Panasonic INDUSTRY

Mechanical relays

Power relays (Over 2A) / High-capacity DC cut off relays / Signal relays (2A or less) / Microwave devices / Safety relays

SELECTION GUIDE

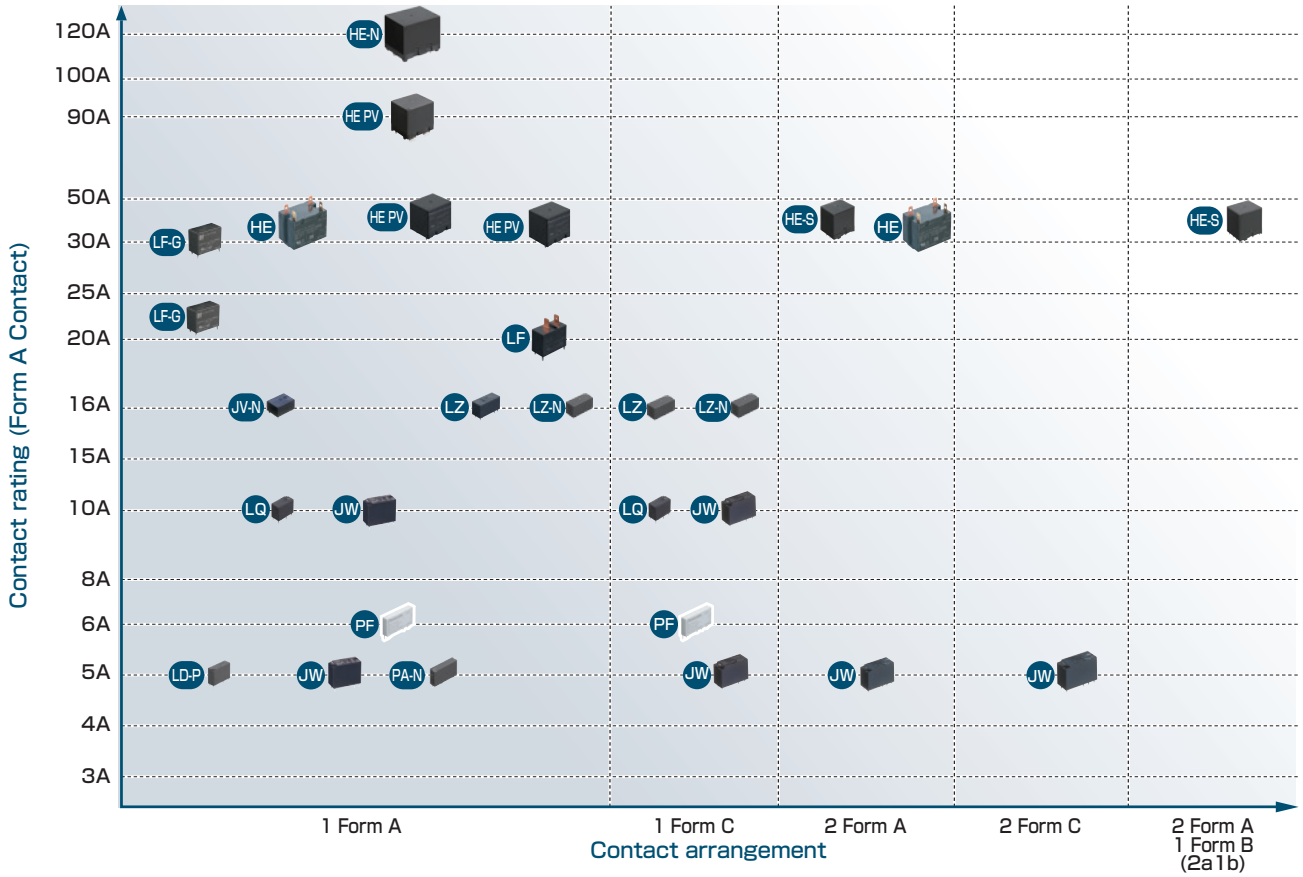
INDEX

SELECTION GUIDE FOR MECHANICAL RELAYS

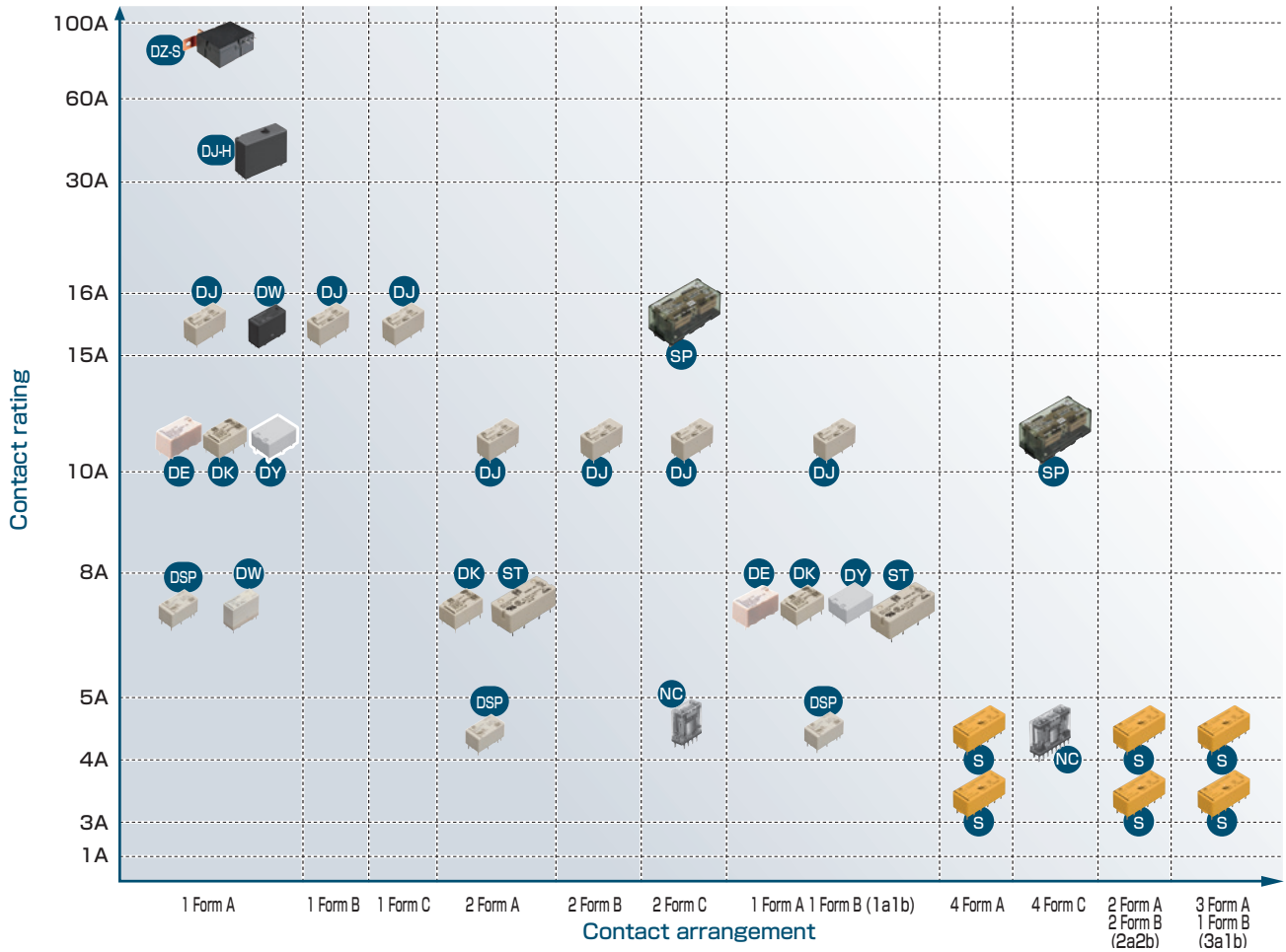
ASCTB445E 202110

Power relays line up

Non polarized type power relays



Polarized type power relays (with latching)



DC load switching capacity (reference value)

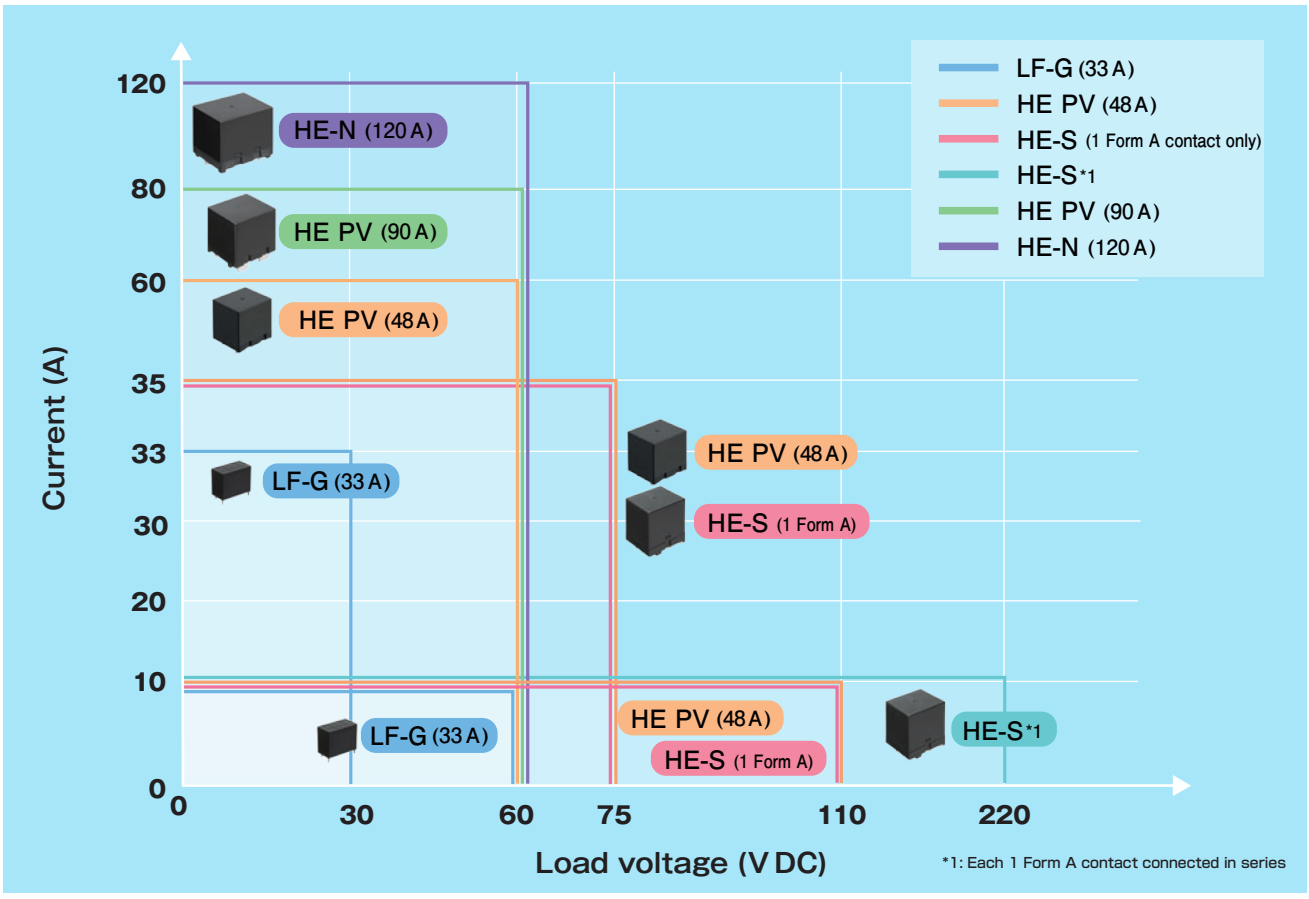
AC load relays shown below can switch DC load as following chart

Appearance	Product name	Contact	Load voltage	Current	Electrical expected life(resistive load)	Remarks
	LF-G (33A)	1 Form A	30 V DC	33 A	10^4	
			60 V DC	10 A		
	HE PV (48A)	1 Form A	60 V DC	60 A		
			75 V DC	35 A		
			110 V DC	10 A		
	HE PV (90A)	1 Form A	60 V DC	80 A		
	HE-N (120A)	1 Form A	60 V DC	120 A		
	HE-S (35A)	2 Form A	75 V DC	35 A		1 Form A contact only
			110 V DC	10 A		1 Form A contact only
			220 V DC	10 A		Each 1 Form A contact connected in series

This chart is guideline for using DC load. Please test actual condition before use.

