

# POWER RELAY

## 1 POLE—15A

### VS-NR SERIES

RoHS compliant

#### ■ FEATURES

- UL, CSA, VDE, SEV, SEMKO, CQC recognized
- TV-8 is available
- Working class: C
- UL class B (130°C) insulation
- Type of service: continuous duty
- Heavy duty miniature slim type power relay
- High isolation in small package
  - Insulation distance: 8 mm
  - Dielectric strength: 5,000 VAC (between coil and contacts)
  - Surge strength: 10,000 V
- Standard and high sensitivity types available
- Flux free type and plastic sealed type available
- Lead Free since date code: 0437L2  
Please see page 11 for more information
- Cadmium free is available



#### ■ ORDERING INFORMATION

[Example] VS - 12 S M B U - NR - UC  
(a) (\*) (b) (c) (d) (e) (f) (g) (h)

(a)	Series Name	VS: VS-NR Series
(b)	Nominal Voltage	Refer to the COIL DATA CHART
(c)	Coil Type	Nil : Standard type (700-750 mW) S : High sensitivity type (530 mW)
(d)	Contact Arrangement	M : 1 form A (SPST-NO)
(e)	Enclosure	B : Flux free type C : Plastic sealed type (with tape) K : Plastic sealed type
(f)	Standard	Nil : TV rating type U : Non TV rating type (standard type)
(g)	Contact Material	NR: Silver alloy
(h)	Safety Standard	UC : UL, CSA SM2 : UL, CSA, VDE, SEMKO IM2 : UL, CSA, VDE, SEV, SEMKO

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

# VS-NR SERIES

## ■ PART NUMBERS

Standard 700 to 750 mW TV-8 rating

Ordering Part Number	Series	Coil	Coil Power	Contact		TV rating	Contact Material	Safety Standard
VS-3M(B, C, K)-NR	VS-NR	3	720	M: 1 form A	B: Flux free C: Plastic sealed with tape K: Plastic sealed	TV-8	NR: Silver alloy	UC: UL, CSA SM2: UL, CSA, VDE, SEMKO
VS-5M(B, C, K)-NR		5	700					
VS-6M(B, C, K)-NR		6	720					
VS-9M(B, C, K)-NR		9	700					
VS-12M(B, C, K)-NR		12	720					
VS-14M(B, C, K)-NR		14	700					
VS-18M(B, C, K)-NR		18	700					
VS-24M(B, C, K)-NR		24	700					
VS-36M(B, C, K)-NR		36	700					
VS-48M(B, C, K)-NR		48	700					
VS-60M(B, C, K)-NR		60	700					
VS-100M(B, C, K)-NR	100	750						

Standard 700 to 750 mW Non-TV-8 rating

Ordering Part Number	Series	Coil	Coil Power	Contact		TV rating	Contact Material	Safety Standard
VS-3M(B,C,K)U-NR	VS-NR	3	720	M: 1 form A	B: Flux free C: Plastic sealed with tape K: Plastic sealed	No TV-8	NR: Silver alloy	UC: UL, CSA VD3: UL/CSA/VDE
VS-5M(B,C,K)U-NR		5	700					
VS-6M(B,C,K)U-NR		6	720					
VS-9M(B,C,K)U-NR		9	700					
VS-12M(B,C,K)U-NR		12	720					
VS-14M(B,C,K)U-NR		14	700					
VS-18M(B,C,K)U-NR		18	700					
VS-24M(B,C,K)U-NR		24	700					
VS-36M(B,C,K)U-NR		36	700					
VS-48M(B,C,K)U-NR		48	700					
VS-60M(B,C,K)U-NR		60	700					
VS-100M(B,C,K)U-NR	100	750						

