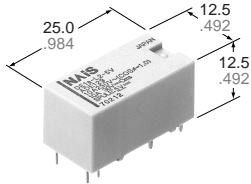


# NAIS

## COMPACT HIGH-INSULATION POLARIZED POWER RELAY

# DE RELAYS



mm inch

### FEATURES

- **Conforms to VDE0631.**  
Insulating distance between coil and contacts:  
Clearance Min. 8mm .315 inch  
Creepage distance Min. 8mm .315 inch
- **Low operating power**  
Nominal operating power at 200 mW  
(Single side stable, 2 coil latching)
- **Compact body saves space**  
Size: 12.5(W) × 25.0(L) × 12.5(H) mm  
.492(W) × .984(L) × .492(H) inch
- **Extensive product line-up.**
- **High inrush current capability**  
Surge voltage between contact and coil  
12 kV
- **UL/CSA, VDE approved**

### SPECIFICATIONS

#### Contact

Arrangement	1 Form A	1 Form A 1 Form B	2 Form A
Contact material	Silver alloy		
Initial contact resistance, max. (By voltage drop 6V DC 1A)	30mΩ		
Rating (resistive load)	Nominal switching capacity	10A 250V AC, 10A 30V DC	8A 250V AC, 8A 30V DC
	Max. switching power	2,500 VA, 300W	2,000 VA, 240W
	Max. switching voltage	440V AC, 230V DC	440V AC, 230V DC
	Max. switching current	10A	8A
Expected life (min. operations)	Mechanical (at 300cpm)	10 <sup>7</sup>	
	Electrical (at 20 cpm) (resistive load)	10 <sup>5</sup>	10 <sup>5</sup> (AC) 5 × 10 <sup>4</sup> (DC)

#### Coil (at 20°C, 68°F)

	Nominal operating power
Single side stable	200 mW
1 coil latching	100 mW
2 coil latching	200 mW

#### Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*1 Measurement at same location as "Initial breakdown voltage" section.
- \*2 Detection current: 10mA
- \*3 Wave is standard shock voltage of ±1.2 × 50μs according to JEC-212-1981
- \*4 Nominal operating voltage applied to the coil, excluding contact bounce time.
- \*5 By resistive method

#### Characteristics

Max. operating speed	20 cpm (at rated load)	
Initial insulation resistance*1	Min. 1,000 MΩ (at 500 V DC)	
Initial breakdown voltage*2	Between open contacts	1,000 Vrms
	Between contact sets	4,000 Vrms (2 Form A, 1 Form A 1 Form B)
	Between contact and coil	5,000 Vrms
Surge voltage between contact and coil*3	Min. 12,000 V (initial)	
Operate time [Set time]*4	Max. 10ms (typ. 5ms) [Max. 10ms (typ. 4ms)] (at 20°C 68°F)	
Release time (without diode) [Reset time]*4	Max. 5ms (typ. 2ms) [Max. 10ms (typ. 4ms)] (at 20°C 68°F)	
Temperature rise (at 70°C)*5	Max. 50°C	
Shock resistance	Functional*6	Min. 196 m/s <sup>2</sup> {20 G}
	Destructive*7	Min. 980 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional*8	10 to 55 Hz at double amplitude of 2 mm
	Destructive	10 to 55 Hz at double amplitude of 3 mm
Conditions for operation, transport and storage*9 (Not freezing and condensing at low temperature)	Ambient temp.	-40°C to 70°C -40°F to 158°F
	Humidity	5 to 85% R.H.
Unit weight	Approx. 7 g .25 oz	

\*6 Half-wave pulse of sine wave: 11ms, detection time: 10ms.

\*7 Half-wave pulse of sine wave: 6ms

\*8 Detection time: 10ms

\*9 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61).

### TYPICAL APPLICATIONS

- Temperature controller
- Automatic meter reading
- OA equipment
- FA equipment

### ORDERING INFORMATION

Ex. DE 1a - L - 3 V

Product name	Contact arrangement	Operating function	Coil voltage, V DC
DE	1a: 1 Form A 1a1b: 1 Form A 1 Form B 2a: 2 Form A	Nil: Single side stable L: 1 coil latching L2: 2 coil latching	1: 3 4: 24 9: 5 2: 6 6: 4.5 3: 12 7: 9

Note: Standard packing; Carton (tube package): 50 pcs. Case 500 pcs.  
UL/CSA, VDE approved type is standard.

