available 	<p>Max.: 2A Min.: 10μA</p> 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 6, 9, 12, 24V
<p>★ GN (SMD)</p> <p>1:1</p>  <p>10.6 x 5.7 x 9.0mm</p>	<ul style="list-style-type: none"> Compact slim body saves space Outstanding surge resistance The use of twin crossbar contacts ensures high contact reliability High sensitivity 100mW type available 	<p>Max.: 1A Min.: 10μA</p> 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 6, 9, 12, 24V
<p>★ TQ (SMD)</p> <p>1:1</p>  <p>14 x 9 x 5.6mm</p>	<ul style="list-style-type: none"> Ultra low profile 5.8mm Surge withstand 2,500V 3 types of surface-mount terminals available 	<p>Max.: 2A Min.: 10μA</p> 	<ul style="list-style-type: none"> 220V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
<p>TQ (THT)</p> <p>1:1</p>  <p>14 x 9 x 5mm</p>	<ul style="list-style-type: none"> 1,500V FCC 	<p>Max.: 1A Min.: 10μA</p> 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c	(DC) 3, 4.5, 5, 6, 9, 12, 24, 48V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
<p>Single side stable: 140mW (1.5 - 12V DC) 230mW (24V DC)</p> <p>1 coil latching: 100mW (1.5V - 12V DC) 120mW (24V DC)</p>	750Vrms	1000Vrms	1500Vrms	1,500V FCC 2,500V Telcordia	<p>PCB, SMT</p> 	69 BSI, CSA, UL
<p>Single side stable: 140mW (1.5 - 12V DC) 230mW (24V DC)</p> <p>1 coil latching: 100mW (1.5V - 12V DC) 120mW (24V DC)</p>	750Vrms	1000Vrms	1500Vrms	1,500V FCC 2,500V	<p>PCB, SMT</p> 	64 BSI, CSA, UL
<p>Single side stable: 140mW (up to 12V DC) 200mW (24V DC) 300mW (48V DC)</p> <p>1 coil latching: 70mW (up to 12V DC) 100mW (24V DC)</p> <p>2 coil latching: 140mW (up to 12V DC) 200mW (24V DC)</p>	1000Vrms	1500Vrms	1500Vrms	1,500V FCC 2,500V Telcordia	<p>SMT</p> 	78 CSA, UL
<p>Single side stable: 140mW (3 - 12V DC) 200mW (24V DC) 300mW (48V DC)</p> <p>1 coil latching: 100mW (3 - 12V DC) 150mW (24V DC)</p> <p>2 coil latching: 200mW (3 - 12V DC) 300mW (24V DC)</p>	750Vrms	1000Vrms	1000Vrms	1,500V FCC	<p>PCB</p> <p>Grid 2.54mm</p> 	78 CSA, UL

Signal Relays

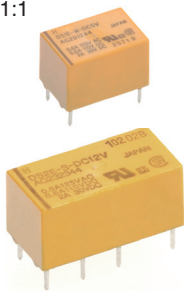

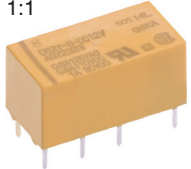

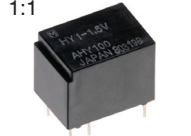
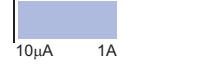
Mechanical Relays Selector Chart

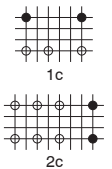
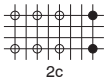
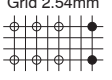
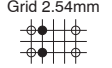
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
★ TX (SMD)  1:1 15 x 7.4 x 8.2mm	<ul style="list-style-type: none"> Surge withstand 2,500V Breakdown voltage between contacts and coil 2,000V 3 types of surface-mount terminals available Added new pin layout (LT type) in 2 coil latching type 	Max.: 2A Min.: 10 μ A 	<ul style="list-style-type: none"> 220V DC 220V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
★ TX-TH (SMD)  1:1 15 x 7.4 x 8.2mm	<ul style="list-style-type: none"> Controlled 7.5A inrush current 2 types of pin layouts 3 types of surface mount terminals available 	Max.: 7.5A Min.: 10 μ A 	<ul style="list-style-type: none"> 220V DC 250V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
TX-D (SMD)  1:1 15 x 7.4 x 8.2/8.4mm	<ul style="list-style-type: none"> High-insulation relay that conforms to the insulation level provided for in the EN41003 3 types of surface-mount terminals available High-insulation relay that conforms to the insulation level provided for in the EN60950 Surge breakdown voltage 6kV (contacts to coil) available 	Max.: 2A Min.: 10 μ A 	Break Before Make: <ul style="list-style-type: none"> 220V DC 250V AC Make Before Break: <ul style="list-style-type: none"> 125V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24V
TX-S (SMD)  1:1 15 x 7.4 x 8.2/8.4mm	<ul style="list-style-type: none"> Higher sensitivity Nominal operating power, 50mW 1,500V FCC 3 types of surface-mount terminals available Added new pin layout (LT type) in 2 coil latching type 	Max.: 1A Min.: 10 μ A 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: 140mW (up to 24V DC) 270mW (48V DC) 1 coil latching: 100mW 2 coil latching: 200mW	1000Vrms	1000Vrms	2000Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 5.08 1 2.54 3.16 1.6 0.3 7.24 15 For glue-pad	90 BSI, CSA, UL
Single side stable: 140mW (up to 24V DC) 270mW (48V DC) 1 coil latching: 100mW (up to 24V DC) 2 coil latching: 140mW (up to 24V DC)	1000Vrms	1000Vrms	2000Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 5.08 1 2.54 3.16 1.6 0.3 7.24 15 For glue-pad	116 BSI, CSA, UL
Single side stable: 200mW (1.5 - 12V DC) 230mW (24V DC) 1 coil latching: 150mW (1.5 - 12V DC) 170mW (24V DC)	1000Vrms	1000Vrms	3000Vrms	6,000V for fax machines & lighting ballasts	PCB, SMT PCB, grid 2.54mm  SMD 5.08 1 2.54 3.16 1.6 0.3 7.24 15 For glue-pad	97 BSI, CSA, UL
Single side stable: 50mW (1.5 - 12V DC) 70mW (24V DC) 1 coil latching: 35mW (1.5 - 12V DC) 50mW (24V DC) 2 coil latching: 70mW (1.5 - 12V DC) 150mW (24V DC)	750Vrms	1000Vrms	1800Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 5.08 1 2.54 3.16 1.6 0.3 7.24 15 For glue-pad	109 BSI, CSA, UL

Signal Relays











Mechanical Relays Selector Chart

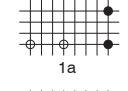
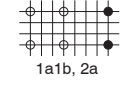
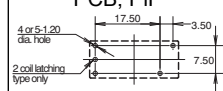
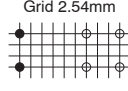
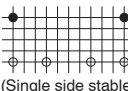
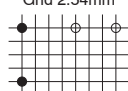
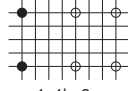
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
DS 1:1  15/20 x 9.9 x 9.9mm	<ul style="list-style-type: none"> 1,500V FCC High switching power 	Max.: 2A Min.: 10μA 	<ul style="list-style-type: none"> 220V DC 250V AC 	1c, 2c	(DC) 1.5, 3, 5, 6, 9, 12, 24, 48V
★ DS2Y 1:1  20 x 9.9 x 9.3mm	<ul style="list-style-type: none"> High sensitivity 2 Form C contact 1,500V FCC Sealed construction 	Max.: 2A Min.: 10μA 	<ul style="list-style-type: none"> 220V DC 250V AC 	2c	(DC) 1.5, 3, 5, 6, 9, 12, 24, 48V
HY 1:1  12 x 7.4 x 10.1mm	<ul style="list-style-type: none"> High sensitivity 150mW / 200mW 	Max.: 1A Min.: 10μA 	<ul style="list-style-type: none"> 60V DC 	1c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
S type: Single side stable: 200mW 1 coil latching: 90mW 2 coil latching: 180mW	1000Vrms (DS1-S: 500Vrms)	1000Vrms	1500Vrms (DS1-S: 1000Vrms)	1,500V FCC	PCB Grid 2.54mm  1c  2c	56 CSA, UL
Single side stable: 200mW (up to 24V DC) 300mW (48V DC)	750Vrms	1000Vrms	1000Vrms	1,500V FCC	PCB Grid 2.54mm 	61 CSA, UL
Standard: 200mW High sensitivity: 150mW	500Vrms	—	1000Vrms	—	PCB Grid 2.54mm 	74 CSA, UL






