



## SURFACE MOUNT MAGNETIC-LATCHING TO-5 RELAYS DPDT



SERIES DESIGNATION	RELAY TYPE
S422	SMT-J mounted, Magnetic-latching DPDT Relay
S422D	SMT-J mounted, Magnetic-latching DPDT Relay with internal diode for coil transient suppression
S422DD	SMT-J mounted, Magnetic-latching DPDT Relay with internal diode for coil transient suppression and polarity reversal protection

### DESCRIPTION

The magnetic-latching 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 for high-density PC board surface mounting, its small size and low coil power dissipation make the S422 relay one of the most versatile ultraminiature relays available.

#### S422 Features:

- 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 Series S422D and S422DD utilize discrete diodes for coil suppression and polarity reversal protection.

By virtue of its inherently low intercontact capacitance and contact circuit losses, these TO-5 relays have proven to be excellent ultraminiature RF switches for frequency ranges well into the UHF spectrum. A typical RF application for these TO-5 relays is in handheld radio receivers, wherein the combined features of good RF performance, small size, very low coil power dissipation and high reliability make it a preferred method of transmit-receive switching.

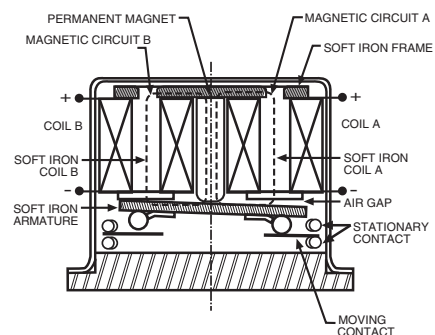
The Series S422 magnetic-latching relays are ideally suited for applications where power dissipation must be minimized. The relays can be operated with a short duration pulse. After the contacts have transferred, no external holding power is required.

The magnetic latching feature of the Series S422 relays provide a “memory” capability, since the relays will not reset upon removal of coil power.

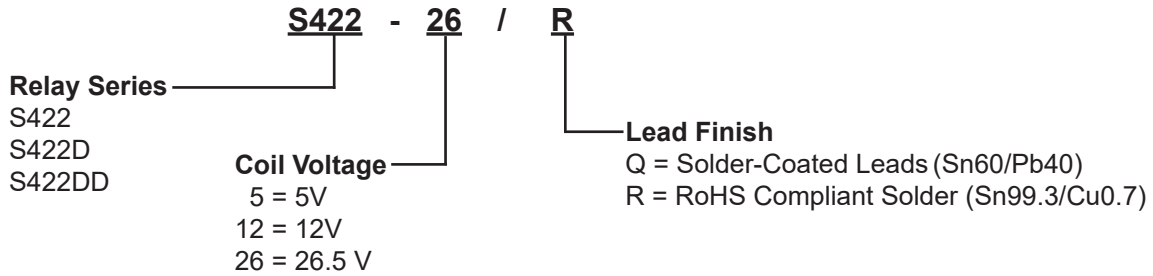
### ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS

<b>Temperature</b> (Operating)	-55°C to +85°C
<b>Vibration</b> (Note 1)	10 g's to 500 Hz
<b>Shock</b> (Note 1)	30 g's, 6ms half sine
<b>Acceleration</b>	50 g's
<b>Enclosure</b>	Hermetically sealed
<b>Weight</b>	0.10 oz. (2.84g) max.
<b>Reflow Temperature</b>	260°C max. temp. 1 min. max

### INTERNAL CONSTRUCTION



### Part Numbering System (Notes 7 & 8)



### GENERAL ELECTRICAL SPECIFICATIONS (-55 °C to 85 °C unless otherwise noted. See notes 2 & 3.)

<b>Contact Arrangement</b>	2 Form C (DPDT)	
<b>Rated Duty</b>	Continuous	
<b>Contact Resistance</b>	0.125 Ω max. before life; 0.225 Ω max. after life at 1.0 A / 28Vdc (measured 1/8" from header)	
<b>Contact Load Rating (DC)</b> (See Fig. 2 for other DC resistive voltage/current ratings)	Resistive: 1A / 28Vdc Inductive: 200 mA / 28Vdc (320 mH) Lamp: 100 mA / 28Vdc Low level: 10 to 50 μA, 10 to 50 mV	
<b>Contact Load Rating (AC)</b>	Resistive: 250 mA/115Vac, 60 Hz and 400 Hz (Case not grounded) 100 mA/115Vac, 60 Hz and 400 Hz (Case grounded)	
<b>Contact Life Ratings</b>	10,000,000 cycles (typical) at low level 1,000,000 cycles (typical) at 0.5 A / 28Vdc resistive 100,000 cycles min. at all other loads specified above	
<b>Contact Overload Rating</b>	2A / 28Vdc Resistive (100 cycles min.)	
<b>Contact Carry Rating</b>	Contact Factory	
<b>Coil Operating Power</b>	290 mW typical @ nominal rated voltage @ 25 °C	
<b>Operate Time</b>	S422/S422D: 1.5 ms max. at nominal rated coil voltage S422DD: 2.0 ms max. at nominal rated coil voltage	
<b>Contact Bounce</b>	2.0 ms max.	
<b>Minimum Operate Pulse</b>	4.5 ms width @ rated voltage	
<b>Intercontact Capacitance</b>	0.4 pF typical	
<b>Insulation Resistance</b>	10,000 MΩ min. between mutually isolated terminals	
<b>Dielectric Strength</b>	500 Vrms (60 Hz) @ atmospheric pressure;	70,000 ft.: 125 Vrms/60 Hz
<b>Negative Coil Transient (Vdc)</b>	S422D, S422DD	1.0 max
<b>Diode P.I.V. (Vdc)</b>	S422D, S422DD	100 min.