Maximum DC load switching capacity

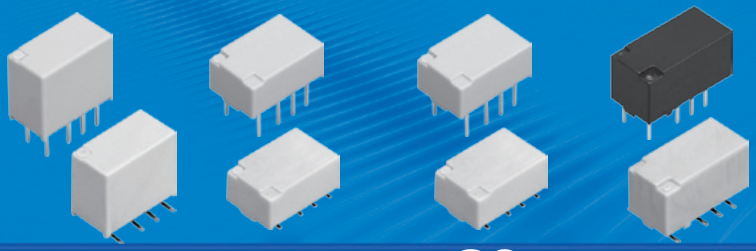
Conditions: resistive load, electrical expected life of 10^4 cycles (reference value)



Wide variety of signal relays leading on the global market with high

Communication Network Equipment

Signal Relays



GN

- Botton surface area 5.7 × 10.6 ㎟
- Compact slim body
- High sensitivity 100 mW type

GQ

- Low profile : 5.2 ㎜
- Compact flat body
- High sensitivity 100 mW type

GQ (TH)

- Small size controlled 3.5 A inrush current possible

TX

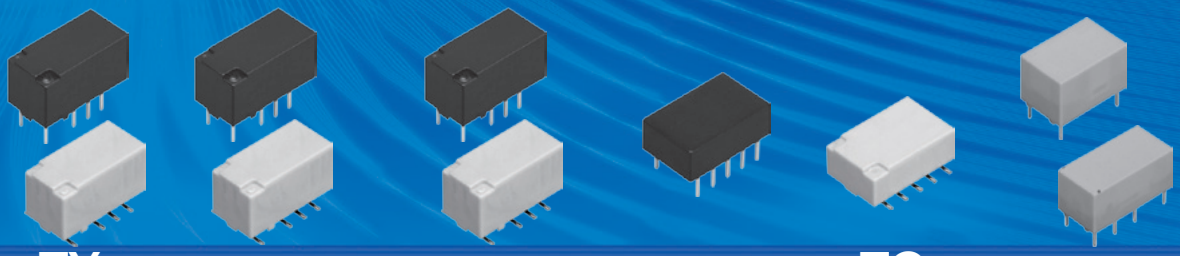
- High contact capacity
- High breakdown voltage

OA Equipment / Thermostat

performance and quality

Signal Relays

Security



TX (TH)

·Controlled 7.5 A inrush current possible

TX-S

·High sensitivity 50 mW type

TX-D

·Surge Breakdown voltage 6,000 V

TQ

·Low profile : 5 ㎜

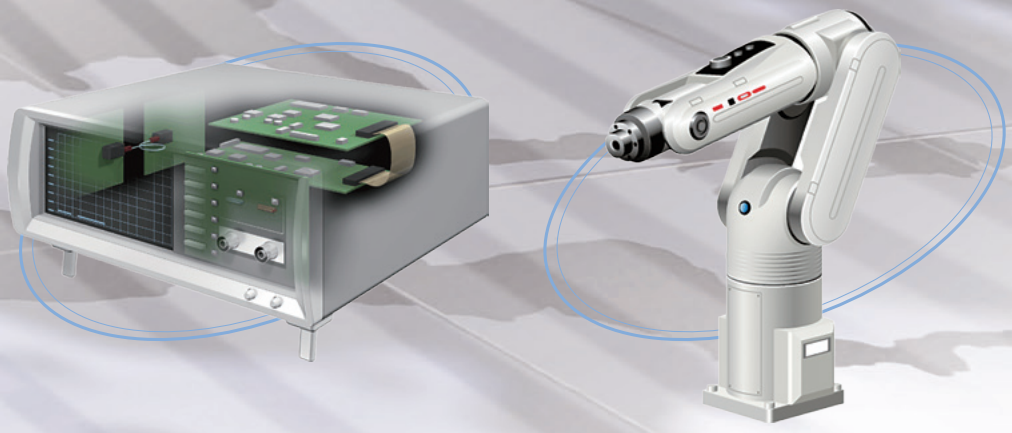
TQ (SMD)

·Low profile : 5.6 ㎜

DS

·High switching capacity : 2A

Precision / Industrial Equipment



Panasonic Corporations' Superior Microwave Devices
Product Lineup

MICROWAVE DEVICES

Terminal type for PC board

HIGH FREQUENCY RELAYS

RA Relay | RS Relay | RN Relay | RJ Relay

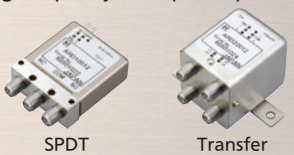
RS Relay

Coaxial connector contact terminal

COAXIAL SWITCHES

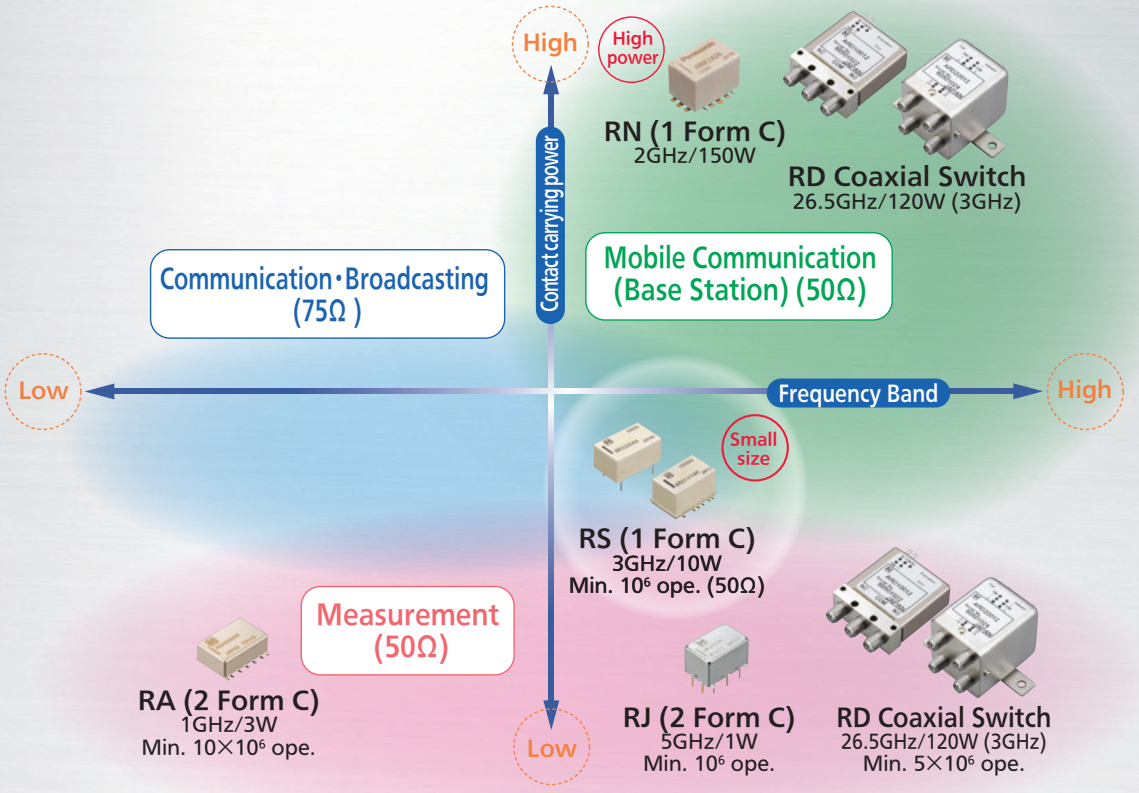
RD Coaxial Switch

- Frequency 13GHz (SP6T)
  (Up to 26.5GHz, SPDT/Transfer)
- High capacity load (120W)



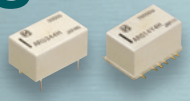
SPDT　　Transfer

■ Application



Support for Wide Range of Frequencies
Microwave Devices

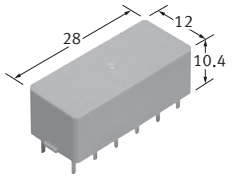
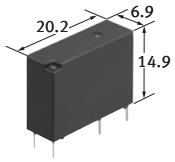
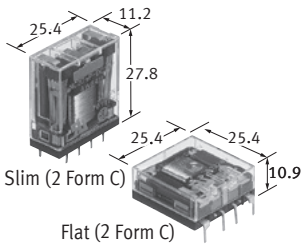
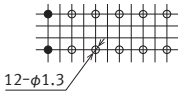
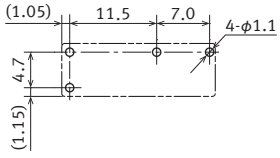
■ Product lineup

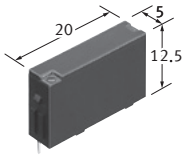
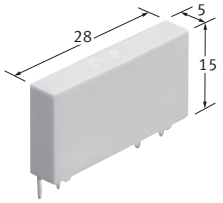
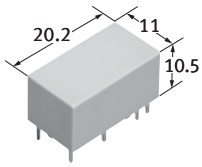
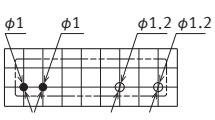
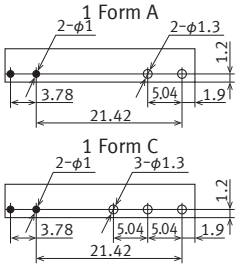
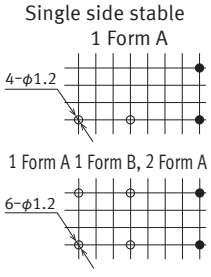
Features	Impedance (Ω)	Contact arrangement	Frequency range (GHz) 1 2 3 8 13 18 26.5
RA  10 million operations For measurement equipment	50	2 Form C	
RJ  8GHz*1 capable Surface mount terminal available	50	2 Form C	※1
RS  Small size microwave relay Silent type available	50/75	1 Form C 1 Form C reversed	
RN  8GHz capable*2 150W carrying power available (at 2GHz)	50	1 Form C 1 Form C reversed	※2
RD  Long life and high sensitivity coaxial switch 	50	SPDT	
		Transfer	
		SP6T	

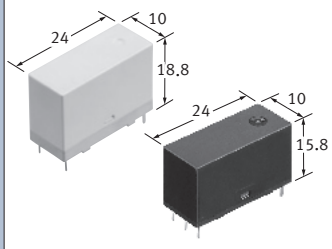
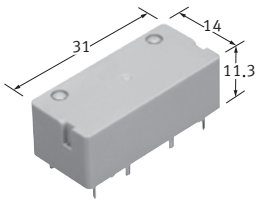
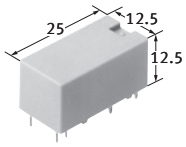
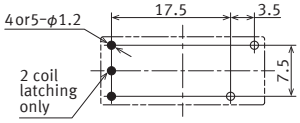
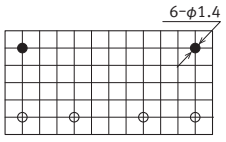
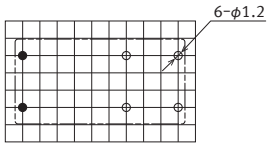
*1: Ratings are 5GHz
*2: Ratings are 6GHz

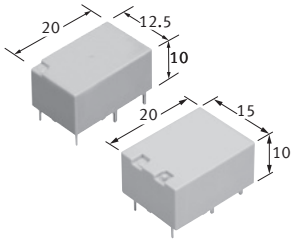
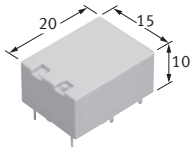
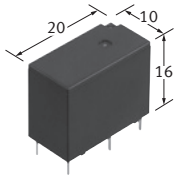
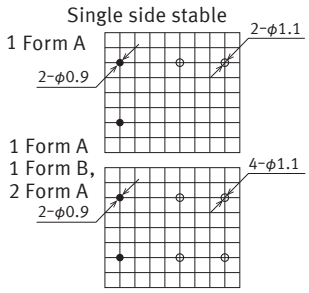
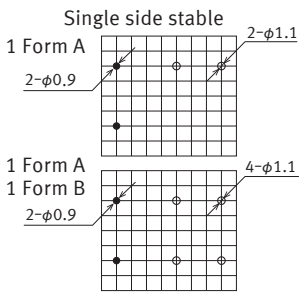
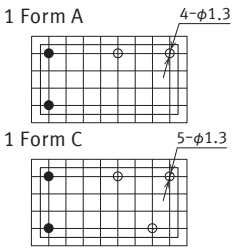
Power relays (Over 2A) selector chart

[Order of products: Max.contact rating (small to large)]

