

# TELEDYNE RELAYS

## COMMERCIAL/INDUSTRIAL TO-5 RELAY DPDT MAGNETIC LATCHING

**SERIES  
722**

SERIES DESIGNATION	RELAY TYPE
722	DPDT relay
722D	DPDT relay with internal diode for coil transient suppression

### DESCRIPTION

The TO-5 relay, originally conceived and developed by Teledyne, has become one of the industry standards for low level switching from dry circuit to 1 ampere. Designed expressly for high density PC Board mounting, its small size and low coil power dissipation make the TO-5 relay one of the most versatile ultraminiature relays available.

Unique construction features and manufacturing techniques provide excellent resistance to environmental extremes and overall high reliability.

- All welded construction.
- Unique uni-frame design providing high magnetic efficiency and mechanical rigidity.
- High force/mass ratios for resistance to 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 722D Series utilizes discrete silicon diodes for coil suppression.

The 722 Series magnetic latching relays are ideally suited for applications where power dissipation must be minimized. The relays can be operated with a short duration pulse and after contacts have transferred, no external holding power is required.

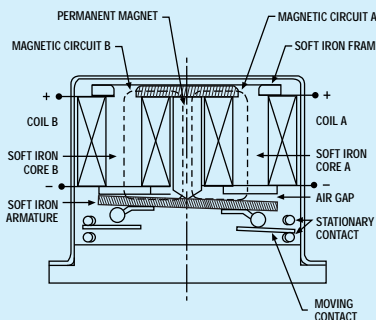
The magnetic latching feature of the 722 Series provides a "memory" capability, since the relays will not reset upon removal of power.

By virtue of its inherently low intercontact capacitance and contact circuit losses, the TO-5 relay has shown itself to be an excellent ultraminiature RF switch for frequency ranges well into the UHF spectrum. A typical RF application for the TO-5 relay is in hand held 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 Transmitter-Receive switching (see Figure 1).

### PRINCIPLE OF OPERATION

Energizing Coil B produces a magnetic field opposing the holding flux of the permanent magnet in Circuit B. As this net holding force decreases, the attractive force in the air gap of Circuit A, which also results from the flux of the permanent magnet, becomes great enough to break the armature free of Core B, and snap it into a closed position against Core A. The armature then remains in this position upon removal of power from Coil B, but will snap back into position B upon energizing Coil A. Since operation depends upon cancellation of a magnetic field, it is necessary to apply the correct polarity to the relay coils as indicated on the relay schematic.

When latching relays are installed in equipment, the latch and reset coils should not be pulsed simultaneously. Coils should not be pulsed with less than the nominal coil voltage and the pulse width should be a minimum of three times the specified operate time of the relay. If these conditions are not followed, it is possible for the relay to be in the magnetically neutral position.



### ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS


Temperature (Ambient)	-55°C to + 85°C
Vibration	10 g's to 1000 Hz (Note 3)
Shock	30 g's for 6 msec. (Note 3) half-sine
Enclosure	Hermetically sealed
Weight	0.1 oz (2.9 gms.) max.

## SERIES 722

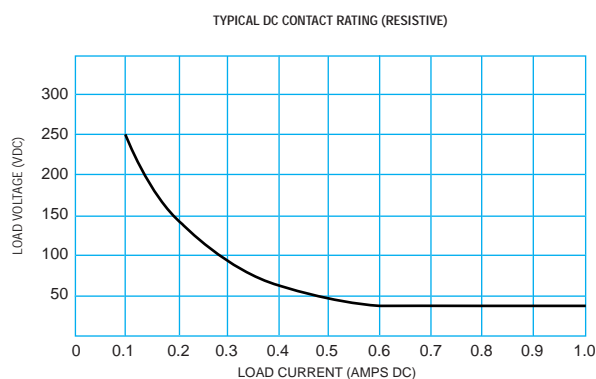
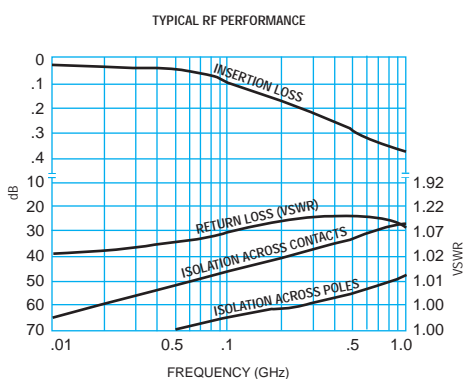
### GENERAL ELECTRICAL SPECIFICATIONS (@ 25°C) (Notes 1 & 2)

