MINIATURE RELAY

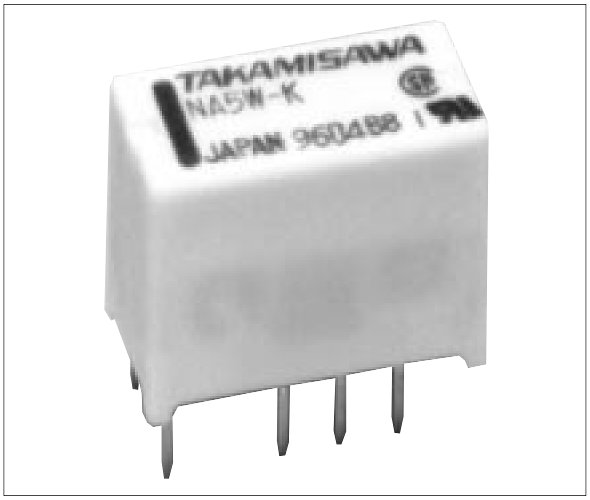
2 POLES—1 to 2 A (FOR SIGNAL SWITCHING)

NA SERIES

RoHS Compliant

■ FEATURES

- Slim type relay for high density mounting
- Conforms to Bellcore specification and FCC Part 68
  —Dielectric strength 1,500 VAC between coil and contacts
  —Surge strength 2,500 V between coil and contacts (at 2 × 10 s surge wave)
- Maximum switching capability - 4.2A, 700VAC
- UL, CSA recognized
- High sensitivity and low consumption power
- High reliability—bifurcated contacts
- DIL pitch terminals
- Plastic sealed type
- RoHS compliant since date code: 0437B8
  Please see page 7 for more information



■ ORDERING INFORMATION

[Example]	NA	L	–	D	12	W	–	K
	(a)	(b)	(*)	(c)	(d)	(e)		(f)

(a)	Series Name	NA : NA Series
(b)	Operation Function	Nil : Standard type L : Latching type
(c)	Number of Coil	Nil : Single winding type D : Double winding type
(d)	Nominal Voltage	Refer to the COIL DATA CHART
(e)	Contact	W : Bifurcated type
(f)	Enclosure	K : Plastic sealed type

Note: Actual marking omits the hyphen (-) of (*)

■ SAFETY STANDARD AND FILE NUMBERS

UL508, 1950, 478 (File No. E45026)
C22.2 No. 0, No. 14, No. 950 (File No. LR35579)
Only UL/CSA approval markings are marked on the cover.

Nominal voltage	Contact rating
1.5 to 48 VDC	0.5 A 125 VAC 2 A 30 VDC 0.3 A 110 VDC — resistive

■ SPECIFICATIONS

Item			Standard Type NA-( ) W-K	Single Winding Latching Type NAL-( ) W-K	Double Winding Latching Type NAL-D ( ) W-K
Contact	Arrangement		2 form C (DPDT)		
	Material		Gold overlay silver alloy		
	Style		Bifurcated		
	Resistance (initial)		Maximum 50 mΩ (at 1 A 6 VDC)		
	Rating (resistive)		0.5 A 125 VAC or 1 A 30 VDC		
	Maximum Carrying Current		2 A		
	Maximum Switching Power		62.5 AV, 30 W		
	Maximum Switching Voltage		250 VAC, 220 VDC		
	Maximum Switching Current		2 A		
	Minimum Switching Load*1		0.01 mA 10 mVDC		
	Capacitance		Approximately 0.5 pF (between open contacts, adjacent contacts) Approximately 1.0 pF (between coil and contacts)		
Coil	Nominal Power (at 20°C)		0.14 to 0.3 W	0.1 to 0.15 W	0.20 to 0.3 W
	Operate Power (at 20°C)		0.08 to 0.17 W	0.06 to 0.085 W	0.115 to 0.17 W
	Operating Temperature		–40°C to +85°C (no frost)(refer to the CHARACTERISTIC DATA)		
Time Value	Operate (at nominal voltage)		Maximum 6 ms	Maximum 6 ms (set)	
	Release (at nominal voltage)		Maximum 4 ms	Maximum 6 ms (reset)	
Insulation	Resistance (at 500 VDC)		Minimum 1,000 MΩ		
	Dielectric Strength	between open contacts	1,000 VAC 1 minute		
		between adjacent contacts	1,000 VAC 1 minute		
		between coil and contacts	1,500 VAC 1 minute		1,000 VAC 1 minute
	Surge Strength	between open contacts	1,500 V (at 10×700 µs)		
		between adjacent contacts	1,500 V (at 10×700 µs)		
		between coil and contacts	2,500 V (at 2×10 µs)		1,500 V (at 10×160 µs)
Life	Mechanical		1×10^8 operations minimum	1×10^7 operations minimum	
	Electrical		2×10^5 ops. min. (0.5 A 125 VAC), 5×10^5 ops. min. (1 A 30 VDC)		
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 3.3 mm)		
		Endurance	10 to 55 Hz (double amplitude of 5.0 mm)		
	Shock Resistance	Misoperation	500 m/s^2 (11 ±1 ms)		
		Endurance	1,000 m/s^2 (6 ±1 ms)		
	Weight		Approximately 1.5 g		