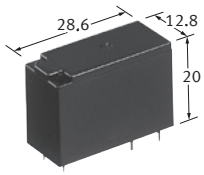
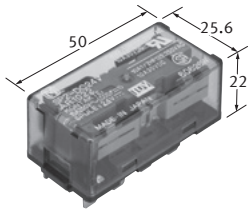
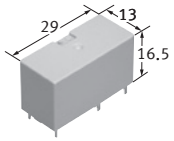
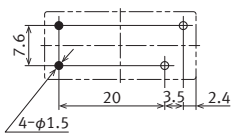
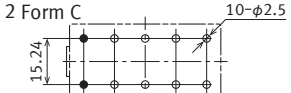
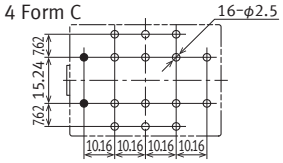
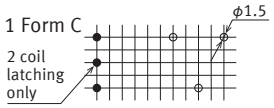
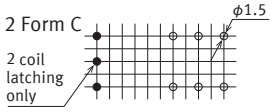
Category		Power Relays (~5 A)		
Product name		S RELAY	LD-P RELAY	NC RELAY
Type of relay (Height includes standoff unit = mm) Initial of part number		 **AG3**	 **ALDP**	 **AW8**
Features		• 2 Form A 2 Form B/3 Form A 1 Form B/4 Form A 4A polarized power relays	• 1 Form A 5A slim power relays	• Transistor drive • 2 Form C/4 Form C 5A slim power relays
Contact data	Contact arrangement	2 Form A 2 Form B, 3 Form A 1 Form B, 4 Form A	1 Form A	2 Form C, 4 Form C
	Contact shape	Twin	Single	Twin
	Contact material	Double layer contact of AgNi-$AgSnO_2$ type +Au clad	AgNi type	AgNi type +Au clad
	Contact rating (resistive)	30 A 20 A 15 A 10 A 8 A 5 A 3 A 4 A 250 V AC 3 A 30 V DC	5 A 277 V AC 3 A 30 V DC	2c: 5 A 250 V AC*1 4c: 4 A 250 V AC*1 5 A 30 V DC
	Min. switching load (reference value)	100 µA 100 mV DC	100 mA 5 V DC	100 µA 1 V DC
	Max.switching voltage	250 V AC, 48 V DC	277 V AC, 30 V DC	250 V AC, 220 V DC
Latching types availability		●	–	–
Coil data	Rated operating power	200 mW	200 mW	360 mW (2 Form C)*2, 720 mW (4 Form C)*2
	Operate [Set] voltage (initial)	Max.70% V	Max.75% V	Max.80% V
	Release [Reset] voltage (initial)	Min.10% V [Max.70% V]	Min.5% V	Min.10% V
Time Characteristics (initial)	Operate [Set] time (initial)	Max.15 ms	Max.10 ms	Max.20 ms
	Release [Reset] time (initial)	Max.10 ms [Max.15 ms]	Max.10 ms (with diode)	Max.10 ms
Expected life	Mechanical life (ope.)	Min.100 $x10^6$	Min.5 $x10^6$	Min.50 $x10^6$
Dielectric strength (initial)	Between open contacts	750 V rms for 1 min	750 V rms for 1 min	1,000 V rms for 1 min
	Between contact sets	1,000 V rms for 1 min	–	1,000 V rms for 1 min
	Between contact and coil	1,500 V rms for 1 min	4,000 V rms for 1 min	2,000 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		–	10,000 V	–
Ambient temperature		–55 to +65°C	–40 to +85°C	–40 to +70°C (2 Form C)*2 –40 to +55°C (4 Form C)
Protective construction	Dust cover	–	–	●
	Flux-resistant	–	–	–
	Sealed	●	●	●
PC board pattern (BOTTOM VIEW) ● indicates input terminal 2.54mm grid		Single side stable 		Slim 2 Form C 8-ϕ1.2 4 Form C 14-ϕ1.2 Flat 2 Form C 8-ϕ1.2 4 Form C 14-ϕ1.2
Safety standards		UL, CSA	UL/C-UL, VDE, CQC (Excluding Class F insulation)	UL, CSA
Unit weight (Approx.)		8 g	4 g	16 g (2 Form C), 19 g (4 Form C: slim), 18 g (4 Form C: Flat)
Option		Socket	–	Socket, Terminal socket
Remarks		–	–	*1: Dust cover *2: Max.48 V DC

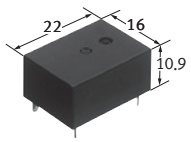
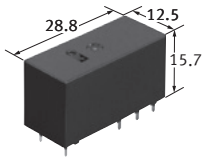
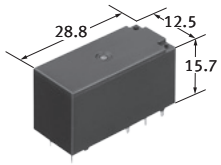
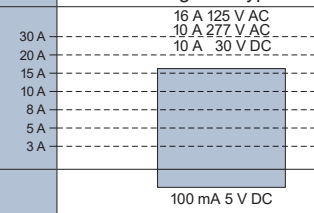
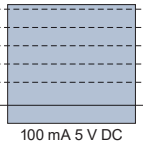
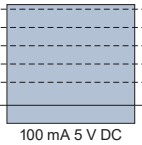
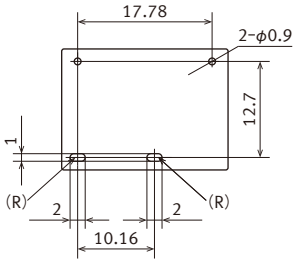
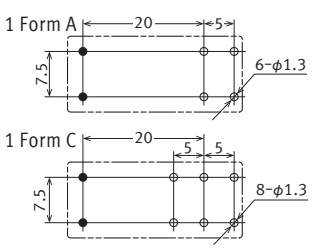
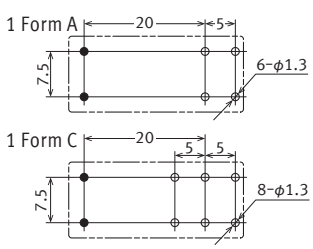
Category		Power Relays (~5 A)	Power Relays (~10 A)		
Product name		PA-N RELAY	PF RELAY	DS-P RELAY	
Type of relay (Height includes standoff unit = mm) Initial of part number		 **APAN3**	 **APF**	 **AGP**	
Features		• 1 Form A 5A Slim power relays meet IEC61010 reinforced insulation	• Compliant with European standards • 1 Form A/1 Form C 6A Slim power relays	• 1 Form A 8A (AC) 5A(DC), 1 Form A 1 Form B/2 Form A 5A (AC/DC) small polarized power relays	
Contact data	Contact arrangement	1 Form A	1 Form A, 1 Form C	1 Form A	1 Form A 1 Form B, 2 Form A
	Contact shape	Twin	Single	Single	
	Contact material	AgNi type +Au	AgNi type, AgNi type +Au plated	$AgSnO_2$ type +Au flashed	
	Contact rating (resistive)	30 A 20 A 15 A 10 A 8 A 5 A 3 A 5 A 250 V AC 5 A 30 V DC	6 A 250 V AC No Au plating type	6 A 250 V AC Au plating type	8 A 250 V AC 5 A 30 V DC 5 A 250 V AC 5 A 30 V DC
	Min. switching load (reference value)	100 µA 100m V DC	100 mA 5 V DC	1 mA 1 V DC	10 mA 5 V DC 10 mA 5 V DC
	Max.switching voltage	250 V AC, 110 V DC (0.4 A)	250 V AC		250 V AC, 125 V DC (0.2 A)
Latching types availability		–	–	●	
Coil data	Rated operating power	110 mW	170 mW (4.5 to 24 V DC) 217 mW (48 V DC), 175 mW (60 V DC)	300 mW	
	Operate [Set] voltage (initial)	Max.70% V	Max.70% V	Max.80% V	
	Release [Reset] voltage (initial)	Min.5% V	Min.5% V	Min.10% V [Max.80% V]	
Time Characteristics (initial)	Operate [Set] time (initial)	Max.10 ms	Max.8 ms	Max.10 ms	
	Release [Reset] time (initial)	Max.5 ms	Max.4 ms	Max.5 ms [Max.10 ms]	
Expected life	Mechanical life (ope.)	Min.20×10^6	Min.5 x10^6	Min.50 x10^6	
Dielectric strength (initial)	Between open contacts	1,000 V rms for 1 min	1,000 V rms for 1 min	1,000 V rms for 1 min	
	Between contact sets	–	–	–	2,000 V rms for 1 min
	Between contact and coil	3,000 V rms for 1 min	4,000 V rms for 1 min	3,000 V rms for 1 min	
Surge withstand voltage (between contact and coil) (initial)		6,000 V	6,000 V	5,000 V	
Ambient temperature		–40 to +90°C	–40 to +85°C	–40 to +60°C (1 Form A, 2 Form A) –40 to +65°C (1 Form A 1 Form B)	
Protective construction	Dust cover	–	–	–	
	Flux-resistant	–	–	–	
	Sealed	●	●	●	
PC board pattern (BOTTOM VIEW) ● indicates input terminal 2.54mm grid					
Safety standards		UL/C-UL, TÜV	UL/C-UL, VDE	UL/C-UL, TÜV	
Unit weight (Approx.)		3 g	5 g	4.5 g	
Option		Socket	–	Socket	
Remarks		–	–	–	

Category		Power Relays (~10 A)		
Product name		DW RELAY	ST RELAY	DE RELAY
Type of relay (Height includes standoff unit = mm) Initial of part number		 **ADW**	 **AR2**	 **ADE**
Features		• 1 Form A 8A/16A (TV-8 rated)* , small polarized power relays	• TV-3 rated • 1 Form A 1 Form B/2 Form A 8A polarized power relays	• Meet European standards • 1 Form A/2 Form A/1 Form A 1 Form B 10A/8A polarized power relays
Contact data	Contact arrangement	1 Form A	1 Form A 1 Form B, 2 Form A	1 Form A / 1 Form A 1 Form B, 2 Form A
	Contact shape	Single	Single	Single
	Contact material	$AgSnO_2$ type	$AgSnO_2$ type +Au flashed	$AgSnO_2$ type
	Contact rating (resistive)	30 A, 20 A, 15 A, 10 A, 8 A, 5 A, 3 A 8 A 250 V AC Standard type 16 A 277 V AC* Inrush type (Low profile type)	8 A 250 V AC 5 A 30 V DC	10 A 250 V AC 10 A 30 V DC 8 A 250 V AC 8 A 30 V DC
	Min. switching load (reference value)	100 mA 5 V DC / 100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC / 100 mA 5 V DC
	Max.switching voltage	250 V AC / 277 V AC	250 V AC, 30 V DC	250 V AC, 30 V DC
Latching types availability		● (Latching type only)	●	●
Coil data	Rated operating power	200 mW (1 coil latching) 400 mW (2 coil latching)	Approx 240 mW	200 mW
	Operate [Set] voltage (initial)	Max.80% V	Max.80% V	Max.70% V
	Release [Reset] voltage (initial)	Max.80% V	Min.10% V [Max.80% V]	Min.10% V [Max.70% V]
Time Characteristics (initial)	Operate [Set] time (initial)	Max.15 ms	Max.15 ms	Max.10 ms
	Release [Reset] time (initial)	Max.15 ms	Max.10 ms [Max.15 ms]	Max.5 ms [Max.10 ms]
Expected life	Mechanical life (ope.)	Min.10^6	Min.10 x10^6	Min.10 x10^6
Dielectric strength (initial)	Between open contacts	1,000 V rms for 1 min	1,200 V rms for 1 min	1,000 V rms for 1 min
	Between contact sets	–	2,000 V rms for 1 min	– / 4,000 V rms for 1 min
	Between contact and coil	5,000 V rms for 1 min	3,750 V rms for 1 min	5,000 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		12,000 V	6,000 V	12,000 V
Ambient temperature		–40 to +85°C (Max.8 A) –40 to +70°C (Max.8 to 16 A)	–40 to +60°C	–40 to +70°C
Protective construction	Dust cover	–	–	–
	Flux-resistant	●	–	–
	Sealed	–	●	●
PC board pattern (BOTTOM VIEW) ● indicates input terminal 2.54mm grid			Single side stable 	Single side stable 
Safety standards		UL/C-UL, VDE, CQC	UL, CSA, VDE	UL/C-UL, VDE
Unit weight (Approx.)		8 g (Low profile type: 7.5 g)	10 g	7 g
Option		–	Socket	–
Remarks		* TV-8 rated and inrush type: 16 A only	–	–

