



## TO-5 RELAYS ESTABLISHED RELIABILITY MILITARY DPDT



SERIES	RELAY TYPE
432	DPDT basic relay
432D	DPDT relay with internal diode for coil transient suppression
432DD	DPDT relay with polarity reversal protection and coil transient suppression diode
432T	DPDT relay with internal transistor driver and coil transient suppression diode

### 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 432 relay one of the most versatile ultraminiature relays available.

The following unique construction features and manufacturing techniques provide excellent resistance to environmental extremes and overall high reliability.

### The 432 feature:

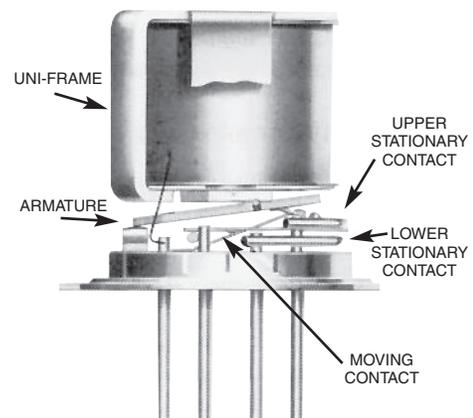
- All welded construction.
- Unique uni-frame design providing high magnetic efficiency and mechanical rigidity.
- High force/mass ratios for resistance to shock and vibration.
- Advanced cleaning techniques provide maximum assurance of internal cleanliness.
- Precious metal alloy contact material with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

The Series 432D and 432DD relays have internal discrete silicon diodes for coil suppression and polarity reversal protection. The hybrid 432T relay features an internal silicon suppression diode and transistor driver. This hybrid package reduces required PC board floor space by reducing the number of external components needed to drive the relay.

By virtue of its inherently low intercontact capacitance and contact circuit losses, the 432 relay has shown its worth as an RF switch for frequency ranges well into the UHF spectrum (see Figure 1). In addition, the sensitive Series 432 relay has a high resistance coil, thus requiring extremely low operating power (200 milliwatts, typical at room temperature). The advantages of reduced heat dissipation and power supply demands are a plus.

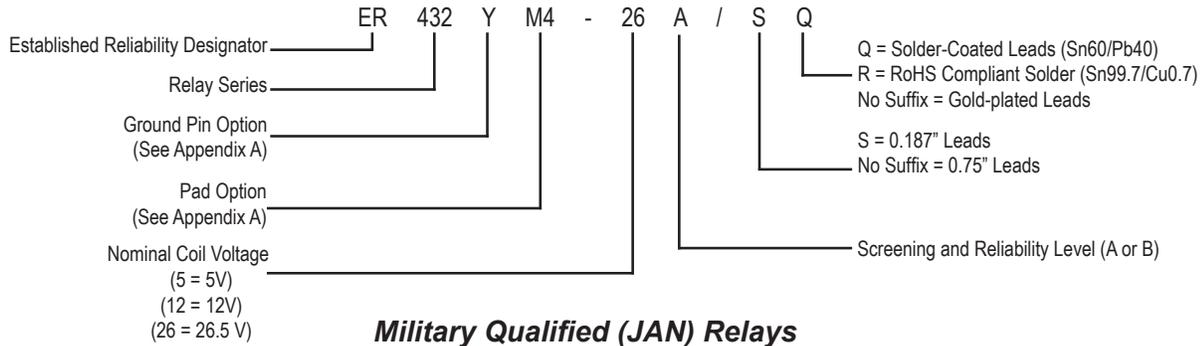
ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS	
Temperature (Ambient)	-65°C to +125°C
Vibration (Note 1)	30 g's to 3000 Hz
Shock (Note 1)	75 g's, 6ms half sine
Acceleration	50 g's
Enclosure	Hermetically sealed
Weight	0.159 oz. (4.5g) max.
Reflow Temperature	260°C max. temp. 1 min. max