## TYPES AND COIL DATA (at 20°C 68°F)

### • Single side stable type

#### 1 Form A

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.) (initial)	Drop-out voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )	Nominal operating current, mA ( $\pm 10\%$ )	Nominal operating power, mW	Max. allowable voltage, V DC
DE1a-3V	3	2.1	0.3	45	66.6	200	3.9
DE1a-4.5V	4.5	3.15	0.45	101	44.5	200	5.85
DE1a-5V	5	3.5	0.5	125	40	200	6.5
DE1a-6V	6	4.2	0.6	180	33.3	200	7.8
DE1a-9V	9	6.3	0.9	405	22.2	200	11.7
DE1a-12V	12	8.4	1.2	720	16.6	200	15.6
DE1a-24V	24	16.8	2.4	2,880	8.3	200	31.2

#### 1 Form A 1 Form B

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.) (initial)	Drop-out voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )	Nominal operating current, mA ( $\pm 10\%$ )	Nominal operating power, mW	Max. allowable voltage, V DC
DE1a1b-3V	3	2.1	0.3	45	66.6	200	3.9
DE1a1b-4.5V	4.5	3.15	0.45	101	44.5	200	5.85
DE1a1b-5V	5	3.5	0.5	125	40	200	6.5
DE1a1b-6V	6	4.2	0.6	180	33.3	200	7.8
DE1a1b-9V	9	6.3	0.9	405	22.2	200	11.7
DE1a1b-12V	12	8.4	1.2	720	16.6	200	15.6
DE1a1b-24V	24	16.8	2.4	2,880	8.3	200	31.2

#### 2 Form A

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.) (initial)	Drop-out voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )	Nominal operating current, mA ( $\pm 10\%$ )	Nominal operating power, mW	Max. allowable voltage, V DC
DE2a-3V	3	2.1	0.3	45	66.6	200	3.9
DE2a-4.5V	4.5	3.15	0.45	101	44.5	200	5.85
DE2a-5V	5	3.5	0.5	125	40	200	6.5
DE2a-6V	6	4.2	0.6	180	33.3	200	7.8
DE2a-9V	9	6.3	0.9	405	22.2	200	11.7
DE2a-12V	12	8.4	1.2	720	16.6	200	15.6
DE2a-24V	24	16.8	2.4	2,880	8.3	200	31.2

### • 1 coil latching type

#### 1 Form A

Part No.	Nominal voltage, V DC	Set voltage, V DC (max.) (initial)	Reset voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )	Nominal operating current, mA ( $\pm 10\%$ )	Nominal operating power, mW	Max. allowable voltage, V DC
DE1a-L-3V	3	2.1	2.1	90	33.3	100	3.9
DE1a-L-4.5V	4.5	3.15	3.15	202	22.3	100	5.85
DE1a-L-5V	5	3.5	3.5	250	20	100	6.5
DE1a-L-6V	6	4.2	4.2	360	16.7	100	7.8
DE1a-L-9V	9	6.3	6.3	812	11.1	100	11.7
DE1a-L-12V	12	8.4	8.4	1,440	8.3	100	15.6
DE1a-L-24V	24	16.8	16.8	5,760	4.2	100	31.2

#### 1 Form A 1 Form B

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.) (initial)	Drop-out voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )	Nominal operating current, mA ( $\pm 10\%$ )	Nominal operating power, mW	Max. allowable voltage, V DC
DE1a1b-L-3V	3	2.1	2.1	90	33.3	100	3.9
DE1a1b-L-4.5V	4.5	3.15	3.15	202	22.3	100	5.85
DE1a1b-L-5V	5	3.5	3.5	250	20	100	6.5
DE1a1b-L-6V	6	4.2	4.2	360	16.7	100	7.8
DE1a1b-L-9V	9	6.3	6.3	812	11.1	100	11.7
DE1a1b-L-12V	12	8.4	8.4	1,440	8.3	100	15.6
DE1a1b-L-24V	24	16.8	16.8	5,760	4.2	100	31.2

## 2 Form A

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.) (initial)	Drop-out voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )	Nominal operating current, mA ( $\pm 10\%$ )	Nominal operating power, mW	Max. allowable voltage, V DC
DE2a-L-3V	3	2.1	2.1	90	33.3	100	3.9
DE2a-L-4.5V	4.5	3.15	3.15	202	22.3	100	5.85
DE2a-L-5V	5	3.5	3.5	250	20	100	6.5
DE2a-L-6V	6	4.2	4.2	360	16.7	100	7.8
DE2a-L-9V	9	6.3	6.3	812	11.1	100	11.7
DE2a-L-12V	12	8.4	8.4	1,440	8.3	100	15.6
DE2a-L-24V	24	16.8	16.8	5,760	4.2	100	31.2