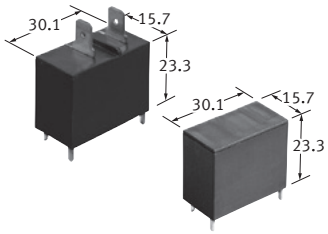
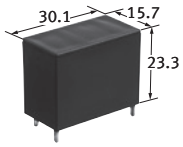
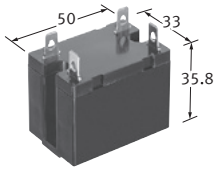
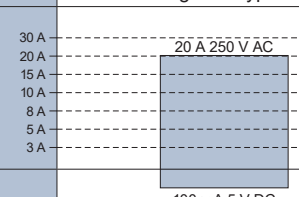
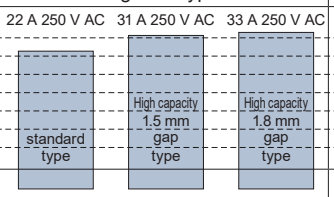
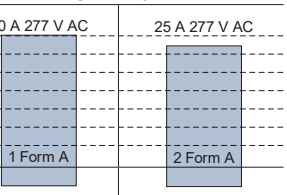
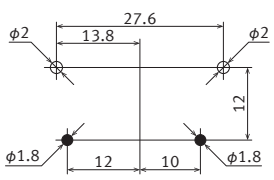
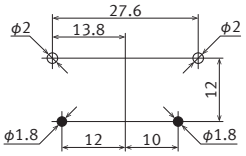
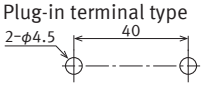
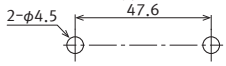
Category		Power Relays (~10 A)				
Product name		DK RELAY		DY RELAY		LQ RELAY
Type of relay (Height includes standoff unit = mm)						
Initial of part number		**AW3**		**ADY**		**ALQ**
Features		• 1 Form A 10A, 1 Form A 1 Form B/2 Form A 8A small polarized power relays		• 1 Form A 10A, 1 Form A 1 Form B 8A small polarized power relays		• 1 Form A/1 Form C 10A small power relays
Contact data	Contact arrangement	1 Form A	1 Form A 1 Form B, 2 Form A	1 Form A	1 Form A 1 Form B	1 Form A, 1 Form C
	Contact shape	Single		Single		Single
	Contact material	$AgSnO_2$ type + Au flashed	AgNi type + Au flashed	$AgSnO_2$ type +Au flashed		AgNi type
	Contact rating (resistive)	30 A 20 A 15 A 10 A 8 A 5 A 3 A 10 A 250 V AC 10 A 30 V DC	8 A 250 V AC 8 A 30 V DC	10 A 250 V AC 10 A 30 V DC	8 A 250 V AC 8 A 30 V DC	10 A 125 V AC 5 A 250 V AC 5 A 30 V DC Form A
	Min. switching load (reference value)	10 mA 5 V DC	10 mA 5 V DC	10 mA 5 V DC	10 mA 5 V DC	100 mA 5 V DC
	Max.switching voltage	250 V AC, 125 V DC (0.2 A)		250 V AC, 125 V DC (0.2 A)		250 V AC, 30 V DC
Latching types availability		●		●		–
Coil data	Rated operating power	200 mW		200 mW		200 mW (1 Form A), 400 mW (1 Form C)
	Operate [Set] voltage (initial)	Max.70% V		Max.70% V		Max.75% V
	Release [Reset] voltage (initial)	Min.10% V [Max.70% V]		Min.10% V [Max.70% V]		Min.5% V
Time Characteristics (initial)	Operate [Set] time (initial)	Max.10 ms		Max.10 ms		Max.20 ms
	Release [Reset] time (initial)	Max.8 ms [Max.10 ms]		Max.8 ms [Max.10 ms]		Max.20 ms (With diode)
Expected life	Mechanical life (ope.)	Min.50 $x10^6$		Min.50 $x10^6$		Min.10 $x10^6$
Dielectric strength (initial)	Between open contacts	1,000 V rms for 1 min		1,000 V rms for 1 min		1,000 V rms for 1 min (1 Form A), 750 V rms for 1 min (1 Form C)
	Between contact sets	–	4,000 V rms for 1 min	–	4,000 V rms for 1 min	–
	Between contact and coil	4,000 V rms for 1 min		4,000 V rms for 1 min		4,000 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		10,000 V		10,000 V		8,000 V
Ambient temperature		–40 to +65°C		–40 to +70°C		–40 to +85°C
Protective construction	Dust cover	–		–		–
	Flux-resistant	–		–		–
	Sealed	●		●		●
PC board pattern (BOTTOM VIEW) ● indicates input terminal 2.54mm grid						
Safety standards		UL, CSA, TÜV, VDE		UL, CSA, TÜV		UL/C-UL, VDE, CQC
Unit weight (Approx.)		5 g	6 g	6 g		7 g
Option		Socket		Socket		–
Remarks		–		–		–

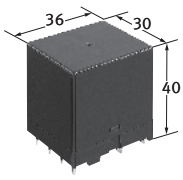
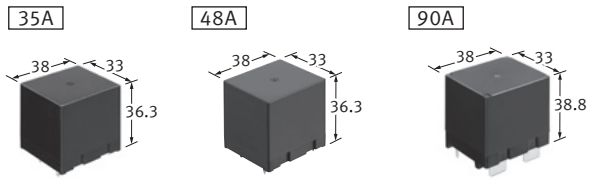
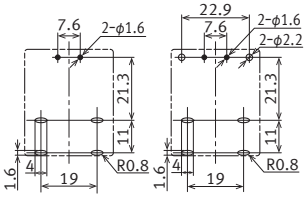
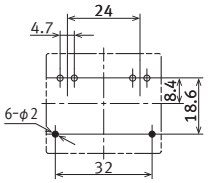
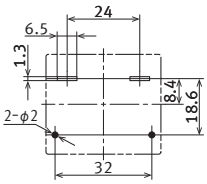
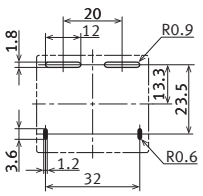
Power relays (Over 2A) selector chart

Category		Power Relays (~10 A)		Power Relays (~20 A)			
Product name		JW RELAY		SP RELAY		DJ RELAY	
Type of relay (Height includes standoff unit = mm) Initial of part number		 **AJW**		 **AR1**		 **ADJ**	
Features		• TV-5 rated (1a) • 1 Form A/1 Form C/2 Form A/ 2 Form C 5A/10A universal power relays		• 2 Form C 15A, 4 Form C 10A polarized power relays		• 1-pole/2-pole 16A polarized power relays • Clearance and creepage distance is Min.8mm (Contact and coil)	
Contact data	Contact arrangement	1 Form A, 1 Form C, 2 Form A, 2 Form C	1 Form A, 1 Form C	2 Form C	4 Form C	1 Form C, 1 Form A, 1 Form B	1 Form A 1 Form B, 2 Form C, 2 Form A, 2 Form B
	Contact shape	Single		Twin		Single	
	Contact material	1 Form A: $AgSnO_2$ type 1 Form C, 2 Form A, 2 Form C: AgNi type		Stationary: $AgSnO_2$ type +Au flashed Movable: $AgSnO_2$ type		$AgSnO_2$ type	$AgSnO_2$ type + Au flashed
	Contact rating (resistive)	30 A 20 A 15 A 10 A 8 A 5 A 3 A 5 A 250 V AC 5 A 30 V DC Standard type	10 A 250 V AC 10 A 30 V DC High capacity type	15 A 250 V AC 10 A 30 V DC 2c	10 A 250 V AC 10 A 30 V DC 4c	16 A 250 V AC	10 A 250 V AC
	Min. switching load (reference value)	100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC
	Max.switching voltage	250 V AC, 30 V DC		250 V AC, 30 V DC		250 V AC	
Latching types availability		–		●		●	
Coil data	Rated operating power	530 mW		300 mW		150 mW (1 coil latching) 250 mW (Single side stable, 2 coil latching)	
	Operate [Set] voltage (initial)	Max.70% V		Max.70% V		Max.75% V [Max.70% V]	
	Release [Reset] voltage (initial)	Min.10% V		Min.10% V [Max.70% V]		Min.10% V [Max.70% V]	
Time Characteristics (initial)	Operate [Set] time (initial)	Max.15 ms		Max.30 ms		Max.20 ms	
	Release [Reset] time (initial)	Max.5 ms		Max.20 ms [Max.30 ms]		Max.20 ms	
Expected life	Mechanical life (ope.)	Min.5 x10^6		Min.50 x10^6		Min.5 x10^6	
Dielectric strength (initial)	Between open contacts	1,000 V rms for 1 min		1,500 V rms for 1 min		1,000 V rms for 1 min	
	Between contact sets	3,000 V rms for 1 min (2 poles)	–	3,000 V rms for 1 min		–	2,000 V rms for 1 min
	Between contact and coil	5,000 V rms for 1 min		3,000 V rms for 1 min		4,000 V rms for 1 min	
Surge withstand voltage (between contact and coil) (initial)		10,000 V		–		10,000 V	
Ambient temperature		–40 to +60°C (Class E) –40 to +85°C (Class B)		–50 to +60°C		–40 to +70°C	
Protective construction	Dust cover	–		●		–	
	Flux-resistant	●		–		●	
	Sealed	●		–		●*	
PC board pattern (BOTTOM VIEW) ● indicates input terminal 2.54mm grid		1 Form A 		2 Form C  4 Form C 		1 Form C  2 Form C 	
Safety standards		UL, CSA, VDE, CQC (AJW7211 only)		UL, CSA, TÜV		UL/C-UL, VDE, CQC	
Unit weight (Approx.)		13 g		50 g	65 g	14 g	
Option		Socket		Terminal socket, Mounting board		–	
Remarks		–		–		Test button type is available * Please contact our sales representative for details	

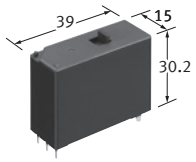
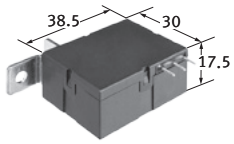
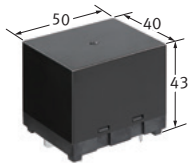
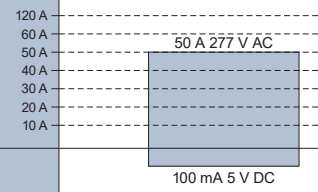
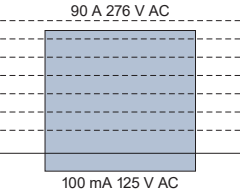
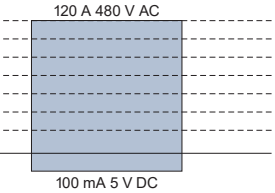
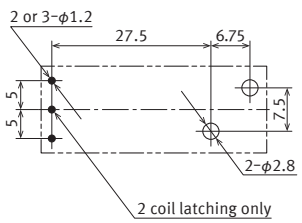
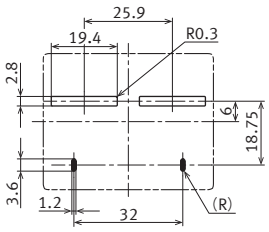
Category		Power Relays (~20 A)		
Product name		JV-N RELAY	LZ RELAY	LZ-N RELAY
Type of relay (Height includes standoff unit = mm)				
Initial of part number		**AJVN**	**ALZ**	**ALZN**
Features		• 1 Form A 16A, low profile: 10.9 mm power relays for heater control	• TV-5 rated • Low profile: 15.7mm height 1 Form A/1 Form C 16A power relays	• TV-5 rated and meet EN60335-1 GWT Low profile: 15.7mm height 1 Form A/1 Form C 16A power relays
Contact data	Contact arrangement	1 Form A	1 Form A, 1 Form C	1 Form A, 1 Form C
	Contact shape	Single	Single	Single
	Contact material	$AgSnO_2$ type	$AgSnO_2$ type	$AgSnO_2$ type
	Contact rating (resistive)			
	Min. switching load (reference value)	100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC
	Max.switching voltage	277 V AC, 110 V DC (0.3 A)	440 V AC	440 V AC
Latching types availability		–	–	–
Coil data	Rated operating power	200 mW (4.5 to 48 V DC) 600 mW (100 V DC)	400 mW	400 mW
	Operate [Set] voltage (initial)	Max.75% V (4.5 to 48 V DC) Max.60 V DC (100 V DC)	Max.70% V	Max.70% V
	Release [Reset] voltage (initial)	Min.5% V (4.5 to 48 V DC) Min.4 V DC (100 V DC)	Min.10% V	Min.10% V
Time Characteristics (initial)	Operate [Set] time (initial)	Max.12 ms (4.5 to 48 V DC) Min.8 ms (100 V DC)	Max.15 ms	Max.15 ms
	Release [Reset] time (initial)	Max.5 ms	Max.5 ms	Max.5 ms
Expected life	Mechanical life (ope.)	Min. 20 x10^6	Min.10 x10^6	Min.10^6
Dielectric strength (initial)	Between open contacts	1,000 V rms for 1 min	1,000 V rms for 1 min	1,000 V rms for 1 min
	Between contact sets	–	–	–
	Between contact and coil	2,500 V rms for 1 min	5,000 V rms for 1 min	5,000 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		4,500 V	10,000 V	10,000 V
Ambient temperature		–40 to +70°C, –40 to +60°C (100 V DC)	–40 to +85°C (Class B) –40 to +105°C (Class F)	–40 to +85°C (Class B) –40 to +105°C (Class F)
Protective construction	Dust cover	–	–	–
	Flux-resistant	●	●	●
	Sealed	–	● *	–
PC board pattern (BOTTOM VIEW) ● indicates input terminal				
Safety standards		UL, CSA, TÜV	UL/C-UL, VDE	UL/C-UL, VDE
Unit weight (Approx.)		8 g	12 g	11 g
Option		–	–	–
Remarks		–	* Please contact our sales representative for details	Not meeting Electrical Appliance and Material Safety Act

