

POWER RELAY

1 POLE—10, 15 A (HEAVY POWER CONTROL)

VS SERIES

Lead Free / RoHS compliant*

■ FEATURES

- UL, CSA, VDE, SEV, SEMKO, FIMKO, IMQ recognized TV-5, TV-8 rated
 - 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 8 for more information

* some part numbers still contain cadmium and are not RoHS compliant



■ ORDERING INFORMATION

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

(a)	Series Name	VS: VS 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	T : 1 form C (SPDT) (non VS-NR type) 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 (15A) N : Silver alloy (10A) Nil : Silver-cadmium oxide (TV-5 rating type) 5 : Silver-cadmium oxide (non TV rating) Nil : Gold overlay silver-nickel (non TV rating) E : Silver-nickel (non TV rating)

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

VS SERIES

■ SAFETY STANDARD AND FILE NUMBERS

UL508, (File No. E56140, E108658)

C22.2 No. 1, No. 14 (File No. LR35579)

VDE0435, 0630, 0631, 0700, 0860 (File No. 11039-4940-1008)

Please note that UL/CSA ratings may differ from the standard ratings.

Please request when the approval markings are required on the cover and/or relay recognized by VDE, SEV, SEMKO, FIMKO, IMQ is required.


	Type	Nominal voltage	Contact rating
TV-Rating	VS-()M-NR	3 to 100 VDC	TV-8 120 VAC 1/3 HP 120 VAC/240 VAC 15 A 24 VDC/120 VAC resistive 10 A 240 VAC resistive Pilot duty B 150
	VS-()M VS-()SM	3 to 100 VDC	TV-5 120 VAC 1/3 HP 120 VAC/240 VAC 10 A 24 VDC/240 VAC resistive Pilot duty C 150
General	VS-()MU-NR VS-()SMU-NR VS-()U-N VS-()SU-N	3 to 100 VDC	1/3 HP 120 VAC/240 VAC 15 A 24 VDC/120 VAC resistive 10 A 240 VAC resistive 4.3A 250 VAC inductive (PF=0.4) Pilot duty B 150
	VS-()()U-() VS-()S()U-()	3 to 100 VDC	1/3 HP 120 VAC/240 VAC 10 A 24 VDC/240 VAC resistive 2.9A 250 VAC inductive (PF=0.4) Pilot duty C 150

VS SERIES

■ SPECIFICATIONS

Item		TV-5 Rating Type			Standard			
		VS-()M-NR	VS-()M	VS-()M-N	VS-()MU-NR	VS-()U-5	VS-()U-N	VS-()U VS-()U-E*
Contact	Arrangement	1 form A (SPST-NO)			1 form A (SPST-NO) or			
	Material	Silver alloy	Silver cadmium--oxide	Silver alloy	Silver alloy	Silver cadmium--oxide	Silver alloy	Gold overlay silver nickel (non-gold overlay: only VS-()U-E)
	Style	Single						
	Resistance (initial) (at 1A 6VDC)	Max. 100m						
	Rating (resistive)	15A 120VAC/24VDC	10A 120VAC/24VDC		15A 240VAC 24VDC	10A 240VAC / 24VDC		
	Max. Carrying Current							
	Max. Switching Power	3600VA / 360W	2400VA / 240W		3600VA / 360W	2400VA / 240W		
	Max. Switching Voltage	250 VAC 150VDC						
	Max. Switching Current	15A	10A		15A	10A		
	Min. Switching Load*1	100mA 5VDC (VS-NR, M, 5, E), 10mA 5VDC (VS-)						
Coil	Nominal Power (at 20° C)	Standard type: 0.7 to 0.75 W. High sensitivity type: 0.53 W						
	Operate Power (at 20° C)	Standard type: 0.35 to 0.37 W. High sensitivity type: 0.26 W						
	Operating Temperature	Standard type: - 40° C to +65° C. High sensitivity type: - 40° C to +75° C (no frost)						
Time Value	Operate (at nominal voltage)	Maximum 20 ms						
	Release (at nominal voltage)	Maximum 10 ms						
Insulation	Resistance (at 500 VDC)	Minimum 1,000 M						
	Dielectric Strength	between open contacts	1,000VAC 1 minute					
		between coil and contacts*2	5,000VAC 1 minute					
Surge Strength*3	10,000V (at1.2 x 50µs)							
Life	Mechanical	2x10 ⁷ operations minimum						
	Electrical	1x10 ⁵ operations minimum (at contact rating, resistive)						
			4x10 ⁴ operations min. (at 1/4 HP 120VAC, motor)			3x10 ⁴ operations min. (at 1/4 HP 120VAC, motor)		
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 ² (11±1m/s)					
		Endurance	1,000m/s ² (6±1m/s)					
Weight	Approximately 17g							

