

# Panasonic

ideas for life

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(радиодетали) СО СКЛАДА И ПОД ЗАКАЗ

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SHORT FORM

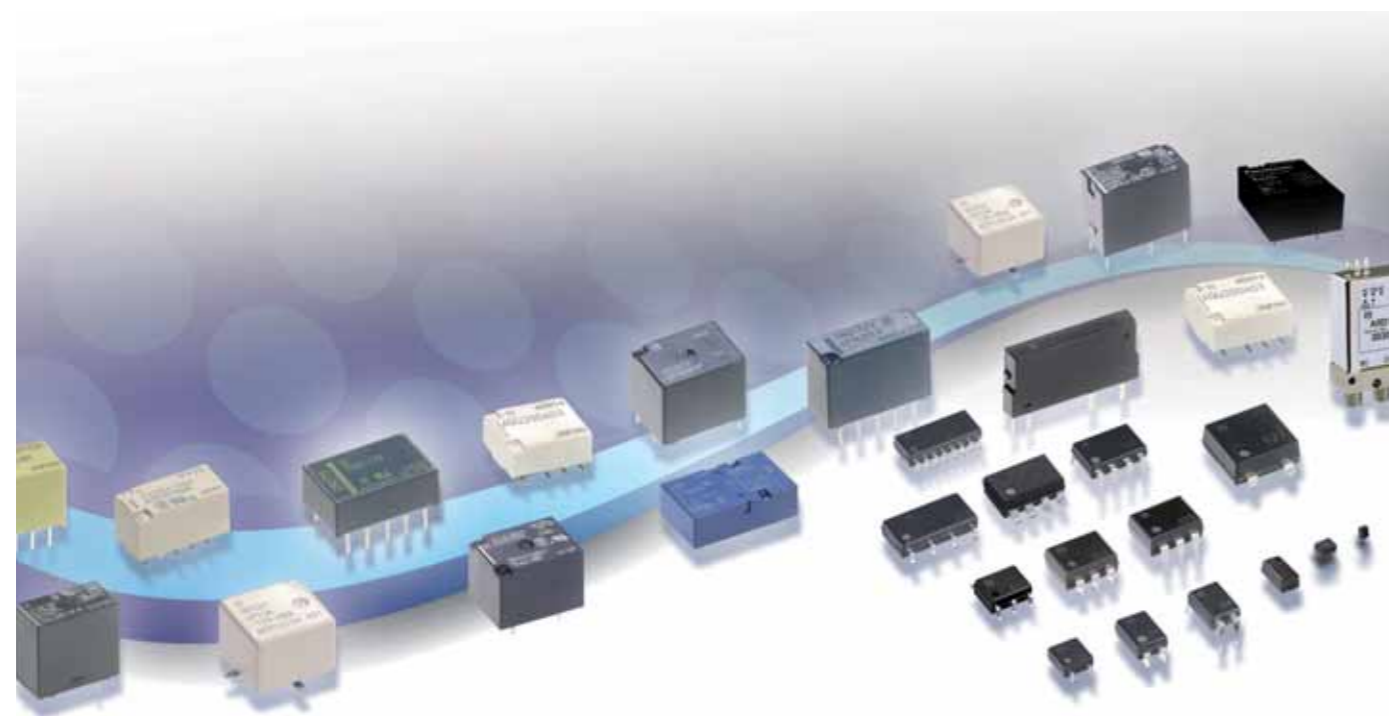
RELAYS



## Panasonic Relay Technology Innovation across the board

Telecommunications, machine construction, measurement and control systems, automotive electronics, building security and installation – today there is virtually no branch of human activity that can exist without using modern relays. Panasonic is able to meet both simple or complex demands from its vast range of sophisticated, economic switching technologies by offering the relay most appropriate to

solving the specific application. With over 30 years experience at the forefront of relay innovation and development, Panasonic today offers one of the world's most comprehensive ranges of electromechanical and semiconductor types. Currently our product range extends from ultra-miniature SMD semiconductor types to robust, compact industrial devices.



Load switching capability ranges from low-level signals to double-digit ampere values. Panasonic relays are available for all common mounting configurations with screw, PCB, solder or surface mount terminals to meet most demands of operating environments or conditions. With its well established, comprehensive T and G series relays, we are making significant contributions within the field of global data transmission.

Panasonic power relays, particularly those of the J, L and C series, are not only used in mains isolation applications, but also in diverse ranges of consumer

appliances, automotive electrics and diverse OEM manufacturing industries. In the field of safety of man and machine, the SF series relays with forcibly guided contacts, have set a new standard of security. Panasonic has developed a wide range of SMD miniature relays for the new generation of surface mounting, automated assembly processes. In addition to electromechanical SMD types such as the TQ, TX, GN, GQ and CP series, we have made significant developments in the rapidly expanding field of SSR and PhotoMOS relays.

## Panasonic Semiconductor Relays: Compact and Reliable

If your application requires long lifetime, stable behavior, small size or high switching speed, semiconductor relays are definitely the best choice for you. Within our broad product range, you can find relays to switch low level loads or double-digit ampere values. Various package options are also available. In other words, our semiconductor relays complement our electromechanical relay selection to allow us to exactly meet your needs. For us, supplying quality products is

paramount. To guarantee superior quality, the company has implemented strict testing and inspection procedures to comply with or even exceed most international specifications. Of course, we sell RoHS compliant products and have ISO9001 certification. If you need more detailed information about Panasonic relays, please ask us to send you the complete relay catalog.

## Soldering Guidelines for Lead-free Solder

Our products support lead-free soldering processes. Please contact a Panasonic sales office to find out when each relay will support lead-free solder.

If you are using Sn-Pb eutectic solder, mounting conditions can remain as they are.

When using lead-free solder for our products, please adhere to the following soldering guidelines:

- **DIP type**

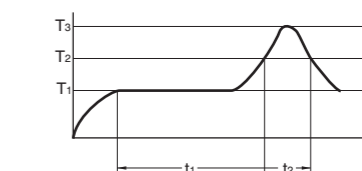
The conditions for mounting with lead-free solder are: preheating at 120°C within 120 seconds and soldering at 260 ±5°C within 6 seconds. (Soldering of PhotoMOS relays can be carried out at 260°C within 10 seconds.)

The reliability of the solder at the joining part can vary greatly depending on the actual mounting conditions. Influencing factors are: the type of lead-free solder, the landscape of the PCB, the mounting conditions.

- **SMT type**

We recommend the following temperature profile as a condition for automatic mounting when using lead-free solder.

- **Recommended temperature profile condition during reflow soldering**



T<sub>1</sub> = 150° to 180°C  
T<sub>2</sub> = 230°C and higher  
T<sub>3</sub> = Up to 250°C

t<sub>1</sub> = 60 to 120 sec.  
t<sub>2</sub> = Within 30 sec.

- **Cautions when mounting**

The relay temperature may rise depending on the mounting density and the heating method of the reflow oven. Accordingly, please set the temperature so that the soldered parts of the relay terminals do not exceed the mounting conditions given above. We recommend checking the temperature rise at each part to be soldered under the actual conditions.

## Service Has Priority

We are constantly striving to optimize our service sector to enable us to react quickly to customer requests. Whether you have specific application requests or you simply want technical information, we are always ready to advise and assist you; you only have to call. Our current delivery program is assembled for you in this relay overview. Besides the most important technical data, you will find numerous illustrations of possible applications.

Of course, detailed data sheets are available on our homepage

[www.panasonic-electric-works.com](http://www.panasonic-electric-works.com)

Our product managers, sales and application engineers will be happy to advise you.



## Relays: Characteristics at a Glance


UL coil insulation	Coil insulation	Relay
	UL-B	LE, LZ, JS, JQ, JW
	UL-F	LE, LZ, JT-N, JT-V

TV rated	TV rated	Steady (A)	Inrush (A)	Relay
	TV-2			HL (1C; NC), HL (2c, NC)
	TV-3	4.5	71	ST, HC (1c,2c), HL (1c, NC)
	TV-4	6.0	91	LA, HL (2c, NO)
	TV-5	7.5	111	LK-P, LK-Q, JQ, JS, JW, HL (1c, NO)
	TV-8	12.0	163	LK-T, LK-Q
	TV-10	15.0	191	HE (2a)
	TV-15	18.8	215	HE (1a)

Surge voltage between contact and coil	Surge voltage	Relay
	5 000V	DS-P
	6 000V	ST, PF, JT-V
	8 000V	JQ, JK, PQ
	10 000V	LF, LE, LZ, LA, LD, LJ, LK-S, LK-P, LK-T, LK-Q, JW, JM, HE, JC, DJ, DK, DQ, DY

High frequency characteristics	Relay	Arrangement	Isolation	Insertion loss
	RD coaxial switch	SPDT, Transfer, SP6T	Min. 60dB (18GHz)	Max. 0.5dB (18GHz)
	RV coaxial switch	SPDT	Min. 60dB (18GHz)	Max. 0.7dB (18GHz)
	RJ	2 Form C	Min. 35dB (5GHz)	Max. 0.5dB (18GHz)
	RE	1 Form C	Min. 30dB (2.6GHz)	Max. 0.5dB (2.6GHz)
	RA	2 Form C	Min. 30dB (1GHz)	Max. 0.3dB (1GHz)
	RS	2 Form C	Min. 30dB (3GHz)	Max. 0.3dB (3GHz)

	Relay
Terminal socket	HN, HC, HJ, HK, HL, SP, NC, HE, SFS
Socket	HC, HL, S, ST, SP, NC, PA, DK, DS-P, JW, JC, Power PhotoMOS Relay, SFS, PF
LED operation indication type	HN, HC, HJ, HK, HL, SFS, AQ-K

Please download  from our Web site: [www.panasonic-electric-works.com](http://www.panasonic-electric-works.com)

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## Well Proven in Various Applications













## Signal Relays

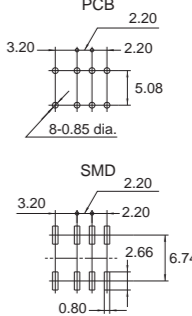
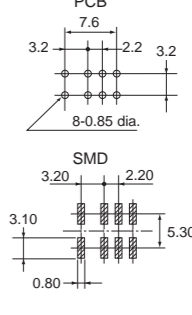
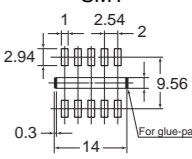
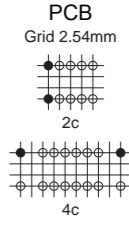
## Mechanical Relays Selector Chart

## 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 criti-









cal values, please refer to the respective data sheet or contact your Panasonic representative.