# VS-NR SERIES

## ■ PART NUMBERS

High Sensitive type 530 mW Non-TV-8 rating

Ordering Part Number	Series	Coil	Coil Power	Contact		TV rating	Contact Material	Safety Standard
VS-3SM(B, C, K)U-NR	VS-NR	3	530	M: 1 form A	B: Flux free C: Plastic sealed with tape K: Plastic sealed	Non-TV-8	NR: Silver alloy	UC: UL, CSA VD3: UL/CSA/VDE
VS-5SM(B, C, K)U-NR		5						
VS-6SM(B, C, K)U-NR		6						
VS-9SM(B, C, K)U-NR		9						
VS-12SM(B, C, K)U-NR		12						
VS-14SM(B, C, K)U-NR		14						
VS-18SM(B, C, K)U-NR		18						
VS-24SM(B, C, K)U-NR		24						
VS-36SM(B, C, K)U-NR		36						
VS-48SM(B, C, K)U-NR		48						
VS-60SM(B, C, K)U-NR		60						
VS-100SM(B, C, K)U-NR		100						

# VS-NR SERIES

## ■ COIL DATA CHART

Standard

Coil Voltage	Nominal Voltage	Max. Coil Voltage* <sup>1</sup>	Coil Resistance (±10%)	Must Operate Voltage* <sup>2</sup>	Must Release Voltage* <sup>2</sup>	Coil Power
3	3 VDC	4.95 VDC	12.5 Ω	2.1 VDC	0.3 VDC	720 mW
5	5 VDC	8.25 VDC	36 Ω	3.5 VDC	0.5 VDC	700 mW
6	6 VDC	9.90 VDC	50 Ω	4.2 VDC	0.6 VDC	720 mW
9	9 VDC	14.85 VDC	115 Ω	6.3 VDC	0.9 VDC	700 mW
12	12 VDC	19.8 VDC	200 Ω	8.4 VDC	1.2 VDC	720 mW
14	14 VDC	23.1 VDC	280 Ω	9.8 VDC	1.4 VDC	700 mW
18	18 VDC	29.7 VDC	460 Ω	12.6 VDC	1.8 VDC	700 mW
24	24 VDC	39.6 VDC	820 Ω	16.8 VDC	2.4 VDC	700 mW
36	36 VDC	59.4 VDC	1,850 Ω	25.2 VDC	3.6 VDC	700 mW
48	48 VDC	79.2 VDC	3,300 Ω	33.6 VDC	4.8 VDC	700 mW
60	60 VDC	99.0 VDC	5,100 Ω	42.0 VDC	6.0 VDC	700 mW
100	100 VDC	165 VDC	13,400 Ω	70.0 VDC	10.0 VDC	750 mW

High Sensitive

Coil Voltage	Nominal Voltage	Max. Coil Voltage* <sup>1</sup>	Coil Resistance (±10%)	Must Operate Voltage* <sup>2</sup>	Must Release Voltage* <sup>2</sup>	Coil Power
3	3 VDC	4.95 VDC	17 Ω	2.1 VDC	0.3 VDC	530 mW
5	5 VDC	8.25 VDC	47 Ω	3.5 VDC	0.5 VDC	530 mW
6	6 VDC	9.90 VDC	68 Ω	4.2 VDC	0.6 VDC	530 mW
9	9 VDC	14.85 VDC	115 Ω	6.3 VDC	0.9 VDC	530 mW
12	12 VDC	19.8 VDC	270 Ω	8.4 VDC	1.2 VDC	530 mW
14	14 VDC	23.1 VDC	370 Ω	9.8 VDC	1.4 VDC	530 mW
18	18 VDC	29.7 VDC	610 Ω	12.6 VDC	1.8 VDC	530 mW
24	24 VDC	39.6 VDC	1,000 Ω	16.8 VDC	2.4 VDC	530 mW
36	36 VDC	59.4 VDC	2,450 Ω	25.2 VDC	3.6 VDC	530 mW
48	48 VDC	79.2 VDC	4,400 Ω	33.6 VDC	4.8 VDC	530 mW
60	60 VDC	99.0 VDC	6,800 Ω	42.0 VDC	6.0 VDC	530 mW
100	100 VDC	165 VDC	18,860 Ω	70.0 VDC	10.0 VDC	530 mW

Note: All values in the table are measured at 20°C.