*1 Minimum switching loads mentioned above are reference values. Please perform the confirmation test with the actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

■ COIL DATA CHART

	MODEL	Nominal voltage	Coil resistance (±10%)	Must operate voltage*1	Must release voltage*1	Nominal power
Standard Type	NA-1.5 W-K	1.5 VDC	16.1 Ω	+1.13 VDC	+0.15 VDC	140 mW
	NA- 3 W-K	3 VDC	64.3 Ω	+2.25 VDC	+0.3 VDC	140 mW
	NA-4.5 W-K	4.5 VDC	145 Ω	+3.38 VDC	+0.45 VDC	140 mW
	NA- 5 W-K	5 VDC	178 Ω	+3.75 VDC	+0.5 VDC	140 mW
	NA- 6 W-K	6 VDC	257 Ω	+4.5 VDC	+0.6 VDC	140 mW
	NA- 9 W-K	9 VDC	579 Ω	+6.75 VDC	+0.9 VDC	140 mW
	NA-12 W-K	12 VDC	1,028 Ω	+9.0 VDC	+1.2 VDC	140 mW
	NA-18 W-K	18 VDC	1,620 Ω	+13.5 VDC	+1.8 VDC	200 mW
	NA-24 W-K	24 VDC	2,880 Ω	+18.0 VDC	+2.4 VDC	200 mW
	NA-48 W-K	48 VDC	7,680 Ω	+36.0 VDC	+4.8 VDC	300 mW

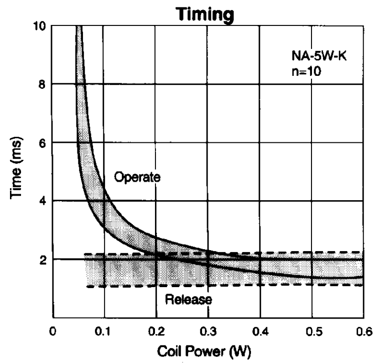
Note: *1 Specified values are subject to pulse wave voltage.
All values in the table are measured at 20°C.