Power relays (Over 2A) selector chart

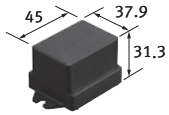
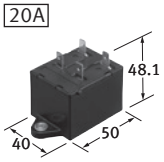
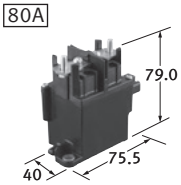
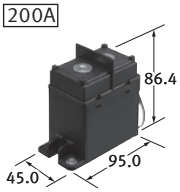
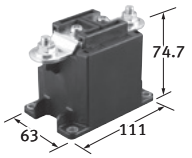
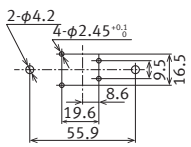
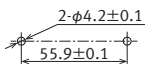
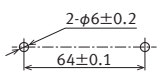
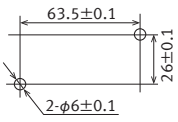
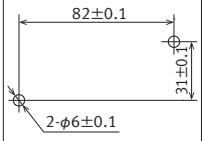
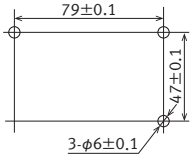
Category		Power Relays (~20 A)	Power Relays (~30 A)	
Product name		LF RELAY	LF-G RELAY	HE RELAY
Type of relay (Height includes standoff unit = mm) Initial of part number		 **ALF**	 **ALFG**	 **AHE**
Features		• TV-8 rated • 1 Form A 20A power relays for compress or and invertor load	• 1 Form A 22A/33A Compact power relays for solar inverter load	• TV-10/TV-15 rated • 1 Form A 30A, 2 Form A 25A power relays
Contact data	Contact arrangement	1 Form A	1 Form A	1 Form A / 2 Form A
	Contact shape	Single	Single	Single
	Contact material	$AgSnO_2$ type	$AgSnO_2$ type	$AgSnO_2$ type
	Contact rating (resistive)			
	Min. switching load (reference value)	100 mA 5 V DC	100 mA 5 V DC 100 mA 5 V DC 100 mA 5 V DC	100 mA 5 V DC 100 mA 5 V DC
	Max.switching voltage	250 V AC	250 V AC	277 V AC, 30 V DC
Latching types availability		–	–	–
Coil data	Rated operating power	900 mW	1.4 W	1.7 to 2.7 VA (AC) , 1.92 W (DC)
	Operate [Set] voltage (initial)	Max.70% V	Max.70% V	Max.70% V
	Release [Reset] voltage (initial)	Min.10% V	Min.10% V	Min.15% V (AC) , Min.10% V (DC)
Time Characteristics (initial)	Operate [Set] time (initial)	Max.20 ms	Max.20 ms	Max.30 ms
	Release [Reset] time (initial)	Max.15 ms (With diode)	Max.10 ms	Max.30 ms (AC) , Max.10 ms (DC)
Expected life	Mechanical life (ope.)	Min.2 x 10^6	Min.10^6 (Contact gap: 1.5 mm) Min.500 x 10^3 (Contact gap: 1.8 mm)	Min.5 x 10^6 (AC) Min.10 x 10^6 (DC)
Dielectric strength (initial)	Between open contacts	1,000 V rms for 1 min	2,500 V rms for 1 min	2,000 V rms for 1 min
	Between contact sets	–	–	– / 4,000 V rms for 1 min
	Between contact and coil	5,000 V rms for 1 min	4,000 V rms for 1 min	5,000 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		10,000 V	6,000 V	10,000 V
Ambient temperature		–40 to +60°C	–40 to +60°C, –40 to +85°C*	–50 to +55°C
Protective construction	Dust cover	–	–	●
	Flux-resistant	●	●	● (PC board terminal)
	Sealed	–	–	–
PC board pattern (BOTTOM VIEW) ● indicates input terminal		PC board terminal  (TMP type is also available)		Panel cutout Plug-in terminal type  TM type  (PC board terminal, Screw teminal type are also available)
Safety standards		UL/C-UL, TÜV, VDE	UL/C-UL, VDE	UL, CSA, VDE, TÜV, CQC
Unit weight (Approx.)		23 g	23 g	80 to 120 g
Option		–	–	Terminal socket
Remarks		–	Not meeting Electrical Appliance and Material Safety Act * Coil holding voltage is 45 to 85%V	–

Category		Power Relays (30 A~)			
Product name		HE-S RELAY	HE RELAY PV TYPE		
Type of relay (Height includes standoff unit = mm)					
Initial of part number		**AHES**	**AHE**		
Features		• TV-8 / TV-10 rated • 2 Form A/2 Form A 1 Form B 40A compact power relays	• 1 Form A 35A/48A/90A compact power relays for inverter		
Contact data	Contact arrangement	2 Form A, 2 Form A 1 Form B	1 Form A		
	Contact shape	Single	Single		
	Contact material	$AgSnO_2$ type (Form A) AgNi type +Au flashed (Form B)	$AgSnO_2$ type (35 A)	AgNi type (48 A/90 A)	
	Contact rating (resistive)	120 A 60 A 50 A 40 A 30 A 20 A 10 A 40 A 277 V AC Form A	35 A 277 V AC 35 A type	48 A 277 V AC 48 A type	90 A 277 V AC 90 A type
	Min. switching load (reference value)	100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC	100 mA 5 V DC
	Max.switching voltage	480 V AC, 110 V DC	277 V AC, 30 V DC		480 V AC
Latching types availability		–	–		
Coil data	Rated operating power	1.88 W	1.92 W		
	Operate [Set] voltage (initial)	Max.75% V	Max.70% V		
	Release [Reset] voltage (initial)	Min.5% V	Min.10% V		
Time Characteristics (initial)	Operate [Set] time (initial)	Max.30 ms	Max.30 ms		
	Release [Reset] time (initial)	Max.10 ms	Max.10 ms		
Expected life	Mechanical life (ope.)	Min.5 x 10^6	Min.10 x 10^6 (35 A/48 A)		Min.10^6 (90 A)
Dielectric strength (initial)	Between open contacts	2,000 V rms for 1 min (Between open Form A contacts)	2,000 V rms for 1 min		
	Between contact sets	5,000 V rms for 1 min (Between Form A contact sets)	–		
	Between contact and coil	5,000 V rms for 1 min (Between Form A contact and coil)	5,000 V rms for 1 min		
Surge withstand voltage (between contact and coil) (initial)		10,000 V (Between From A contact and coil)	10,000 V		
Ambient temperature		-40 to 70°C (Max. carrying current 40 A) –40 to 85°C (Max. carrying current 35 A, transport and storage) *	–50 to +55°C, –50 to +85°C*		
Protective construction	Dust cover	–	–		
	Flux-resistant	●	●		
	Sealed	–	–		
PC board pattern (BOTTOM VIEW) ● indicates input terminal		2 Form A 2 Form A 1 Form B 	35A Type 	48A Type 	90A Type 
Safety standards		UL/C-UL, VDE, CQC	UL, CSA, VDE	UL/C-UL, VDE	
Unit weight (Approx.)		64 g	80 g		85 g
Option		–	–		
Remarks		* When using at 55°C or higher, the coil holding voltage should be 30 to 60% V.	90 A type does not meet the Electrical Appliance and Material Safety Law * Coil holding voltage is 50 to 60%V		

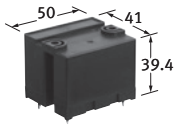
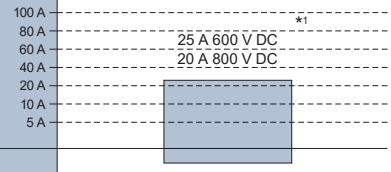
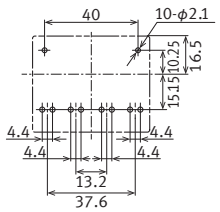
Power relays (Over 2A) selector chart

Category		Power Relays (30 A~)		
Product name		DJ-H RELAY	DZ-S RELAY	HE-N RELAY
Type of relay (Height includes standoff unit = mm)				
Initial of part number		**ADJH**	**ADZS**	**AHE6**
Features		• 1 Form A 50A latching relays for lighting and motor load	• Meet IEC62055-31 UC3 1 Form A 90A power latching relays	• High capacity 120A 480V AC 1 Form A power relays
Contact data	Contact arrangement	1 Form A	1 Form A	1 Form A
	Contact shape	Single	Single	Single
	Contact material	$AgSnO_2$ type	$AgSnO_2$ type	AgNi type
	Contact rating (resistive)			
	Min. switching load (reference value)	100 mA 5 V DC	100 mA 125 V AC	100 mA 5 V DC
	Max.switching voltage	480 V AC	276 V AC	800 V AC
Latching types availability		● (Latching only)	● (Latching only)	–
Coil data	Rated operating power	1 W (1 coil latching) 2 W (2 coil latching)	1.5 W (1 coil latching) 3 W (2 coil latching)	2.5 W
	Operate [Set] voltage (initial)	Max.75% V	Max.70% V	Max.75% V
	Release [Reset] voltage (initial)	Max.75% V	Max.70% V	Min.5% V
Time Characteristics (initial)	Operate [Set] time (initial)	Max.20 ms	Max.20 ms	Max.30 ms
	Release [Reset] time (initial)	Max.20 ms	Max.20 ms	Max.10 ms
Expected life	Mechanical life (ope.)	Min.10^6	Min.100 x 10^3	Min.10^6
Dielectric strength (initial)	Between open contacts	1,500 V rms for 1 min	2,000 V rms for 1 min	2,000 V rms for 1 min
	Between contact sets	–	–	–
	Between contact and coil	4,000 V rms for 1 min	4,000 V rms for 1 min	5,000 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		12,000 V	12,000 V	10,000 V
Ambient temperature		–40 to +85°C	–40 to +85°C	–40 to +55°C*1 –40 to +85°C*2
Protective construction	Dust cover	–	●	–
	Flux-resistant	●	–	●
	Sealed	–	–	–
PC board pattern (BOTTOM VIEW) ● indicates input terminal			–	
Safety standards		UL/C-UL, VDE	–	UL/C-UL, VDE
Unit weight (Approx.)		31 g	45 g	115 g
Option		–	–	–
Remarks		Reverse polarity type is available	IEC62055-31 UC3	*1: Coil holding voltage is 40 to 100%V (at 20°C) *2: Coil holding voltage is 50 to 60%V (at 85°C)

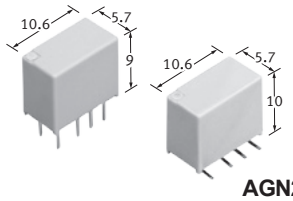
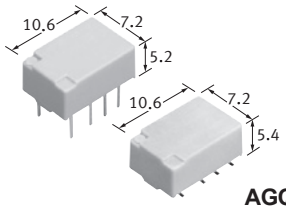
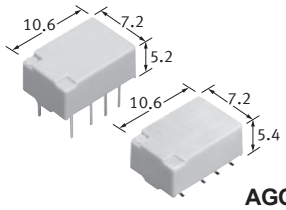
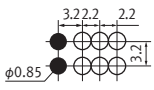
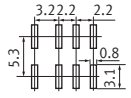
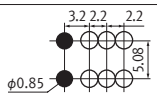
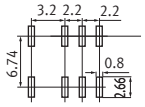
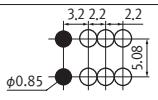
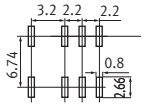
High-capacity DC cut off relays selector chart

