



RoHS compliant

FEATURES

1. Compact with high contact rating Even with small 10 mm .394 inch (H) x 11 mm .433 inch (W) x 20 mm .787 inch (L) (dimensions, high capacity switching is provided: 1a, 8 A 250 V AC; 2a and 1a1b, 5 A 250 V AC.

2. High switching capability

High contact pressure, low contact bounce, and wiping operation improve resistance to weld bonding. Resistant against lamp load and dielectric loading: 1a achieves maximum switching capacity of 2,000 VA (8A 250 V AC).

1a 8A, 1a1b/2a 5A small polarized power relays

3. High sensitivity

Using the same type of highperformance polar magnetic circuits as DS relays, by matching the spring load to the magnetic force of attraction, greater sensitivity has been achieved. The resultant pick up sensitivity of about 190 mW makes possible direct driving of transistors and chips.

4. High breakdown voltage

Breakdown voltage has been raised by keeping the coil and contacts separate.

Between contact and coil		Between contacts				
	3,000 Vrms for 1 min. 5,000 V surge breakdown voltage	1,000 Vrms for 1 min. 1,500 V surge breakdown voltage				
	Conforms with FCC Part 6	8				

5. Latching types available

6. Wide variation

Three types of contact arrangement are offered: 1a, 2a, and 1a1b. In addition, each is available in standard and reversed polarity types.

- 7. Sealed construction allows automatic washing.
- 8. Complies with safety standards Complies with Japan Electrical Appliance and Material Safety Law requirements for operating 200 V power supply circuits, and complies with UL, CSA, and TÜV safety standards.
 9. Sockets are available.

DSP RELAYS

TYPICAL APPLICATIONS

- 1. Office and industrial electronic devices
- 2. Terminal devices of information processing equipment, such as printer, data recorder.
- 3. Office equipment (copier, facsimile)
- 4. Measuring instruments
- 5. NC machines, temperature controllers and programmable logic controllers.



TYPES

Contact	Nominal coil	Single side stable	2 coil latching		
arrangement	voltage	Part No.	Part No.		
	3V DC	DSP1a-DC3V	DSP1a-L2-DC3V		
	5V DC	DSP1a-DC5V	DSP1a-L2-DC5V		
1 Form A	6V DC	DSP1a-DC6V	DSP1a-L2-DC6V		
I FOITH A	9V DC	DSP1a-DC9V	DSP1a-L2-DC9V		
	12V DC	DSP1a-DC12V	DSP1a-L2-DC12V		
	24V DC	DSP1a-DC24V	DSP1a-L2-DC24V		
	3V DC	DSP1-DC3V-F	DSP1-L2-DC3V-F		
	5V DC	DSP1-DC5V-F	DSP1-L2-DC5V-F		
1 Form A	6V DC	DSP1-DC6V-F	DSP1-L2-DC6V-F		
1 Form B	9V DC	DSP1-DC9V-F	DSP1-L2-DC9V-F		
	12V DC	DSP1-DC12V-F	DSP1-L2-DC12V-F		
	24V DC	DSP1-DC24V-F	DSP1-L2-DC24V-F		
	3V DC	DSP2a-DC3V	DSP2a-L2-DC3V		
	5V DC	DSP2a-DC5V	DSP2a-L2-DC5V		
	6V DC	DSP2a-DC6V	DSP2a-L2-DC6V		
2 Form A	9V DC	DSP2a-DC9V	DSP2a-L2-DC9V		
	12V DC	DSP2a-DC12V	DSP2a-L2-DC12V		
	24V DC	DSP2a-DC24V	DSP2a-L2-DC24V		

Standard packing: Carton: 50 pcs.; Case: 500 pcs. Note: Reverse polarity type are manufactured by lot upon receipt of order. Self-clinching types are also available, please consult us.

* For sockets, see page 100.