\*1: No contact current at 20°C

\*2: Specified values are subject to pulse wave voltage

# VS-NR SERIES

## ■ SPECIFICATIONS

Item		TV-8 Rating Type	Standard	
		VS-( )M-NR	VS-( )MU-NR	
Contact	Arrangement	1 form A (SPST-NO)		
	Material	Silver alloy		
	Style	Single		
	Resistance (initial) (at 1A 6VDC)	Max. 100mΩ		
	Rating (resistive)	15A 240VAC / 24VDC		
	Max. Carrying Current*1	15A		
	Max. Switching Power	1800VA / 360W		
	Max. Switching Voltage	250 VAC / 150VDC		
	Min. Switching Load*2	100mA 5VDC		
	Max. Inrush Current (at lamp load)	117A 120VAC	-	
Coil	Nominal Power (at 20°C)	Standard type: 700 to 750mW. High sensitive type: 530mW		
	Operate Power (at 20°C)	Standard type: 350 to 370mW. High sensitive type: 260mW		
	Operating Temperature	Standard type: -40°C to +65°C. High sensitive type: -40°C to +75°C (no frost)		
Time Value	Operate (at nominal value)	Maximum 15ms		
	Release (at nominal value)	Maximum 10ms		
Life	Mechanical		2x10 <sup>7</sup> operations minimum	
	Electrical	Contact rating	1x10 <sup>5</sup> operations minimum (resistive)	
		Motor	5x10 <sup>4</sup> operations minimum (at 1/4 HP 120VAC UL HP rating)	3x10 <sup>4</sup> operations minimum (at 1/4 HP 120VAC UL HP rating)
	Lamp	2.5x10 <sup>4</sup> operations minimum		
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 1.5mm)	
		Endurance	10 to 55 Hz (double amplitude of 1.5mm)	
	Shock Resistance	Misoperation	100m/s <sup>2</sup> (11±1m/s)	
		Endurance	1,000m/s <sup>2</sup> (6±1m/s)	
	Weight	Approximately 17g		

\*1 When max. carrying current is more than 10A, PCB layout needs to be considered.

\*2 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.

# VS-NR SERIES

## ■ SAFETY STANDARDS

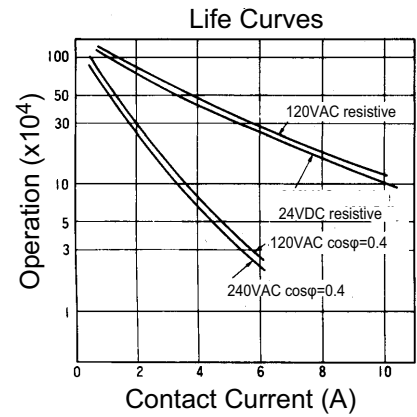
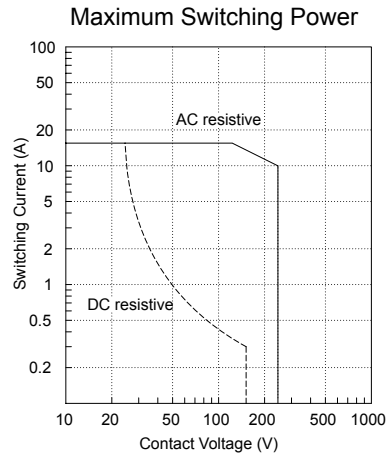
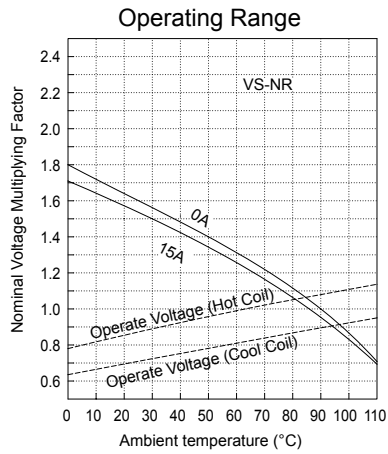
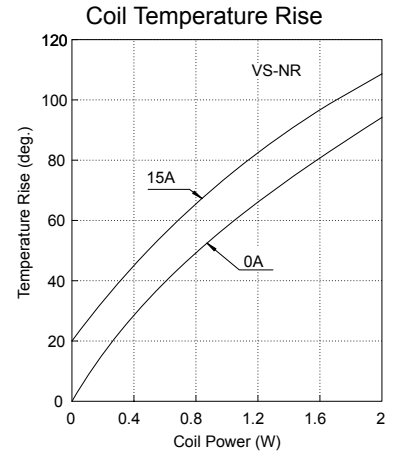
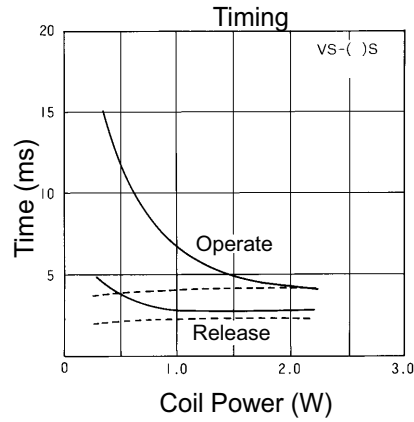
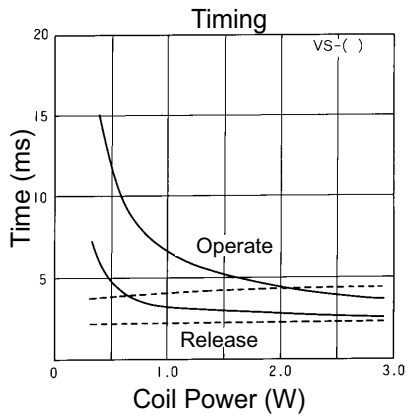
Type	Compliance	Contact rating
UL	UL 508 E56140	Flammability: UL 94-V0 (plastics) Isolation: classB 10A, 240VAC(resistive)
CSA	C22.2 No. 14 LR 35579	1/2 hp, 240VAC/120VAC 1/3 hp, 120VAC / 240VAC Pilot duty: B150 [TV-8] 15A, 120VAC/24VDC (resistive) 1/3 hp, 240VAC/120VAC
VDE	DIN EN 61810-1	15A 250VAC (cos $\phi$ =1) 4.3A 250VAC (cos=0.4) 15A 24VDC (0ms) 15A/120VAC, 250VAC