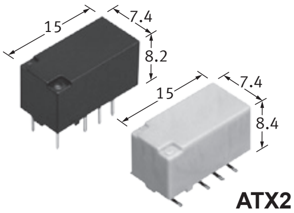
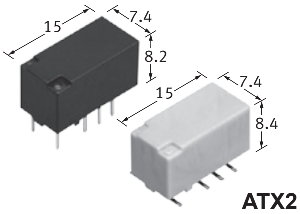
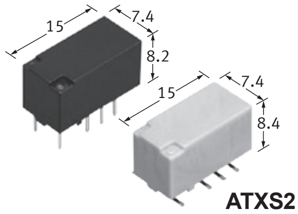
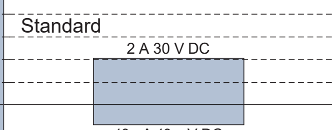
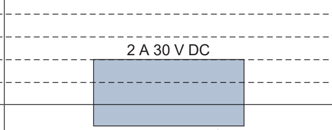
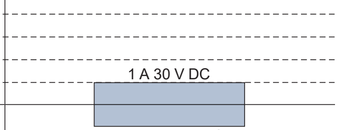
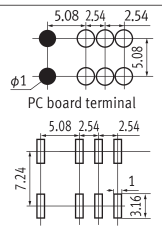
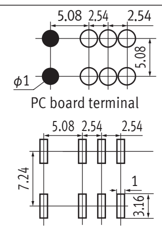
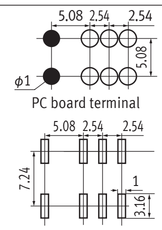
Category		High-capacity DC cut off relays				
Product name		EP RELAY				
Type of relay (Height includes standoff unit = mm)		10A 	20A 	80A 	200A 	300A 
Initial of part number		AEP				
Features		• High Capacity Max. 1,000 V DC Cut-off power relay				
Contact data	Contact arrangement	1 Form A				
	Contact shape	Single				
	Contact material	Molybdenum type	Copper type alloy	Tungsten type/ Copper type alloy	Copper type alloy	Copper type alloy
	Contact rating (resistive)	200 A 120 A 100 A 80 A 60 A 20 A 10 A; 10 A 400 V DC	20 A 400 V DC	80 A 400 V DC	200 A 400 V DC	300 A 400 V DC
	Min. switching load (reference value)	1 A 6 V DC	1 A 12 V DC	1 A 12 V DC	1 A 12 V DC	1 A 24 V DC
Latching types availability		–	–	–	–	–
Coil data	Rated operating power	1.24 W	3.9 W	4.2 W	6 W	Inrush: Max. 40 W (12 V DC, approx. 0.1 sec.) Inrush: Max. 45 W (24 V DC, approx. 0.1 sec.) Stable: Max. 4 W
	Operate [Set] voltage (initial)	Max. 75% V	Max. 75% V	Max. 75% V	Max. 75% V	Max. 75% V
	Release [Reset] voltage (initial)	Min. 8.3% V	Min. 4.17% V	Min. 8.3% V	Min. 8.3% V	Min. 16.7% V
Time Characteristics (initial)	Operate [Set] time (initial)	Max. 50 ms	Max. 50 ms	Max. 50 ms	Max. 50 ms	Max. 30 ms
	Release [Reset] time (initial)	Max. 30 ms	Max. 30 ms	Max. 30 ms	Max. 30 ms	Max. 10 ms
Expected life	Mechanical life	Min. 100 x10³	Min. 200 x10³	Min. 200 x10³	Min. 200 x10³	Min. 200 x10³
Dielectric strength (initial)	Between open contacts	2,500 V rms for 1 min	2,500 V rms for 1 min	2,500 V rms for 1 min	2,500 V rms for 1 min	2,500 V rms for 1 min
	Between contact sets	–	–	–	–	–
	Between contact and coil	2,500 V rms for 1 min	2,500 V rms for 1 min	2,500 V rms for 1 min	2,500 V rms for 1 min	2,500 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		–	–	–	–	–
Ambient temperature		–40 to +80°C	–40 to +80°C	–40 to +80°C	–40 to +80°C	–40 to +80°C
Protective construction	Dust cover	–	–	–	–	–
	Flux-resistant	–	–	–	–	–
	Sealed	• (Capsule contact)				
PC board pattern (BOTTOM VIEW) • indicates input terminal		PC board terminal  TM type 				
Safety standards		UL/C-UL	UL	UL/C-UL	–	UL/C-UL
Unit weight (Approx.)		80g	180g	400g	600g	750g
Option socket		–	–	Connector with lead wire	Hexagonal bolt x2 (M6)	Connector with lead wire
Remarks		–	–	–	–	–

High-capacity DC cut off relays selector chart

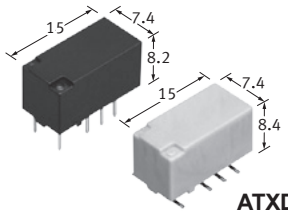
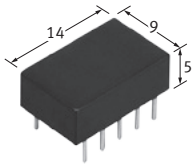
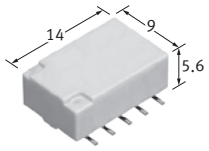
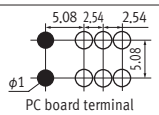
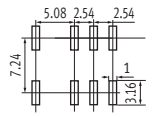
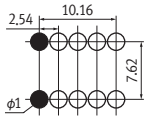
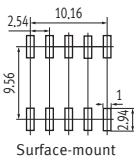
Category		High-capacity DC cut off relays
Product name		HE-V RELAY
Type of relay (Height includes standoff unit = mm)		
Initial of part number		**AHEV**
Features		• High capacity Max. 1,000 V DC, 20 A cut-off power relay
Contact data	Contact arrangement	2 Form A
	Contact shape	Single
	Contact material	AgNi type
	Contact rating (resistive)	
	Min. switching load (reference value)	100 mA 5 V DC
Latching types availability		–
Coil data	Rated operating power	1.92 W
	Operate [Set] voltage (initial)	Max. 70% V
	Release [Reset] voltage (initial)	Min. 5% V
Time Characteristics (initial)	Operate [Set] time (initial)	Max. 30 ms
	Release [Reset] time (initial)	Max. 10 ms
Expected life	Mechanical life	Min. 10^6
Dielectric strength (initial)	Between open contacts	2,000 V rms for 1 min
	Between contact sets	4,000 V rms for 1 min
	Between contact and coil	5,000 V rms for 1 min
Surge withstand voltage (between contact and coil) (initial)		10,000 V
Ambient temperature		–40 to +55°C –40 to +85°C *2
Protective construction	Dust cover	–
	Flux-resistant	●
	Sealed	–
PC board pattern (BOTTOM VIEW) ● indicates input terminal		
Safety standards		UL/C-UL, VDE
Unit weight (Approx.)		120 g
Option socket		–
Remarks		*1: Each 1a contact connected in series *2: When coil holding voltage is 33 to 60% of rated coil voltage

Signal Relays (2 A or less) selector chart

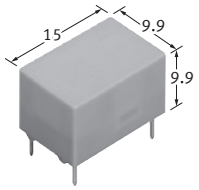
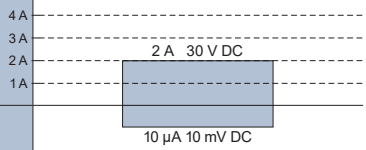
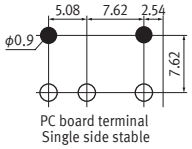
Category		Signal Relays (2 A or less)		
Product name		GN	GQ	GQ (TH type)
Type of relay (Height includes standoff unit: mm) Initial of part number		 **AGN2**	 **AGQ2**	 **AGQ2**
Features		• High sensitivity 100 mW type • 2 Form C and 1 A Compact , Slim body type relays	• High sensitivity 100 mW type • 2 Form C and 1 A Compact flat body type relays	• Small size controlled 3.5 A inrush current possible • 2.4 V coil voltage type newly available DC battery operation
Contact data	Contact arrangement	2 Form C	2 Form C	2 Form C
	Contact shape	Crossbar Twin	Crossbar Twin	Crossbar Twin
	Contact material	Stationary : AgPd + Au-clad Movable : AgPd	Stationary : AgPd + Au-clad Movable : AgPd	AgNi + Au-plating
	Contact rating (resistive)	4 A 3 A 2 A 1 A 1 A 30 V DC	2 A 30 V DC	2 A 30 V DC
	Min. switching load (reference value)	10 µA 10 mV DC	10 µA 10 m V DC	10 µA 10 m V DC
Latching types availability		•	•	•
Coil data	Rated coil voltage	1.5, 3, 4.5, 6, 9, 12, 24 V DC	1.5, 3, 4.5, 6, 9, 12, 24 V DC	1.5, 2.4, 3, 4.5, 6, 9, 12, 24 V DC
	Rated operating power	Single side stable: 140 mW (1.5 to 12 V DC), 230 mW (24 V DC) Latching type & High sensitivity: 100 mW (1.5 to 12 V DC), 120 mW (24 V DC)	Single side stable: 140 mW (1.5 to 12 V DC), 230 mW (24 V DC) Latching type & High sensitivity: 100 mW (1.5 to 12 V DC), 120 mW (24 V DC)	Single side stable: 140 mW (1.5 to 12 V DC), 230 mW (24 V DC) Latching type: 100 mW (1.5 to 12 V DC), 120 mW (24 V DC)
	Operate [Set] voltage (initial)	Max. 75% V , Max. 80% V (High sensitivity)	Max. 75% V , Max. 80% V (High sensitivity)	Max. 75 % V [Max. 75 % V]
	Release [Reset] voltage (initial)	Min. 10% V [Max. 75% V]	Min. 10% V [Max. 75% V]	Min. 10 % V [Max. 75 % V]
Time characteristics (initial)	Operate [Set] time (initial)	Max. 4 ms	Max. 4 ms	Max. 4 ms
	Release [Reset] time (initial)	Max. 4 ms	Max. 4 ms	Max. 4 ms
Expected life	Mechanical life	Min. 50 × 10^6	Min. 50 × 10^6	Min. 50 × 10^6
Dielectric strength (initial)	Between open contacts	750 Vrms for 1 min	750 Vrms for 1 min	750 Vrms for 1 min
	Between contact and coil	1,500 Vrms for 1 min	1,500 Vrms for 1 min	1,500 Vrms for 1 min
	Between contact sets	1,000 Vrms for 1 min	1,000 Vrms for 1 min	1,000 Vrms for 1 min
Surge withstand voltage (initial)	Between open contacts	1,500 V 10 × 160 µs (FCC Part 68)	1,500 V 10 × 160 µs (FCC Part 68)	1,500 V (10 × 160 µs) (FCC Part 68)
	Between contact and coil	2,500 V 2 × 10 µs	2,500 V 2 × 10 µs	2,500 V 2 × 10 µs (Telcordia)
Ambient temperature		–40 to + 85°C / –40 to + 70°C (High sensitivity)	–40 to + 85°C / –40 to + 70°C (High sensitivity)	–40 to +85°C
Protective construction	Dust cover	–	–	–
	Flux-resistant	–	–	–
	Sealed	•	•	•
PC board pattern (BOTTOM VIEW) • indicates input terminal		 PC board terminal  Surface-mount terminal A type (TOP VIEW)	 PC board terminal  Surface-mount terminal A type (TOP VIEW)	 PC board terminal  Surface-mount terminal A type (TOP VIEW)
Safety standards		UL/C-UL, BSI	UL/C-UL, BSI	UL/C-UL, BSI
Unit weight (Approx.)		1 g	1 g	1 g
Option		–	–	–
Remarks		–	–	–

Category		Signal Relays (2 A or less)		
Product name		TX	TX(TH)	TX-S
Type of relay (Height includes standoff unit: mm) Initial of part number		 ATX2	 ATX2	 ATXS2
Features		• 2, 000 V rms dielectric strength • 2 Form C and 2 A relays	• Controlled 7.5 A inrush current possible • 2 Form C Compact body type relays	• High sensitivity 50 mW type • 2 Form C and 1 A Compact body type relays
Contact data	Contact arrangement	2 Form C	2 Form C	2 Form C
	Contact shape	Crossbar Twin	Crossbar Twin	Crossbar Twin
	Contact material	Standard : Ag + Au-clad	Ag + Au-plating	Standard : Ag + Au-clad
	Contact rating (resistive) (4 A / 3 A / 2 A / 1 A)	 Standard 2 A 30 V DC	 2 A 30 V DC	 1 A 30 V DC
	Min. switching load (reference value)	10 µA 10 mV DC	10 µA 10 mV DC	10 µA 10 mV DC
Latching types availability		●	●	●
Coil data	Rated coil voltage	1.5, 3, 4.5, 5, 6, 9, 12, 24, 48 V DC (48 V ; Only single side stable type)	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24, 48 V DC (48 V ; Only single side stable type, 2.4 V ; Only latching type)	1.5, 3, 4.5, 6, 9, 12, 24 V DC
	Rated operating power	Single side stable: 140 mW (1.5 to 24 V DC), 270 mW (48 V DC) Latching type: 200 mW (1.5 to 24 V DC)	Single side stable: 140 mW (1.5 to 24 V DC), 270 mW (48 V DC) Latching type: 140 mW (1.5 to 24 V DC)	Single side stable: 50 mW (1.5 to 12V DC), 70 mW (24 V DC) Latching type: 70 mW (1.5 to 12V DC), 150 mW (24 V DC)
	Operate [Set] voltage (initial)	Max. 75% V	Max. 75% V	Max. 80% V
	Release [Reset] voltage (initial)	Min. 10% V [Max. 75% V]	Min. 10% V [Max. 75% V]	Min. 10% V [Max. 80% V]
Time characteristics (initial)	Operate [Set] time (initial)	Max. 4 ms	Max. 4 ms	Max. 5 ms
	Release [Reset] time (initial)	Max. 4 ms	Max. 4 ms	Max. 5 ms
Expected life	Mechanical life	Min. 100 × 10^6	Min. 100 × 10^6	Min. 50 × 10^6
Dielectric strength (initial)	Between open contacts	1,000 Vrms for 1 min	1,000 Vrms for 1 min	750 Vrms for 1 min
	Between contact and coil	2,000 Vrms for 1 min	2,000 Vrms for 1 min	1,800 Vrms for 1 min
	Between contact sets	1,000 Vrms for 1 min	1,000 Vrms for 1 min	1,000 Vrms for 1 min
Surge withstand voltage (initial)	Between open contacts	1,500 V 10 × 160 µs (FCC Part 68)	1,500 V 10 × 160 µs (FCC Part 68)	1,500 V 10 × 160 µs (FCC Part 68)
	Between contact and coil	2,500 V 2 × 10 µs	2,500 V 2 × 10 µs	2,500 V 2 × 10 µs
Ambient temperature		−40 to +85°C (1.5 to 24 V DC) / −40 to + 70°C (48 V DC)	−40 to + 85°C (1.5 to 24 V DC) / −40 to + 70°C (48 V DC)	−40 to + 70°C
Protective construction	Dust cover	–	–	–
	Flux-resistant	–	–	–
	Sealed	●	●	●
PC board pattern (BOTTOM VIEW) ● indicates input terminal		 PC board terminal Surface-mount terminal SA type Single side stable (TOP VIEW)	 PC board terminal Surface-mount terminal SA type Single side stable (TOP VIEW)	 PC board terminal Surface-mount terminal SA type Single side stable (TOP VIEW)
Safety standards		UL/C-UL, BSI	UL/C-UL, BSI	UL/C-UL, BSI
Unit weight (Approx.)		2 g	2 g	2 g
Option		–	–	–
Remarks		–	–	–