*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.

*2 IMQ 

*3 IMQ 

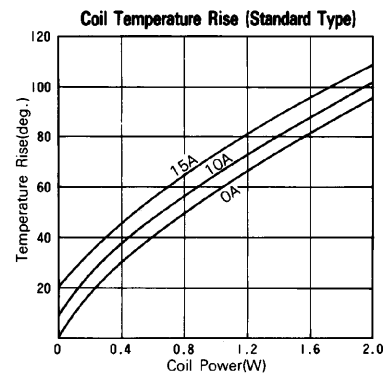
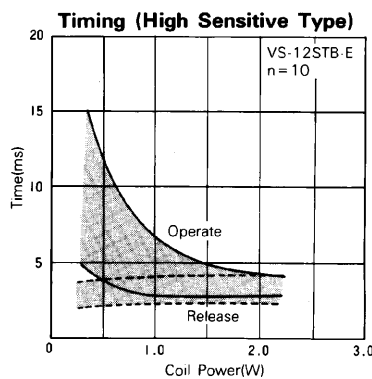
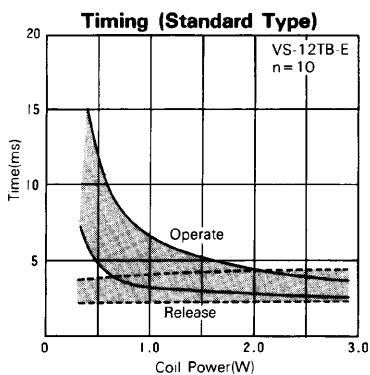
VS SERIES