### DETAILED ELECTRICAL SPECIFICATIONS (-55 °C to 85 °C unless otherwise noted. See note 3.)

BASE PART NUMBERS		S422-5	S422-12	S422-26
		S422D-5	S422D-12	S422D-26
		S422DD-5	S422DD-12	S422DD-26
<b>Coil Voltage, Nominal (Vdc)</b>	Nom.	5.0	12.0	26.5
	Max.	6.0	16.0	32.0
<b>Coil Resistance (Ohms ±10% @25°C)</b>	S422 & S422D	61	500	2000
	S422DD (Note 4)	48	500	2000
<b>Coil Current (mAdc @ 25 °C) (S422DD Series only)</b>	Min.	75.8	20.0	11.6
	Max.	104.2	25.5	14.4
<b>Set &amp; Reset Voltage (Vdc, Max.)</b>	S422 & S422D	3.5	9.0	18.0
	S422DD	4.5	10.0	19.0

**PERFORMANCE CURVES (NOTE 2)**

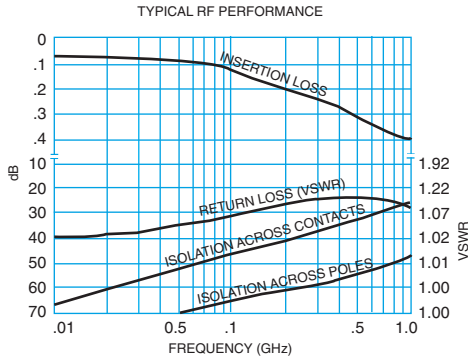


FIGURE 1

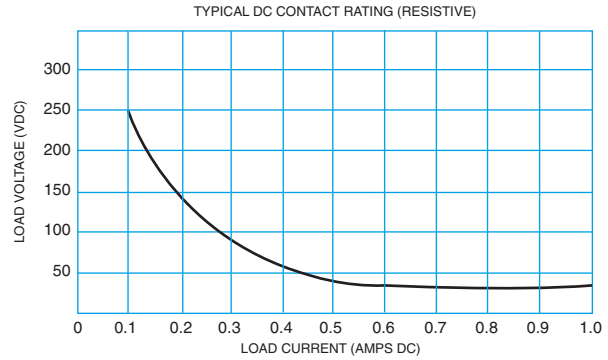
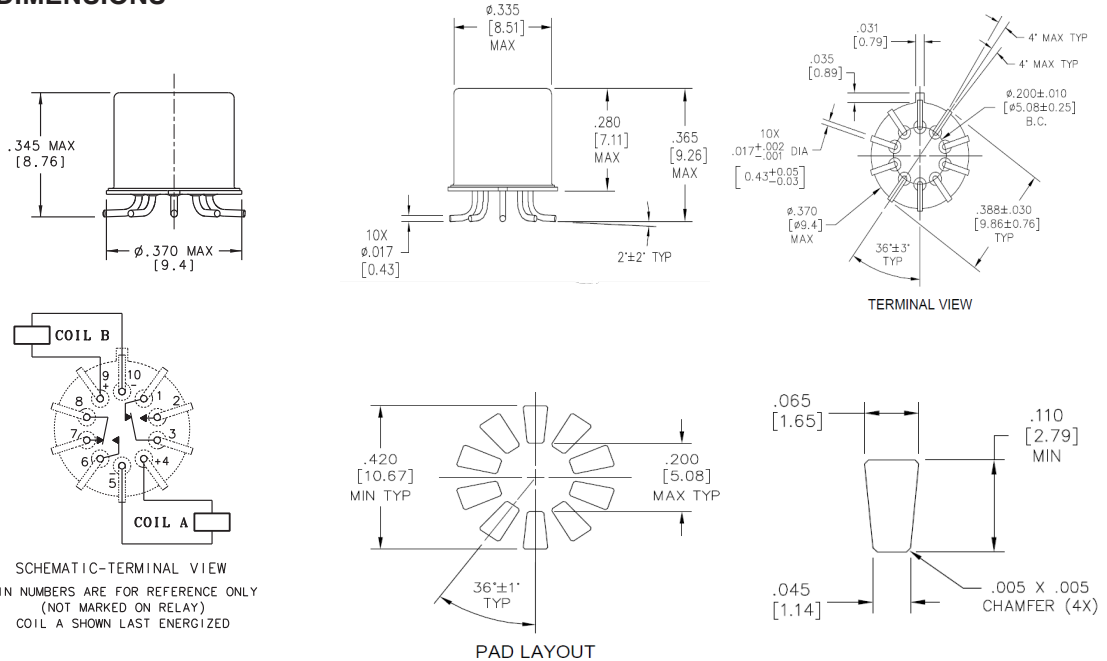


FIGURE 2

**OUTLINE DIMENSIONS**



RECOMMENDED PAD LAYOUT  
See Notes 5 and 6

**DIMENSIONS ARE SHOWN IN INCHES (MILIMETERS)**

**NOTES:**

- Relay contacts will exhibit no chatter in excess of 10  $\mu$ s or transfer in excess of 1  $\mu$ s.
- "Typical" characteristics are based on available data and are best estimates. No on-going verification tests are performed.
- Unless otherwise specified, parameters are initial values.
- For reference only. Coil resistance not directly measurable at relay terminals due to internal series diode. S422DD only.
- Recommended solder paste thickness: 0.01"
- Leads will fit pad layout shown with no overhang.
- Unless otherwise specified, relays will be supplied with solder-coated leads.
- The slash and characters appearing after the slash are not marked on the relay.