



CENTIGRID®
MAGNETIC-LATCHING
COMMERCIAL RELAYS
DPDT
CMOS COMPATIBLE



SERIES	RELAY TYPE
122C	DPDT general-purpose magnetic-latching relay with internal power MOSFET driver and diode coil transient suppression

DESCRIPTION

The 122C Centigrid® magnetic-latching relay is an ultraminiature, hermetically sealed, armature relay capable of being directly driven by most IC logic families. Its low profile height and .100" grid spaced terminals, which precludes the need for spreader pads, make it ideal for applications where extreme packaging density and/or close PC board spacing are required.

The basic operating function and internal structure are similar to Teledyne's TO-5, 422 relay series. The 122C is capable of meeting Teledyne Relays' T2R® requirements. The following unique construction features and manufacturing techniques provide overall high reliability and excellent resistance to environmental extremes

The 122C feature:

- All welded construction.
- Unique uni-frame design providing high magnetic efficiency and mechanical rigidity.
- High force/mass ratios to withstand shock and vibration.
- Advanced cleaning techniques provide maximum assurance of internal cleanliness.
- Precious metal alloy contact material with gold plating assures excellent high current and dry circuit switching capabilities.

The Series 122C relay has internal silicon diodes for coil suppression, Zener diodes to protect the MOSFET gate inputs, and N-channel enhancement-mode MOSFET chips, which enable direct relay interfacing with most microprocessor and IC logic families (CMOS, TTL and MOS).

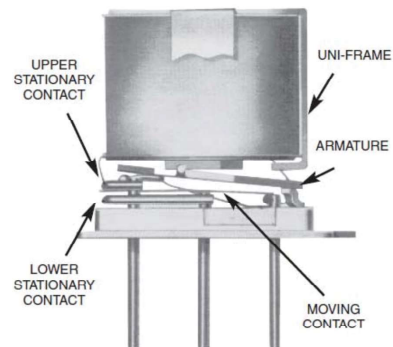
The 122C magnetic-latching relay is ideally suited for applications where coil operating power must be minimized. The relays can be operated with a short-duration pulse. After the contacts have transferred, no external coil power is required.

The magnetic-latching feature of the Series 122C relay provides a "memory" capability, since the relays will not reset upon removal of coil power.

By virtue of its inherently low intercontact capacitance and contact circuit losses, the 122C relay has proven to be an excellent ultraminiature RF switch for frequency ranges well into the UHF spectrum. A typical RF application for this Centigrid® relay is in handheld radio transceivers, wherein the combined features of good RF performance, small size, low coil power dissipation and high reliability make it a preferred method of transmit-receive switching (see Figure 1).

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS	
Temperature (Ambient)	-65°C to +125°C
Vibration (General Note I)	30 g's to 3000 Hz
Shock (General Note I)	50 g's, 6ms half sine
Acceleration	50 g's
Enclosure	Hermetically sealed
Weight	0.10 oz. (2.75g) max.

INTERNAL CONSTRUCTION



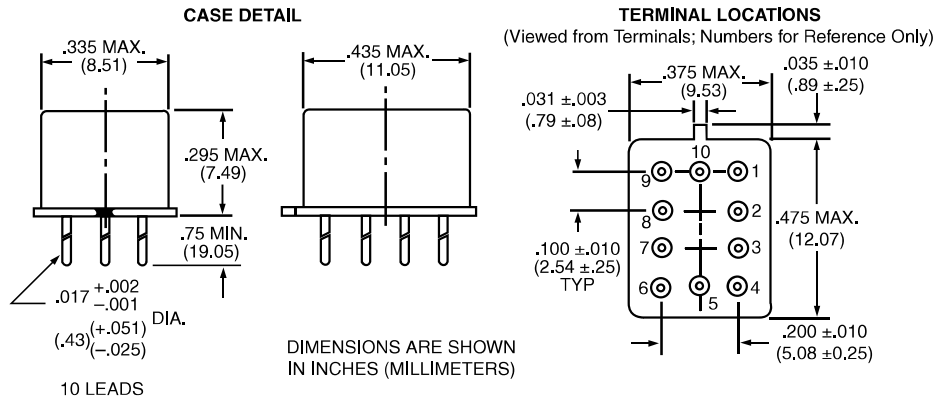
SERIES 122C
GENERAL ELECTRICAL SPECIFICATIONS (@25°C)