Contact Arrangement	2 Form C (DPDT)
Rated Duty	Continuous
Contact Resistance	0.15 ohm max. before life; 0.25 ohm max. after life at 1A/28VDC, (measured 1/8" from header)
Contact Load Rating (DC) (See Fig. 2 for other DC resistive voltage/current ratings)	Resistive: 1 Amp/28VDC Inductive: 200 mA/28VDC (320 mH) Lamp: 100 mA/28VDC Low Level: 10 to 50 $\mu$ A/10 to 50 mV
Contact Load Ratings (AC)	Resistive: 250 mA/115VAC, 60 and 400Hz (Case not grounded) 100 mA/115VAC, 60 and 400Hz (Case grounded)
Contact Life Ratings	10,000,000 cycles (typical) at low level 1,000,000 cycles (typical) at 0.5A/28VDC resistive 100,000 cycles min. at all other loads specified above
Contact Overload Rating	2A/28VDC Resistive (100 cycles min.)
Contact Carry Rating	Contact factory
Coil Operating Power	290 milliwatts typical at nominal rated voltage
Operate Time	2.0 msec. max. at nominal rated coil voltage
Minimum Operate Pulse	6.0 msec. at nominal voltage
Intercontact Capacitance	0.4 pf typical
Insulation Resistance	1,000 megohms min. between mutually isolated terminals
Dielectric Strength	Atmospheric pressure: 350 VRMS/60 Hz
Diode P.I.V. 720D/722D	60 VDC, min.
Negative Coil Transient 720D/722D	2.0 Volt, max.

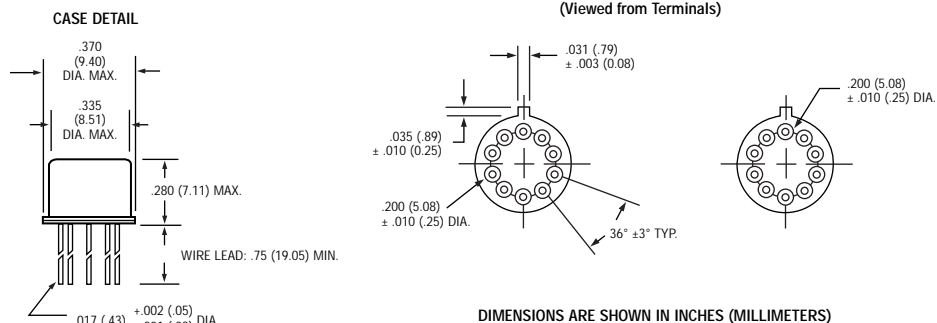
### DETAILED ELECTRICAL SPECIFICATIONS (@ 25°C) (Note 2)

BASE PART NUMBERS 		722-5 722D-5	722-6 722D-6	722-9 722D-9	722-12 722D-12	722-18 722D-18	722-26 722D-26
Coil Voltage (VDC)	Nom.	5.0	6.0	9.0	12.0	18.0	26.5
	Max.	6.0	8.0	12.0	16.0	24.0	32.0
Coil Resistance (Ohms $\pm$ 20% @ 25°C)		61	120	280	500	1130	2000
Set & Reset Voltage (VDC, Max.) Pulse Operated		3.5	4.5	6.8	9.0	13.5	18.0

### PERFORMANCE CURVES (NOTE 1)

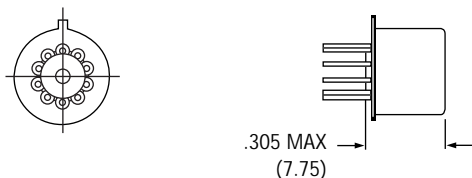


## OUTLINE DIMENSIONS



## SPACER PAD

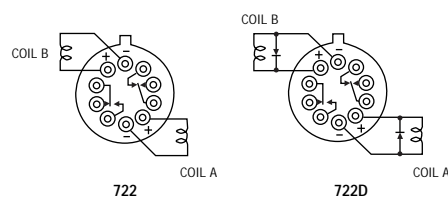
Relays can be supplied with a spacer pad attached to the relay header. The pad permits the relay to be spaced away from the mounting surface facilitating solder joint inspection. To order add **M4** to the part number (e.g. 722M4-26).



## NOTES:

1. Material: Polyester film.
2. Increase contact resistance by 0.01 ohm.

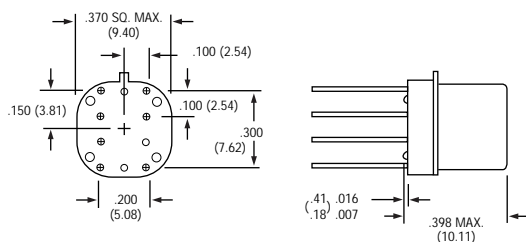
## SCHEMATIC DIAGRAMS



SCHEMATICS ARE VIEWED FROM TERMINALS.  
 CONTACTS SHOWN IN POSITION RESULTING WHEN COIL A LAST ENERGIZED.

## SPREADER PAD

Relays can be supplied with spreader pads which are attached to the relays. Spreaders can be supplied by adding **M** to the part number (e.g. 722M-26).



## NOTES:

1. Material: Diallyl phthalate.
2. Increase contact resistance by 0.925 ohm.

## NOTES:

1. Characteristics shown as "typical" are based on available data and are best estimates. No on-going verification tests are performed.
2. Unless otherwise specified, parameters are initial values.
3. Relays will exhibit no contact chatter in excess of 10 μsec or transfer in excess of 1 μsec.