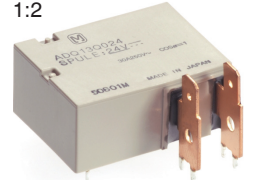

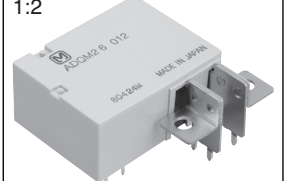

Polarized Power Relays

Mechanical Relays Selector Chart

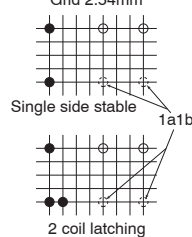
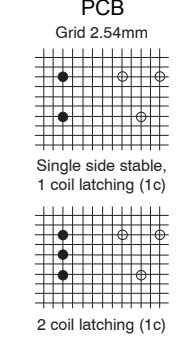
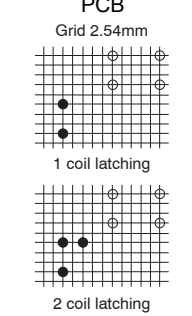
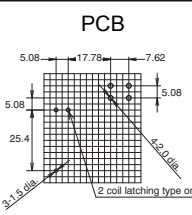
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
★ DSP  1:2 20.2 x 11 x 10.5mm	<ul style="list-style-type: none"> High switching capacity High sensitivity High breakdown voltage Miniature high-power relay Creepage and clearance distance min. 4mm 	Max.: 8A (1a)  5A (1a1b, 2a) 	<ul style="list-style-type: none"> 220V DC 400V AC 	1a, 1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24V
★ DW  1:2 24 x 10 x 18.8mm	<ul style="list-style-type: none"> Pin-in-Paste version available Surge withstand voltage between coil and contact: 12,000V Breakdown voltage between coil and contact: 5,000V rms Conforms to EN 60335 Creepage and clearance distance min. 6mm 	Max.: 8A (1a) 	<ul style="list-style-type: none"> 250V AC 	1a	(DC) 3, 5, 6, 9, 12, 24V
★ DE  1:2 25 x 12.5 x 12.5mm	<ul style="list-style-type: none"> Conforms to VDE0631 Low coil power Compact body saves space High switching capacity: 16A = 25,000 10A = 100,000 switching cycles Creepage and clearance distance min. 8mm 	Max.: 10/16A (1a)   8A (1a1b, 2a) 	<ul style="list-style-type: none"> 230V DC 440V AC 	1a, 1a1b, 2a	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
ST  1:2 31 x 14 x 11.3mm	<ul style="list-style-type: none"> High capacity in small size High inrush capability Latching type available Frictionless pivoted rotating armature High breakdown voltage Socket available Not for new applications Creepage and clearance distance min. 4mm 	Max.: 8A Min.: 1mA 	<ul style="list-style-type: none"> 250V DC 400V AC 	1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24, 48V
DK  1:2 20 x 12.5 x 9.7mm	<ul style="list-style-type: none"> Dimensions for 1a = 12.5mm, for 2a, 1a1b = 15mm Low coil power Creepage and clearance distance min. 8mm: DK2A-L2 min. 6.8mm DK1A1B-L2 min. 6.8mm 	Max.: 10A (1a)  8A (1a1b, 2a) 	<ul style="list-style-type: none"> 125V DC 400V AC 	1a, 1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: 300mW 1 coil latching: 150mW 2 coil latching: 300mW	1000Vrms	2000Vrms	3000Vrms	5,000V	PCB Grid 2.54mm  1a  1a1b, 2a	150 CSA, SEV, TÜV, UL
Single side stable: 200mW 2 coil latching: 400mW	1000Vrms	—	5000Vrms	12,000V	PCB, PiP  4 pins, 1.20 dia. hole 2 coil latching type only	162 CSA, TÜV, UL
Single side stable: 200mW 1 coil latching: 100mW 2 coil latching: 200mW	1000Vrms	4000Vrms (1a1b, 2a)	5000Vrms	12,000V	PCB Grid 2.54mm 	122 CSA, TÜV, UL, VDE
Single side stable: 240mW 1 coil latching: 130mW 2 coil latching: 240mW	1200Vrms	2000Vrms	3750Vrms	6,000V	PCB Grid 2.54mm  (Single side stable)	188 CSA, SEV, TV rating, UL, VDE
Single side stable: 200mW 2 coil latching: 200mW	1000Vrms	4000Vrms	4000Vrms	10,000V	PCB Grid 2.54mm  1a  1a1b, 2a	136 CSA, SEV, TÜV, UL, VDE

Polarized Power Relays


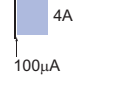
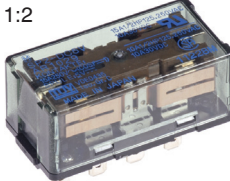

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
DY 1:2  20 x 15 x 9.7mm	<ul style="list-style-type: none"> Low cost, polarized power relay 1a1b-contact arrangement is pin-compatible to DK1a1b Latching type available Creepage and clearance distance min. 6mm 	Max.: 10A (1a)  10A 8A (1a1b)  8A	<ul style="list-style-type: none"> 125V DC 380V AC 	1a, 1a1b	(DC) 3, 5, 6, 12, 24V
DJ 1:2  29 x 13 x 16/16.5mm	<ul style="list-style-type: none"> Latching type available Compact with high capacity Low coil power Optional available with manual test button Creepage and clearance distance min. 8mm 	Max.: 16A  16A	<ul style="list-style-type: none"> 125V DC 400V AC 	1a, 1b, 1c, 1a1b, 2a, 2b, 2c	(DC) 5, 6, 12, 24, 48V
DQ 1:2  38 x 29 x 17.3mm	<ul style="list-style-type: none"> Latching type available Compact with high capacity High insulation Creepage and clearance distance min. 8mm 	Max.: 30A  30A	<ul style="list-style-type: none"> 250V DC 250V AC 	1a	(DC) 4.5, 6, 9, 12, 24V
DQM 1:2  44 x 40.4 x 17.3mm	<ul style="list-style-type: none"> Miniature 60A polarized power relay Latching type available High insulation Creepage and clearance distance min. 8mm 	Max.: 60A  60A	<ul style="list-style-type: none"> 250V AC 	1a	(DC) 4.5, 6, 9, 12, 24V

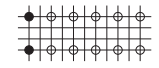
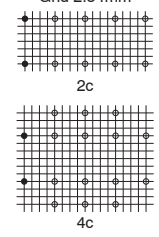
Mechanical Relays Selector Chart

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: 200mW 2 coil latching: 200mW	1000Vrms	4000Vrms	4000Vrms	10,000V	PCB Grid 2.54mm  Single side stable 1a1b 2 coil latching	157 CSA, TÜV, UL
Single side stable: 250mW 1 coil latching: 150mW 2 coil latching: 250mW	1000Vrms	—	4000Vrms	10,000V	PCB Grid 2.54mm  Single side stable, 1 coil latching (1c) 2 coil latching (1c)	127 CSA, SEV, TÜV, UL, VDE
1 coil latching: 500mW 2 coil latching: 1000mW	1500Vrms	—	4000Vrms	10,000V	PCB Grid 2.54mm  1 coil latching 2 coil latching	143 CSA, UL
1 coil latching: 500mW 2 coil latching: 1000mW	1500Vrms	—	4000Vrms	10,000V	PCB  2 coil latching type only	146 —

Polarized Power Relays










Mechanical Relays Selector Chart

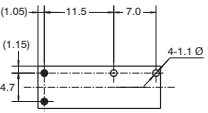
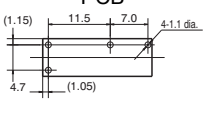
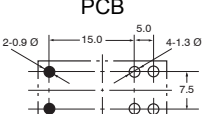
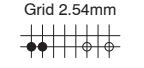
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
S 1:2  28 x 12 x 10.4mm	<ul style="list-style-type: none"> High switching capacity range due to 5-layer contact High sensitivity High vibration and shock resistance Low thermal electromotive force (approx. 3μV) Latching type available Sockets available 	Max.: 4A Min.: 100μA 	<ul style="list-style-type: none"> 200V DC 250V AC 	2a2b, 3a1b, 4a	(DC) 3, 5, 6, 12, 24, 48V
SP 1:2  2c: 50 x 25.6 x 22mm 4c: 50 x 36.8 x 22mm	<ul style="list-style-type: none"> Polarized power relay with rotating armature High sensitivity High vibration and shock resistance Wide switching range Latching type available Socket available 	Max.: 15A 	<ul style="list-style-type: none"> 110V DC 250V AC 	2c, 4c	(DC) 3, 5, 6, 12, 24, 48V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: ~200mW (3V - 24V DC) 271mW (48V DC) 1 coil latching: ~100mW (3V - 24V DC) 144mW (48V DC) 2 coil latching: ~200mW (3V - 24V DC) 355mW (48V DC)	750Vrms	1000Vrms	1500Vrms	—	PCB Grid 2.54mm 	174 CSA, UL
Single side stable: 300mW 2 coil latching: 300mW	1500Vrms	3000Vrms	3000Vrms	—	PCB, Plug-in Grid 2.54mm 	180 CSA, TÜV, UL

Non-Polarized Power Relays










Mechanical Relays Selector Chart

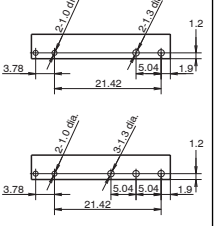
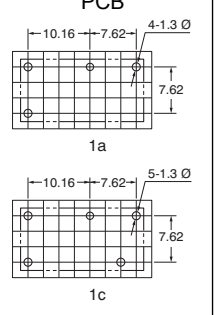
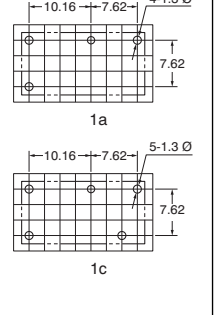
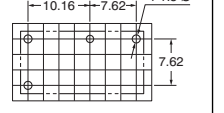
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
LD 1:2  20.3 x 7 x 15mm	<ul style="list-style-type: none"> Slim type: width 7mm Coil power: 200mW Creepage and clearance distance min. 6mm Not for new applications 	Max.: 3A 	<ul style="list-style-type: none"> 30V DC 277V AC 	1a	(DC) 4.5, 5, 6, 9, 12, 18, 24V
LD-P 1:2  20.3 x 7 x 15mm	<ul style="list-style-type: none"> Slim type: width 7mm Coil power: 200mW High switching capacity 5A/277V AC Creepage and clearance distance min. 6mm 	Max.: 5A 	<ul style="list-style-type: none"> 30V DC 277V AC 	1a	(DC) 5, 6, 9, 12, 18, 24V
LA 1:2  24 x 12 x 25mm	<ul style="list-style-type: none"> Low cost slim power relay: 2 Form A High insulation resistance between contact and coil 3A-version with gold clad contacts available (ideal speaker switch) Surge withstand voltage: 10kV Creepage and clearance distance min. 6mm 	Standard: Max.: 3A (3A rated)  Power type: Max.: 5A (5A, TV-4 rated) 	<ul style="list-style-type: none"> 30V DC 277V AC 	2a	(DC) 12, 24V
PA 1:2  20 x 5 x 12.5mm	<ul style="list-style-type: none"> Slim size permits high density mounting High switching capacity Gold-clad contacts Pin-compatible with the AQZ PhotoMOS relay High surge voltage: 4,000V High breakdown voltage: 2,000V PAD with min. 3.6mm creepage distance and min. 3.1mm clearance distance 	Max.: 5A 	<ul style="list-style-type: none"> 110V DC 250V AC 	1a	(DC) 5, 6, 9, 12, 18, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
200mW	750Vrms	—	4000Vrms	10,000V	PCB 	291 CSA, TÜV, UL, VDE
200mW	750Vrms	—	4000Vrms	10,000V	PCB 	294 C-UL, UL, VDE
530mW	1000Vrms	1000Vrms	4000Vrms	10,000V	PCB 	287 CSA, SEV, SEMKO, TÜV, UL
120mW (5 - 18V) 180mW (24V)	1000Vrms	—	2000Vrms	4,000V	PCB Grid 2.54mm 	336 CSA, TÜV, UL