## • 2 coil latching type

## 1 Form A

Part No.	Nominal voltage, V DC	Set voltage, V DC (max.) (initial)	Reset voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )		Nominal operating current, mA ( $\pm 10\%$ )		Nominal operating power, mW		Max. allowable voltage, V DC
				Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
DE1a-L2-3V	3	2.1	2.1	45	45	66.6	66.6	200	200	3.9
DE1a-L2-4.5V	4.5	3.15	3.15	101	101	44.5	44.5	200	200	5.85
DE1a-L2-5V	5	3.5	3.5	125	125	40	40	200	200	6.5
DE1a-L2-6V	6	4.2	4.2	180	180	33.3	33.3	200	200	7.8
DE1a-L2-9V	9	6.3	6.3	405	405	22.2	22.2	200	200	11.7
DE1a-L2-12V	12	8.4	8.4	720	720	16.6	16.6	200	200	15.6
DE1a-L2-24V	24	16.8	16.8	2,880	2,880	8.3	8.3	200	200	31.2

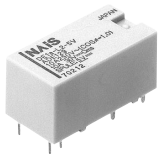
## 1 Form A 1 Form B

Part No.	Nominal voltage, V DC	Set voltage, V DC (max.) (initial)	Reset voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )		Nominal operating current, mA ( $\pm 10\%$ )		Nominal operating power, mW		Max. allowable voltage, V DC
				Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
DE1a1b-L2-3V	3	2.1	2.1	45	45	66.6	66.6	200	200	3.9
DE1a1b-L2-4.5V	4.5	3.15	3.15	101	101	44.5	44.5	200	200	5.85
DE1a1b-L2-5V	5	3.5	3.5	125	125	40	40	200	200	6.5
DE1a1b-L2-6V	6	4.2	4.2	180	180	33.3	33.3	200	200	7.8
DE1a1b-L2-9V	9	6.3	6.3	405	405	22.2	22.2	200	200	11.7
DE1a1b-L2-12V	12	8.4	8.4	720	720	16.6	16.6	200	200	15.6
DE1a1b-L2-24V	24	16.8	16.8	2,880	2,880	8.3	8.3	200	200	31.2

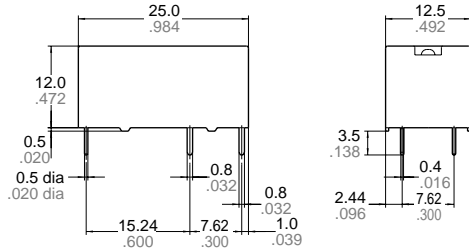
## 2 Form A

Part No.	Nominal voltage, V DC	Set voltage, V DC (max.) (initial)	Reset voltage, V DC (min.) (initial)	Coil resistance, $\Omega$ ( $\pm 10\%$ )		Nominal operating current, mA ( $\pm 10\%$ )		Nominal operating power, mW		Max. allowable voltage, V DC
				Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
DE2a-L2-3V	3	2.1	2.1	45	45	66.6	66.6	200	200	3.9
DE2a-L2-4.5V	4.5	3.15	3.15	101	101	44.5	44.5	200	200	5.85
DE2a-L2-5V	5	3.5	3.5	125	125	40	40	200	200	6.5
DE2a-L2-6V	6	4.2	4.2	180	180	33.3	33.3	200	200	7.8
DE2a-L2-9V	9	6.3	6.3	405	405	22.2	22.2	200	200	11.7
DE2a-L2-12V	12	8.4	8.4	720	720	16.6	16.6	200	200	15.6
DE2a-L2-24V	24	16.8	16.8	2,880	2,880	8.3	8.3	200	200	31.2

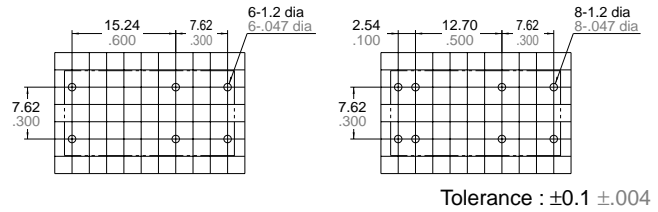
**DIMENSIONS**



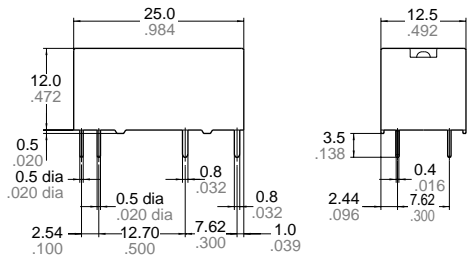
Single side stable  
1 coil latching type



PC board pattern (Bottom view)  
Single side stable 1 coil latching type      2 coil latching type