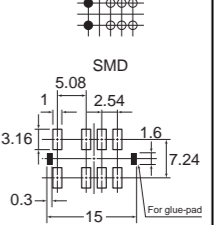
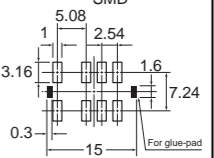
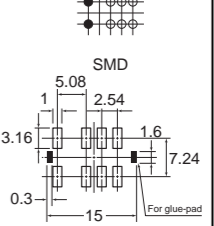
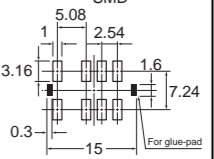
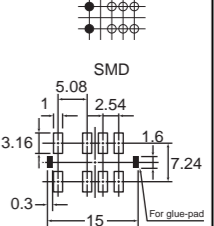
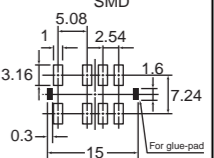
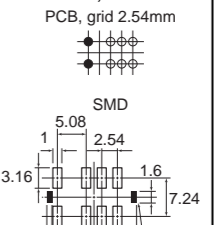
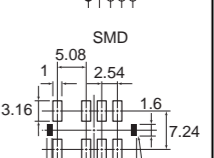
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
★ <b>GQ (SMD)</b> 1:1  10.6 x 7.2 x 5.2/5.4mm	<ul style="list-style-type: none"> <li>Compact flat body saves space</li> <li>Outstanding surge resistance</li> <li>The use of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

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

# Signal Relays



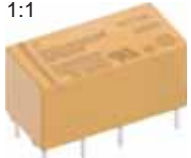



# Mechanical Relays Selector Chart

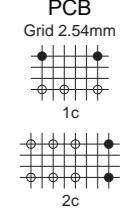

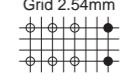

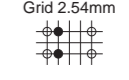

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
<b>★ TX (SMD)</b>  1:1 15 x 7.4 x 8.2mm	<ul style="list-style-type: none"> <li>Surge withstand 2,500V</li> <li>Breakdown voltage between contacts and coil 2,000V</li> <li>3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

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<b>Single side stable:</b> 140mW (up to 24V DC) 270mW (48V DC)  <b>1 coil latching:</b> 100mW  <b>2 coil latching:</b> 200mW	1000Vrms	1000Vrms	2000Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 	BSI, CSA, UL
<b>Single side stable:</b> 140mW (up to 24V DC) 270mW (48V DC)  <b>1 coil latching:</b> 100mW (up to 24V DC)  <b>2 coil latching:</b> 140mW (up to 24V DC)	1000Vrms	1000Vrms	2000Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 	BSI, CSA, UL
<b>Single side stable:</b> 200mW (1.5 - 12V DC) 230mW (24V DC)  <b>1 coil latching:</b> 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 	BSI, CSA, UL
<b>Single side stable:</b> 50mW (1.5 - 12V DC) 70mW (24V DC)  <b>1 coil latching:</b> 35mW (1.5 - 12V DC) 50mW (24V DC)  <b>2 coil latching:</b> 70mW (1.5 - 12V DC) 150mW (24V DC)	750Vrms	1000Vrms	1800Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 	BSI, CSA, UL

# Signal Relays















# Mechanical Relays Selector Chart

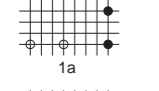
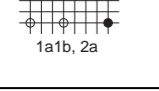
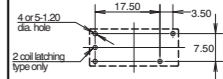
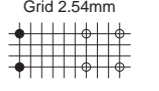
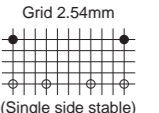
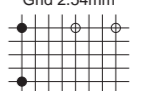
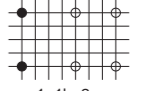
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
<b>DS</b> 1:1  15/20 x 9.9 x 9.9mm	<ul style="list-style-type: none"> <li>1,500V FCC</li> <li>High switching power</li> </ul>	<b>Max.:</b> 2A <b>Min.:</b> 10µA 	<ul style="list-style-type: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

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<b>M type:</b> <b>Single side stable:</b> 400mW <b>1 coil latching:</b> 180mW <b>2 coil latching:</b> 360mW <b>S type:</b> <b>Single side stable:</b> 200mW <b>1 coil latching:</b> 90mW <b>2 coil latching:</b> 180mW	1000Vrms (DS1-S: 500Vrms)	1000Vrms	1500Vrms (DS1-S: 1000Vrms)	1,500V FCC	PCB Grid 2.54mm 	CSA, UL 
<b>Single side stable:</b> 200mW (up to 24V DC) 300mW (48V DC)	750Vrms	1000Vrms	1000Vrms	1,500V FCC	PCB Grid 2.54mm 	CSA, UL 
<b>Standard:</b> 200mW <b>High sensitivity:</b> 150mW	500Vrms	—	1000Vrms	—	PCB Grid 2.54mm 	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
<b>DSP</b> 1:2  20.2 x 11 x 10.5mm	<ul style="list-style-type: none"> <li>High switching capacity</li> <li>High sensitivity</li> <li>High breakdown voltage</li> <li>Miniature high-power relay</li> <li>Creepage and clearance distance min. 4mm</li> </ul>	<b>Max.:</b> 8A (1a)  5A (1a1b, 2a) 	<ul style="list-style-type: none"> <li>220V DC</li> <li>400V AC</li> </ul>	1a, 1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24V
<b>DW</b> 1:2  24 x 10 x 18.8mm	<ul style="list-style-type: none"> <li>Pin-in-Paste version available</li> <li>Surge withstand voltage between coil and contact: 12,000V</li> <li>Breakdown voltage between coil and contact: 5,000V eff</li> <li>Conforms to EN 60335</li> <li>Creepage and clearance distance min. 6mm</li> </ul>	<b>Max.:</b> 8A (1a) 	<ul style="list-style-type: none"> <li>250V AC</li> </ul>	1a	(DC) 3, 5, 6, 9, 12, 24V
<b>DE</b> 1:2  25 x 12.5 x 12.5mm	<ul style="list-style-type: none"> <li>Conforms to VDE0631</li> <li>Low coil power</li> <li>Compact body saves space</li> <li>High switching capacity: 16A = 25,000 10A = 100,000 switching cycles</li> <li>Creepage and clearance distance min. 8mm</li> </ul>	<b>Max.:</b> 10/16A (1a)   8A (1a1b, 2a) 	<ul style="list-style-type: none"> <li>230V DC</li> <li>440V AC</li> </ul>	1a, 1a1b, 2a	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
<b>ST</b> 1:2  31 x 14 x 11.3mm	<ul style="list-style-type: none"> <li>High capacity in small size</li> <li>High inrush capability</li> <li>Latching type available</li> <li>Frictionless pivoted rotating armature</li> <li>High breakdown voltage</li> <li>Socket available</li> <li>Not for new applications</li> <li>Creepage and clearance distance min. 4mm</li> </ul>	<b>Max.:</b> 8A <b>Min.:</b> 1mA 	<ul style="list-style-type: none"> <li>250V DC</li> <li>400V AC</li> </ul>	1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24, 48V
<b>DK</b> 1:2  20 x 12.5 x 9.7mm	<ul style="list-style-type: none"> <li>Dimensions for 1a = 12.5mm, for 2a, 1a1b = 15mm</li> <li>Low coil power</li> <li>Creepage and clearance distance min. 8mm: DK2A-L2 min. 6.8mm DK1A1B-L2 min. 6.8mm</li> </ul>	<b>Max.:</b> 10A (1a)  8A (1a1b, 2a) 	<ul style="list-style-type: none"> <li>125V DC</li> <li>400V AC</li> </ul>	1a, 1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24V

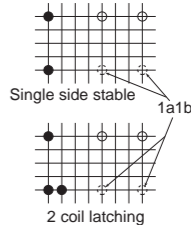

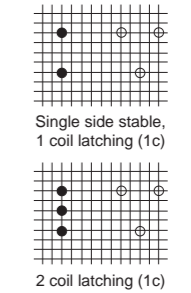

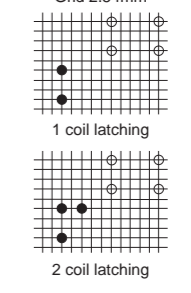

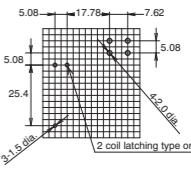

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<b>Single side stable:</b> 300mW  <b>1 coil latching:</b> 150mW  <b>2 coil latching:</b> 300mW	1000Vrms	2000Vrms	3000Vrms	5,000V	PCB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

Power

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


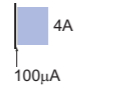


Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<b>Single side stable:</b> 200mW  <b>2 coil latching:</b> 200mW	1000Vrms	4000Vrms	4000Vrms	10,000V	PCB Grid 2.54mm  Single side stable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