Non-Polarized Power Relays

Mechanical Relays Selector Chart

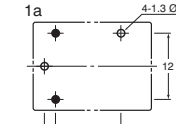
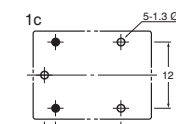
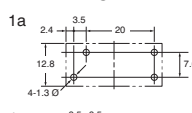
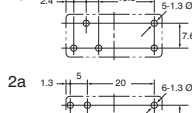
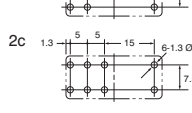
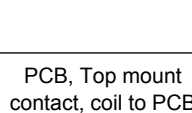
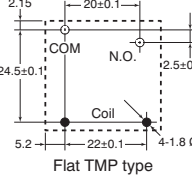
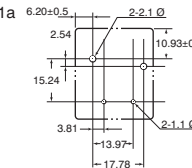
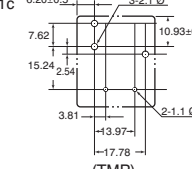
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<p>★ PF</p>  <p>1:2 28 x 5 x 15mm</p>	<ul style="list-style-type: none"> Slim size permits high density mounting Wide switching capacity High surge voltage: 6,000V High breakdown voltage: 4,000V Slim relay for grid applications Insulation construction conforms to VDE0700 Contacts with gold flash plating or gold-clad contacts available Print socket available Clearance distance min. 5.5mm Creepage distance min. 8mm 	<p>Max.: 6A</p> 	<ul style="list-style-type: none"> 300V DC 400V AC 	1a, 1c	(DC) 4.5, 5, 6, 12, 18, 24, 48, 60V
<p>JQ</p>  <p>1:2 20 x 10 x 15.6mm</p>	<ul style="list-style-type: none"> High switching capacity in small size High surge withstand voltage: 8,000V Low power consumption Extremely low cost Not for new applications - LQ substitute type available Creepage and clearance distance min. 4mm 	<p>Standard: Max.: 5A</p>  <p>Power type: Max.: 10A</p> 	<ul style="list-style-type: none"> 277V AC 	1a, 1c	(DC) 3, 5, 6, 9, 12, 18, 24, 48V
<p>★ LQ</p>  <p>1:2 20 x 10 x 16mm</p>	<ul style="list-style-type: none"> High switching capacity in small size High surge withstand voltage: 8,000V Low power consumption Extremely low cost 	<p>Max.: 10A (1a, 1c)</p> 	<ul style="list-style-type: none"> 277V AC 	1a, 1c	(DC) 5, 6, 9, 12, 18, 24V
<p>PQ</p>  <p>1:2 20 x 10 x 15.6mm</p>	<ul style="list-style-type: none"> High electrical noise immunity High sensitivity: 200mW High surge voltage: 8,000V Pin-compatible to JQ1a Gold-clad twin (bifurcated) contacts! 	<p>Max.: 5A</p> 	<ul style="list-style-type: none"> 110V DC 250V AC 	1a	(DC) 3, 5, 6, 9, 12, 18, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
170mW (5 - 24V) 217mW (48V) 175mW (60V)	1000Vrms	—	4000Vrms	6,000V	<p>PCB</p> 	341 C-UL, UL, VDE
200mW (1a) 400mW (1c)	1000Vrms (1a) 750Vrms (1c)	—	4000Vrms	8,000V	<p>PCB</p> 	263 CSA, SEMKO, TÜV, UL, VDE
200mW (1a) 400mW (1c)	1000Vrms (1a) 750Vrms (1c)	—	4000Vrms	8,000V	<p>PCB</p> 	327 C-UL, UL, VDE
200mW	1000Vrms	—	4000Vrms	8,000V	<p>PCB</p> 	347 CSA, SEMKO, TÜV, UL, VDE

Non-Polarized Power Relays

Mechanical Relays Selector Chart

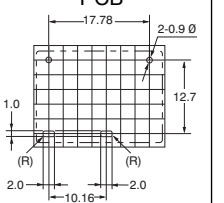
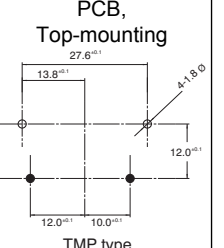
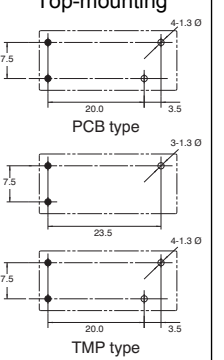
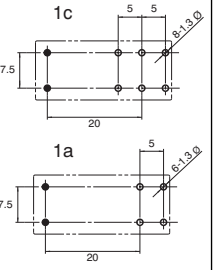
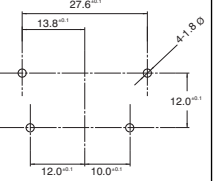
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
JS 1:2  22 x 16 x 16mm	<ul style="list-style-type: none"> Ultra-miniature power relay with universal terminal foot-print Special type for high ambient temperature available Extremely low cost High switching capacity: 10A 	Max.: 10A 	<ul style="list-style-type: none"> 100V DC 277V AC 	1a, 1c	(DC) 5, 6, 9, 12, 18, 24, 48V
JW 1:2  28.6 x 12.8 x 20mm	<ul style="list-style-type: none"> Compact power relay High surge withstand voltage: 10,000V Class B coil insulation types available Creepage and clearance distance min. 8mm between contacts and coil (for 2 changeover contacts min. 7.5mm) 	Standard: Max.: 5A (2a, 2c)  High capacity: Max.: 10A (1a, 1c) 	<ul style="list-style-type: none"> 100V DC 440V AC 	1a, 1c, 2a, 2c	(DC) 5, 6, 9, 12, 18, 24, 48V
JM 1:2  Slim: 30.4 x 16 x 26.5mm Flat: 31 x 28.5 x 17.2mm	<ul style="list-style-type: none"> Superior welding resistance High surge resistance Compact high capacity relay for inductive load Relay for high motor loads Ideal for high inrush currents Pin-compatible with the LF relays 	Max.: 20A 	<ul style="list-style-type: none"> 100V DC 250V AC 	1a	(DC) 5, 6, 9, 12, 24, 48V
JT-V 1:2  PCB: 31.9 x 26.9 x 20.2mm TMP: 32.2 x 27.4 x 27.9mm	<ul style="list-style-type: none"> High breakdown voltage High surge withstand voltage: min. 6kV High switching capacity with small dimensions and low height TMP types available Class F type as standardIncreased insulation construction than JT-N Clearance, contact to coil: min. 6.4mm Creepage, contact to coil: min. 9.5mm 	Max.: 30A 	<ul style="list-style-type: none"> 30V DC 277V AC 	1a, 1c	(DC) 12, 18, 24, 48V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
360mW	750Vrms	—	1500Vrms	—	PCB 1a  1c 	269 CSA, TÜV, complies with TV-5, UL, VDE
530mW	1000Vrms	3000Vrms (2a, 2c)	5000Vrms	10,000V	PCB 1a  1c  2a  2c 	281 CSA, SEMKO, SEV, TÜV, complies with TV-5, UL, VDE
900mW	1000Vrms	—	5000Vrms	10,000V	PCB, Top mount contact, coil to PCB  Flat TMP type	259 CSA, TÜV, UL, VDE
1000mW	—	1200Vrms	3500Vrms	6,000V	PCB Top-mounting 1a  1c  (TMP)	274 C-UL, UL