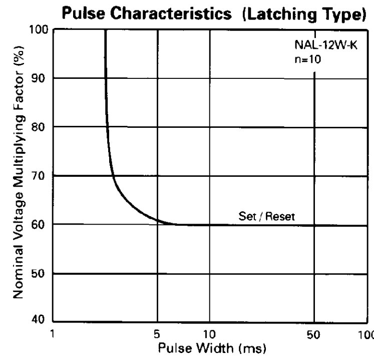
	MODEL	Nominal voltage	Coil resistance (±10%)	Set voltage	Reset voltage	Nominal power
Single Winding Latching Type	NAL-1.5W-K	1.5 VDC	22.5 Ω	+1.13 VDC	–1.13 VDC	100 mW
	NAL- 3 W-K	3 VDC	90 Ω	+2.25 VDC	–2.25 VDC	100 mW
	NAL-4.5W-K	4.5 VDC	203 Ω	+3.38 VDC	–3.38 VDC	100 mW
	NAL- 5 W-K	5 VDC	250 Ω	+3.75 VDC	–3.75 VDC	100 mW
	NAL- 6 W-K	6 VDC	360 Ω	+4.5 VDC	–4.5 VDC	100 mW
	NAL- 9 W-K	9 VDC	810 Ω	+6.75 VDC	–6.75 VDC	100 mW
	NAL-12 W-K	12 VDC	1,440 Ω	+9.0 VDC	–9.0 VDC	100 mW
	NAL-18 W-K	18 VDC	2,160 Ω	+13.5 VDC	–13.5 VDC	150 mW
	NAL-24 W-K	24 VDC	3,840 Ω	+18.0 VDC	–18.0 VDC	150 mW
Double Winding Latching Type	NAL-D1.5W-K	1.5 VDC	P 11.25 Ω	+1.13 VDC		200 mW
			S 11.25 Ω		+1.13 VDC	
	NAL-D 3 W-K	3 VDC	P 45 Ω	+2.25 VDC		200 mW
			S 45 Ω		+2.25 VDC	
	NAL-D4.5W-K	4.5 VDC	P 101 Ω	+3.38 VDC		200 mW
			S 101 Ω		+3.38 VDC	
	NAL-D 5 W-K	5 VDC	P 125 Ω	+3.75 VDC		200 mW
			S 125 Ω		+3.75 VDC	
	NAL-D 6 W-K	6 VDC	P 180 Ω	+4.5 VDC		200 mW
			S 180 Ω		+4.5 VDC	
	NAL-D 9 W-K	9 VDC	P 405 Ω	+6.75 VDC		200 mW
			S 405 Ω		+6.75 VDC	
	NAL-D12 W-K	12 VDC	P 720 Ω	+9.0 VDC		200 mW
			S 720 Ω		+9.0 VDC	
	NAL-D18 W-K	18 VDC	P 1,080 Ω	+13.5 VDC		300 mW
			S 1,080 Ω		+13.5 VDC	
	NAL-D24 W-K	24 VDC	P 1,920 Ω	+18.0 VDC		300 mW
			S 1,920 Ω		+18.0 VDC	

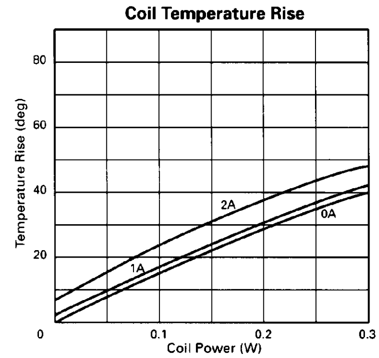
Note: *1 Specified values are subject to pulse wave voltage.
All values in the table are measured at 20°C.