RATING

1. Coil data

1) Single side stable

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. applied voltage (at 20°C 68°F)
3V DC		al voltage nominal voltage	100mA	30Ω		130%V of nominal voltage
5V DC			60mA	83Ω		
6V DC	80%V or less of		50mA	120Ω		
9V DC	(Initial)		33.3mA	270Ω	300111	
12V DC	(25mA	480Ω		
24V DC			12.5mA	1,920Ω		

2) 2 coil latching

Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)		Coil resistance [±10%] (at 20°C 68°F)		Nominal operating power		Max. applied voltage (at 20°C 68°F)
c .			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
3V DC	80%V or less of nominal voltage (Initial)		100mA	100mA	30Ω	30Ω	- 300mW	300mW	130%V of nominal voltage
5V DC			60mA	60mA	83Ω	83Ω			
6V DC			50mA	50mA	120Ω	120Ω			
9V DC			33.3mA	33.3mA	270Ω	270Ω			
12V DC			25mA	25mA	480Ω	480Ω			
24V DC			12.5mA	12.5mA	1,920Ω	1,920Ω			

DSP

2. Specifications

Characteristics		Item	Specifications				
	Arrangement		1 Form A	1 Form A 1 Form B	2 Form A		
Contact	Contact resistance (Initial)		Max. 30 mΩ (By voltage drop 6 V DC 1A)				
	Contact material		Au-flashed AgSnO ₂ type				
	Nominal switching capacity (resistive load)		8 A 250 V AC, 5A 30V DC	5 A 250 V AC, 5 A 30 V DC			
	Max. switching power (resistive load)		2,000 VA, 150 W 1,250 VA, 150 W				
Rating	Max. switching voltag	e	250 V AC, 125 V DC				
Rating	Max. switching currer	nt	8 A AC, 5 A DC 5 A AC, DC				
	Nominal operating power			300 mW			
	Min. switching capacity (Reference value)*1			10m A 5 V DC			
	Insulation resistance	(Initial)		easurement at same location a	0		
	Brookdown voltago	Between open contacts	1,000 Vrms for 1min. (Detection current: 10mA.)				
	Breakdown voltage (Initial)	Between contact sets	2,000 Vrms (1 Form A 1 Form B, 2 Form A) (Detection current: 10mA.)				
	Between contact and coil		3,000 Vrms for 1min. (Detection current: 10mA.)				
Electrical characteristics	Surge breakdown voltage*2	between contacts and coil	5,000 V				
	Temperature rise (coi	il) (at 65°C 149°F)	Max. 55°C	Max. 40°C	Max. 55°C		
	Operate time [Set time] (at 20°C 68°F)Release time [Reset time] (at 20°C 68°F)		Max. 10 ms [10 ms] (Nominal o	coil voltage applied to the coil, e	xcluding contact bounce time		
			Max. 5 ms [10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time. (without diode)				
	Charle registeres	Functional	Min. 196 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10µs.)				
Mechanical	Shock resistance	Destructive	Min. 980 m/s ² (Half-wave pulse of sine wave: 6 ms.)				
characteristics	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 2 mm (Detection time: 10µs.)				
	VIDIATION TESISTANCE	Destructive	10 to 55 Hz at double amplitude of 3.5 mm				
Expected life	Mechanical		Min. 5×107 (at 180 times/min.)				
Lypected life	Electrical		Min. 10 ⁵ (resistive load)				
	Conditions for operation, transport and storage*3 (Not freezing and condensing at low temperature)		Ambient temperature: -40°C to +60°C -40°F to +140°F	Ambient temperature: -40°C to +65°C -40°F to +149°F	Ambient temperature: -40°C to +60°C -40°F to +140°F		
Conditions	Solder heating		250°C 482°F (10s), 300°C 572°F (5s), 350°C 662°F (3s) (Soldering depth: 2/3 terminal pitch)				
	Max. operating speed	1	3 cps				
Unit weight	Approx. 4.5 g .16 oz						

Notes: *1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

 *2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981
 *3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

REFERENCE DATA



3.-(1) Coil temperature rise (1 Form A) Tested sample: DSP1a-DC12V, 5 pcs.