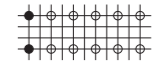

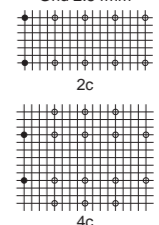

Power



# 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
<b>S</b> 1:2  28 x 12 x 10.4mm	<ul style="list-style-type: none"> <li>High switching capacity range due to 5-layer contact</li> <li>High sensitivity</li> <li>High vibration and shock resistance</li> <li>Low thermal electromotive force (approx. 3μV)</li> <li>Latching type available</li> <li>Sockets available</li> </ul>	<b>Max.:</b> 4A <b>Min.:</b> 100μA 	<ul style="list-style-type: none"> <li>200V DC</li> <li>250V AC</li> </ul>	2a2b, 3a1b, 4a	(DC) 3, 5, 6, 12, 24, 48V
<b>SP</b> 1:2  2c: 50 x 25.6 x 22mm 4c: 50 x 36.8 x 22mm	<ul style="list-style-type: none"> <li>Polarized power relay with rotating armature</li> <li>High sensitivity</li> <li>High vibration and shock resistance</li> <li>Wide switching range</li> <li>Latching type available</li> <li>Socket available</li> </ul>	<b>Max.:</b> 15A 	<ul style="list-style-type: none"> <li>110V DC</li> <li>250V AC</li> </ul>	2c, 4c	(DC) 3, 5, 6, 12, 24, 48V

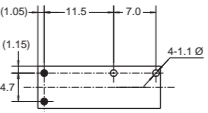

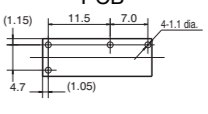

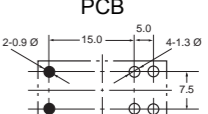

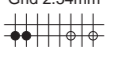

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<b>Single side stable:</b> ~200mW (3V - 24V DC) 271mW (48V DC)  <b>1 coil latching:</b> ~100mW (3V - 24V DC) 144mW (48V DC)  <b>2 coil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

Power

## Non-Polarized Power Relays










## Mechanical Relays Selector Chart

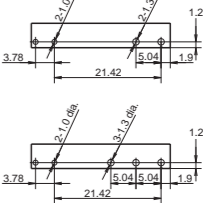
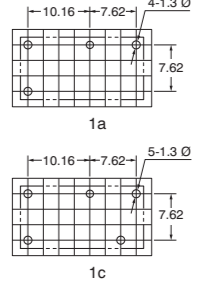
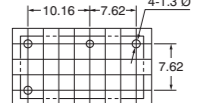
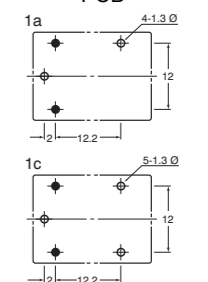
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<b>LD</b> 1:2  20.3 x 7 x 15mm	<ul style="list-style-type: none"> <li>Slim type: width 7mm</li> <li>Coil power: 200mW</li> <li>Creepage and clearance distance min. 6mm</li> </ul>	<b>Max.:</b> 3A 	<ul style="list-style-type: none"> <li>30V DC</li> <li>277V AC</li> </ul>	1a	(DC) 4.5, 5, 6, 9, 12, 18, 24V
<b>LD-P</b> 1:2  20.3 x 7 x 15mm	<ul style="list-style-type: none"> <li>Slim type: width 7mm</li> <li>Coil power: 200mW</li> <li>High switching capacity 5A/277V AC</li> <li>Creepage and clearance distance min. 6mm</li> </ul>	<b>Max.:</b> 5A 	<ul style="list-style-type: none"> <li>30V DC</li> <li>277V AC</li> </ul>	1a	(DC) 5, 6, 9, 12, 18, 24V
<b>LA</b> 1:2  24 x 12 x 25mm	<ul style="list-style-type: none"> <li>Low cost slim power relay: 2 Form A</li> <li>High insulation resistance between contact and coil</li> <li>3A-version with gold clad contacts available (ideal speaker switch)</li> <li>Surge withstand voltage: 10kV</li> <li>Creepage and clearance distance min. 6mm</li> </ul>	<b>Standard:</b> <b>Max.:</b> 3A (3A rated)  <b>Power type:</b> <b>Max.:</b> 5A (5A, TV-4 rated) 	<ul style="list-style-type: none"> <li>30V DC</li> <li>277V AC</li> </ul>	2a	(DC) 12, 24V
<b>PA</b> 1:2  20 x 5 x 12.5mm	<ul style="list-style-type: none"> <li>Slim size permits high density mounting</li> <li>High switching capacity</li> <li>Gold-clad contacts</li> <li>Pin-compatible with the AQZ PhotoMOS relay</li> <li>High surge voltage: 4,000V</li> <li>High breakdown voltage: 2,000V</li> <li>PAD with min. 3.6mm creepage distance and min. 3.1mm clearance distance</li> </ul>	<b>Max.:</b> 5A 	<ul style="list-style-type: none"> <li>110V DC</li> <li>250V AC</li> </ul>	1a	(DC) 5, 6, 9, 12, 18, 24V

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

## Non-Polarized Power Relays








## Mechanical Relays Selector Chart

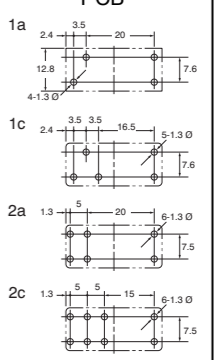

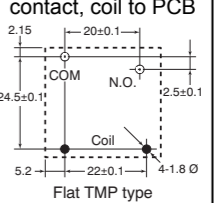

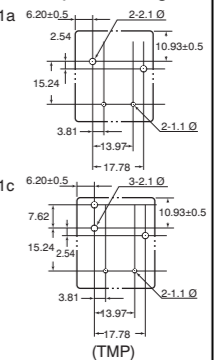

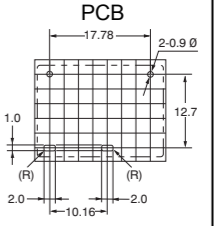

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<p>★ PF</p>  <p>1:2 28 x 5 x 15mm</p>	<ul style="list-style-type: none"> <li>Slim size permits high density mounting</li> <li>Wide switching capacity</li> <li>High surge voltage: 6,000V</li> <li>High breakdown voltage: 4,000V</li> <li>Slim relay for grid applications</li> <li>Insulation construction conforms to VDE0700</li> <li>Contacts with gold flash plating or gold-clad contacts available</li> <li>Print socket available</li> <li>Clearance distance min. 5.5mm</li> <li>Creepage distance min. 8mm</li> </ul>	<p>Max.: 6A</p> 	<ul style="list-style-type: none"> <li>300V DC</li> <li>400V AC</li> </ul>	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"> <li>High switching capacity in small size</li> <li>High surge withstand voltage: 8,000V</li> <li>Low power consumption</li> <li>Extremely low cost</li> <li>Creepage and clearance distance min. 4mm</li> </ul>	<p>Standard: Max.: 5A</p>  <p>Power type: Max.: 10A</p> 	<ul style="list-style-type: none"> <li>277V AC</li> </ul>	1a, 1c	(DC) 3, 5, 6, 9, 12, 18, 24, 48V
<p>PQ</p>  <p>1:2 20 x 10 x 15.6mm</p>	<ul style="list-style-type: none"> <li>High electrical noise immunity</li> <li>High sensitivity: 200mW</li> <li>High surge voltage: 8,000V</li> <li>Pin-compatible to JQ1a</li> <li>Gold-clad twin (bifurcated) contacts!</li> </ul>	<p>Max.: 5A</p> 	<ul style="list-style-type: none"> <li>110V DC</li> <li>250V AC</li> </ul>	1a	(DC) 3, 5, 6, 9, 12, 18, 24V
<p>JS</p>  <p>1:2 22 x 16 x 16mm</p>	<ul style="list-style-type: none"> <li>Ultra-miniature power relay with universal terminal footprint</li> <li>Special type for high ambient temperature available</li> <li>Extremely low cost</li> <li>High switching capacity: 10A</li> </ul>	<p>Max.: 10A</p> 	<ul style="list-style-type: none"> <li>100V DC</li> <li>277V AC</li> </ul>	1a, 1c	(DC) 5, 6, 9, 12, 18, 24, 48V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
170mW (5 - 24V) 217mW (48V) 175mW (60V)	1000Vrms	—	4000Vrms	6,000V	<p>PCB</p> 	C-UL, UL, VDE
200mW (1a) 400mW (1c)	1000Vrms (1a) 750Vrms (1c)	—	4000Vrms	8,000V	<p>PCB</p> 	CSA, SEMKO, TÜV, UL, VDE
200mW	1000Vrms	—	4000Vrms	8,000V	<p>PCB</p> 	CSA, SEMKO, TÜV, UL, VDE
360mW	750Vrms	—	1500Vrms	—	<p>PCB</p> 	CSA, TÜV, complies with TV-5, 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
<b>JW</b>  1:2 28.6 x 12.8 x 20mm	<ul style="list-style-type: none"> <li>Compact power relay</li> <li>High surge withstand voltage: 10,000V</li> <li>Class B coil insulation types available</li> <li>Creepage and clearance distance min. 8mm between contacts and coil (for 2 changeover contacts min. 7.5mm)</li> </ul>	<b>Standard:</b> <b>Max.:</b> 5A (2a, 2c)  <b>High capacity:</b> <b>Max.:</b> 10A (1a, 1c) 	<ul style="list-style-type: none"> <li>100V DC</li> <li>440V AC</li> </ul>	1a, 1c, 2a, 2c	(DC) 5, 6, 9, 12, 18, 24, 48V
<b>JM</b>  1:2 Slim: 30.4 x 16 x 26.5mm Flat: 31 x 28.5 x 17.2mm	<ul style="list-style-type: none"> <li>Superior welding resistance</li> <li>High surge resistance</li> <li>Compact high capacity relay for inductive load</li> <li>Relay for high motor loads</li> <li>Ideal for high inrush currents</li> <li>Pin-compatible with the LF relays</li> </ul>	<b>Max.:</b> 20A 	<ul style="list-style-type: none"> <li>100V DC</li> <li>250V AC</li> </ul>	1a	(DC) 5, 6, 9, 12, 24, 48V
<b>JT-V</b>  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"> <li>High breakdown voltage</li> <li>High surge withstand voltage: min. 6kV</li> <li>High switching capacity with small dimensions and low height</li> <li>TMP types available</li> <li>Class F type as standardIncreased insulation construction than JT-N</li> <li>Clearance, contact to coil: min. 6.4mm</li> <li>Creepage, contact to coil: min. 9.5mm</li> </ul>	<b>Max.:</b> 30A 	<ul style="list-style-type: none"> <li>30V DC</li> <li>277V AC</li> </ul>	1a, 1c	(DC) 12, 18, 24, 48V
<b>JV-N</b>  1:2 22 x 16 x 10.9mm	<ul style="list-style-type: none"> <li>Compact, flat type with low 10.9mm profile</li> <li>Sensitive coil</li> </ul>	<b>Max.:</b> 16A 	<ul style="list-style-type: none"> <li>110V DC</li> <li>277V AC</li> </ul>	1a	(DC) 4.5, 6, 9, 12, 24, 48, 100V