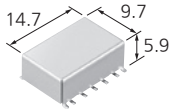
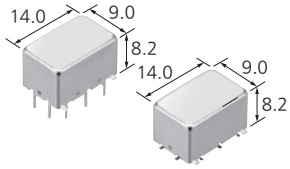
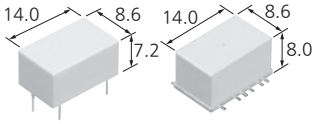
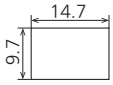
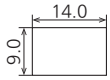
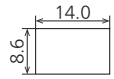
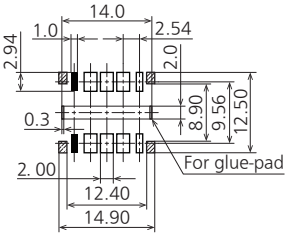
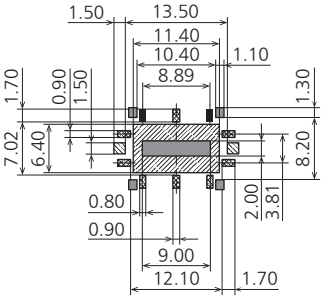
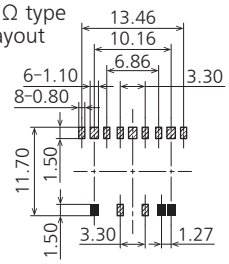
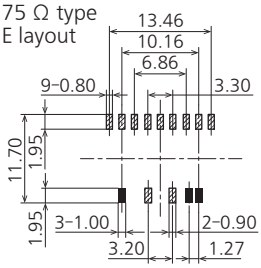
Signal Relays (2 A or less) selector chart

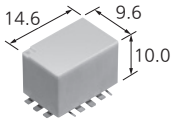
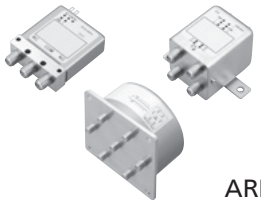
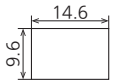
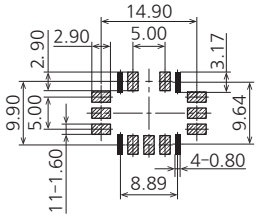
Category		Signal Relays (2 A or less)		
Product name		TX-D	TQ*	TQ(SMD)
Type of relay (Height includes standoff unit: mm) Initial of part number		 **ATXD2**	 **ATQ**	 **ATQ**
Features		• 6,000 V Surge withstand voltage type • 2 Form A, 2 A and High dielectric strength type relays	• 5 mm Low profile • 2 Form C, 1 A type relays	• 5.6 mm Low profile • 2 Form C 2 A Surface-mount type relays
Contact data	Contact arrangement	2 Form C	2 Form C	2 Form C
	Contact shape	Crossbar Twin	Crossbar Twin	Crossbar Twin
	Contact material	Standard : Ag + Au-clad	Ag + Au-clad	AgNi + Au-clad
	Contact rating (resistive)	4 A 3 A 2 A 1 A 2 A 30 V DC	1 A 30 V DC	2 A 30 V DC
	Min. switching load (reference value)	10 µA 10 mV DC	10 µA 10 mV DC	10 µA 10 mV DC
Latching types availability		●	●	●
Coil data	Rated coil voltage	1.5, 3, 4.5, 6, 9, 12, 24 V DC	3, 4.5, 5, 6, 9, 12, 24, 48 V DC (48 V ; Only single side stable type)	1.5, 3, 4.5, 5, 6, 9, 12, 24, 48 V DC (48 V ; Only single side stable type)
	Rated operating power	2 Form C Single side stable: 200 mW (1.5 to 12 V DC), 230 mW (24V DC) 2 Form C Latching type: 150 mW (1.5 to 12 V DC), 170 mW (24 V DC)	2 Form C Single side stable: 140 mW (3 to 12 V DC) 200 mW (24 V DC) , 300 mW (48 V DC)	Single side stable: 140 mW (1.5 to 12 V DC) 200 mW (24 V DC), 300 mW (48 V DC)
	Operate [Set] voltage (initial)	Max. 75% V	Max. 75% V	Max. 75% V
	Release [Reset] voltage (initial)	Min. 10% V [Max. 75% V]	Min. 10% V [Max. 75% V]	Min. 10% V [Max. 75% V]
Time characteristics (initial)	Operate [Set] time (initial)	Max. 4 ms	Max. 3 ms	Max. 4 ms
	Release [Reset] time (initial)	Max. 4 ms	Max. 3 ms	Max. 4 ms
Expected life	Mechanical life	Min. 100 × 10^6	Min. 100 × 10^6	Min. 100 × 10^6
Dielectric strength (initial)	Between open contacts	1,000 Vrms for 1 min	750 Vrms for 1 min	1,000 Vrms for 1 min
	Between contact and coil	3,000 Vrms for 1 min	1,000 Vrms for 1 min	1,500 Vrms for 1 min
	Between contact sets	1,000 Vrms for 1 min	1,000 Vrms for 1 min	1,500 Vrms for 1 min
Surge withstand voltage (initial)	Between open contacts	1,500 V 10 × 160 µs (FCC Part68)	1,500 V 10 × 160 µs (FCC Part68)	1,500 V 10 × 160 µs (FCC Part 68)
	Between contact and coil	6,000 V 1.2 × 50 µs	–	2,500 V 2 × 10 µs
Ambient temperature		–40 to + 85°C	–40 to + 70°C	–40 to + 85°C (1 A or less for use over 70°C)
Protective construction	Dust cover	–	–	–
	Flux-resistant	–	–	–
	Sealed	●	●	●
PC board pattern (BOTTOM VIEW) ● indicates input terminal		 PC board terminal  Surface-mount terminal SA type Single side stable (TOP VIEW)	 PC board terminal	 Surface-mount SA type (TOP VIEW)
Safety standards		UL/C-UL, BSI	UL, CSA	UL, CSA
Unit weight (Approx.)		2 g	1.5 g	2 g
Option		–	–	–
Remarks		MBB contact	MBB contact	–

* Standard PC board terminal and self-clinching terminal.

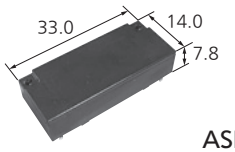
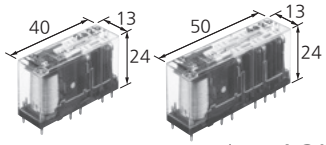
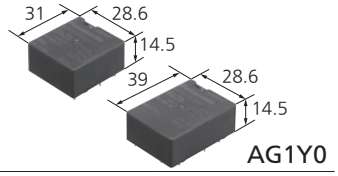
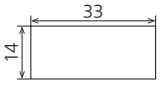
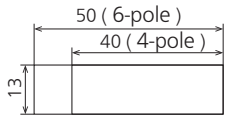
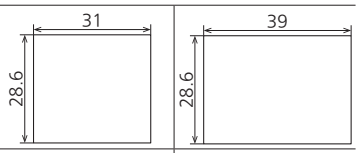
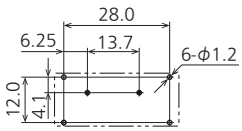
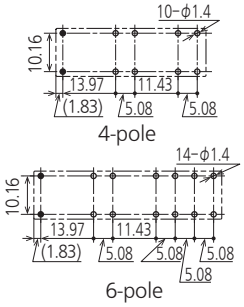
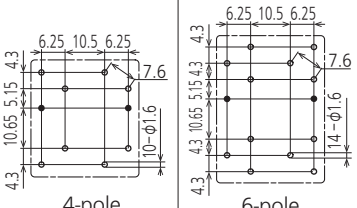
Category		Signal Relays (2 A or less)
Product name		DS
Type of relay (Height includes standoff unit: mm) Initial of part number		 **AG2**
Features		• High sensitivity 200 mW type • 1 Form C, 2 A type relays
Contact data	Contact arrangement	1 Form C
	Contact shape	Twin
	Contact material	Ag + Au-clad
	Contact rating (resistive)	
	Min. switching load (reference value)	10 µA 10 mV DC
Latching types availability		●
Coil data	Rated coil voltage	1.5, 3, 5, 6, 9, 12, 24, 48 V DC
	Rated operating power	Single side stable: 400 mW (Standard), 200 mW (High sensitivity) Latching type :360 mW (Standard), 180 mW (High sensitivity)
	Operate [Set] voltage (initial)	Max. 70% V , Max. 80% V (High sensitivity)
	Release [Reset] voltage (initial)	Min. 10% V [Max. 70% V , Max. 80% V (High sensitivity)]
Time characteristics (initial)	Operate [Set] time (initial)	Max. 10 ms
	Release [Reset] time (initial)	Max. 5 ms [Max. 10 ms]
Expected life	Mechanical life	Min. 100 × 10^6 (Single side stable), Min. 10 × 10^6 (2 coil latching)
Dielectric strength (initial)	Between open contacts	1,000 Vrms for 1 min (Standard), 500 Vrms for 1 min (High sensitivity)
	Between contact and coil	1,500 Vrms for 1 min (Standard), 1,000 Vrms for 1min (High sensitivity)
	Between contact sets	–
Surge withstand voltage (initial)	Between open contacts	–
	Between contact and coil	–
Ambient temperature		–40 to + 70°C
Protective construction	Dust cover	–
	Flux-resistant	–
	Sealed	●
PC board pattern (BOTTOM VIEW) ● indicates input terminal		 PC board terminal Single side stable
Safety standards		UL, CSA
Unit weight (Approx.)		3 g
Option		–
Remarks		–