### INTERNAL CONSTRUCTION

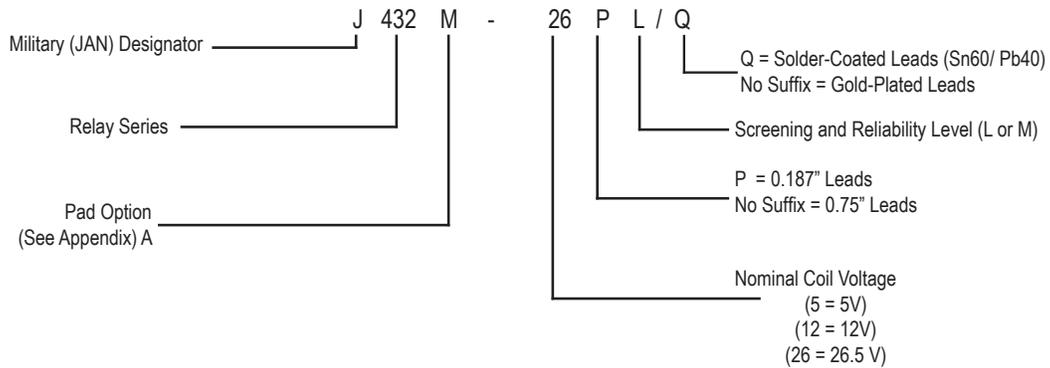


### PART NUMBERING SYSTEM (5 & 6)

#### T<sup>2</sup>R Established Reliability Relays



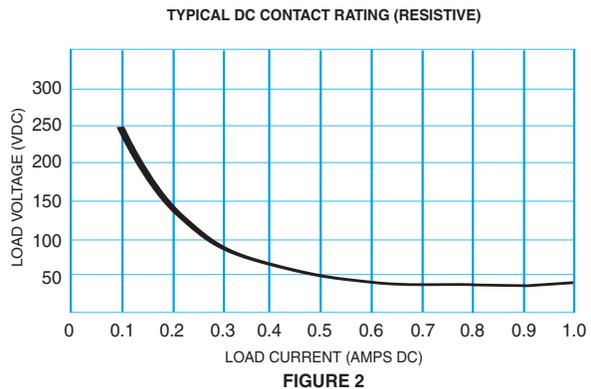
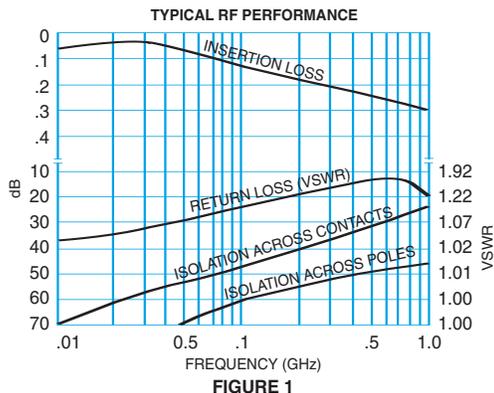
#### Military Qualified (JAN) Relays



**GENERAL ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted) (Notes 2 & 3)**

<b>Contact Arrangement</b>	2 Form C (DPDT)	
<b>Rated Duty</b>	Continuous	
<b>Contact Resistance</b>	0.1 ohm max. before life; 0.2 ohm max. after life at 1A/28Vdc (measured 1/8" from header)	
<b>Contact Load Rating (DC)</b>	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	
<b>Contact Load Rating (AC)</b>	Resistive: 250 mA / 115Vac, 60 and 400 Hz (Case not grounded) 100 mA / 115 Vac, 60 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 / 28 Vdc resistive 100,000 cycles min. at all other loads specified above	
<b>Contact Overload Rating</b>	2 A / 28 Vdc Resistive (100 cycles min.)	
<b>Coil Operating Power</b>	200 mW typical at nominal rated voltage	
<b>Contact Carry Rating</b>	Contact Factory	
<b>Operate Time</b>	4.0 ms max. at nominal rated coil voltage	
<b>Release Time</b>	432: 1.5 ms max.	432D, 432DD, 432T: 7.5 ms max
<b>Contact Bounce</b>	1.5 ms max	
<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 V <sub>rms</sub> / 60 Hz @ atmospheric pressure 125 V <sub>rms</sub> / 60 Hz @ 70,000 ft	
<b>Negative Coil Transient (Vdc) 432D, 432DD, 432T</b>	1.0 Vdc Max.	
<b>Diode P.I.V. (Vdc) 432D, 432DD, 432T</b>	100 Vdc Min.	
<b>432T Transistor Characteristics</b>	Base Voltage to Turn Off (Vdc)	0.3 min
	Emitter-Base breakdown Voltage (BV <sub>EBO</sub> ) (@25°C) (Vdc)	6.0 min
	Collector-Base breakdown Voltage (BV <sub>CBO</sub> ) (@25°C & I <sub>c</sub> = 100 µA) (Vdc)	75 min

**PERFORMANCE CURVES (Note 2)**



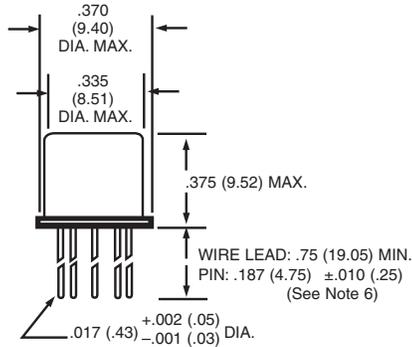
**DETAILED ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted) (Notes 3)**