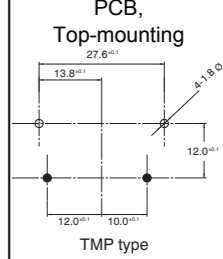
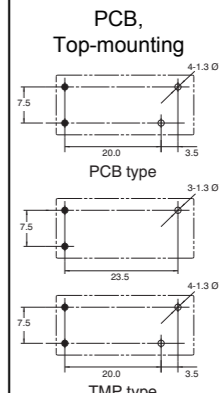
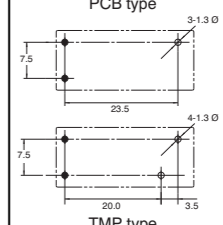
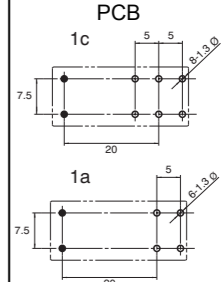
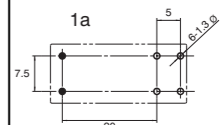
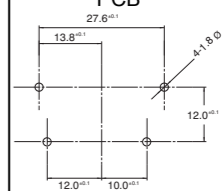
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
530mW	1000Vrms	3000Vrms (2a, 2c)	5000Vrms	10,000V	PCB 	CSA, SEMKO, SEV, TÜV, complies with TV-5, UL, VDE 
900mW	1000Vrms	—	5000Vrms	10,000V	PCB, Top mount contact, coil to PCB 	CSA, TÜV, UL, VDE 
1000mW	—	1200Vrms	3500Vrms	6,000V	PCB Top-mounting 	C-UL, UL 
(DC) 200mW (4.5V - 48V) (DC) 600mW (100V)	1000Vrms	—	2500Vrms	4,500V	PCB 	CSA, TÜV, UL 













# Non-Polarized Power Relays

# Mechanical Relays Selector Chart

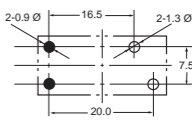

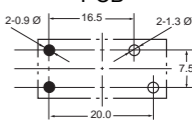

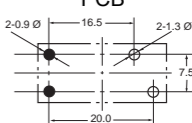

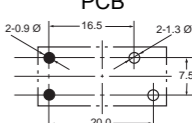

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<b>LF</b> 1:2  30.1 x 15.7 x 23.3mm	<ul style="list-style-type: none"> <li>Ideal for compressor and inverter loads</li> <li>High insulation resistance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

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
900mW	1000Vrms	—	5000Vrms	10,000V	PCB, Top-mounting  TMP type	CSA, SEMKO, TÜV, UL, VDE
<b>Standard:</b> 400mW  <b>High sensitivity:</b> 200mW	1000Vrms	—	4000Vrms	10,000V	PCB, Top-mounting  PCB type  TMP type	CSA, TÜV, UL, VDE
400mW	1000Vrms	—	5000Vrms	10,000V	PCB  1c  1a	CSA, UL, VDE
1400mW	2500Vrms	—	4000Vrms	6,000V	PCB  TMP type	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
<b>LK-G</b> 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> <li>Contact gap: 1mm</li> <li>3 different types available</li> <li>High insulation resistance</li> <li>Slim profile</li> <li>High noise immunity</li> <li>Creepage and clearance distance between contact and coil min. 6mm (IEC65 compliant)</li> </ul>	<b>Max.: 10A</b>  <b>Max.: 16A</b> 	• 277V AC	1a	(DC) 5, 9, 12, 24V
<b>LK-P</b> 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> <li>High switching capacity 10A 277V AC</li> <li>High inrush current capability: 111A</li> <li>UL/CSA TV-5 rated type available</li> <li>High insulation: Creepage and clearance distance between contact and coil min. 6mm</li> </ul>	<b>Max.: 10A</b> 	<ul style="list-style-type: none"> <li>30V DC</li> <li>277V AC</li> </ul>	1a	(DC) 12, 24V
<b>LK-Q</b> 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> <li>Reduced noise</li> <li>High sensitivity: nominal coil power 250mW</li> <li>TV-5/TV-8 rated type available</li> <li>Slim shape</li> <li>Creepage and clearance distance min. 6mm</li> </ul>	<b>Max.:</b> TV5: 5A (AC)  TV8: 8A (AC) 	<ul style="list-style-type: none"> <li>30V DC</li> <li>277V AC</li> </ul>	1a	(DC) 5, 9, 12, 24V
<b>LK-T</b> 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> <li>High inrush current capability: 118A</li> <li>UL/CSA TV-8 rated type available</li> <li>High noise immunity realized by the card separation structure between contact and coil</li> <li>High insulation resistance:               <ol style="list-style-type: none"> <li>Creepage and clearance distance between contact and coil min. 6mm</li> <li>Surge withstand voltage between contact and coil &gt; 10kV</li> </ol> </li> </ul>	<b>Max.: 8A</b> 	• 277V AC	1a	(DC) 5, 9, 12, 24V









# Mechanical Relays Selector Chart

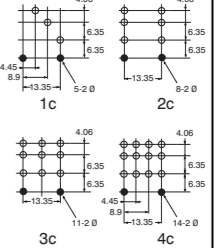
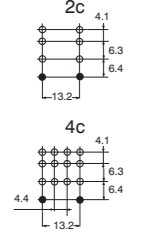

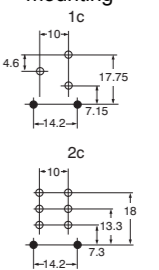
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
530mW	1000Vrms	—	4000Vrms	10,000V	PCB 	CSA, TÜV, UL 
530mW	1000Vrms	—	4000Vrms	10,000V	PCB 	CSA, SEMKO, SEV, TÜV, TV-5 rating, UL,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

Power

## Non-Polarized Power Relays











## Mechanical Relays Selector Chart

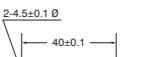

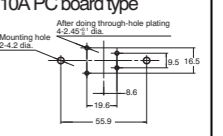

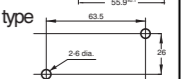
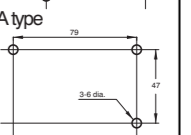
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<b>HC</b> 1:2  27.2 x 20.8 x 35.2mm	<ul style="list-style-type: none"> <li>Wide applications</li> <li>Versatile range</li> <li>Footprint compatible with competitive types</li> <li>Compact power relay</li> <li>AC and DC coil available</li> <li>Socket available</li> <li>Pin-compatible with the HJ relays</li> </ul>	<b>Max.:</b> 10A <b>Min.:</b> 1mA 	<ul style="list-style-type: none"> <li>30V DC</li> <li>250V AC</li> </ul>	1c, 2c, 3c, 4c	(DC) 6, 12, 24, 48, 110V (AC) 6, 12, 24, 48, 120, 240V
<b>HJ</b> 1:2  28 x 21.5 x 35/38mm	<ul style="list-style-type: none"> <li>2 contact arrangements, same footprint as our popular HC relay</li> <li>Coil breakdown detection-function (AC type with LED only)</li> <li>Convenient screw terminal sockets with finger protection also available</li> <li>Test button type available</li> <li>Compact power relay for AC and DC voltage</li> <li>Socket available</li> </ul>	<b>Max.:</b> 7A 	<ul style="list-style-type: none"> <li>30V DC</li> <li>250V AC</li> </ul>	2c, 4c	(DC) 12, 24, 48, 110V (AC) 12, 24, 48, 100, 120, 200, 220/240V
<b>HN</b> 1:2  29 x 13 x 28mm	<ul style="list-style-type: none"> <li>Slim (13mm) and compact size relay: The size has been reduced 20% compared with the existing HC/HJ relays.</li> <li>Plug-in solder type available</li> <li>Slim screw terminal socket (17.5mm)</li> <li>Also available with LED indication</li> <li>High reliability</li> <li>AC and DC coil available</li> </ul>	<b>Max.:</b> 5A 	<ul style="list-style-type: none"> <li>30V DC</li> <li>250V AC</li> </ul>	1c, 2c	(DC) 5, 6, 12, 24, 48V (AC) 100, 120, 240V
<b>HL</b> 1:2  27.2 x 20.8 x 35.4mm	<ul style="list-style-type: none"> <li>Large capacity</li> <li>Compact size</li> <li>Designed for long lifetime</li> <li>Footprint compatible with competitive types</li> <li>High load switching range</li> <li>Socket available</li> </ul>	<b>Max.:</b> 15A <b>Min.:</b> 1mA 	<ul style="list-style-type: none"> <li>30V DC</li> <li>250V AC</li> </ul>	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)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
(DC) 900mW (AC) 1.2VA	700Vrms	700Vrms	2000Vrms	—	PCB, Plug-in, Top-mounting 	CSA, SEV, TV rating, UL, VDE
(DC) 900 mW (AC) 1.2 - 1.5VA	1000Vrms	2000Vrms	2000Vrms	—	Plug-in 	CSA, SEV, TV rating, UL, VDE
(DC) 530mW (AC) 0.9VA	1000Vrms	3000Vrms	5000Vrms	—	Plug-in, Screw terminal 	UL, C-UL, (VDE)
(DC) 900 - 1000mW (AC) 1.2 - 1.3VA	1000Vrms	1500Vrms	2000Vrms	—	PCB, Plug-in, Top-mounting 	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
<b>HE/ HE PV</b> 1:3  50 x 33 x 35.8mm	<ul style="list-style-type: none"> <li>High surge withstand voltage: 10,000V</li> <li>High inrush resistance: TV-15: 1 form A TV-10: 2 form A</li> <li>Compact power relays for AC and DC voltage</li> <li>Contact gap: 3mm</li> <li>Socket available</li> <li>Creepage and clearance distance min. 8mm</li> </ul>	<b>Max.: 30A</b>  <b>Max.: 50A</b> 	<ul style="list-style-type: none"> <li>100V DC</li> <li>277V AC</li> </ul>	1a, 2a	(DC) 6, 12, 24, 48, 110V (AC) 12, 24, 48, 120, 240V
<b>EP</b> 1:8 mm   62.4 x 37.9 x 31.3 66.8 x 37.9 x 45  75.5 x 40 x 79  111 x 63 x 74.7	<ul style="list-style-type: none"> <li>High capacity to cut off DC voltage in a compact relay: max. cut-off current 2,500A/300V DC</li> <li>Nominal switching capacity 300A 400V DC</li> <li>Low operating noise</li> <li>High contact reliability</li> <li>DC type with sealed capsule</li> </ul>	<b>Max.:</b> 10A  80A  300A 	<ul style="list-style-type: none"> <li>400V DC</li> </ul>	1a	(DC) 12, 24, 48, 100V




Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	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)	CSA, TÜV, TV rating, UL, VDE
Max.: 1.4W (10A) 4.5W (80A) 4 - 40W (300A)	2500Vrms	—	2500Vrms	—	PCB 10A PC board type  10A TM type  80A type  300A type 	—

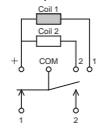
Power



## High-Frequency Relays




## Mechanical Relays Selector Chart


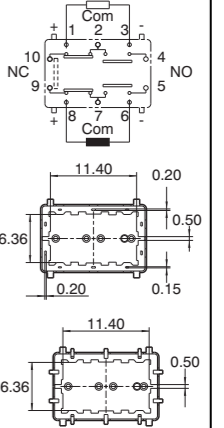

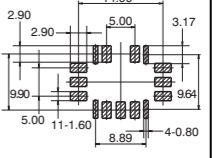

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
<b>RV SPDT</b> 1:1  15.9 x 15.9 x 11.2mm	<ul style="list-style-type: none"> <li>Ultra small coaxial switch</li> <li>Up to 26.5 GHz</li> <li>Impedance 50Ω</li> <li>PIN and SMA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

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

## High-Frequency Relays


## Mechanical Relays Selector Chart

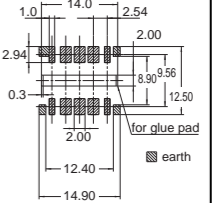
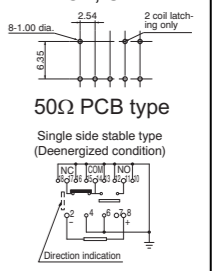
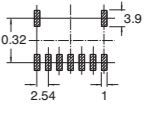
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
★ RD SP6T 1:4  80 x 80 x 39.5mm	<ul style="list-style-type: none"> <li>Coaxial relay</li> <li>Up to 13GHz (18GHz)</li> <li>Terminated type available</li> <li>Impedance 50Ω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

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

## High-Frequency Relays

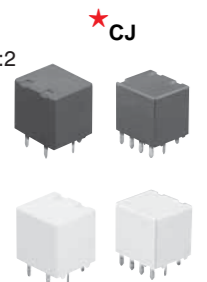


## Mechanical Relays Selector Chart

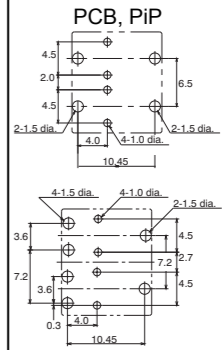
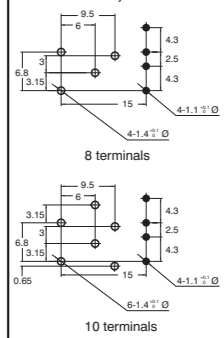
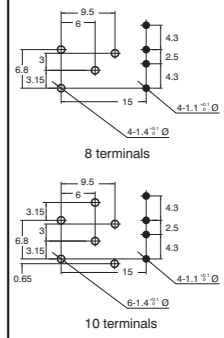
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
<b>RA</b> 1:1  14.7 x 9.7 x 5.9mm	<ul style="list-style-type: none"> <li>• HF relay in SMT version</li> <li>• Up to 1GHz</li> <li>• Impedance 50Ω</li> <li>• Latching types available</li> </ul> HF Characteristics at 1GHz: <ul style="list-style-type: none"> <li>• Isolation min. 20dB</li> <li>• Isolation min. 30dB between contact sets</li> <li>• Insertion loss max. 0.3dB</li> <li>• V.S.W.R. max. 1.2</li> </ul>	<b>DC:</b> 1A <b>HF:</b> 3W (1GHz, carrying point to carrying current)	• 30V DC	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
<b>RS</b> 1:1  14 x 8.6 x 7/8mm	<ul style="list-style-type: none"> <li>• HF relay</li> <li>• Up to 3GHz</li> <li>• Impedance 50/75Ω</li> <li>• Silent type available</li> <li>• Latching types available</li> <li>• SMT and PCB version available</li> <li>• 10W at 3GHz contact carrying power</li> </ul> HF Characteristics at 3GHz (50Ω PCB type): <ul style="list-style-type: none"> <li>• Isolation min. 35dB</li> <li>• Insertion loss max. 0.35dB</li> <li>• V.S.W.R. max. 1.4</li> </ul>	<b>DC:</b> 0.5A <b>HF:</b> 1W (3GHz)	• 30V DC	1c	(DC) 3, 4.5, 9, 12, 24V
<b>RE</b> 1:1  20.2 x 11.2 x 8.9/9.6mm	<ul style="list-style-type: none"> <li>• HF relay</li> <li>• Up to 2.6GHz</li> <li>• Impedance 50/75Ω</li> <li>• SMT and PCB version available</li> </ul> HF Characteristics at 2.6GHz (75Ω PCB type): <ul style="list-style-type: none"> <li>• Isolation min. 30dB</li> <li>• Insertion loss max. 0.5dB</li> <li>• V.S.W.R. max. 1.5</li> </ul>	<b>DC:</b> 0.5A <b>HF:</b> 1W (2.6GHz)	• 30V DC	1c	(DC) 3, 4.5, 6, 9, 12, 24V

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

# 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
<b>Twin</b>					
<p>★ <b>CJ</b></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"> <li>Ultra small size</li> <li>Twin (1 Form C x 2)</li> <li>High capacity in a compact body</li> <li>H-bridge type available (twin relay)</li> <li>RTIII (IP67)</li> <li>Pin in Paste (with vent hole) available</li> </ul>	<p><b>Max.:</b></p> <p>20A (N.O.)</p> <p>10A (N.C.)</p>	<ul style="list-style-type: none"> <li>16V DC</li> </ul>	<p>1c, 1c x 2</p>	(DC) 12V
<p>★ <b>CT</b></p> <p>1:2</p>  <p>17.4 x 14 x 13.5mm</p>	<ul style="list-style-type: none"> <li>Super miniature size</li> <li>Twin (1 Form C x 2)</li> <li>ACT512 layout = layout of 2 x ACT112</li> <li>H-bridge type available (twin relay)</li> <li>Quiet operation</li> <li>RTIII (IP67)</li> <li>Pin in Paste (with vent hole) available</li> </ul>	<p><b>Max.:</b></p> <p>20A (N.O.)</p> <p>10A (N.C.)</p>	<ul style="list-style-type: none"> <li>16V DC</li> </ul>	<p>1c, 1c x 2</p>	(DC) 12V
<p>★ <b>CT POWER</b></p> <p>1:2</p>  <p>17.4 x 14 x 13.5mm</p>	<ul style="list-style-type: none"> <li>Super miniature size</li> <li>Twin (1 Form C x 2)</li> <li>Footprint same as CT standard type</li> <li>30A switching capacity (motor load)</li> <li>H-bridge type available (twin relay)</li> <li>RTIII (IP67)</li> <li>Pin in Paste (with vent hole) available</li> </ul>	<p><b>Max.:</b></p> <p>30A (N.O.)</p> <p>10A (N.C.)</p>	<ul style="list-style-type: none"> <li>16V DC</li> </ul>	<p>1c, 1c x 2</p>	(DC) 12V











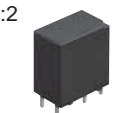

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<p><b>Standard:</b> 800mW</p> <p><b>High sensitivity:</b> 640mW</p>	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	—
800mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	—
1000mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	—

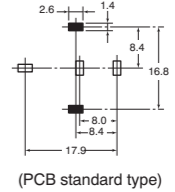
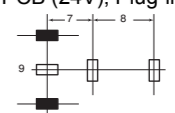
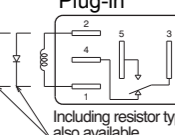
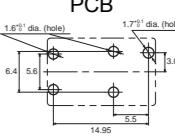
Automotive



# Automotive Relays









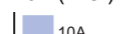


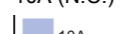
# Mechanical Relays Selector Chart

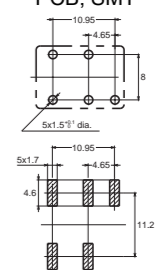
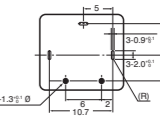
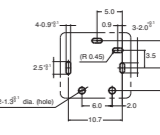
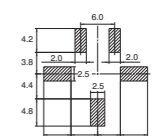
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<b>Single</b>					
<b>CB</b>  1:2 26 x 22 x 25mm	<ul style="list-style-type: none"> <li>40A switching current at 85°C</li> <li>Mini-ISO type terminals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