Contact Arrangement	2 Form C (DPDT)	
Rated Duty	Continuous	
Contact Resistance	0.125 Ω max. before life; 0.225 max. after life at 1A / 28 Vdc (measured 1/8" from header)	
Contact Load Rating (DC)	Resistive: 1 A / 28 Vdc Inductive: 200 mA / 28 Vdc (320mH) Lamp: 100 mA / 28 Vdc (320mH) Low level: 10 to 50 μA @ 10 to 50 mV	
Contact Load Rating (AC)	Resistive: 250 mA / 115Vac, 60 and 400 Hz (Case not grounded) 100 mA / 115 Vac, 60 and 400 Hz (Case grounded)	
Contact Life Ratings	10,000,000 cycles (typical) at low level 1,000,000 cycles (typical) at 0.5 A / 28 Vdc resistive 100,000 cycles min. at all other loads specified above	
Contact Overload Rating	2 A / 28 Vdc Resistive (100 cycles min.)	
Contact Carry Rating	Contact Factory	
Operate Time	1.5 msec max. at nominal rated coil voltage	
Contact Bounce	1.5 msec max.	
Min. Operate Pulse	4.5 msec width @ rated voltage	
Intercontact Capacitance	0.4 pf typical	
Insulation Resistance	10,000 MΩ min. between mutually isolated terminals	
Dielectric Strength	500 Vrms (60 Hz) @ atmospheric pressure	70,000 ft: 125 Vrms / 60 Hz
Negative Coil Transient (Vdc)	1.0 Vdc Max.	
Min. Diode P.I.V. (Vdc)	100	
Zener Voltage (Vdc)	17 min to 23 max	
Zener Leakage Current @ 15.2 Vdc (μA)	2.5 max.	
Power FET Characteristics -65°C to +125°C	Gate Volt. to Turn Off (Vdc)	0.5 max
	Gate Volt. to Turn On (Vdc)	3.8 min (Note 8)
	Drain-Source (V_{DS}) (Vdc)	55 max.

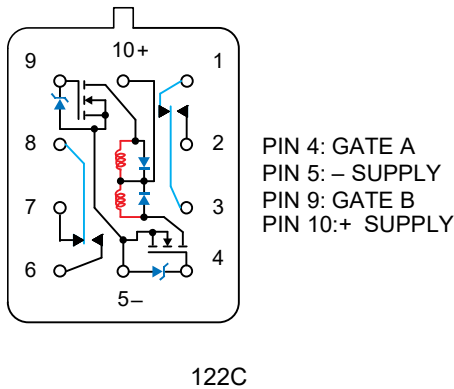
DETAILED ELECTRICAL SPECIFICATIONS (@25°C)

BASE PART NUMBERS (122C)		122C-5	122C-12	122C-26
Coil Voltage (Vdc)	Nom.	5.0	12.0	26.5
	Max.	5.6	16.0	32.0
Coil Current (S114DD) (mAdc@25°C)	(Note 9)	Min.	82.2	20.5
		Max.	114.9	27.8
Coil Operating Power @25°C (mW)	Nom.	505	287	351
Latch and Reset Voltage (Vdc)	Max.	3.5	9.0	18.0

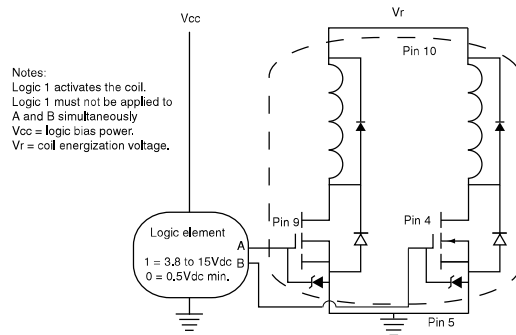
SERIES 122C
OUTLINE DIMENSIONS



SCHEMATIC DIAGRAMS



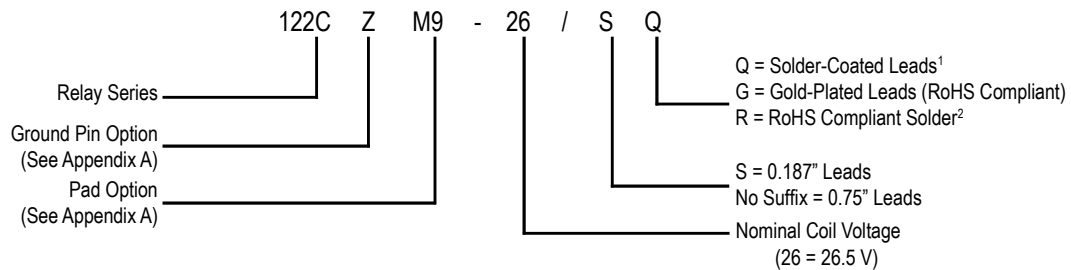
TYPICAL CMOS INTERFACE CIRCUIT



NOTES:

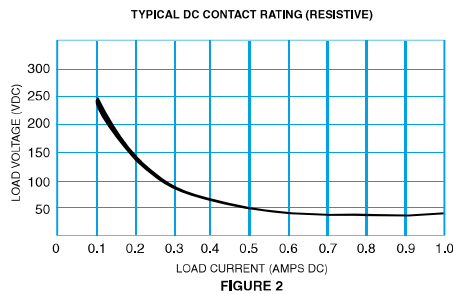
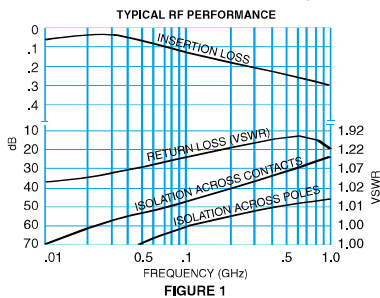
1. DIMENSIONS ARE IN INCHES, METRIC EQUIVALENTS SHOWN IN [].
2. POSITIONS 5 AND 10 ARE FOR UNINSULATED CASE GROUND OPTIONS.
3. NO PROTRUSION BELOW BOTTOM OF HEADER WHEN GROUND PINS ARE INSTALLED
4. TO ORDER THE CASE GROUND OPTION, AFTER THE SERIES DESIGNATOR, ADD "YZ" TO THE PART NUMBER.
5. UNLESS OTHERWISE SPECIFIED, TOLERANCES ON DIMENSIONS ARE ± .010 INCH (0.025 MM)

SERIES 122C
Part Numbering System



Note: Parts ordered without suffix may be supplied with Solder-Coated or Gold-Plated leads.
1 Parts ordered with Solder-Coated leads will have (Sn60/Pb40)
2 Parts ordered with RoHS Solder-Coated leads will have (Sn99.3/Cu0.7)

PERFORMANCE CURVES (Note 2)



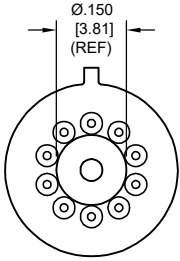
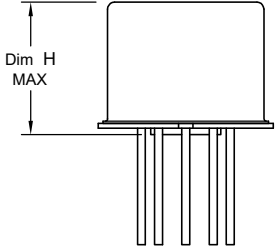
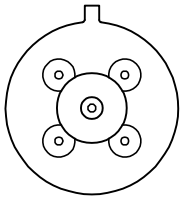
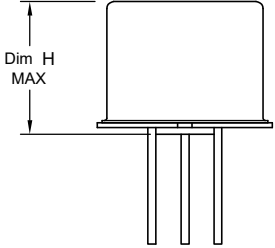
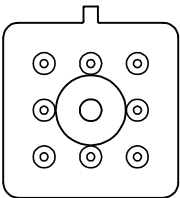
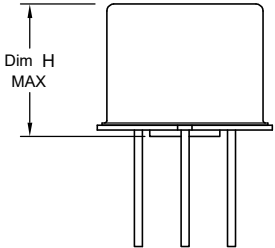
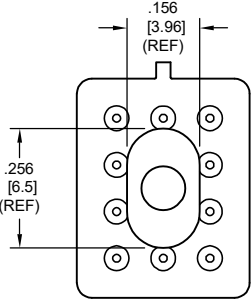
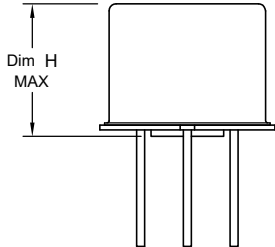
GENERAL NOTES

1. Relay contacts will exhibit no chatter in excess of 10 μ sec or transfer in excess of 1 μ sec.
2. "Typical" characteristics are based on available data and are best estimates. No on-going verification tests are performed.
3. Unless otherwise specified, parameters are initial values.
4. Relays can be supplied with a spacer pad. See appendix.