COIL DATA CHART

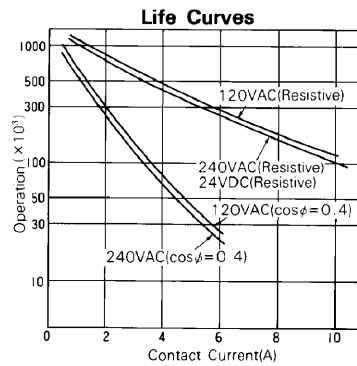
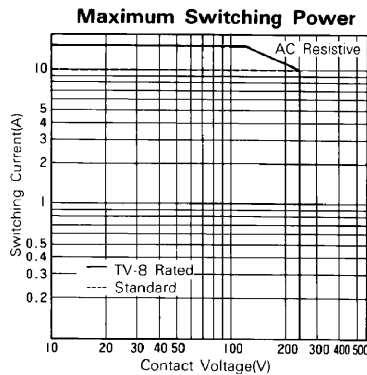
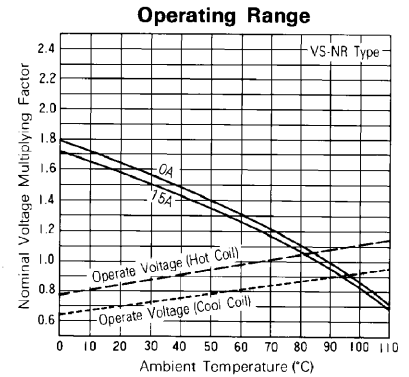
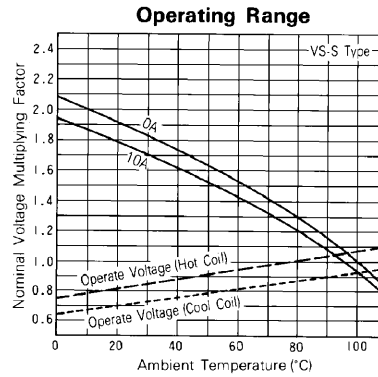
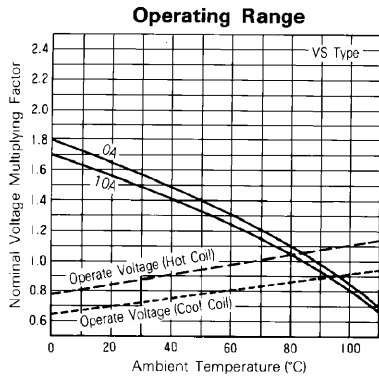
	MODEL				Nominal voltage	Coil resistance ($\pm 10\%$)	Must operate voltage	Must release voltage	Nominal power
	TV-8 Rating	TV-5 Rating	Standard						
	15 A Type	10 A Type	15 A Type	10 A Type					
Standard Type	VS- 3M()-NR	VS- 3M()	VS- 3M()U-NR	VS- 3()()U-()	3 VDC	12.5 Ω	2.1 VDC	0.3 VDC	0.72 W
	VS- 5M()-NR	VS- 5M()	VS- 5M()U-NR	VS- 5()()U-()	5 VDC	36 Ω	3.5 VDC	0.5 VDC	0.70 W
	VS- 6M()-NR	VS- 6M()	VS- 6M()U-NR	VS- 6()()U-()	6 VDC	50 Ω	4.2 VDC	0.6 VDC	0.72 W
	VS- 9M()-NR	VS- 9M()	VS- 9M()U-NR	VS- 9()()U-()	9 VDC	115 Ω	6.3 VDC	0.9 VDC	0.70 W
	VS- 12M()-NR	VS- 12M()	VS- 12M()U-NR	VS- 12()()U-()	12 VDC	200 Ω	8.4 VDC	1.2 VDC	0.72 W
	VS- 14M()-NR	VS- 14M()	VS- 14M()U-NR	VS- 14()()U-()	14 VDC	280 Ω	9.8 VDC	1.4 VDC	0.70 W
	VS- 18M()-NR	VS- 18M()	VS- 18M()U-NR	VS- 18()()U-()	18 VDC	460 Ω	12.6 VDC	1.8 VDC	0.70 W
	VS- 24M()-NR	VS- 24M()	VS- 24M()U-NR	VS- 24()()U-()	24 VDC	820 Ω	16.8 VDC	2.4 VDC	0.70 W
	VS- 36M()-NR	VS- 36M()	VS- 36M()U-NR	VS- 36()()U-()	36 VDC	1,850 Ω	25.2 VDC	3.6 VDC	0.70 W
	VS- 48M()-NR	VS- 48M()	VS- 48M()U-NR	VS- 48()()U-()	48 VDC	3,300 Ω	33.6 VDC	4.8 VDC	0.70 W
	VS- 60M()-NR	VS- 60M()	VS- 60M()U-NR	VS- 60()()U-()	60 VDC	5,100 Ω	42.0 VDC	6.0 VDC	0.70 W
VS-100M()-NR	VS-100M()	VS- 100M()U-NR	VS-100()()U-()	100 VDC	13,400 Ω	70.0 VDC	10.0 VDC	0.75 W	
High Sensitive Type	VS- 3SM()	VS- 3SM()	VS- 3SM()U-NR	VS- 3S()()U-()	3 VDC	17 Ω	2.1 VDC	0.3 VDC	0.53 W
	VS- 5SM()	VS- 5SM()	VS- 5SM()U-NR	VS- 5S()()U-()	5 VDC	47 Ω	3.5 VDC	0.5 VDC	0.53 W
	VS- 6SM()	VS- 6SM()	VS- 6SM()U-NR	VS- 6S()()U-()	6 VDC	68 Ω	4.2 VDC	0.6 VDC	0.53 W
	VS- 9SM()	VS- 9SM()	VS- 9SM()U-NR	VS- 9S()()U-()	9 VDC	155 Ω	6.3 VDC	0.9 VDC	0.53 W
	VS- 12SM()	VS- 12SM()	VS- 12SM()U-NR	VS- 12S()()U-()	12 VDC	270 Ω	8.4 VDC	1.2 VDC	0.53 W
	VS- 14SM()	VS- 14SM()	VS- 14SM()U-NR	VS- 14S()()U-()	14 VDC	370 Ω	9.8 VDC	1.4 VDC	0.53 W
	VS- 18SM()	VS- 18SM()	VS- 18SM()U-NR	VS- 18S()()U-()	18 VDC	610 Ω	12.6 VDC	1.8 VDC	0.53 W
	VS- 24SM()	VS- 24SM()	VS- 24SM()U-NR	VS- 24S()()U-()	24 VDC	1,100 Ω	16.8 VDC	2.4 VDC	0.53 W
	VS- 36SM()	VS- 36SM()	VS- 36SM()U-NR	VS- 36S()()U-()	36 VDC	2,450 Ω	25.2 VDC	3.6 VDC	0.53 W
	VS- 48SM()	VS- 48SM()	VS- 48SM()U-NR	VS- 48S()()U-()	48 VDC	4,400 Ω	33.6 VDC	4.8 VDC	0.53 W
	VS- 60SM()	VS- 60SM()	VS- 60SM()U-NR	VS- 60S()()U-()	60 VDC	6,800 Ω	42.0 VDC	6.0 VDC	0.53 W
	VS-100SM()	VS-100SM()	VS-100SM()U-NR	VS-100S()()U-()	100 VDC	18,860 Ω	70.0 VDC	10.0 VDC	0.53 W