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	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)	—
1500mW (12V DC type) 1800mW (24V DC type)	500Vrms	—	500Vrms	—	PCB (24V), Plug-in 	—
800mW	500Vrms	—	500Vrms	—	Plug-in  Including resistor type also available	—
450mW 640mW	500Vrms	—	500Vrms	—	PCB 	—

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

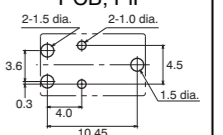
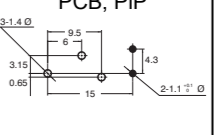
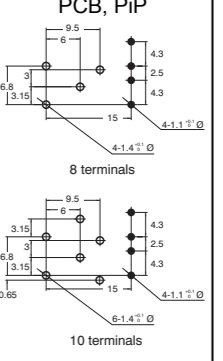
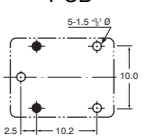
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
640mW	500Vrms	—	500Vrms	—	PCB, SMT 	—
640mW	500Vrms	—	500Vrms	—	PCB 	—
450mW 640mW	500Vrms	—	500Vrms	—	PCB 	—
640mW	500Vrms	—	500Vrms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

Automotive

# 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"> <li>Ultra small size</li> <li>Twin (1 Form C x 2)</li> <li>High capacity in a compact body</li> <li>H-bridge type available (twin relay)</li> <li>RTIII (IP67)</li> <li>Pin in Paste (with vent hole) available</li> </ul>	<p>Max.: 20A (N.O.) 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"> <li>Super miniature size</li> <li>Twin (1 Form C x 2)</li> <li>ACT512 layout = layout of 2 x ACT112</li> <li>H-bridge type available (twin relay)</li> <li>Quiet operation</li> <li>RTIII (IP67)</li> <li>Pin in Paste (with vent hole) available</li> </ul>	<p>Max.: 20A (N.O.) 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"> <li>Super miniature size</li> <li>Twin (1 Form C x 2)</li> <li>Footprint same as CT standard type</li> <li>30A switching capacity (motor load)</li> <li>H-bridge type available (twin relay)</li> <li>RTIII (IP67)</li> <li>Pin in Paste (with vent hole) available</li> </ul>	<p>Max.: 30A (N.O.) 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"> <li>Very quiet operation</li> <li>Terminal layout identical to JJM</li> <li>RTIII (IP67)</li> </ul>	<p>Max.: 20A (N.O.) 10A (N.C.)</p> 	• 16V DC	1c	(DC) 12V

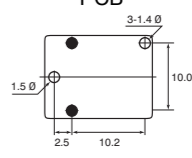
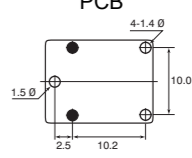
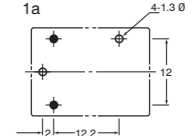
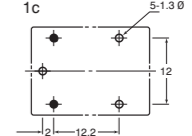
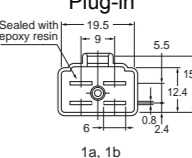
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<p>Standard: 800mW</p> <p>High sensitivity: 640mW</p>	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	—
800mW	500Vrms	—	500Vrms	—	<p>PCB, PiP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

Automotive

# Automotive Relays

# Mechanical Relays Selector Chart











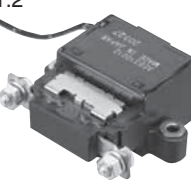

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
<b>★ JJM</b> 1:2  15.5 x 12 x 13.9mm	<ul style="list-style-type: none"> <li>Compact (half the size of JS-M)</li> <li>Best-selling, familiar blinker sound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

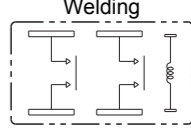
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
640mW	500Vrms	—	500Vrms	—	PCB 	—
1000mW	500Vrms	—	500Vrms	—	PCB 	—
640mW	750Vrms	—	1500Vrms	—	PCB 1a  1c 	—
1800mW 1400mW (type S)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

Automotive

# 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
<b>Special Types</b>					
<b>EV</b> 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"> <li>• 5 versions available: 10, 20, 80, 120, 300A</li> <li>• DC type with sealed capsule for electric and hybrid vehicles</li> <li>• Compact size</li> <li>• Small arcing space required thanks to blow-out magnets</li> <li>• Safety construction</li> <li>• High contact reliability</li> </ul>	<b>Max.:</b> 10A (1a)  20A (1a)  80A (1a)  120A (1a)  300A (1a) 	• 400V DC	1a	(DC) 12, 24V
<b>EV QUIET</b> 1:4  76 x 36 x 72.3mm 77 x 67.8 x 37.7mm	<ul style="list-style-type: none"> <li>• DC type with sealed capsule, mainly for hybrid vehicles</li> <li>• Very quiet operation</li> <li>• Small size and light weight</li> <li>• Small arcing space required thanks to blow-out magnets</li> <li>• Safety construction</li> <li>• High contact reliability</li> <li>• Standard type for horizontal mounting available</li> </ul>	<b>Max.:</b> 60A (1a) 	• 400V DC	1a	(DC) 12V
<b>CW</b> 1:2  32 x 18 x 26mm	<ul style="list-style-type: none"> <li>• Ideal relay for high output, 3-phase motors (Electric Power Steering)</li> <li>• High cut-off current capability and high carrying current</li> <li>• RTIII (IP67)</li> </ul>	<b>Max.:</b> 	• 14V DC	2a	(DC) 12V
<b>EB</b> 1:2  70 x 80 x 34mm	<ul style="list-style-type: none"> <li>• Automotive high-capacity DC cutoff relay</li> <li>• Supports even 42V vehicles</li> </ul>	<b>Max.:</b> 100A (1a) 	• 42V DC	1a	(DC) 12, 24, 36V






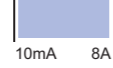

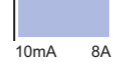
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<b>Stable:</b> • 1240mW (10A, 12/24V) • 3900mW (20A, 12V) • 4200mW (80A/120A, 12/24V) • 3600mW (300A, 12V) • 3800mW (300A, 24V)  <b>Inrush: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

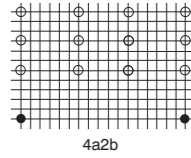
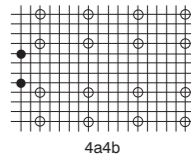
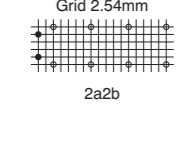
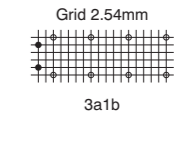
Automotive



# Safety Relays

# Mechanical Relays Selector Chart






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

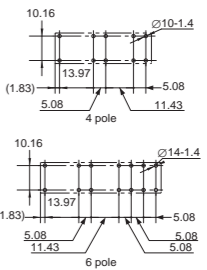

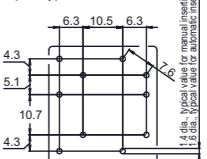
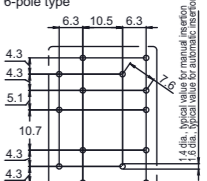

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
390mW (5 - 24V) 420mW (36 - 60V)	2500Vrms	4000Vrms	5000Vrms	—	PCB Grid 2.5mm  4a2b	CSA, SEV, TÜV, UL
500mW	2500Vrms	2500Vrms	2500Vrms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

Sicherheit

# Safety Relays

# Mechanical Relays Selector Chart

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

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

Safety

# PhotoMOS Relays

# Semiconductor Relays

## What is PhotoMOS?

Panasonic Electric Works offers a wide range of PhotoMOS relays for use in telecommunication, measurement, security devices and industrial control. Obviously, the PhotoMOS relay differs from the conventional electromechanical relay, but it also distinguishes itself from other switching solutions that utilize optocouplers or semiconductors.

The construction of the PhotoMOS relay is illustrated below:

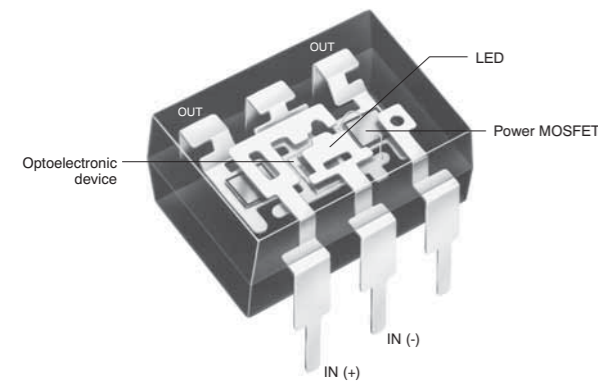


Figure 1 PhotoMOS internal construction

The input pins are connected to a light emitting diode. This LED is located on the upper part of the relay and as soon as a current flows through it, it starts emitting infrared light. Below the LED, there is an array of solar cells intergrated into an optoelectronic device, thus switching the output transistors.

The light emitter and detector are moulded in translucent resin that allows light to pass through but provides a dielectric barrier between the input and output side. By integrating an internal circuit in the optoelectronic device, it serves as a control circuit for switching the power MOSFETs and therefore the load circuit in an ON or OFF-state.

A single power MOSFET is only capable of switching a DC voltage since its internal source-drain diode will become forward biased if the load polarity is reversed. Using a PhotoMOS relay for switching AC voltages therefore requires two source-coupled power MOSFETs in one PhotoMOS relay.

By connecting the two output transistors of an AC relay in parallel, the allowable DC current can also be increased (A,B or C connection) as illustrated below:

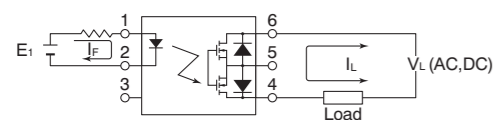


Figure 2 PhotoMOS in A connection

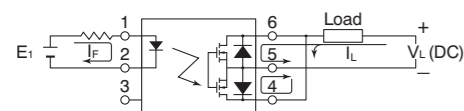


Figure 3 PhotoMOS in C connection

Basically, the power MOSFET's output acts as a pure ohmic resistance thus distinguishing the PhotoMOS from an optocoupler or triac solution, since no saturation voltage or offset voltage is required. However the aforementioned source-drain diode of the MOSFET may influence the linearity of the output, and the output capacitance may limit the usability for higher frequencies. This strongly depends on the type of PhotoMOS relay used and on the application's requirements.