Complies with SEV, SEMKO, NEMKO, DEMKO, FIMKO, CQC, VDE,

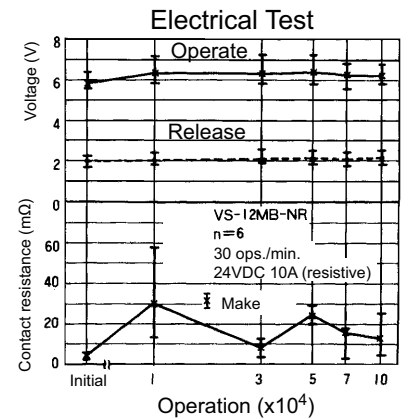
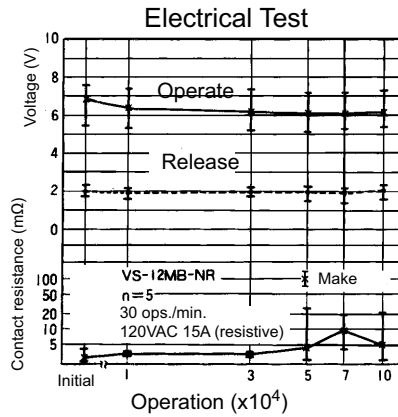
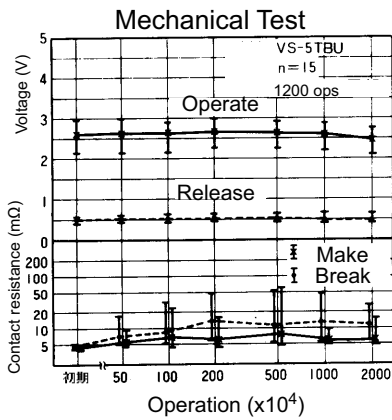
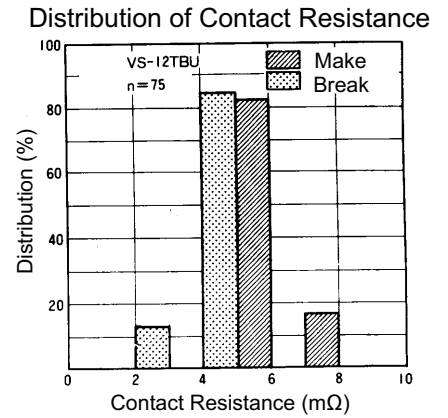
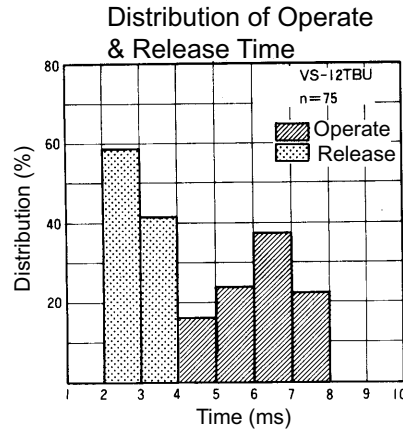
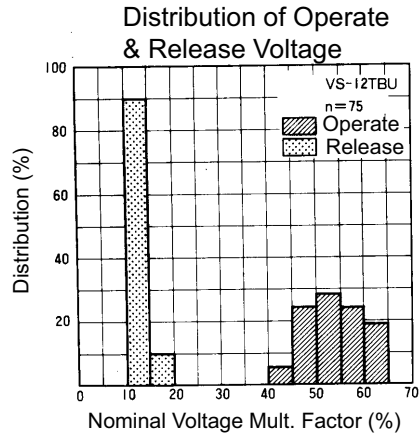
## ■ INSULATION