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

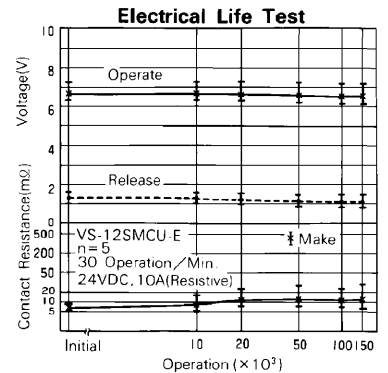
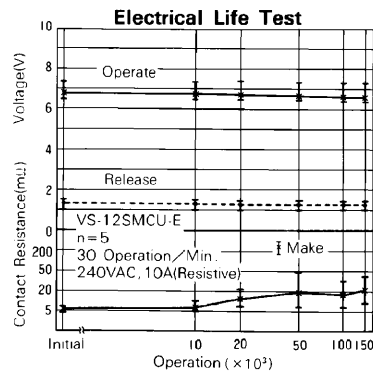
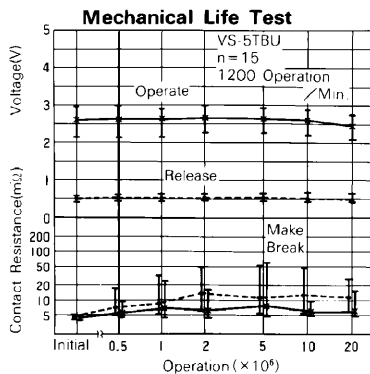
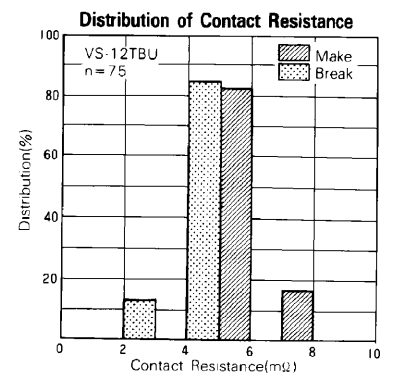
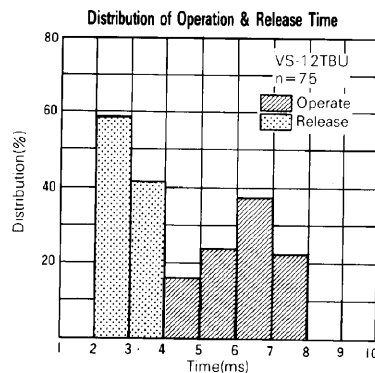
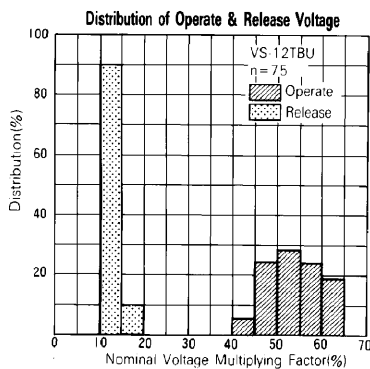
CHARACTERISTIC DATA