Due to Panasonic's broad product range, we are able to offer PhotoMOS relays for numerous applications, enabling you to utilize

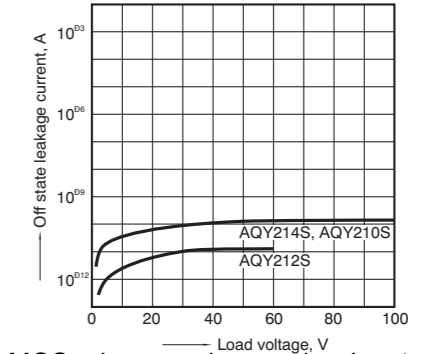
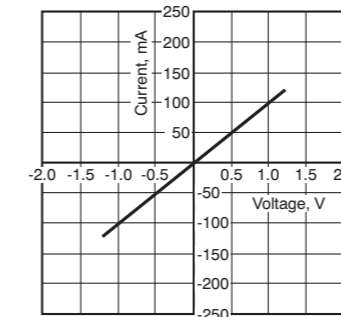
### PhotoMOS advantages:

- Low control current
- Control of small analog signals
- Low leakage current
- Fast switching speed
- Stable ON-resistance over lifetime
- Extremely long product life
- Small size
- Flexible mounting position
- High vibration and shock resistance
- No contact bouncing
- No switching noise

Due to the enormous variety of PhotoMOS relays, they are suitable for numerous applications (see figure 4). They can be used in telecommunications and for measurement equipment, for switching and controlling small motors or other power loads, and for controlling various signals out of microcontrollers.

## Examples of PhotoMOS Advantages

1. High output linearity without any saturation or offset voltage making PhotoMOS perfectly suitable for switching signals or loads (AQY225R2V).
2. Fast switching times with stable behavior over lifetime and no contact bouncing due to semiconductor technology (AQY221N3V).
3. Perfectly suited for switching low level signals due to low off-state leakage current in the range of pA to nA (AQY21\*S).
4. PhotoMOS relays require very low input control currents. Sensitive types are also available (AQV234). Take temperature and safety considerations into account.



2. Fast switching times with stable behavior over lifetime and no contact bouncing due to semiconductor technology (AQY221N3V).

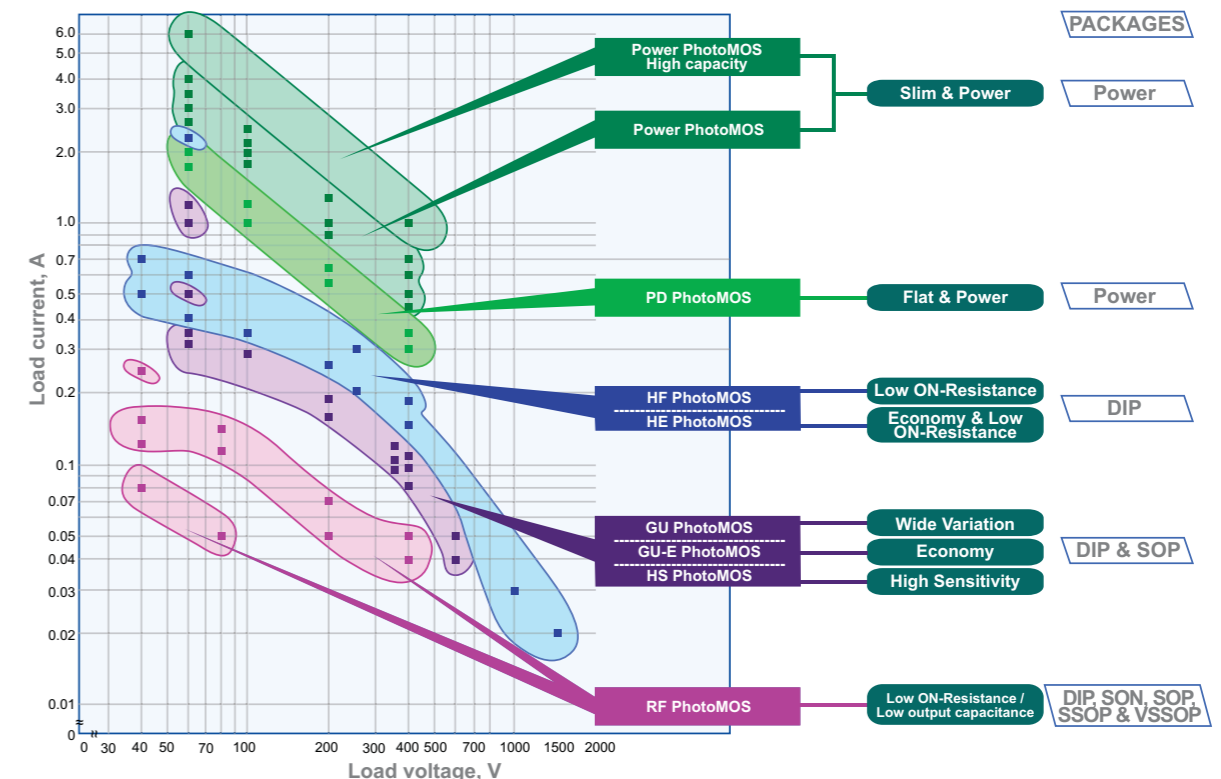
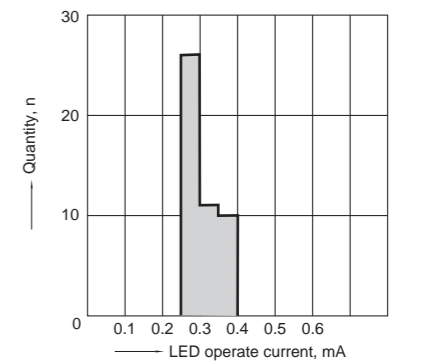
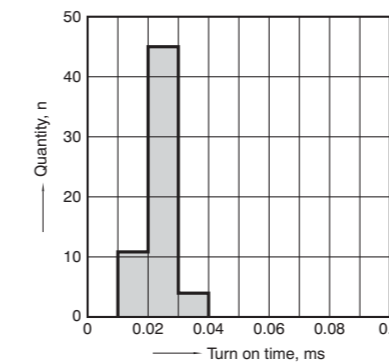
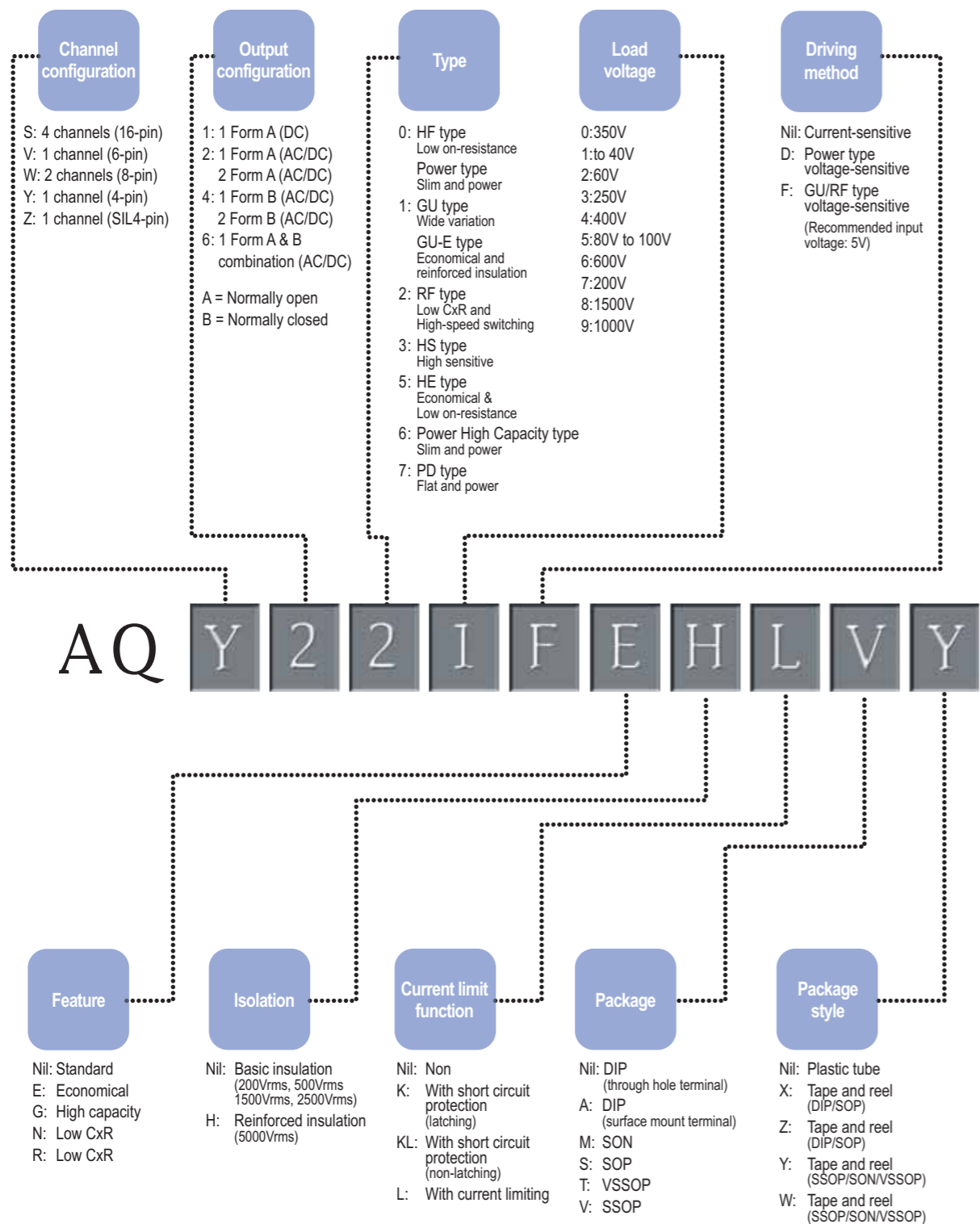


Figure 4 PhotoMOS load current vs. voltage - Selector Chart

# PhotoMOS Relays

# Semiconductor Relays

## Product Key



Note: Valid only for combinations of products listed in the catalog.  
(Please inquire regarding combinations with products not listed in the catalog.)