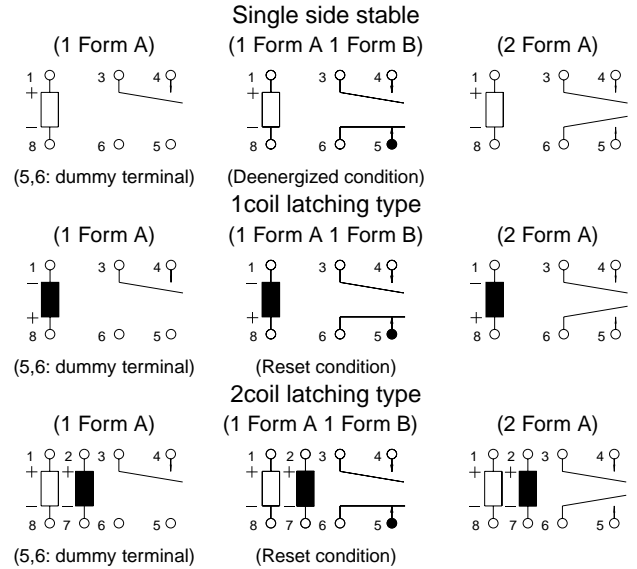


2 coil latching type



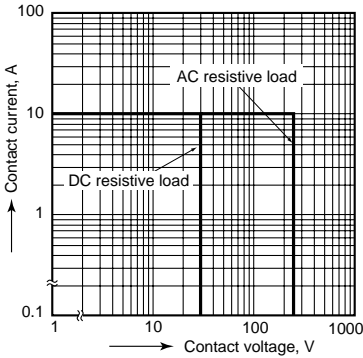
Tolerance:  $\pm 0.3 \pm .012$

Schematic (Bottom view)

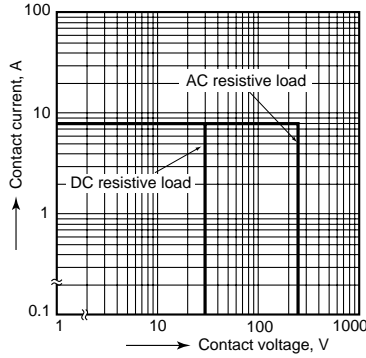


**REFERENCE DATA**

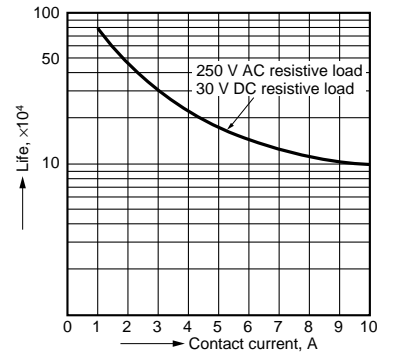
1.-(1) Maximum switching power (1 Form A)



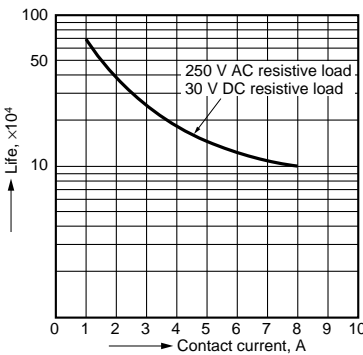
1.-(2) Maximum switching power (1 Form A 1 Form B, 2 Form A)



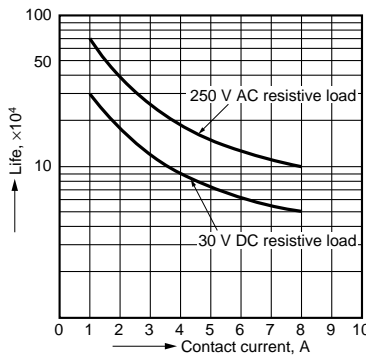
2.-(1) Life curve (1 Form A)



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

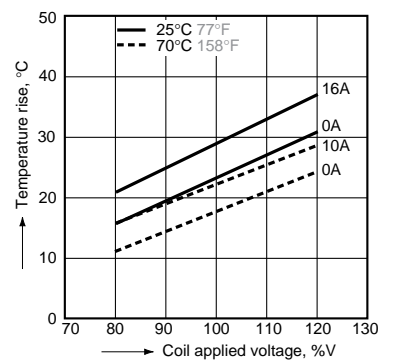


2.-(3) Life curve (2 Form A)