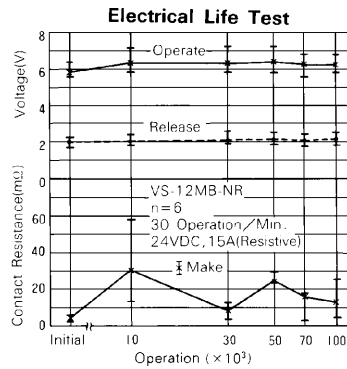
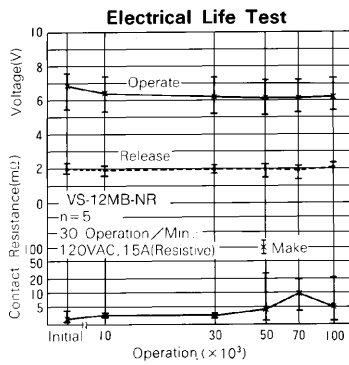
VS SERIES



REFERENCE DATA



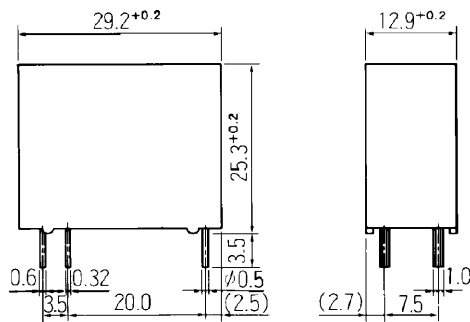
VS SERIES



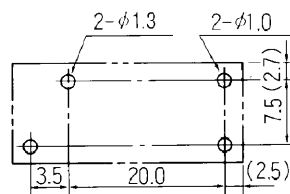
■ DIMENSIONS

● Dimensions

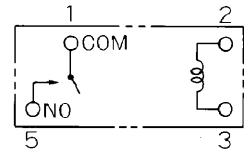
VS-M type



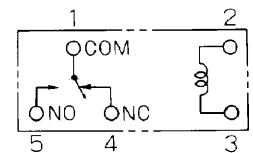
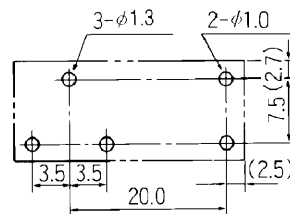
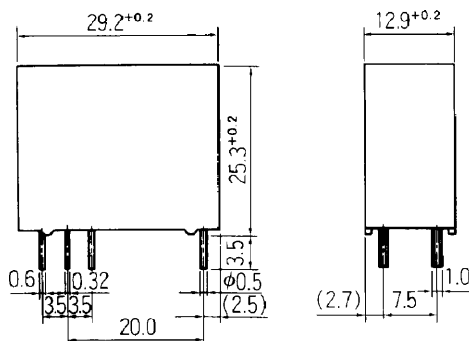
● Schematics (BOTTOM VIEW)