## PhotoMOS Relays: ★ Popular Type Selection Table

	Type <sup>1)</sup>	Package	Contact	Voltage (V) <sup>2)</sup>	Current (A) <sup>2)</sup>	R <sub>on</sub> <sup>3)</sup> (Ω)	Info.
	AQY211EH(A)	DIP4	1a	30	1.0	0.25	General use
	AQY212EH(A)			60	0.55	0.85	
	AQY212GH(A)				1.1	0.34	
	AQY210EH(A)			350	0.13	18	
	AQY214EH(A)			400	0.12	26	
AQY216EH(A)	600	0.05	52				
	AQY212S	SOP4	1a	60	0.5	0.83	
	AQY212GS				1.0	0.34	
	AQY212G2S			1.25	0.2		
	AQY210S			350	0.12	17	
	AQY214S			400	0.1	25	
	AQY412S	SOP4	1b	60	0.5	1	
	AQY410S			350	0.12	18	
	AQY414S			400	0.1	26	
	AQY232S			60	0.5	0.85	
	AQY230S			350	0.12	19	
AQY234S	400	0.1	27				
AQY210KS	SOP4	1a	350	0.12	23	Low operate current	
	AQV112KL(A)	DIP6	1a	60	0.5	0.55	Short circuit protected
	AQV251G	DIP6	1a	30	3.5	0.035	High power
	AQV252G			60	2.5	0.08	
	AQV259H(A)			1,000	0.03	85	
	AQV258H(A)			1,500	0.02	345	
	AQV255GS	SOP6	80	1.25	0.09		
	AQY221R2T	VSSOP	1a	40	0.25	0.8	Low CxR C <sub>min</sub> = 1pF
	AQY221N2T			40	0.12	9.5	
	AQY221N3T			25	0.15	5.5	
	AQY221R2M	SON		40	0.25	0.8	
	AQY221N2M			40	0.12	9.5	
	AQY221N3M			25	0.15	5.5	
	AQY221N2V	SSOP		40	0.12	9.5	
	AQY221R2V			40	0.25	0.75	
	AQY221N3V			25	0.15	5.5	
	AQY225R2V			80	0.12	10.5	
	AQY221R4V			40	0.5	0.55	
	AQY221N2S	SOP4		40	0.12	9.5	
	AQY221R2S			40	0.25	0.8	
	AQY225R2S			80	0.15	10.5	
	AQS225R2S	SOP16	4a	80	0.07	10.5	
	AQZ102	SIL4	1a	60	4.0	0.05	DC only
	AQZ202			60	3.0	0.11	
	AQZ205			100	2.0	0.23	
	AQZ204			400	0.5	2	
	AQZ404		1b	400	0.5	2.8	AC & DC

<sup>1)</sup> A = SMD type  
<sup>2)</sup> Maximum value (DC or peak AC)  
<sup>3)</sup> Typical value



# PhotoMOS Relays

# Semiconductor Relays

## PhotoMOS Relay Dimensions

Please download **CAD Data** from our Web site: [www.panasonic-electric-works.com](http://www.panasonic-electric-works.com)

Type	Dimensions		
AQY21 AQY41 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>	<p>Mounting pad (Top view)</p>
	<p>Max. 10</p> <p>6.40.05 7.620.05 4.780.05 2.70.05</p> <p>Max. 10</p> <p>3.20.2 3.0 0.2 0.33 0.47 1.0 0.47 2.54</p> <p>Max. 10</p> <p>6.40.05 7.620.05 4.780.05 2.70.05</p> <p>Max. 10</p> <p>0.23<sup>±</sup> 0.47 0.47 1.0 2.54</p> <p>Terminal thickness = 0.2 General tolerance: ±0.1</p> <p>Terminal thickness = 0.2 General tolerance: ±0.1</p> <p>Max. 10</p> <p>8.3 1.9 1.5 2.54</p> <p>Tolerance: ±0.1</p>		
AQV10 AQV11 AQV20 AQV21 AQV22 AQV23 AQV25 AQV41 AQV45 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Recommended mounting pad (Top view)</p>
	<p>Max. 10</p> <p>6.4±0.05 7.62±0.05 8.8±0.05 3.4</p> <p>Max. 10</p> <p>3.9±0.2 3.0 0.47 0.47 1.25 1.25 2.54 2.54</p> <p>Max. 10</p> <p>6.4±0.05 7.62±0.05 8.8±0.05 3.4</p> <p>Max. 10</p> <p>0.23<sup>±</sup> 0.47 0.47 1.25 1.25 2.54 2.54</p> <p>Terminal thickness = 0.25 General tolerance: ±0.1</p> <p>Terminal thickness = 0.25 General tolerance: ±0.1</p> <p>Max. 10</p> <p>8.3 1.9 1.5 2.54 2.54</p> <p>Tolerance: ±0.1</p>		
APV1122 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Recommended mounting pad (Top view)</p>
	<p>Max. 10</p> <p>6.4±0.05 7.62±0.05 8.8±0.05 3.4</p> <p>Max. 10</p> <p>3.9±0.2 3.0 0.47 0.47 1.25 1.25 2.54 2.54</p> <p>Max. 10</p> <p>6.4±0.05 7.62±0.05 8.8±0.05 3.4</p> <p>Max. 10</p> <p>0.23<sup>±</sup> 0.47 0.47 1.25 1.25 2.54 2.54</p> <p>Terminal thickness = 0.25 General tolerance: ±0.1</p> <p>Terminal thickness = 0.25 General tolerance: ±0.1</p> <p>Max. 10</p> <p>8.3 1.9 1.5 2.54 2.54</p> <p>Tolerance: ±0.1</p>		

Type	Dimensions		
AQW21 AQW22 AQW25 AQW41 AQW45 AQW61 AQW65 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Recommended mounting pad (Top view)</p>
	<p>Max. 10</p> <p>6.4 7.62 9.78 3.4</p> <p>Max. 10</p> <p>6.4 7.62 9.78 3.4</p> <p>Max. 10</p> <p>8-0.8 dia. 7.62 2.54 7.62 2.54</p> <p>Tolerance: ±0.1</p> <p>3.9±0.2 3.0 0.47 0.47 1.25 1.25 2.54 2.54 2.54</p> <p>0.23<sup>±</sup> 0.47 0.47 1.25 1.25 2.54 2.54 2.54</p> <p>Terminal thickness = 0.25 General tolerance: ±0.1</p> <p>Terminal thickness = 0.25 General tolerance: ±0.1</p> <p>Max. 10</p> <p>8.3 1.9 1.5 2.54 2.54 2.54</p> <p>Tolerance: ±0.1</p>		
AQW210EH AQW210HL AQW410EH AQW610EH Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>	<p>Mounting pad (Top view)</p>
	<p>Max. 10</p> <p>6.40.05 7.620.05 9.860.05 2.70.05</p> <p>Max. 10</p> <p>6.40.05 7.620.05 9.860.05 2.70.05</p> <p>Max. 10</p> <p>8-0.8 7.62 2.54 7.62 2.54</p> <p>Tolerance: ±0.1</p> <p>3.20.2 3.0 0.47 0.47 1.0 0.47 0.33 2.54 2.54 2.54</p> <p>2.70.05 0.23<sup>±</sup> 0.47 0.47 1.0 1.0 0.47 2.54 2.54 2.54</p> <p>Terminal thickness = 0.2 General tolerance: ±0.1</p> <p>Terminal thickness = 0.2 General tolerance: ±0.1</p> <p>Max. 10</p> <p>8.3 1.9 1.5 2.54 2.54</p> <p>Tolerance: ±0.1</p>		
AQY221 (VSSOP) Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Terminal thickness = 0.2 General tolerance: ±0.2</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.2</p>	<p>Recommended mounting pad (Top view)</p>
	<p>Max. 10</p> <p>1.80 2.10 0.40 0.40 0.20 0.20 1.27 (2.20)</p> <p>Max. 10</p> <p>1.80 2.10 0.40 0.40 0.20 0.20 1.27 (2.20)</p> <p>Max. 10</p> <p>0.70 0.85 1.75 1.27</p> <p>General tolerance: ±0.2</p> <p>Terminal thickness = 0.2 General tolerance: ±0.2</p> <p>Terminal thickness = 0.2 General tolerance: ±0.2</p> <p>Max. 10</p> <p>8.3 1.9 1.5 2.54 2.54</p> <p>Tolerance: ±0.1</p>		
APV21(SOP) APV11(SOP) AQY21(SOP) AQY22(SOP) AQY41(SOP) Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Terminal thickness = 0.15 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.15 General tolerance: ±0.1</p>	<p>Recommended mounting pad (Top view)</p>
	<p>Max. 10</p> <p>4.4<sup>±0.2</sup> 0.5 6.8<sup>±0.4</sup> 0.5</p> <p>Max. 10</p> <p>4.4<sup>±0.2</sup> 0.5 6.8<sup>±0.4</sup> 0.5</p> <p>Max. 10</p> <p>2.0<sup>±0.2</sup> 0.4 0.4 0.1 2.54</p> <p>Terminal thickness = 0.15 General tolerance: ±0.1</p> <p>Terminal thickness = 0.15 General tolerance: ±0.1</p> <p>Max. 10</p> <p>8.3 1.9 1.5 2.54 2.54</p> <p>Tolerance: ±0.1</p>		