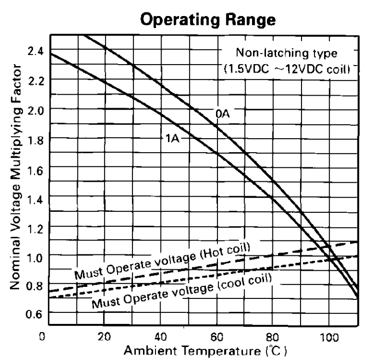
P: Primary coil S: Secondary coil

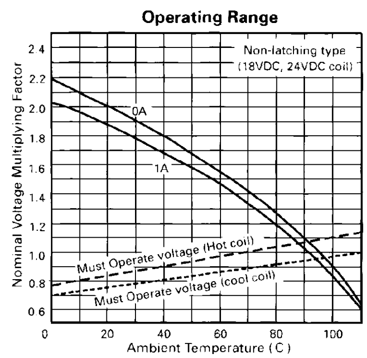
■ CHARACTERISTIC DATA

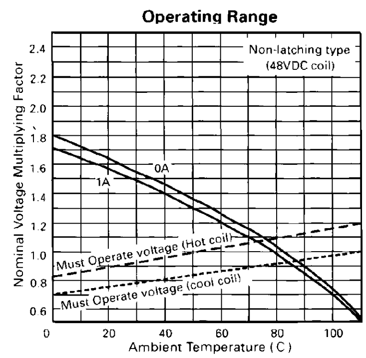


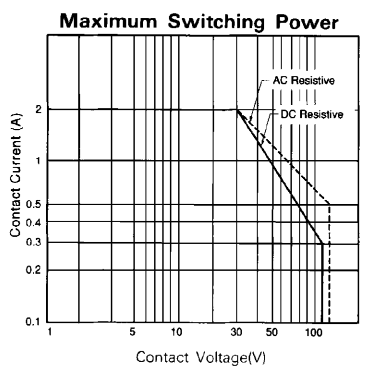


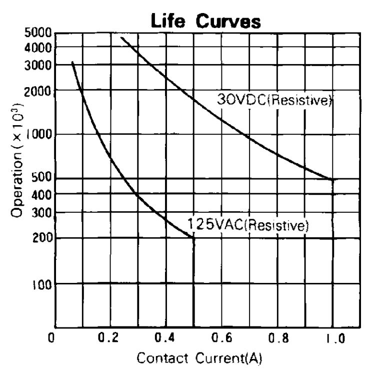


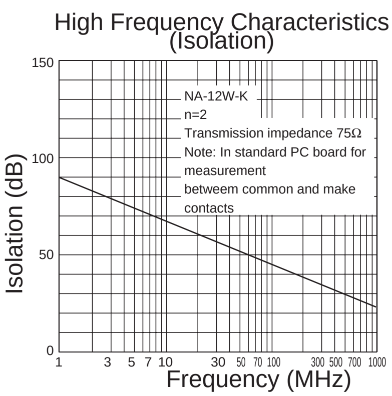


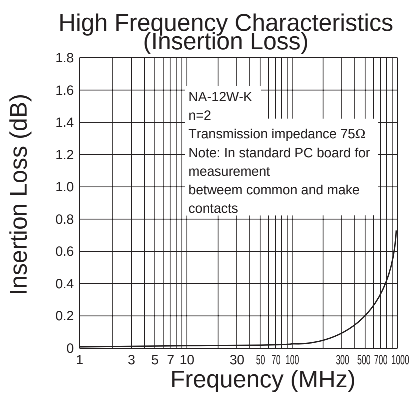






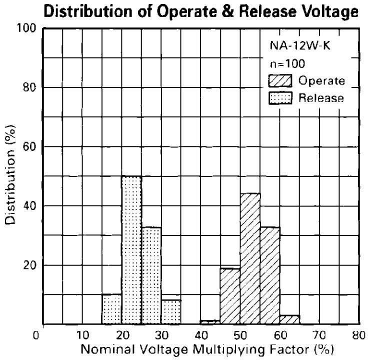




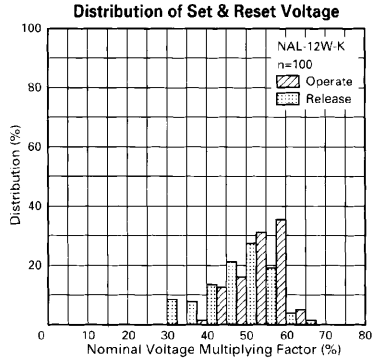


■ REFERENCE DATA

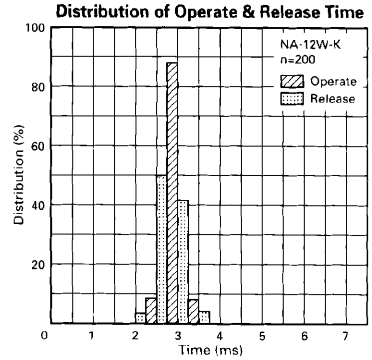
Distribution of Operate & Release Voltage