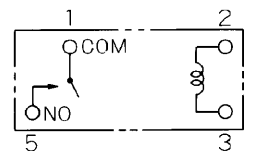
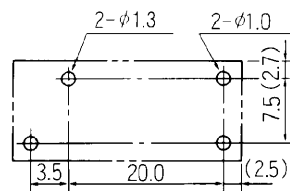
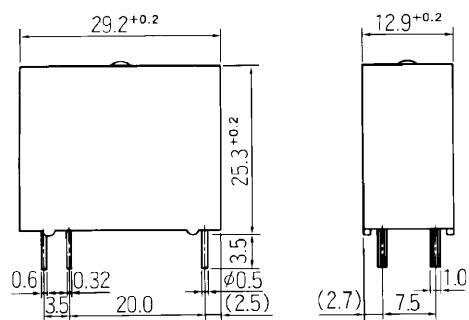
● PC board mounting hole layout (BOTTOM VIEW)



VS type



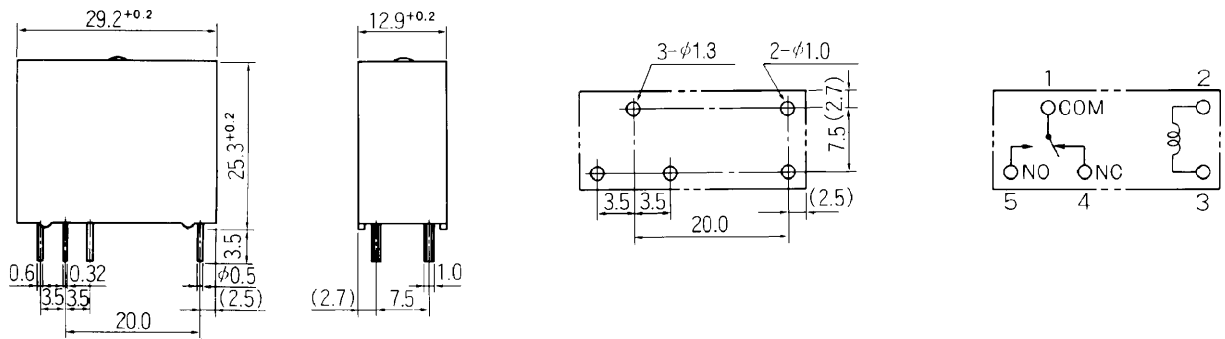
VS-MK type (Plastic sealed type)