Microwave Devices Selector Chart

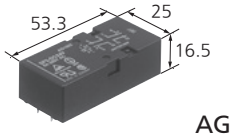
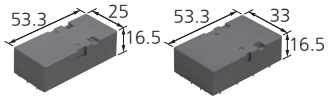
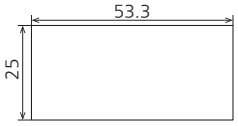
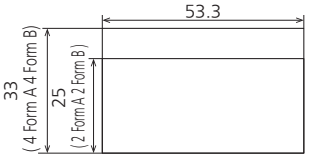
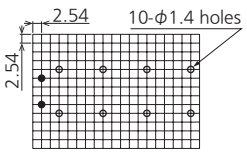
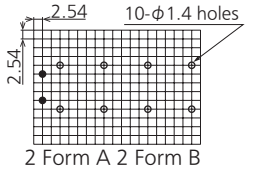
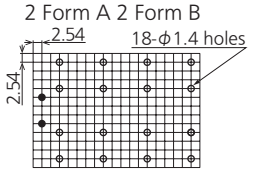
Category		Microwave Devices		
Product name		RA RELAY	RJ RELAY	RS RELAY
Type of relay (Height includes standoff unit = mm) Initial of part number		 ARA	 ARJ	 ARS
Features		1 GHz capable, 3 W carrying power (at 1 GHz), 50 Ω impedance and 2 Form C relays	8 GHz max. capable, 1 W carrying power (at 5 GHz), 50 Ω impedance and 2 Form C relays	3 GHz capable, 10 W carrying power (at 3 GHz), 50 W/75 Ω impedance and 1 Form C relays
Contact data	Contact arrangement	2 Form C	2 Form C	1 Form C
	Contact material	Ag alloy / Au-clad Ag alloy	Au	Au
	Contact input power	3 W (at 1 GHz)	1 W (at 5 GHz)	10 W (at 3 GHz)
Latching types availability		●	●	●
Coil data	Rated coil voltage	1.5, 3, 4.5, 5, 6, 9, 12, 24, 48 V DC (48 V: Only single side stable)	3, 4.5, 12, 24 V DC	3, 4.5, 9, 12, 24 V DC
	Rated operating power	140 mW (1.5 to 12 V) 200 mW (24 V) 300 mW (48 V)	(Single) 200 mW (−L2) 150 mW	(Single) 200 mW (−L) 200 mW (−L2) 400 mW
	Operate [Set] voltage (initial)	Max. 75 % V	Max. 75 % V	Max. 75 % V
	Release [Reset] voltage (initial)	Min. 10 % V	Min. 10 % V	Min. 10 % V
Operate [Set] time (initial)		Max. 4 ms (about 2 ms)	Max. 5 ms	Max. 10 ms
Release [Reset] time (initial)		Max. 4 ms (about 1 ms)	Max. 5 ms	Max. 6 ms
Expected life	Mechanical life	Min. 100×10^6	Min. 10×10^6	Min. 5×10^6
	Electrical life	Min. 10×10^6	Min. 10^6	Min. 300×10^3 (75 Ω) Min. 10^6 (50 Ω)
Surge withstand voltage (initial)	Between open contacts	750 V rms for 1 min	500 V rms for 1 min	500 V rms for 1 min
	Between contact and coil	1,000 V rms for 1 min	500 V rms for 1 min	1,000 V rms for 1 min
Ambient temperature		−40 to +85 ℃	−30 to +70 ℃	−40 to +70 ℃ −40 to +60 ℃ (silent)
Protective construction	Dust cover	–	–	–
	Flux-resistant	–	–	–
	Sealed	●	●	●
Dimensions	Height (Height includes standoff unit = mm)	5.9	8.2	8
	Bottom (mm)			
PC board pattern (TOP VIEW) ■ indicates input terminal		 ▨: Earth for metal case	 ▨: Relay terminals ▨: Ground. Note that soldering is required. ▨: Ground. Note that you must determine the necessity of solder based on effect of heat when soldering. ▨: Ground. Note that some extra work is required due to the effect of lifting when soldering.	50 Ω type E layout  75 Ω type E layout 
Safety standards		–	–	–
Unit weight (Approx.)		2 g	3 g	2 g
Option		–	–	–
Remarks		–	–	Reverse contact type available.

Category		Microwave Devices	
Product name		RN RELAY	RD COAXIAL SWITCH
Type of relay (Height includes standoff unit = mm) Initial of part number		 ARN	 ARD
Features		8 GHz max. capable, 150 W carrying power (at 2 GHz), compact SMD type, 50 Ω impedance and 1 Form C relays	26.5 GHz max. coaxial switches coming in SPDT, Transfer, and SP6T types
Contact data	Contact arrangement	1 Form C	SPDT, Transfer, SP6T
	Contact material	Au	Au
	Contact input power	Max. 150 W (at 2 GHz)	Max. 120 W (at 3 GHz)
Latching types availability		●	●
Coil data	Rated coil voltage	4.5, 12, 24 V DC	4.5, 5, 12, 24 V DC (4.5 V: Excepting Latching with TTL driver , 5 V: Latching with TTL driver)
	Rated operating power	(Single) 320 mW (−L2) 400 mW	(SPDT, SP6T) 840 mW (Transfer) 1,540 mW
	Operate [Set] voltage (initial)	Max. 75 % V	–
	Release [Reset] voltage (initial)	Min. 10 % V	–
Operate [Set] time (initial)		Max. 5 ms	Max. 15 ms (SPDT) Max. 20 ms (Transfer, SP6T)
Release [Reset] time (initial)		Max. 5 ms	–
Expected life	Mechanical life	Min. 10^6	Min. 5×10^6
	Electrical life	Min. 10^3	Min. 5×10^6 (SPDT)
Surge withstand voltage (initial)	Between open contacts	500 V rms for 1 min	500 V rms for 1 min
	Between contact and coil	500 V rms for 1 min	500 V rms for 1 min
Ambient temperature		−40 to +85 ℃	−55 to +85 ℃
Protective construction	Dust cover	–	–
	Flux-resistant	●	–
	Sealed	–	–
Dimensions	Height (Height includes standoff unit = mm)	10	–
	Bottom (mm)		–
PC board pattern (TOP VIEW) ■ indicates input terminal			–
Safety standards		–	–
Unit weight (Approx.)		2.5 g	–
Option		–	–
Remarks		Reverse contact type available.	–

Safety Relays Selector Chart

Category		Safety Relays			
Product name		SF-M RELAY	SF RELAY Slim type		SF-Y RELAY
Type of relay (Height includes standoff unit = mm)					
Initial of part number		ASFM0	4 poles AG1S	6 poles	AG1Y0
Features		Flat type safety relays (1 Form A 1Form B)	Slim type safety relays		Compact Relay Family with Forcibly Guided Contacts
Contactdata	Contact arrangement	1 Form A 1 Form B	4-pole: 2 Form A 2 Form B, 3 Form A 1 Form B 6-pole: 4 Form A 2 Form B, 5 Form A 1 Form B, 3 Form A 3 Form B		4-pole: 2 Form A 2 Form B, 3 Form A 1 Form B 6-pole: 4 Form A 2 Form B, 5 Form A 1 Form B
	Contact shape	Single	Single		Single
	Contact material	RT II : Au flashed AgNi type RT III : Au flashed $AgSnO_2$ type	Au flashed $AgSnO_2$ type		Au flashed AgNi type
	Contact rating chart Maximum (cos ϕ= 1)	30 A 20 A 15 A 10 A 8 A 5 A 3 A NC contact 4 A 250 V AC 4 A 30 V DC NO contact 6 A 250 V AC 6 A 30 V DC	6 A 250 V AC 6 A 30 V DC		6 A 250 V AC 6 A 30 V DC
	Minimum (For Reference)	1 mA 10 V DC 1 mA 10 V DC	1 mA 5 V DC		10 mA 10 V DC
Latching types availability		–	–		–
Coil data	Nominal coil voltage	3, 5, 12, 16, 18, 21, 24 V DC	12, 24, 48 V DC		5, 12, 16, 18, 21, 24 V DC
	Rated operating power	270 mW (When input) 100 mW (When retained)	360 mW	500 mW	670 mW
	Operate [Set] voltage (initial)	Max. 75 %	Max. 75 % V		Max. 75 % V
	Release [Reset] voltage (initial)	Min. 10 % V	Min. 10 % V		Min. 15 % V
Time characteristics	Operate [Set] time (initial)	Max. 15 ms	Max. 20 ms		Max. 20 ms
	Release [Reset] time (initial)	Max. 10 ms	Max. 20 ms		Max. 10 ms
Expected life	Mechanical life (ope.)	Min. 10×10^6	Min. 10×10^6		Min. 10×10^6
Dielectric strength (initial)	Between open contacts	1,500 Vrms for 1 min	1,500 Vrms for 1 min		1,500 Vrms for 1 min
	Between contact and coil	NC contact (3-4 terminal) - coil; 2,500 Vrms for 1 min NO contact (5-6 terminal) - coil; 4,000 Vrms for 1 min	4,000 Vrms for 1 min		NC contact (5-6 terminal) - coil; 2,500 Vrms for 1 min NO contact (7-8 terminal) - coil; 4,000 Vrms for 1 min
Surgewithstandvoltage (initial) Between contact and coil		–	–		–
Ambient temperature		−40 to +85 ℃	−40 to +85 ℃		−40 to +70 ℃
Protective construction	Dust cover	–	–		–
	Flux-resistant	● (RT II)	●		–
	Sealed	● (RT III)	–		● (RT III) *
External dimension	height (mm) Including Standoff	7.8	24		14.5
	Bottom (mm)				
Suggested PC board pattern (BOTTOM VIEW) ●: coil terminal					
Safety standards		UL/C-UL, TÜV	UL/C-UL, TÜV, Korean S, CQC		UL/C-UL, TÜV
Unit weight (Approx.)		6.5 g	20 g	23 g	19 g 23 g
Option		–	Sockets, DIN rail terminal socket		–
Remarks		–	With LED indication		–

* According to EN 61810-1:2015, table 2.

Category		Safety Relays	
Product name		SF RELAY	SF RELAY Double Contact Type
Type of relay (Height includes standoff unit = mm)			
Initial of part number		AG103	AG10
Features		Flat type safety relays	Flat type safety relays (double contact)
Contactdata	Contact arrangement	3 Form A 1 Form B	2 Form A 2 Form B / 4 Form A 4 Form B
	Contact shape	Single	Double Contact
	Contact material	Au flashed $AgSnO_2$ type	Au flashed $AgSnO_2$ type
	Contact rating chart Maximum (cos ϕ= 1)	30 A 20 A 15 A 10 A 8 A 5 A 3 A; 6 A 250 V AC; 6 A 30 V DC	6 A 250 V AC; 6 A 30 V DC
	Minimum (For Reference)	100 mA 5 V DC	100 mA 5 V DC
Latching types availability		–	–
Coil data	Nominal coil voltage	5, 12, 24, 48, 60 V DC	5, 12, 24, 48, 60 V DC
	Rated operating power	500 mW	500 mW
	Operate [Set] voltage (initial)	Max. 80 % V	Max. 75 % V
	Release [Reset] voltage (initial)	Min. 10 % V	Min. 10 % V
Time characteristics	Operate [Set] time (initial)	Max. 30 ms	Max. 30 ms
	Release [Reset] time (initial)	Max. 15 ms	Max. 15 ms
Expected life	Mechanical life (ope.)	Min. 10×10^6	Min. 10×10^6
Dielectric strength (initial)	Between open contacts	2,500 Vrms for 1 min	1,300 Vrms for 1 min
	Between contact and coil	2,500 Vrms for 1 min	2,500 Vrms for 1 min
Surgewithstandvoltage (initial) Between contact and coil		–	–
Ambient temperature		−40 to +70 ℃	−40 to +70 ℃
Protective construction	Dust cover	–	–
	Flux-resistant	–	–
	Sealed	●	●
External dimension	height (mm) Including Standoff	16.5	16.5
	Bottom (mm)		
Suggested PC board pattern (BOTTOM VIEW) ●: coil terminal		 3 Form A 1 Form B	 2 Form A 2 Form B  4 Form A 4 Form B
Safety standards		UL/C-UL, TÜV	UL/C-UL, TÜV
Unit weight (Approx.)		38 g	38 g / 47 g
Option		–	–
Remarks		–	–

Characteristics

■ UL Coil Insulation

Coil Insulation	Relay
UL-B	LQ, LZ, LZ-N, JW
UL-F	LD-P, LF-G, LQ, LZ, LZ-N,HE,HE-PV, HE-N , HE-S, HE-V

■ TV rated

TV rated	Relay
TV-2	–
TV-3	ST
TV-4	–
TV-5	LZ, LZ-N, JW
TV-8	DW (Inrush type), LF, HE-S (STD type N.O.)
TV-10	HE (2 Form A), HE-S (Long life type N.O.)
TV-15	HE (1 Form A), HE-PV (35 A)

■ Surge voltage between contact and coil

Surge voltage	Relay
5,000 V	DS-P
6,000 V	ST, PF, LF-G, PA-N
8,000 V	LQ
10,000 V	LF, LD-P,LZ, LZ-N, JW, HE, HE-PV, HE-N, HE-S, HE-V, DJ, DK, DY
12,000 V	DE, DW

■ High frequency characteristics

Relay	Arrangement	Isolation	Insertion loss
RD COAXIAL SWITCH	SPDT Transfer SP6T	Min. 80 dB (1 to 4 GHz) SPDT Min. 60 dB (12.4 to 18 GHz) Transfer Min. 80 dB (1 to 4 GHz) SP6T	Max. 0.2 dB (1 to 4 GHz) SPDT Max. 0.5 dB (12.4 to 18 GHz) Transfer Max. 0.2 dB (1 to 4 GHz) SP6T
RN RELAY	1 Form C	Min. 30 dB (3 to 6 GHz)	Max. 0.5 dB (3 to 6 GHz)
RJ RELAY	2 Form C	Min. 30 dB (5 GHz) (Between contact sets)	Max. 0.5 dB (5 GHz)
RA RELAY	2 Form C	Min. 30 dB (1 GHz) (Between contact sets)	Max. 0.3 dB (1 GHz)
RS RELAY	1 Form C	Min. 30 dB (3 GHz) 50 Ω Surface-mount terminal Min. 35 dB (3 GHz) 75 Ω PC board terminal	Max. 0.5 dB (3 GHz) 50 Ω Surface-mount terminal Max. 0.35 dB (3 GHz) 75 Ω PC board terminal

■ Terminal socket

SP, NC, HE, SFS

■ Socket

S, ST, NC, PA-N,DK, DS-P, JW, SFS

■ LED operation indication type

SFS

SAFETY STANDARDS Each standard may be updated at any time, so please check our Website for the latest information.

https://www3.panasonic.biz/ac/e/service/export/information/standards/relay/index.jsp?c=search

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