GENERAL NOTES

1. Relay contacts will exhibit no chatter in excess of 10 μ sec or transfer in excess of 1 μ sec.
2. "Typical" characteristics are estimates based on available data. No on-going verification tests are performed.
3. Unless otherwise specified, parameters are initial values.
4. Pins, 4, 5, 9 must be shorted when tested for insulation Resistance and Dielectric withstanding Voltage
5. Unless otherwise specified, relays will be supplied with either gold-plated or solder-coated leads.
6. The slash and characters appearing after the slash are not marked on the relay.
7. Screened HI-REL versions available. Contact factory.
8. Maximum rated gate voltage = 15 Vdc
9. Measured for 5 sec max. Includes allowance for "on" resistance of MOSFET

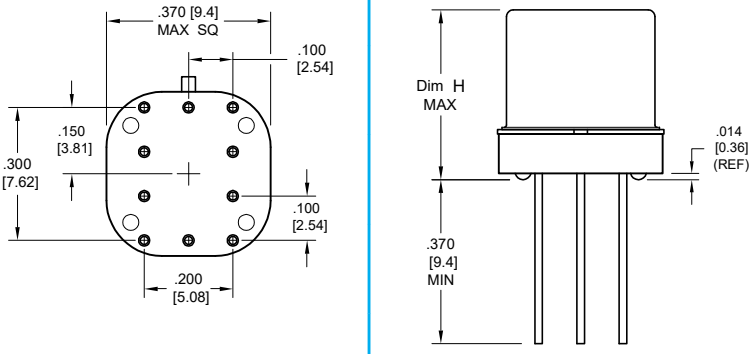
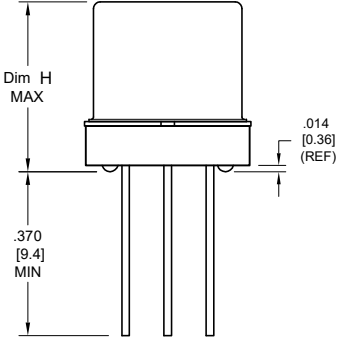
APPENDIX A : Spacer Pads

Pad designation and bottom view dimensions	Height	For use with the following:	Dim. H Max.
 <p style="text-align: center;">“M4” Pad for TO-5</p>		ER412	.295 (7.49)
		712, RF300, RF, RF700, RF703	.300 (7.62)
		ER422, 722	.305 (7.75)
		ER432	.400 (10.16)
		732, RF303	.410 (10.41)
		RF312	.350 (8.89)
 <p style="text-align: center;">“M4” Pad for TO-5</p>		ER411	.295 (7.49)
		RF311	.300 (7.62)
		RF331	.410 (10.41)
 <p style="text-align: center;">“M4” Pad for Centgrid®</p>		172	.305 (7.75)
		ER114, J114	.300 (7.62)
		ER134, J134	.400 (10.16)
		RF100	.315 (8.00)
		RF103	.420 (10.67)
 <p style="text-align: center;">“M9” Pad for Centgrid®</p>		122C, A152	.320 (8.13)
		ER116C, J116C	.300 (7.62)
		ER136C, J136C	.400 (10.16)
		RF180	.325 (8.25)
		A150	.305 (7.75)

Notes:

1. Spacer pad material: Polyester film.
2. To specify an “M4” or “M9” spacer pad, refer to the mounting variants portion of the part numbering example in the applicable datasheet.
3. Dimensions are in inches (mm).
4. Unless otherwise specified, tolerance is $\pm .010$ " (.25 mm).
5. Add 10 m Ω to the contact resistance shown in the datasheet.
6. Add 0.01 oz. (0.25 g) to the weight of the relay assembly shown in the datasheet.

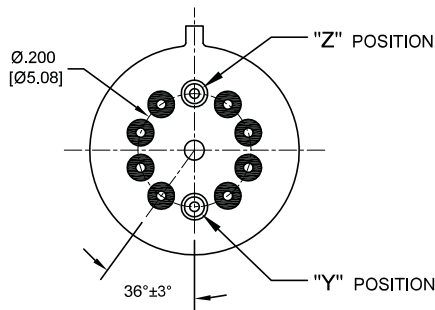
APPENDIX A : Spreader Pads

Pad designation and bottom view dimensions	Height	For use with the following:	Dim. H Max.
 <p style="text-align: center;">"M" Pad <u>5/</u> <u>6/</u></p>		ER411T, ER412, J412	.388 (9.86)
		712	.393 (9.99)
		ER432, J432	.493 (12.52)
		732	.503 (12.78)
		J421, J422, ER422, 722	.398 (10.11)