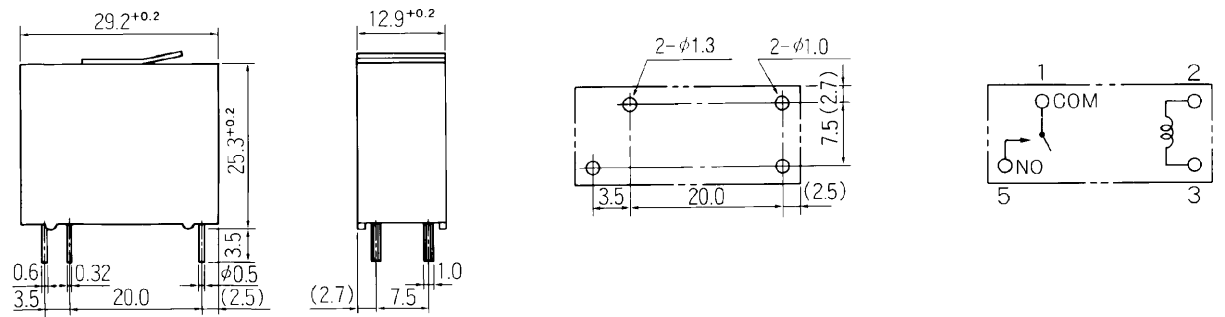
Unit: mm

VS SERIES

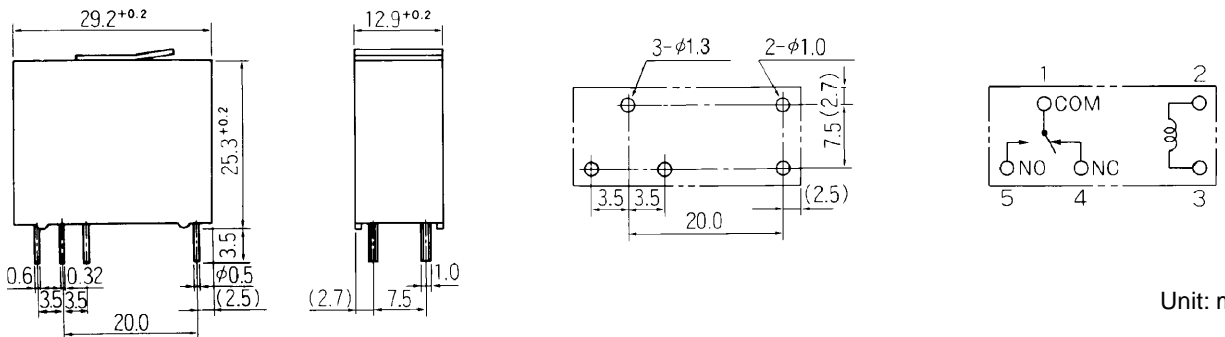
VS-K type (Plastic sealed type)



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

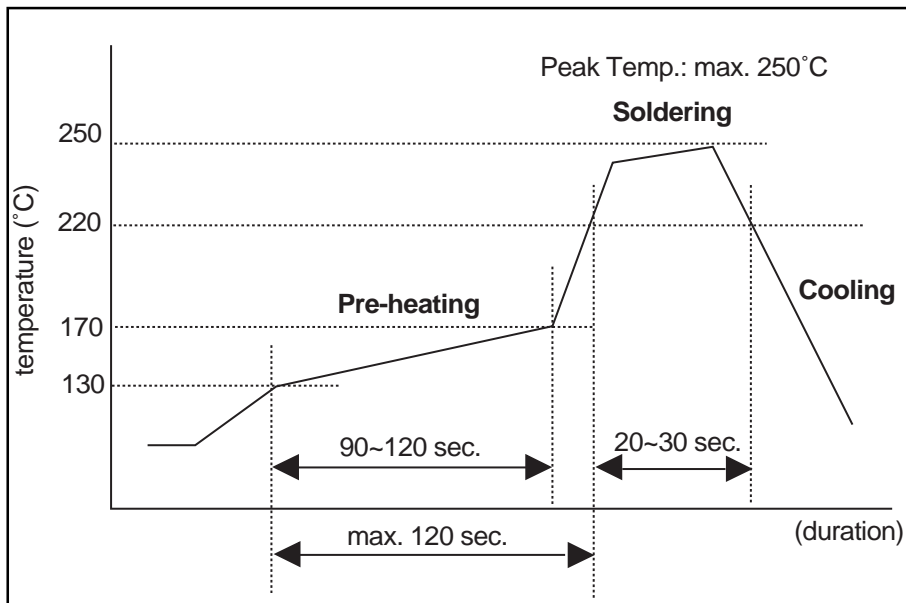
1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. 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 lead 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 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

- SnAgCu solder is known as low risk of 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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