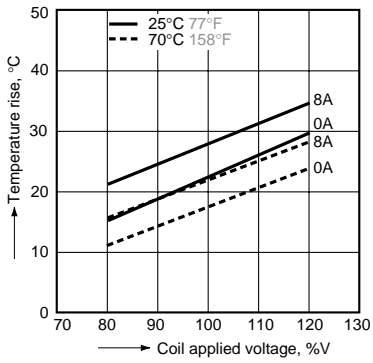


3.-(1) Coil temperature rise (1 Form A)

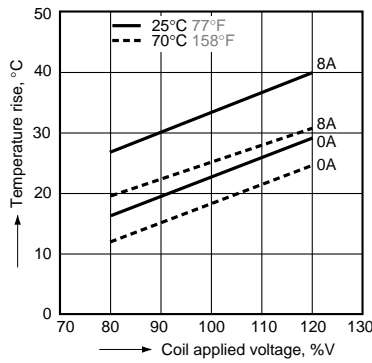
Tested sample: DE1A-12V  
 Quantity: n=6  
 Ambient temperature: 25°C to 70°C 77°F to 158°F



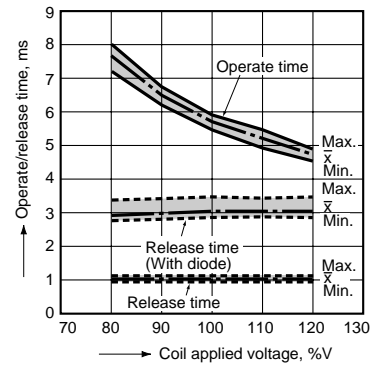
3.-(2) Coil temperature rise (1 Form A 1 Form B)  
 Tested sample: DE1a1b-5V  
 Quantity: n=6  
 Ambient temperature: 25°C to 70°C 77°F to 158°F



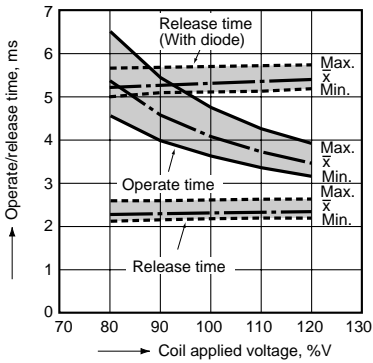
3.-(3) Coil temperature rise (2 Form A)  
 Tested sample: DE2a-5V  
 Quantity: n=6  
 Ambient temperature: 25°C to 70°C 77°F to 158°F



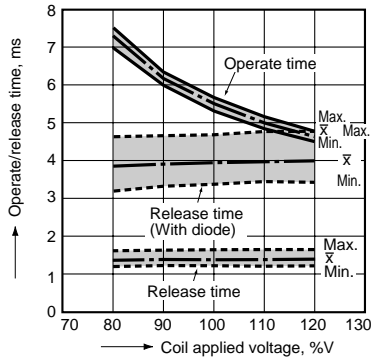
4.-(1) Operate/release time (1 Form A)  
 Tested sample: DE1a-5V  
 Quantity: n=5



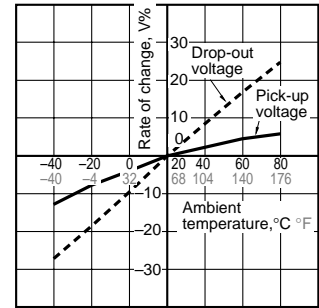
4.-(2) Operate/release time (1 Form A 1 Form B)  
 Tested sample: DE1a1b-5V, Quantity: n=5



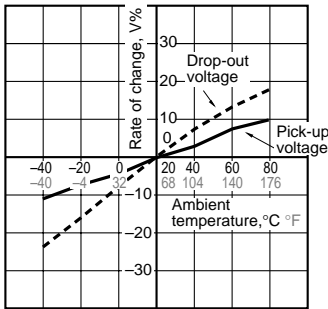
4.-(3) Operate/release time (2 Form A)  
 Tested sample: DE2a-5V, Quantity: n=5



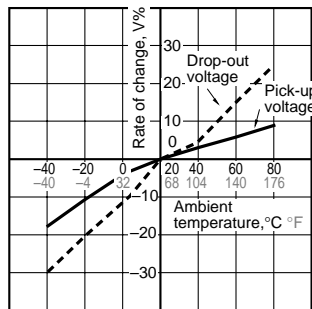
5.-(1) Ambient temperature characteristics (1 Form A)  
 Tested sample: DE1a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



5.-(2) Ambient temperature characteristics (1 Form A 1 Form B)  
 Tested sample: DE1a1b-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



5.-(3) Ambient temperature characteristics (2 Form A)  
 Tested sample: DE2a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



**For Cautions for Use, see Relay Technical Information (Page 48 to 76).**