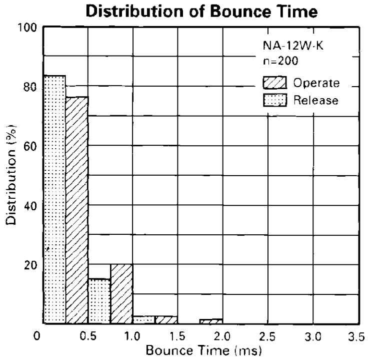
Distribution of Set & Reset Voltage



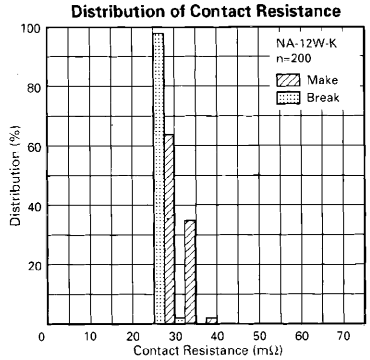
Distribution of Operate & Release Time



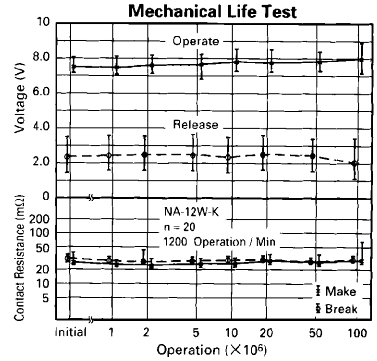
Distribution of Bounce Time



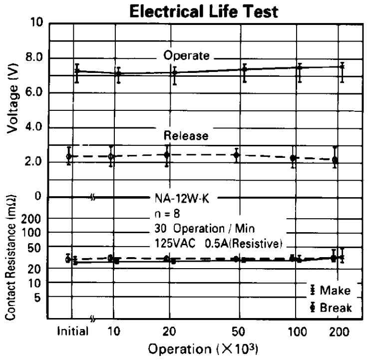
Distribution of Contact Resistance



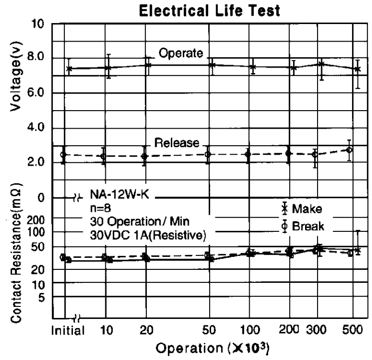
Mechanical Life Test



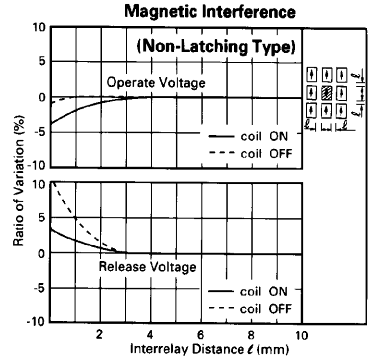
Electrical Life Test



Electrical Life Test



Magnetic Interference



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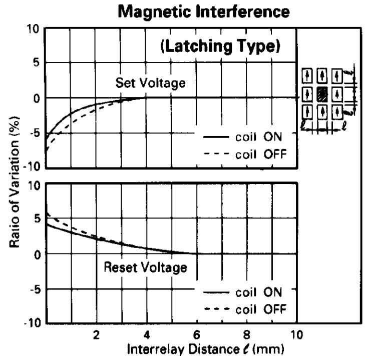


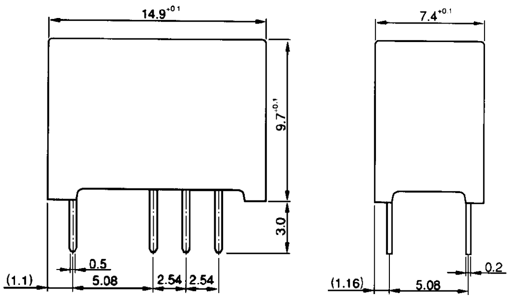
■ DIMENSIONS

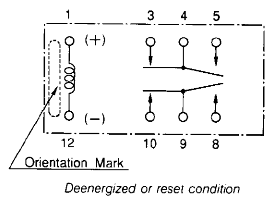
●**Dimensions**

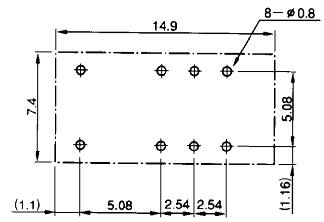
●**Schematics**
(Bottom View)