°0 × 100 of operations, 265 V-130 V AC cosφ = 10 265 V·130 V A0 Ś 0 2 3 4 5 6 Switching capacity, A

2.-(1) Life curve (1 Form A 1 Form B)









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4.-(1) Operate & release time 4.-(2) Operate & release time (without diode, 1 Form A) (without diode, 1 Form A 1 Form B) Tested sample: DSP1a-DC12V, 5 pcs. Tested sample: DSP1-DC12V, 5 pcs. ms ms ms time, time, time, Operate & release Operate & release Operate time Operate & release Operate time Release time ase time ---Max Max. Min. 0 0 0 80 80 100 110 100 120 Coil applied voltage, %V Coil applied voltage, %V 4.-(4) Operate & release time 4.-(5) Operate & release time (with diode, 1 Form A) (with diode, 1 Form A 1 Form B) Tested sample: DSP1a-DC12V, 5 pcs. Tested sample: DSP1-DC12V, 5 pcs.



5.-(1) Change of pick-up and drop-out voltage (1 Form A)





6.-(1) Influence of adjacent mounting (1 Form A)







5.-(2) Change of pick-up and drop-out voltage (1 Form A 1 Form B) Tested sample: DSP1-DC12V, 5 pcs.



6.-(2) Influence of adjacent mounting (1 Form A 1 Form B) Tested sample: DSP1-DC12V, 5 pcs.







4.-(6) Operate & release time (with diode, 2 Form A) Tested sample: DSP2a-DC12V, 5 pcs.



5.-(3) Change of pick-up and drop-out voltage (2 Form A) $\,$





6.-(3) Influence of adjacent mounting (2 Form A) Tested sample: DSP2a-DC12V, 5 pcs.





(Deenergized condition)

(Reset condition)

SAFETY STANDARDS

Item	UL/C-UL (Recognized)			CSA (Certified)		TÜV (Certified)	
nem	File No.	Contact rating	File No.	Contact rating	File No.	Rating	
1 Form A	E43028	8A 250V AC 1/6HP 125, 250V AC 5A 30V DC	LR26550 etc.	8A 250V AC ¼HP 125, 250V AC 5A 30V DC	B 02 10 13461 238	8A 250V AC (cosφ=1.0) 5A 250V AC (cosφ=0.4) 5A 30V DC	
1 Form A 1 Form B	E43028	5A 250V AC ¼HP 125, 250V AC 5A 30V DC	LR26550 etc.	5A 250V AC ¼6HP 125, 250V AC 5A 30V DC	B 02 10 13461 238	5A 250V AC (cosφ=1.0) 3A 250V AC (cosφ=0.4) 5A 30V DC	
2 Form A	E43028	5A 250V AC ¹ /10HP 125, 250V AC 5A 30V DC	LR26550 etc.	5A 250V AC ¹ /10HP 125, 250V AC 5A 30V DC	B 02 10 13461 238	5A 250V AC (cosφ=1.0) 3A 250V AC (cosφ=0.4) 5A 30V DC	

* Remarks: The standard certified for may differ depending on where the product was manufactured.

NOTES

1. Soldering conditions

Please obey the following conditions when soldering automatically. 1) Preheating: Within 120°C 248°F and

within 120 seconds

2) Soldering iron: 260°C±5°C 500°F±41°F and within 6 seconds

2. Cleaning

For automatic cleaning, the boiling method is recommended. Avoid ultrasonic cleaning which subjects the relays to high frequency vibrations, which may cause the contacts to stick. It is recommended that a fluorinated hydrocarbon or other alcoholic solvents be used.

For Cautions for Use.

3. External magnetic field

Since DY relays are highly sensitive polarized relays, their characteristics will be affected by a strong external magnetic field. Avoid using the relay under that condition.

4. Coil operating power

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%. However, check it with the actual circuit since the characteristics may be slightly different. 5. When using, please be aware that the a contact and b contact sides of 1 Form A and 1 Form B types may go on simultaneously at operate time and release time.