Non-Polarized Power Relays

Mechanical Relays Selector Chart

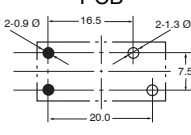
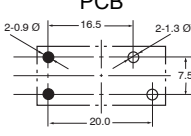
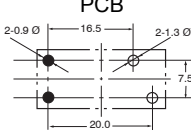
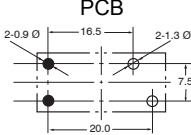
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
JV-N 1:2  22 x 16 x 10.9mm	<ul style="list-style-type: none"> Compact, flat type with low 10.9mm profile Sensitive coil 	Max.: 16A 	<ul style="list-style-type: none"> 110V DC 277V AC 	1a	(DC) 4.5, 6, 9, 12, 24, 48, 100V
LF 1:2  30.1 x 15.7 x 23.3mm	<ul style="list-style-type: none"> Ideal for compressor and inverter loads High insulation resistance Inrush current: 102A/200V AC, 224A/100V AC High surge withstand voltage Creepage and clearance distance min. 8mm 	Max.: 25A 	<ul style="list-style-type: none"> 250V AC 	1a	(DC) 5, 6, 9, 12, 18, 24V
LE 1:2  28.6 x 12.4 x 24.9mm	<ul style="list-style-type: none"> Ideal for magnetron and heater loads Excellent heat resistance 4.8mm fast-on terminals High sensitivity: 200mW Creepage and clearance distance min. 8mm 	Max.: 16A 	<ul style="list-style-type: none"> 277/400V AC 	1a	(DC) 5, 6, 9, 12, 18, 24, 48V
LZ 1:2  28.8 x 12.5 x 15.7mm	<ul style="list-style-type: none"> Low profile relay (15.7mm) Low operating power of 400mW Ambient temperature up to 105°C Creepage and clearance distance min. 10mm 	Max.: 16A 	<ul style="list-style-type: none"> 250V DC 440V AC 	1a, 1c	(DC) 5, 9, 12, 18, 24, 48V
★ LF-G1/LF-G2 1:2  30.1 x 15.7 x 23.3mm	<ul style="list-style-type: none"> Ideal for solar inverters High insulation resistance Inrush current: 102A/200V AC, 224A/100V AC High switching capacity 31A/277V AC High surge withstand voltage Creepage and clearance distance min. 8mm 	Max.: 22A  Max.: 31A 	<ul style="list-style-type: none"> 250V AC 	1a	(DC) 9, 12, 18, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
(DC) 200mW (4.5V - 48V) (DC) 600mW (100V)	1000Vrms	—	2500Vrms	4,500V	PCB 	278 CSA, TÜV, UL
900mW	1000Vrms	—	5000Vrms	10,000V	PCB, Top-mounting  TMP type	308 CSA, SEMKO, TÜV, UL, VDE
Standard: 400mW High sensitivity: 200mW	1000Vrms	—	4000Vrms	10,000V	PCB, Top-mounting  PCB type TMP type	298 CSA, TÜV, UL, VDE
400mW	1000Vrms	—	5000Vrms	10,000V	PCB  1c 1a	332 CSA, UL, VDE
1400mW	2500Vrms	—	4000Vrms	6,000V	PCB 	303 C-UL, UL, VDE

Non-Polarized Power Relays





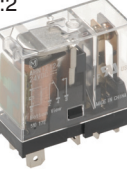



Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
LK-G 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> Contact gap: 1mm 3 different types available High insulation resistance Slim profile High noise immunity Creepage and clearance distance between contact and coil min. 6mm (IEC65 compliant) 	Max.: 10A  Max.: 16A 	• 277V AC	1a	(DC) 5, 9, 12, 24V
LK-P 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> High switching capacity 10A 277V AC High inrush current capability: 111A UL/CSA TV-5 rated type available High insulation: Creepage and clearance distance between contact and coil min. 6mm 	Max.: 10A 	<ul style="list-style-type: none"> • 30V DC • 277V AC 	1a	(DC) 12, 24V
LK-Q 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> Reduced noise High sensitivity: nominal coil power 250mW TV-5/TV-8 rated type available Slim shape Creepage and clearance distance min. 6mm 	Max.: TV5: 5A (AC)  TV8: 8A (AC) 	<ul style="list-style-type: none"> • 30V DC • 277V AC 	1a	(DC) 5, 9, 12, 24V
LK-T 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> High inrush current capability: 118A UL/CSA TV-8 rated type available High noise immunity realized by the card separation structure between contact and coil High insulation resistance: <ol style="list-style-type: none"> Creepage and clearance distance between contact and coil min. 6mm Surge withstand voltage between contact and coil > 10kV 	Max.: 8A 	• 277V AC	1a	(DC) 5, 9, 12, 24V

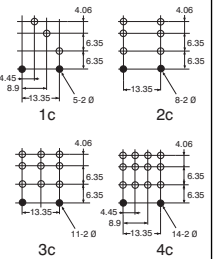
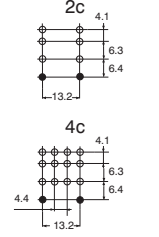
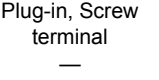
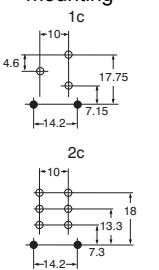
Mechanical Relays Selector Chart

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
530mW	1000Vrms	—	4000Vrms	10,000V	PCB 	312 CSA, TÜV, UL
530mW	1000Vrms	—	4000Vrms	10,000V	PCB 	316 CSA, SEMKO, SEV, TÜV, TV-5 rating, UL, VDE
250mW	1000Vrms	—	4000Vrms	10,000V	PCB 	319 CSA, SEMKO, SEV, TÜV, complies with TV-5, TV-8, UL, VDE
250mW	1000Vrms	—	4000Vrms	10,000V	PCB 	323 CSA, SEMKO, SEV, TÜV, TV rating UL, VDE

Non-Polarized Power Relays













Mechanical Relays Selector Chart

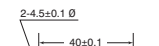
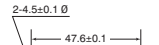
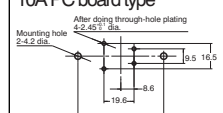


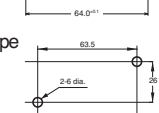
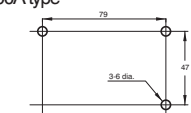
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
HC 1:2  27.2 x 20.8 x 35.2mm	<ul style="list-style-type: none"> Wide applications Versatile range Footprint compatible with competitive types Compact power relay AC and DC coil available Socket available Pin-compatible with the HJ relays 	Max.: 10A Min.: 1mA 	<ul style="list-style-type: none"> 30V DC 250V AC 	1c, 2c, 3c, 4c	(DC) 6, 12, 24, 48, 110V (AC) 6, 12, 24, 48, 120, 240V
HJ 1:2  28 x 21.5 x 35/38mm	<ul style="list-style-type: none"> 2 contact arrangements, same footprint as our popular HC relay Coil breakdown detection-function (AC type with LED only) Convenient screw terminal sockets with finger protection also available Test button type available Compact power relay for AC and DC voltage Socket available 	Max.: 7A 	<ul style="list-style-type: none"> 30V DC 250V AC 	2c, 4c	(DC) 12, 24, 48, 110V (AC) 12, 24, 48, 100, 120, 200, 220/240V
HN 1:2  29 x 13 x 28mm	<ul style="list-style-type: none"> Slim (13mm) and compact size relay: The size has been reduced 20% compared with the existing HC/HJ relays. Plug-in solder type available Slim screw terminal socket (17.5mm) Also available with LED indication High reliability AC and DC coil available 	Max.: 5A 	<ul style="list-style-type: none"> 30V DC 250V AC 	1c, 2c	(DC) 5, 6, 12, 24, 48V (AC) 100, 120, 240V
HL 1:2  27.2 x 20.8 x 35.4mm	<ul style="list-style-type: none"> Large capacity Compact size Designed for long lifetime Footprint compatible with competitive types High load switching range Socket available 	Max.: 15A Min.: 1mA 	<ul style="list-style-type: none"> 30V DC 250V AC 	1c, 2c	(DC) 6, 12, 24, 48, 110V (AC) 6, 12, 24, 48, 120, 240V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
(DC) 900mW (AC) 1.2VA	700Vrms	700Vrms	2000Vrms	—	PCB, Plug-in, Top-mounting 	194 CSA, SEV, TV rating, UL, VDE
(DC) 900 mW (AC) 1.2 - 1.5VA	1000Vrms	2000Vrms	2000Vrms	—	Plug-in 	230 CSA, SEV, TV rating, UL, VDE
(DC) 530mW (AC) 0.9VA	1000Vrms	3000Vrms	5000Vrms	—	Plug-in, Screw terminal 	249 UL, C-UL, (VDE)
(DC) 900 - 1000mW (AC) 1.2 - 1.3VA	1000Vrms	1500Vrms	2000Vrms	—	PCB, Plug-in, Top-mounting 	241 CSA, complies with TV-5, UL

Non-Polarized Power Relays




Mechanical Relays Selector Chart

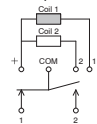
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
HE/ HE PV 1:3  50 x 33 x 35.8mm	<ul style="list-style-type: none"> High surge withstand voltage: 10,000V High inrush resistance: TV-15: 1 form A TV-10: 2 form A Compact power relays for AC and DC voltage Contact gap: 3mm Socket available Creepage and clearance distance min. 8mm 	Max.: 30A  Max.: 50A 	<ul style="list-style-type: none"> 100V DC 277V AC 	1a, 2a	(DC) 6, 12, 24, 48, 110V (AC) 12, 24, 48, 120, 240V
EP 1:8 mm   62.4 x 37.9 x 31.3 66.8 x 37.9 x 45  78 x 40 x 48.1   75.5 x 40 x 79 111 x 63 x 74.7	<ul style="list-style-type: none"> High capacity to cut off DC voltage in a compact relay: max. cut-off current 2,500A/300V DC Nominal switching capacity 300A 400V DC Low operating noise High contact reliability DC type with sealed capsule 	Max.: 10A  20A  80A  300A 	<ul style="list-style-type: none"> 400V DC 	1a	(DC) 12, 24, 48, 100V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
(DC) 1920mW (AC) 1.7 - 2.7VA	2000Vrms	4000Vrms	5000Vrms	10,000V	Top-mounting Panel cutout  (Plug-in terminal type) (Screw terminal type)  (NEMA terminal type) (Screw terminal type, wide pitch)	216 CSA, TÜV, TV rating, UL, VDE
Max.: 1.4W (10A) 3.9W (20A) 4.5W (80A) 4 - 40W (300A)	2500Vrms	—	2500Vrms	—	PCB 10A PC board type  10A TM type  20A type  80A type  300A type 	166 —