Item	VS	Note
Resistance (initial)	Minimum 1,000 M $\Omega$ 1 min.	at 500 VDC
Dielectric Strength	open contacts	1,000 VAC (50/60 Hz) 1 min. 10mA detection current
	coil and contacts	5,000 VAC (50/60 Hz) 1 min. 10mA detection current
Surge Voltage (coil and contact)	10,000 V	1.2 x 50 $\mu$ s standard wave
Clearance/Creepage	8 mm / 8 mm	
Insulation (DIN EN61810-1 VDE0435)		
Voltage	250 V	
Pollution	2	
Isolation material group	III	

## CHARACTERISTIC DATA



## ■ REFERENCE DATA



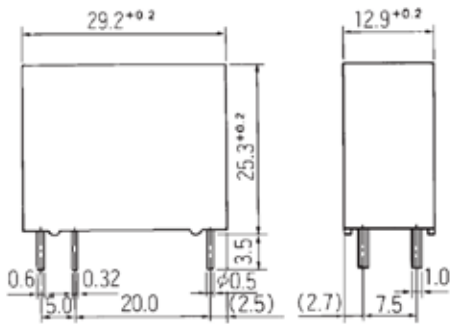


# VS-NR SERIES

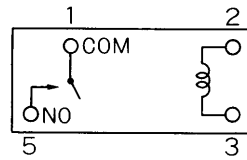
## ■ DIMENSIONS

### ● Dimensions

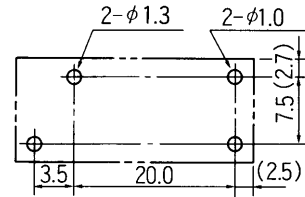
VS-M-NR type



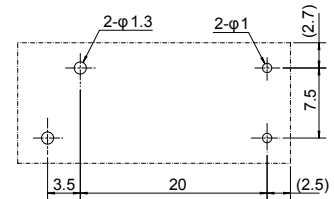
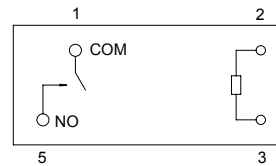
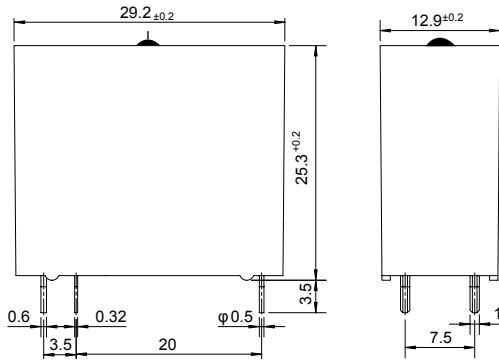
### ● Schematics (BOTTOM VIEW)