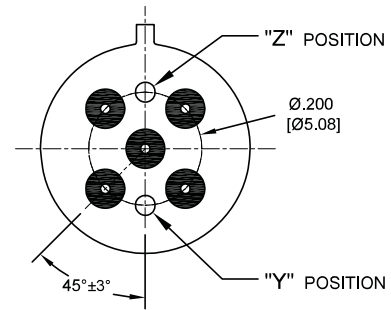
Notes:

1. Spreader pad material: Diallyl Phthalate.
2. To specify an "M", "M2" or "M3" spreader pad, refer to the mounting variants portion of the part number example in the applicable datasheet.
3. Dimensions are in inches (mm).
4. Unless otherwise specified, tolerance is $\pm .010$ " (0.25 mm).
- 5/. Add 25 m Ω to the contact resistance shown in the datasheet.
- 6/. Add .01 oz. (0.25 g) to the weight of the relay assembly shown in the datasheet.
- 7/. Add 50 m Ω to the contact resistance shown in the datasheet.
- 8/. Add 0.025 oz (0.71 g) to the weight of the relay assembly shown in the datasheet.
- 9/. M3 pad to be used only when the relay has a center pin (e.g. ER411M3-12A, 722XM3-26.)

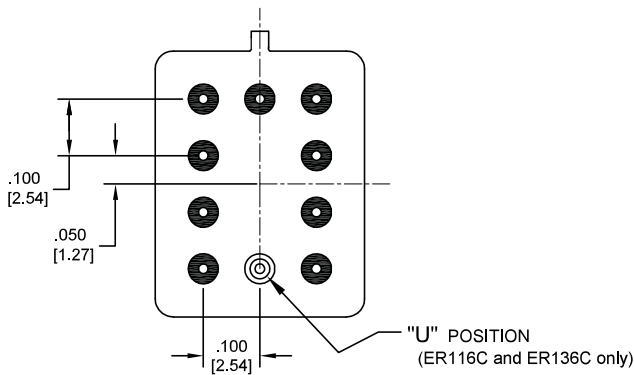
APPENDIX A : Ground Pin Positions



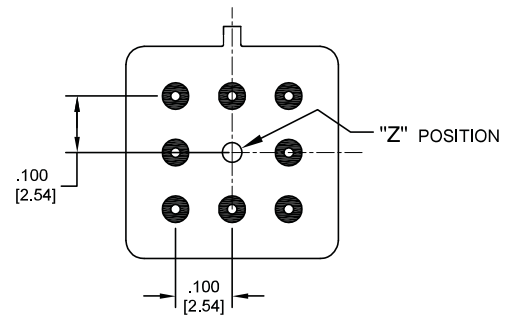
TO-5 Relays:
 ER412, ER412T, ER422, ER432, ER432T, 712, 712TN, 400H, 400K, 400V, RF300, RF303, RF341, RF312, RF332, RF310, RF313, RF320, RF323, SI800, SI803, RF700, RF703



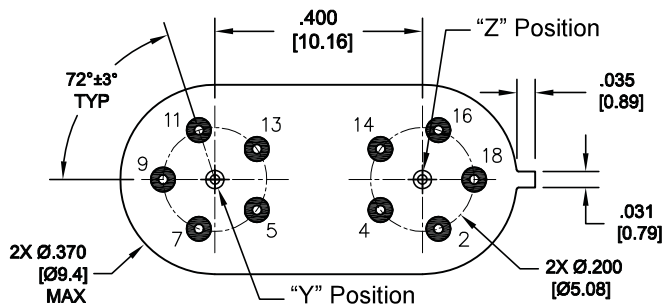
TO-5 Relays:
 ER411, RF311, RF331



Centigrad® Relays:
 RF180, ER116C, 122C, ER136C



Centigrad® Relays:
 RF100, RF103, ER114, ER134, 172



Loopback Relays:
 LB363

- Indicates ground pin position
- Indicates glass insulated lead position
- ◎ Indicates ground pin or lead position depending on relay type

NOTES

1. Terminal views shown
2. Dimensions are in inches (mm)
3. Tolerances: $\pm .010$ ($\pm .25$) unless otherwise specified
4. Ground pin positions are within .015 (0.38) dia. of true position
5. Ground pin head dia., 0.035 (0.89) ref: height 0.010 (0.25) ref.
6. Lead dia. 0.017 (0.43) nom.