High-Frequency Relays



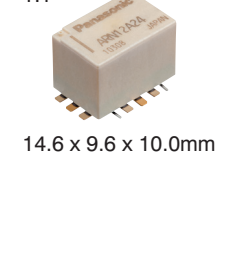
Mechanical Relays Selector Chart

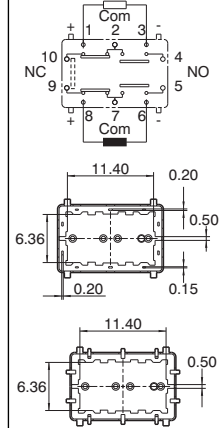
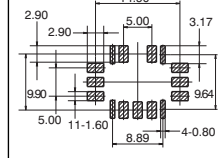
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
RV SPDT 1:1  15.9 x 15.9 x 11.2mm	<ul style="list-style-type: none"> Ultra small coaxial switch Up to 26.5 GHz Impedance 50Ω PIN and SMA terminals available Latching types available 2-coil latching type helps reduce power consumption Failsafe type available Reverse type available Surge withstand voltage: 500Vrms HF Characteristics at 18GHz/ SMA type: <ul style="list-style-type: none"> Isolation min. 40dB Insertion loss max. 0.7dB V.S.W.R. max. 1.7 	HF: 50W (3GHz)	—	SPDT	(DC) 4.5, 12, 24V
★ RD SPDT 1:2  34 x 13.2 x 39mm	<ul style="list-style-type: none"> Coaxial relay Up to 26.5GHz (18GHz) Impedance 50Ω Latching types available TTL Version available HF Characteristics at 18GHz: <ul style="list-style-type: none"> Isolation min. 60dB Insertion loss max. 0.5dB V.S.W.R. max. 1.5 	DC: 100mA (indicator) HF: 120W (3GHz)	• 30V DC (indicator)	SPDT	(DC) 4.5, 5, 12, 24V
★ RD TRANSFER 1:2  32 x 32 x 39mm	<ul style="list-style-type: none"> Coaxial relay Up to 26.5GHz (18GHz) Impedance 50Ω Latching types available TTL Version available HF Characteristics at 18GHz: <ul style="list-style-type: none"> Isolation min. 60dB Insertion loss max. 0.5dB V.S.W.R. max. 1.5 	DC: 100mA (indicator) HF: 120W (3GHz)	• 30V DC (indicator)	DPDT	(DC) 4.5, 5, 12, 24V

Coil power	Breakdown voltage				Life (min. operations)		Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil	Between live parts and ground	Electrical	Mechanical		
700mW	500Vrms	500Vrms	500Vrms	500Vrms	3 x 10 ⁵	10 ⁶	PIN, SMA 	398 —
Single side stable: 840-970mW (4.5, 12, 24V) 2 coil latching: 700-900mW (4.5, 12, 24V) Latching with TTL driver (self cut-off function): 5, 12, 24V	500Vrms	500Vrms	500Vrms	500Vrms	5 x 10 ⁶	5 x 10 ⁶	Coax	357 —
Single side stable: 1540-1670mW (4.5, 12, 24V) 2 coil latching: 1200-1400mW (4.5, 12, 24V) Latching with TTL driver (self cut-off function): 5, 12, 24V	500Vrms	500Vrms	500Vrms	500Vrms	5 x 10 ⁶	5 x 10 ⁶	Coax	357 —

High-Frequency Relays

Mechanical Relays Selector Chart

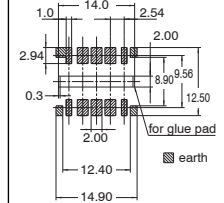
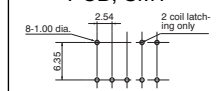
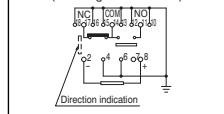
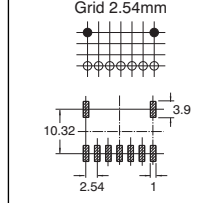
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
★ RD SP6T 1:4  80 x 80 x 39.5mm	<ul style="list-style-type: none"> Coaxial relay Up to 13GHz (18GHz) Terminated type available Impedance 50Ω Latching types available HF Characteristics at 13GHz: <ul style="list-style-type: none"> Isolation min. 65dB Insertion loss max. 0.4dB V.S.W.R. max. 1.5 	DC: 100mA (indicator) HF: 120W (3GHz)	<ul style="list-style-type: none"> 30V DC (indicator) 	SP6T	(DC) 4.5, 5, 12, 24V
★ RJ 1:1  14 x 9 x 8.2mm	<ul style="list-style-type: none"> Shielded HF relay Up to 8GHz Impedance 50Ω Latching types available SMD and PCB version available HF Characteristics at 5GHz: <ul style="list-style-type: none"> Isolation min. 35dB Isolation min. 30dB between contact sets Insertion loss max. 0.5dB V.S.W.R. max. 1.25 	DC: 0.3A HF: 1W (5GHz)	<ul style="list-style-type: none"> 30V DC 	2c	(DC) 3, 4.5, 12, 24V
★ RN 1:1  14.6 x 9.6 x 10.0mm	<ul style="list-style-type: none"> High hot switching capability up to 80W at 2GHz, contact rating up to 150W at 2GHz High frequency capability up to 6GHz 1 changeover contact, impedance 50Ω Reversed contact type available Single side stable or 2 coil latching types available SMT version available Very good HF characteristics HF Characteristics at 2GHz: <ul style="list-style-type: none"> Isolation min. 55dB Insertion loss max. 0.12dB V.S.W.R. max. 1.15 	DC: 0.5A HF: 80W	<ul style="list-style-type: none"> 30V DC 	1c SPDT	(DC) 4.5, 12, 24V

Coil power	Breakdown voltage				Life (min. operations)		Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil	Between live parts and ground	Electrical	Mechanical		
Single side stable: 840mW (4.5, 12V) 970mW (24V) Latching: 700mW (SET 4.5V) 750mW (SET 12V) 900mW (SET 24V)	500Vrms	500Vrms	500Vrms	500Vrms	5 x 10 ⁶	5 x 10 ⁶	Coax	357 —
Single side stable: 200mW 2 coil latching: 150mW	500Vrms	500Vrms	500Vrms	500Vrms	10 ⁶	10 ⁷	PCB, SMT 	375 —
Single side stable: 320mW 2 coil latching: 400mW	500Vrms	—	500Vrms	500Vrms	10 ⁵	10 ⁶	SMT 	380 —

High-Frequency Relays

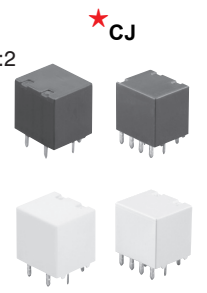
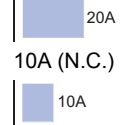
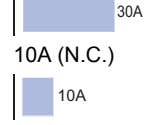
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
RA 1:1  14.7 x 9.7 x 5.9mm	<ul style="list-style-type: none"> • HF relay in SMT version • Up to 1GHz • Impedance 50Ω • Latching types available HF Characteristics at 1GHz: <ul style="list-style-type: none"> • Isolation min. 20dB • Isolation min. 30dB between contact sets • Insertion loss max. 0.3dB • V.S.W.R. max. 1.2 	DC: 1A HF: 3W (1GHz, carrying point to carrying current)	• 30V DC	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
RS 1:1  14 x 8.6 x 7.8mm	<ul style="list-style-type: none"> • HF relay • Up to 3GHz • Impedance 50/75Ω • Silent type available • Latching types available • SMT and PCB version available • 10W at 3GHz contact carrying power HF Characteristics at 3GHz (50Ω PCB type): <ul style="list-style-type: none"> • Isolation min. 35dB • Insertion loss max. 0.35dB • V.S.W.R. max. 1.4 	DC: 0.5A HF: 1W (3GHz)	• 30V DC	1c	(DC) 3, 4.5, 9, 12, 24V
RE 1:1  20.2 x 11.2 x 8.9/9.6mm	<ul style="list-style-type: none"> • HF relay • Up to 2.6GHz • Impedance 50/75Ω • SMT and PCB version available HF Characteristics at 2.6GHz (75Ω PCB type): <ul style="list-style-type: none"> • Isolation min. 30dB • Insertion loss max. 0.5dB • V.S.W.R. max. 1.5 	DC: 0.5A HF: 1W (2.6GHz)	• 30V DC	1c	(DC) 3, 4.5, 6, 9, 12, 24V

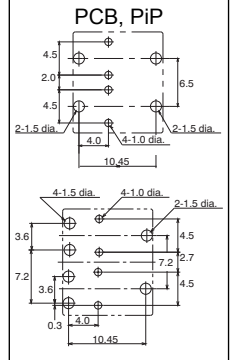
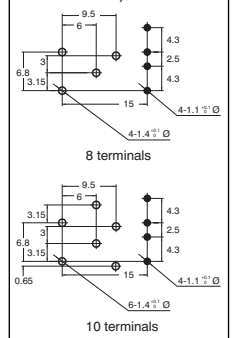
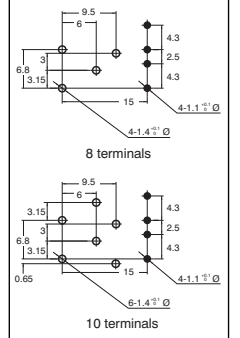
Mechanical Relays Selector Chart