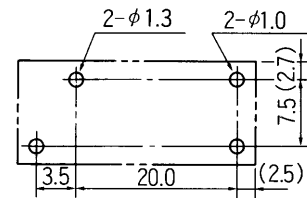
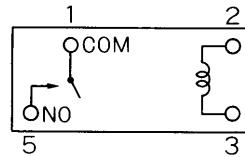
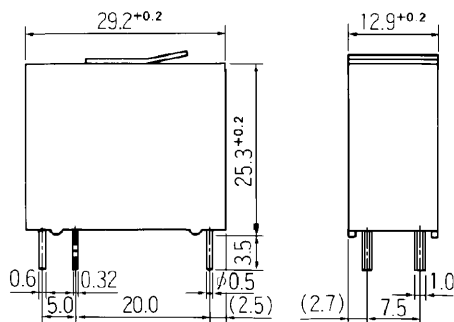
### ● PC board mounting hole layout (BOTTOM VIEW)



VS-MK-NR type (Plastic sealed)



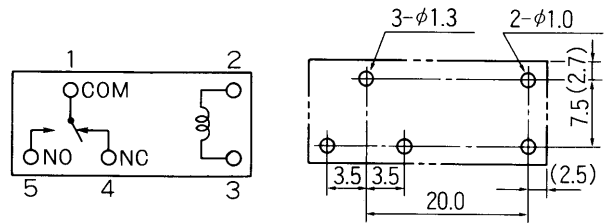
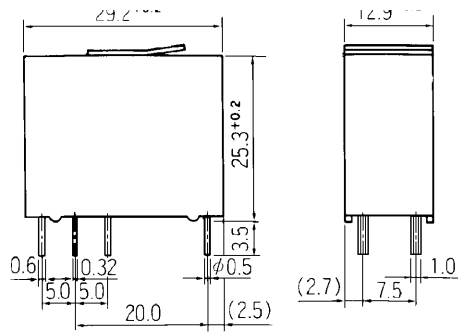
VS-MC-NR type (Plastic sealed with tape)



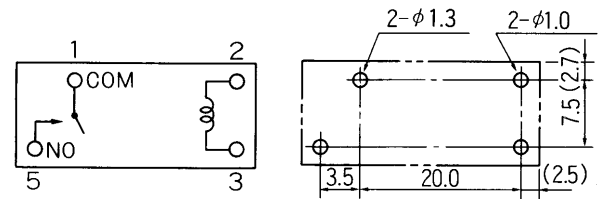
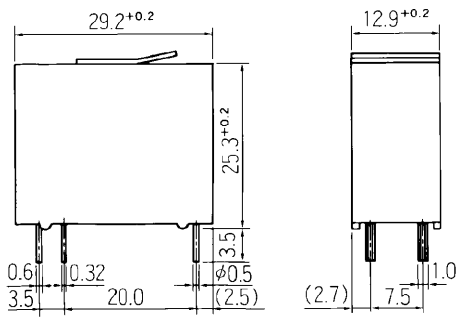
Unit: mm

# VS-NR SERIES

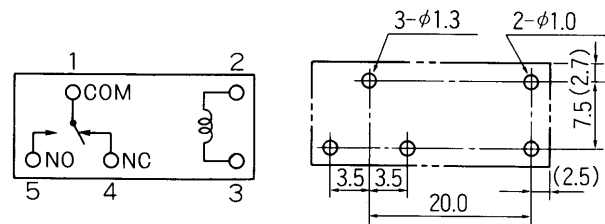
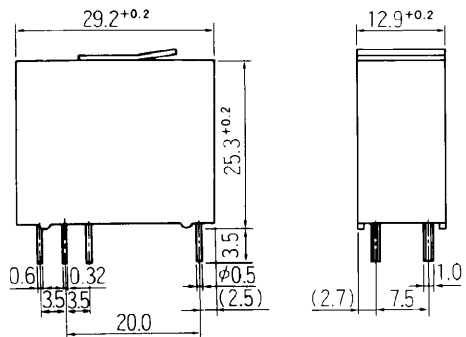
VS-K type (Plastic sealed type)



VS-MC type (Plastic sealed type with tape)



VS-C type (Plastic sealed type with tape)



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. All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
  - Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
  - All signal and power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, 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.
- Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

### 2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

#### Reflow Solder condition

**Flow Solder condition:**

Pre-heating: maximum 120°C  
Soldering: dip within 5 sec. at  
260°C solder 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 relays.

### 4. Tin Whisker

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

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