●**PC board mounting hole layout**
(Bottom View)

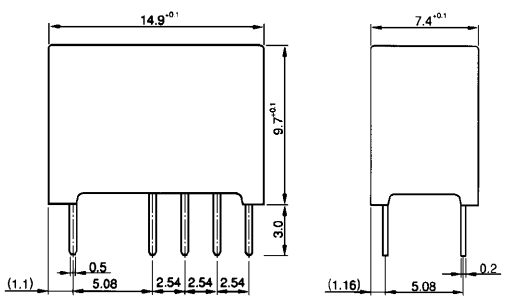
NA, NAL type (Non-latching type, single winding latching type)

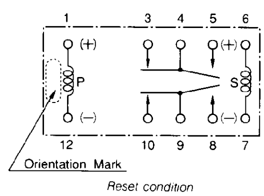


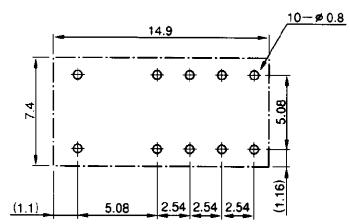




NAL-D type (double winding latching type)







Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

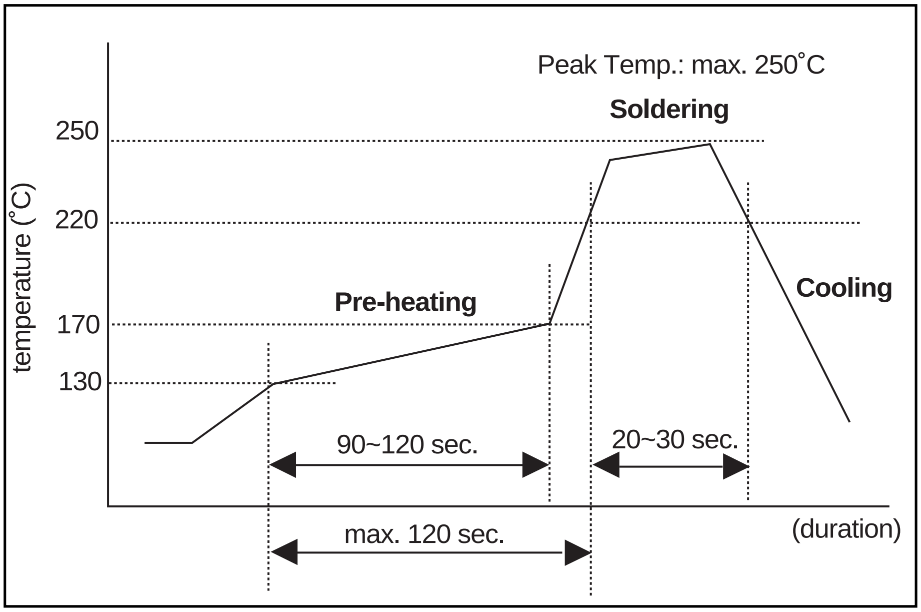
- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (http://www.fcai.fujitsu.com/pdf/LeadFreeLetter.pdf)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu. From February 2005 forward Sn-3.0Cu-Ni will be used for FTRB3 and FTR-B4 series relays.
- Most signal and some power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 6 hazardous materials that are restricted by RoHS directive (lead, mercury, cadmium, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- “LF” is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.

We will ship leaded relays as long as the leaded relay inventory exists.

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu and Sn-3.0 Cu-Ni (only FTR-B3 and FTR-B4 from February 2005)

Reflow Solder condtion



Flow Solder condtion:

Pre-heating:	maximum 120˚C
Soldering:	dip within 5 sec. at 260˚C soler bath

Solder by Soldering Iron:

Soldering Iron

Temperature:	maximum 360˚C
Duration:	maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical realys.

4. Tin Whisker

- SnAgCu solder is known as low riskof tin whisker. No considerable length whisker was found by our in-house test.

5. Solid State Relays

- Each lead terminal will be changed from solder plating to Sn plating and Nickel plating. A layer of Nickel plating is between the terminal and the Sn plating to avoid whisker.

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