Coil power	Breakdown voltage				Life (min. operations)		Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil	Between live parts and ground	Electrical	Mechanical		
Single side stable: 140mW (1.5 - 12V) 200mW (24V) 300mW (48V) 1 coil latching: 70mW (1.5 - 12V) 100mW (24V) 2 coil latching: 140mW (1.5 - 12V) 200mW (24V)	750Vrms	1000Vrms	1000Vrms	1000Vrms	10 ⁷	10 ⁸	SMT Suggested mounting pads (Top view) 	352 —
Single side stable: 200mW 1 coil latching: 200mW 2 coil latching: 400mW	500Vrms	—	1000Vrms	500Vrms	3 x 10 ⁵	5 x 10 ⁶	PCB, SMT  50Ω PCB type Single side stable type (Deenergized condition)  50Ω SMT type	387 —
Single side stable: 200mW	500Vrms	—	1000Vrms	500Vrms	3 x 10 ⁵	10 ⁶	PCB, SMT Grid 2.54mm 	371 —

Automotive Relays











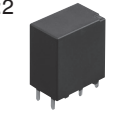

Mechanical Relays Selector Chart

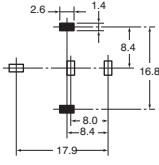
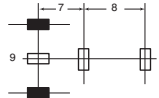
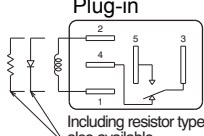
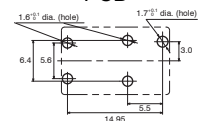
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
Twin					
<p>★ CJ</p> <p>1:2</p>  <p>8 Pin Print: 13.7 x 12.2 x 13.5mm PiP: 13.7 x 12.2 x 13.8mm 10 Pin Print: 14.4 x 12.2 x 13.5mm PiP: 14.4 x 12.2 x 13.8mm</p>	<ul style="list-style-type: none"> Ultra small size Twin (1 Form C x 2) High capacity in a compact body H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.: 20A (N.O.) 10A (N.C.)</p> 	• 16V DC	1c, 1c x 2	(DC) 12V
<p>★ CT</p> <p>1:2</p>  <p>17.4 x 14 x 13.5mm</p>	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) ACT512 layout = layout of 2 x ACT112 H-bridge type available (twin relay) Quiet operation RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.: 20A (N.O.) 10A (N.C.)</p> 	• 16V DC	1c, 1c x 2	(DC) 12V
<p>★ CT POWER</p> <p>1:2</p>  <p>17.4 x 14 x 13.5mm</p>	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) Footprint same as CT standard type 30A switching capacity (motor load) H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.: 30A (N.O.) 10A (N.C.)</p> 	• 16V DC	1c, 1c x 2	(DC) 12V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
<p>Standard: 800mW</p> <p>High sensitivity: 640mW</p>	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	424 —
800mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p>  <p>8 terminals</p> <p>10 terminals</p>	456 —
1000mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p>  <p>8 terminals</p> <p>10 terminals</p>	462 —

Automotive Relays








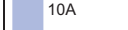


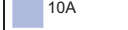
Mechanical Relays Selector Chart

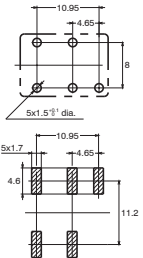
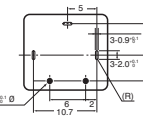
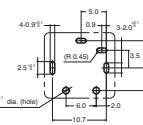
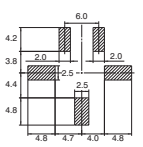
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
Single					
CB 1:2  26 x 22 x 25mm	<ul style="list-style-type: none"> 40A switching current at 85°C Mini-ISO type terminals High shock resistance High thermal resistance 1 Form A available with 70A switching current Broad lineup RTIII (IP67) available 	Max.: 70A (N.O. H type)  40A (1a, 1c N.O.)  30A (1c N.C.) 	<ul style="list-style-type: none"> 16V DC (12V DC type) 32V DC (24V DC type) 	1a, 1c	(DC) 12, 24V
★ CM 1:2  20 x 15 x 22mm	<ul style="list-style-type: none"> Small substitute for Mini-ISO relay Micro-ISO terminal type RTIII (IP67) available 	Max.: 35A (N.O.)  20A (N.C.) 	<ul style="list-style-type: none"> 16V DC (12V DC type) 32V DC (24V DC type) 	1a, 1c	(DC) 12, 24V
CV 1:2  22.5 x 15 x 15.7mm	<ul style="list-style-type: none"> Low profile 20A Micro-ISO terminal type RTIII (IP67) 	Max.: 20A (N.O.)  10A (N.C.) 	<ul style="list-style-type: none"> 16V DC 	1a, 1c	(DC) 12V
★ CN-H 1:2  17 x 10.6 x 18.3mm	<ul style="list-style-type: none"> Best space savings in its class Substitute for Micro-ISO relay High current-carrying capacity RTIII (IP67) 	Max.: 	<ul style="list-style-type: none"> 16V DC 	1a	(DC) 12V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
1400mW (12V DC type) 1800mW (24V DC type) 1800mW (12V DC, H type)	500Vrms	—	500Vrms	—	PCB, Plug-in  (PCB standard type)	413 —
1500mW (12V DC type) 1800mW (24V DC type)	500Vrms	—	500Vrms	—	PCB (24V), Plug-in 	430 —
800mW	500Vrms	—	500Vrms	—	Plug-in  Including resistor type also available	467 —
450mW 640mW	500Vrms	—	500Vrms	—	PCB 	435 —

Automotive Relays

Mechanical Relays Selector Chart

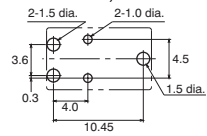
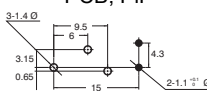
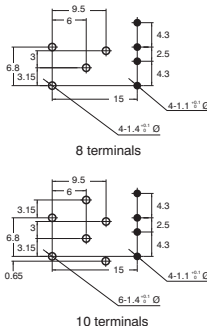
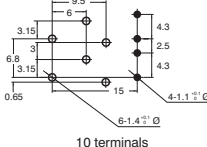
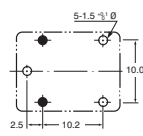
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
CN-M 1:2  15,5 x 11 x 14.4mm	<ul style="list-style-type: none"> Space-saving design High switching capacity (up to 30A) SMD type available RTIII (IP67) Pin in Paste (with vent hole) available 	Max.: 30A (N.O.)  30A 25A (N.C.)  25A	• 16V DC	1a, 1c	(DC) 12V
★ CP 1:2  14 x 13 x 9.5mm	<ul style="list-style-type: none"> Very low profile High capacity 24V DC type available on request RTIII (IP67) 	Max.: 20A (N.O.)  20A 10A (N.C.)  10A	• 16V DC	1a, 1c	(DC) 12V, 24V
★ CP POWER 1:2  14 x 13 x 9.5mm	<ul style="list-style-type: none"> Very low profile High capacity type: 45A maximum carrying current Improved heat conduction thanks to additional pin Layout is downward compatible to CP RTIII (IP67) Pin in Paste (with vent hole) available 	Max.: 20A (N.O.)  20A 10A (N.C.)  10A	• 16V DC	1a, 1c	(DC) 12V
★ CP (SMD) 1:2  14 x 13 x 10.5mm	<ul style="list-style-type: none"> Very low profile High capacity RTIII (IP67) 	Max.: 20A (N.O.)  20A 10A (N.C.)  10A	• 16V DC	1c	(DC) 12V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
640mW	500Vrms	—	500Vrms	—	PCB, SMT 	439 —
640mW	500Vrms	—	500Vrms	—	PCB 	444 —
450mW 640mW	500Vrms	—	500Vrms	—	PCB 	448 —
640mW	500Vrms	—	500Vrms	—	SMT 	444 —

Automotive Relays

Mechanical Relays Selector Chart

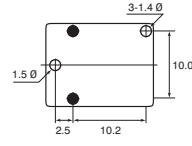
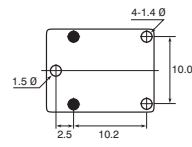
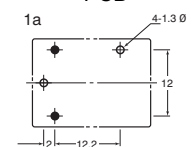
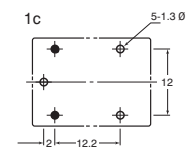
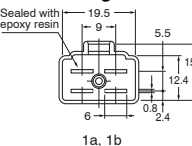
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<p>★ CJ</p>  <p>1:2 Print : 13.5 x 12.2 x 7.2mm PiP : 13.8 x 12.2 x 7.2mm</p>	<ul style="list-style-type: none"> Ultra small size Twin (1 Form C x 2) High capacity in a compact body H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.:</p> <p>20A (N.O.)</p>  <p>10A (N.C.)</p> 	• 16V DC	1c, 1c x 2	(DC) 12V
<p>★ CT</p>  <p>1:2 17.4 x 7.2 x 13.5mm</p>	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) ACT512 layout = layout of 2 x ACT112 H-bridge type available (twin relay) Quiet operation RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.:</p> <p>20A (N.O.)</p>  <p>10A (N.C.)</p> 	• 16V DC	1c, 1c x 2	(DC) 12V
<p>★ CT POWER</p>  <p>1:2 17.4 x 7.2 x 13.5mm</p>	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) Footprint same as CT standard type 30A switching capacity (motor load) H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.:</p> <p>30A (N.O.)</p>  <p>10A (N.C.)</p> 	• 16V DC	1c, 1c x 2	(DC) 12V
<p>CQ</p>  <p>1:2 17 x 13 x 16.6mm</p>	<ul style="list-style-type: none"> Very quiet operation Terminal layout identical to JJM RTIII (IP67) 	<p>Max.:</p> <p>20A (N.O.)</p>  <p>10A (N.C.)</p> 	• 16V DC	1c	(DC) 12V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
<p>Standard: 800mW</p> <p>High sensitivity: 640mW</p>	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	424 —
800mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	456 —
1000mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p>  <p>8 terminals</p>  <p>10 terminals</p>	462 —
640mW	500Vrms	—	500Vrms	—	<p>PCB</p> 	452 —

Automotive Relays













Mechanical Relays Selector Chart

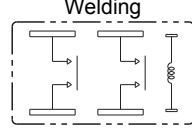
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
★ JJM 1:2  15.5 x 12 x 13.9mm	<ul style="list-style-type: none"> Compact (half the size of JS-M) Best-selling, familiar blinker sound RTIII (IP67) 	Max.: 20A (N.O.)  10A (N.C.) 	• 16V DC	1a, 1c	(DC) 12V
JJM-DM 1:2  15.5 x 12 x 13.9mm	<ul style="list-style-type: none"> Small size Double make contact arrangement Terminal layout compatible to JJM RTIII (IP67) 	Max.: 2 x 6A  	• 16V DC	Double make contact	(DC) 12V
JS-M 1:2  22 x 16 x 16.4mm	<ul style="list-style-type: none"> Low pick-up voltage for high ambient temperatures RTIII (IP67) 	Standard: Max.: 10A  High capacity: Max.: 15A 	• 16V DC	1a, 1c	(DC) 9, 12V
CA 1:2  21.5 x 14.4 x 37mm	<ul style="list-style-type: none"> Small size Direct plug-in RTIII (IP67) 	Max.: 20A (1a, 1.4W type)  30A (1a, 1.8W type)  20A (1b, 1c) 	<ul style="list-style-type: none"> 15V DC (1c - 12VDC type) 16V DC (1a, 1b - 12VDC type) 30V DC (1c - 24VDC type) 	1a, 1b, 1c	(DC) 12, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
640mW	500Vrms	—	500Vrms	—	PCB 	494 —
1000mW	500Vrms	—	500Vrms	—	PCB 	498 —
640mW	750Vrms	—	1500Vrms	—	PCB 1a  1c 	502 —
1800mW 1400mW (type S)	500Vrms	—	500Vrms	—	Plug-in Sealed with epoxy resin  1a, 1b	406 —







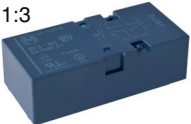

Automotive Relays

Mechanical Relays Selector Chart

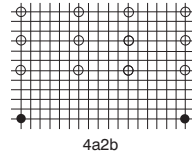
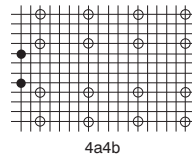
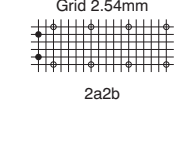
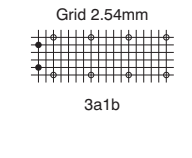
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
Special Types					
EV 1:8  66.8 x 49.7 x 37.9mm 78 x 40 x 48.1mm 82.8 x 40 x 79mm 75.5 x 40 x 80mm 111 x 63 x 75mm	<ul style="list-style-type: none"> 5 versions available: 10, 20, 80, 120, 300A DC type with sealed capsule for electric and hybrid vehicles Compact size Small arcing space required thanks to blow-out magnets Safety construction High contact reliability 	Max.: 10A (1a)  20A (1a)  80A (1a)  120A (1a)  300A (1a) 	• 400V DC	1a	(DC) 12, 24V
EV QUIET 1:4  76 x 36 x 72.3mm 77 x 67.8 x 37.7mm	<ul style="list-style-type: none"> DC type with sealed capsule, mainly for hybrid vehicles Very quiet operation Small size and light weight Small arcing space required thanks to blow-out magnets Safety construction High contact reliability Standard type for horizontal mounting available 	Max.: 60A (1a) 	• 400V DC	1a	(DC) 12V
CW 1:2  32 x 18 x 26mm	<ul style="list-style-type: none"> Ideal relay for high output, 3-phase motors (Electric Power Steering) High cut-off current capability and high carrying current RTIII (IP67) 	Max.: 	• 14V DC	2a	(DC) 12V
EB 1:2  70 x 80 x 34mm	<ul style="list-style-type: none"> Automotive high-capacity DC cutoff relay Supports even 42V vehicles 	Max.: 100A (1a) 	• 42V DC	1a	(DC) 12, 24, 36V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
Stable: • 1240mW (10A, 12/24V) • 3900mW (20A, 12V) • 4200mW (80A/120A, 12/24V) • 3600mW (300A, 12V) • 3800mW (300A, 24V) Inrush: • 37.9W (300A, 12V) • 44.4W (300A, 24V)	2500Vrms	—	2500Vrms	—	Faston terminal —	480 —
4500mW	Vertical: 2500Vrms Horizontal: 2000Vrms	—	Vertical: 2500Vrms Horizontal: 2000Vrms	—	Vertical type: lead wire Horizontal type: Faston terminal —	488 —
1400mW	500Vrms	—	500Vrms	—		472 —
5000mW	1500Vrms	—	2500Vrms	—	Screw terminal —	475 —

Safety Relays


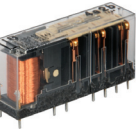



Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
SFN4D 1:3  53.3 x 33 x 14.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN50205, Type B Safety double contact Extremely small total power loss Relay height: 14.5mm 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 500V DC 500V AC 	4a2b	(DC) 5, 9, 12, 16, 18, 21, 24, 36, 48, 60V
SF4D 1:3  53.3 x 33 x 16.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN50205, Type B Safety double contact 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 400V DC 400V AC 	4a4b	(DC) 5, 9, 12, 18, 21, 24, 36, 48, 60V
SF2D 1:3  53.3 x 25 x 16.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN 50205, Type A Safety double contact For applications according to EN 50155 IEC/EN 60335-1 (GWT) compliant 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 400V DC 400V AC 	2a2b	(DC) 5, 9, 12, 18, 21, 24, 36, 48, 60V
SF3 1:3  53.3 x 25 x 16.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN 50205, Type A For applications according to EN 50155 IEC/EN 60335-1 (GWT) compliant 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 400V DC 400V AC 	3a1b	(DC) 5, 9, 12, 18, 21, 24, 36, 48, 60V

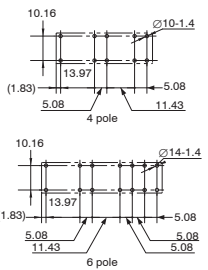
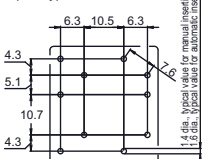
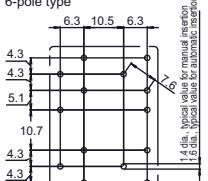
Mechanical Relays Selector Chart

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
390mW (5 - 24V) 420mW (36 - 60V)	2500Vrms	4000Vrms	5000Vrms	—	PCB Grid 2.5mm  4a2b	516 CSA, SEV, TÜV, UL
500mW	2500Vrms	2500Vrms	2500Vrms	—	PCB Grid 2.54mm  4a4b	512 CSA, SEV, TÜV, UL
500mW	2500Vrms	2500Vrms	2500Vrms	—	PCB Grid 2.54mm  2a2b	506 CSA, SEV, TÜV, UL
500mW	2500Vrms	2500Vrms	2500Vrms	—	PCB Grid 2.54mm  3a1b	509 CSA, SEV, TÜV, UL

Safety Relays

Mechanical Relays Selector Chart

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
SFS 1:3  40 x 13 x 24mm  50 x 13 x 24mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN 50205, Type A 4-pole and 6-pole type with various contact arrangements Slim profile reduces mounting area PC board sockets and DIN-rail terminal socket available 	Max.: 6A Min.: 1mA 	<ul style="list-style-type: none"> 30V DC 250V AC 	2a2b, 3a1b, 4a2b, 5a1b, 3a3b	(DC) 12, 16, 18, 21, 24, 48V
SF-Y 1:3  39 x 14.5 x 28.6mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN 50205, Type A 4-pole and 6-pole type with various contact arrangements Gold clad contacts on request 	Max.: 6A Min.: 1mA 	<ul style="list-style-type: none"> 30V DC 250V AC 	2a2b, 3a1b, 4a2b, 5a1b	(DC) 5, 12, 18, 21, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Page Approvals
	Between open contacts	Between contact sets	Contacts to coil			
360mW (4 poles) 500mW (6 poles)	1500Vrms	2500Vrms/ 4000Vrms	4000Vrms	—	PCB 	524 CSA, TÜV, UL
670mW	1500Vrms	2500Vrms/ 4000Vrms	4000Vrms	—	PCB 4-pole type  6-pole type 	533 CSA, TÜV, UL

Signal Relays



Panasonic
ideas for life

Long seller, backed
by product variety and
high reliability

DS RELAYS



FEATURES

- 1. Breakthrough height of 9.8 mm .386 inch beats the 10 mm .394 inch limit**
1c and 2c all have the same height (9.8 mm .386 inch). The width of the relay is also the same (9.9 mm .390 inch). Since the only size variable is the length, the shared form makes mounting on printed printing wiring boards easy.
- 2. Suitable for use in difficult environments**
Epoxy resin seals the parts and cut off the external atmosphere, thus enabling use in difficult environments.
- 3. Can be used with automatic solder and automatic wash systems**
Automatic soldering and automatic washing can be carried out once the parts are mounted on PC boards.
- 4. Gold-clad twin contacts ensure high reliability**
Highly stable gold cladding on the contacts ensures that contact resistance changes little over time. Furthermore, the use of twin contacts, a configuration that performs with superior contact reliability, ensures extremely low contact failure rates even under low level loads.
- 5. Polarized magnetic circuits realize resistance to shock and vibration**
High-performance polarized magnetic circuits that utilize the energy of permanent magnets have made it possible to create relays with strong resistance to shock and vibration.
- 6. DIL terminal array enables use of IC sockets**
- 7. Widening scope of application with multicontact latching**
In addition to single side stable types, you can take advantage of the memory of functions of convenient 1 coil or 2 coil latching relays.

TYPICAL APPLICATIONS

Besides telecommunications, measuring devices, office equipment, computers and related equipment, DS relays are also recommended for a broad range of applications including business devices, audio systems, and industrial equipment.

ORDERING INFORMATION

DS E - - -

Contact arrangement

- 1: 1 Form C
- 2: 2 Form C

Sensitivity

S: 200 mW nominal operating power

Operating function

- Nil: Single side stable
- L: 1 coil latching
- L2: 2 coil latching

Nominal coil voltage

DC 1.5, 3, 5, 6, 9, 12, 24, 48 V

Note: 1 coil latching type are manufactured by lot upon receipt of order.

TYPES

High sensitivity type

Contact arrangement	Nominal coil voltage	Single side stable type	2 coil latching type
		Part No.	Part No.
1 Form C	1.5V DC	DS1E-S-DC1.5V	DS1E-SL2-DC1.5V
	3V DC	DS1E-S-DC3V	DS1E-SL2-DC3V
	5V DC	DS1E-S-DC5V	DS1E-SL2-DC5V
	6V DC	DS1E-S-DC6V	DS1E-SL2-DC6V
	9V DC	DS1E-S-DC9V	DS1E-SL2-DC9V
	12V DC	DS1E-S-DC12V	DS1E-SL2-DC12V
	24V DC	DS1E-S-DC24V	DS1E-SL2-DC24V
2 Form C	3V DC	DS2E-S-DC3V	DS2E-SL2-DC3V
	5V DC	DS2E-S-DC5V	DS2E-SL2-DC5V
	6V DC	DS2E-S-DC6V	DS2E-SL2-DC6V
	9V DC	DS2E-S-DC9V	DS2E-SL2-DC9V
	12V DC	DS2E-S-DC12V	DS2E-SL2-DC12V
	24V DC	DS2E-S-DC24V	DS2E-SL2-DC24V
	48V DC	DS2E-S-DC48V	DS2E-SL2-DC48V

Standard packing: Tube: 50 pcs.; Case: 500 pcs.

Notes: 1 coil latching type are manufactured by lot upon receipt of order.

RATING

1. Coil data

1) Single side stable type

Type	Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [$\pm 10\%$] (at 20°C 68°F)	Coil resistance [$\pm 10\%$] (at 20°C 68°F)	Nominal operating power	Max. applied voltage (at 50°C 122°F)
High sensitivity (S) type	1.5V DC	1 Form C: 80%V or less of nominal voltage 2 Form C: 70%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	133.3mA	11.3 Ω	200mW	1 Form C: 160%V of nominal voltage 2 Form C: 200%V of nominal voltage
	3V DC			66.7mA	45 Ω		
	5V DC			40.0mA	125 Ω		
	6V DC			33.3mA	180 Ω		
	9V DC			22.2mA	405 Ω		
	12V DC			16.7mA	720 Ω		
	24V DC			8.3mA	2,880 Ω		
48V DC	4.2mA	11,520 Ω					

2) 2 coil latching type

Type	Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current [$\pm 10\%$] (at 20°C 68°F)		Coil resistance [$\pm 10\%$] (at 20°C 68°F)		Nominal operating power		Max. applied voltage (at 50°C 122°F)
				Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
High sensitivity (S) type	1.5V DC	1 Form C: 80%V or less of nominal voltage 2 Form C: 70%V or less of nominal voltage (Initial)	1 Form C: 80%V or less of nominal voltage 2 Form C: 70%V or less of nominal voltage (Initial)	120mA	120mA	12.5 Ω	12.5 Ω	180mW	180mW	1 Form C: 160%V of nominal voltage 2 Form C: 200%V of nominal voltage
	3V DC			60mA	60mA	50 Ω	50 Ω			
	5V DC			36mA	36mA	139 Ω	139 Ω			
	6V DC			30mA	30mA	200 Ω	200 Ω			
	9V DC			20mA	20mA	450 Ω	450 Ω			
	12V DC			15mA	15mA	800 Ω	800 Ω			
	24V DC			7.5mA	7.5mA	3,200 Ω	3,200 Ω			
48V DC	3.75mA	3.75mA	12,800 Ω	12,800 Ω						

DS

2. Specifications

Characteristics	Item	Specifications		
		1 Form C	2 Form C	
Contact	Arrangement	1 Form C 2 Form C		
	Initial contact resistance, max.	Max. 50 mΩ (By voltage drop 6 V DC 1A)		
	Contact material	Ag+Au clad		
Rating	Nominal switching capacity	2 A 30 V DC (resistive load)		
	Max. switching power	60 W, 125 VA (resistive load)		
	Max. switching voltage	220 V DC, 250 V AC		
	Max. carrying current	3 A		
	Min. switching capacity (Reference value) ¹	10μA 10m V DC		
	Nominal operating power	Single side stable (S type: 200 mW); latching (S type: 180 mW)		
Electrical characteristics	Insulation resistance (Initial)	Min. 100MΩ (at 500V DC) Measurement at same location as "Initial breakdown voltage" section.		
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1min. (500 Vrms for 1min: 1 Form C high sensitivity type) (Detection current: 10mA.)	
		Between contact and coil	1,500 Vrms for 1min. (1,000 Vrms for 1min: 1 Form C high sensitivity type) (Detection current: 10mA.)	
	Temperature rise	Max. 65°C (By resistive method, nominal coil voltage applied to the coil, contact carrying current: 2A.)		
	Operate time [Set time] (at 20°C 68°F)	Max. 10 ms [10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.)		
	Release time [Reset time] (at 20°C 68°F)	Max. 5 ms [10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)		
	Mechanical characteristics	Shock resistance	Functional ²	Min. 490 m/s ² Min. 490 m/s ²
Destructive			Min. 980 m/s ² (Half-wave pulse of sine wave: 6 ms.)	
Vibration resistance		Functional	10 to 55 Hz at double amplitude of 3.3 mm (Detection time: 10μs.)	
		Destructive	10 to 55 Hz at double amplitude of 5 mm	
Expected life	Mechanical	Min. 10 ⁸ (10 ⁷ : 1 Form C latching type) (at 600 cpm)		
	Electrical	Min. 5×10 ⁵ rated load (at 60 cpm)		
Conditions	Conditions for operation, transport and storage ³	Ambient temperature: -40°C to +70°C -40°F to +158°F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)		
	Max. operating speed (at rated load)	60 cpm		
Unit weight		Approx. 3 g .11 oz	Approx. 4g .14oz	

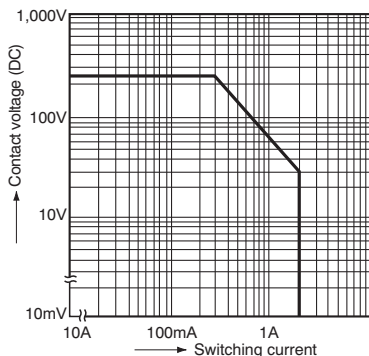
1* This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load. (TX/TX-S/TX-D relay AgPd contact types are available for low level load switching [10V DC, 10mA max. level])

2* Half-wave pulse of sine wave: 11ms; detection time: 10μs

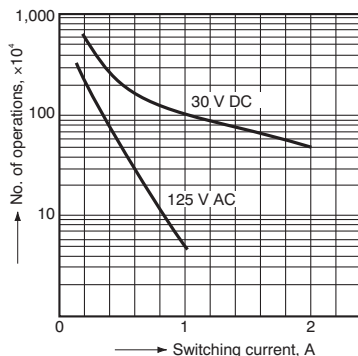
3* Refer to "6. Usage, Storage and Transport Conditions" in AMBIENT ENVIRONMENT (page 556).

REFERENCE DATA

1. Maximum switching capacity

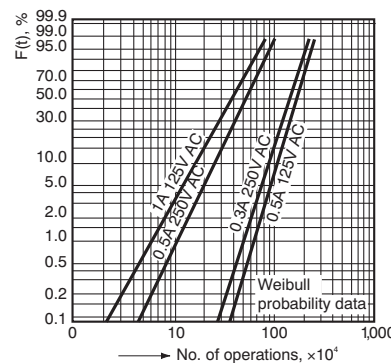


2. Life curve (Resistive load)



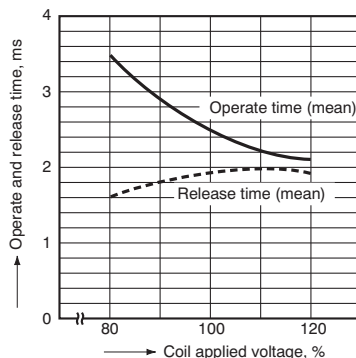
3. Contact reliability for AC loads

Tested sample: DS2E-S-DC24V 10 pcs.
Operating speed: 20 cpm. Detection level: 200 mΩ

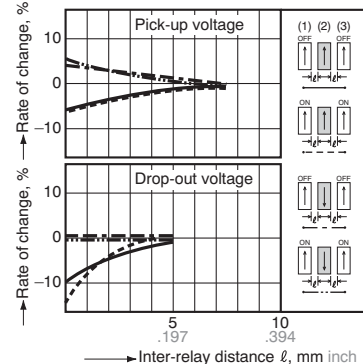


4. Operate and release time characteristics (2 Form C single side stable type)

Test condition: Without diode connected to coil in parallel



5-(1). Influence of adjacent mounting (1 Form C)



5-(2). Influence of adjacent mounting (2 Form C)