BASE PART NUMBERS (432, 432D, 432DD, 432T)		432-5 432D-5 432DD-5 432T-5	432-12 432D-12 432DD-12 432T-12	432-26 432D-26 432DD-26 432T-26
Coil Voltage	Nom.	5.0	12.0	26.5
	Max.	5.8	16.0	32.0
Coil Resistance (Ohms $\pm 10\%$ @25°C)	432, 432D, 432T (Note 4)	100	850	3300
	432DD (Note 4)	64	850	3300
Coil Current (432DD) (mA <sub>dc</sub> @25°C)	Min	56.8	11.7	7.0
	Max	78.1	15.0	8.8
Coil Current (432T) (mA <sub>dc</sub> @25°C)	Min	43.5	12.2	6.9
	Max	59.3	16.7	9.5
Pick-up Voltage (V <sub>dc</sub> , Max)	432, 432D	3.5	9.0	18.0
	432DD	3.7	11.0	19.0
	432T	3.6	11.0	19.0
Drop-out Voltage (V <sub>dc</sub> )	432, 432D, 432T	Min.	0.14	0.41
		Max.	2.5	6.5
	432DD	Min.	0.7	1.0
		Max.	2.6	5.8
Turn On Base Current (mA Max), (Note 7)	432T	1.50	0.47	0.24

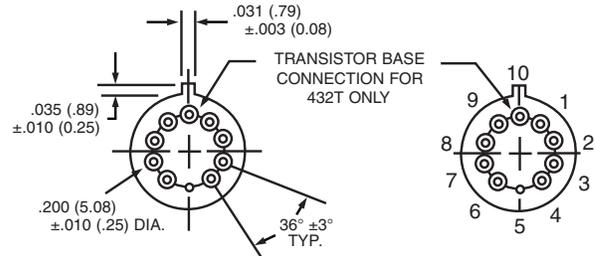
**NOTES:**

- 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.
- Reference only for 432DD and 432T. Coil resistance not directly measurable at relay terminals due to internal series semiconductor.
- Unless otherwise specified, relays will be supplied with gold-plated leads.
- The slash and characters appearing after the slash are not marked on the relay.
- Limit Base Emitter current to 15 mA<sub>dc</sub> max.

**SERIES 432  
OUTLINE DIMENSIONS**

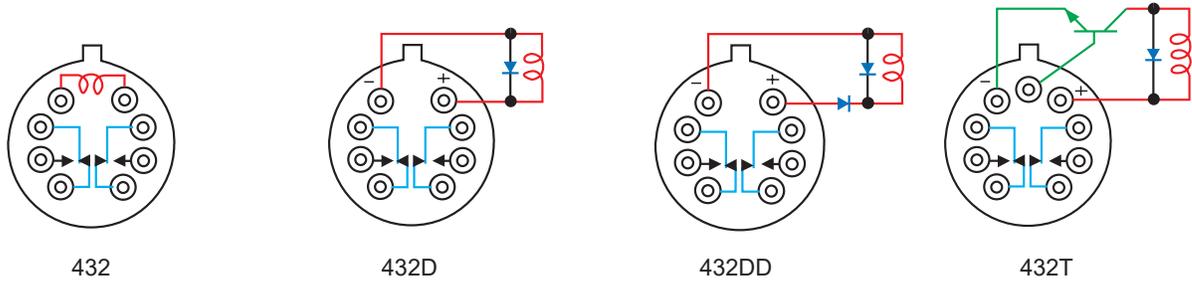


**TERMINAL LOCATIONS AND PIN NUMBERING (REF. ONLY)  
(Viewed from Terminals)**

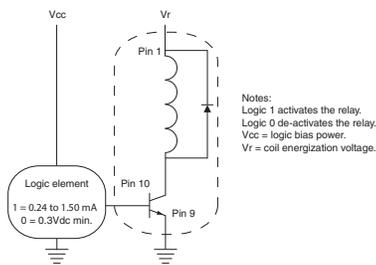


DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)

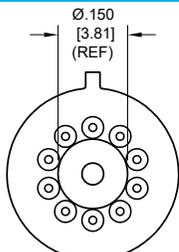
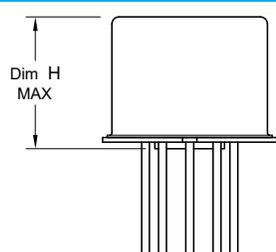
**SCHEMATIC DIAGRAMS**



**TYPICAL LOGIC INTERFACE  
(See Note 7)**

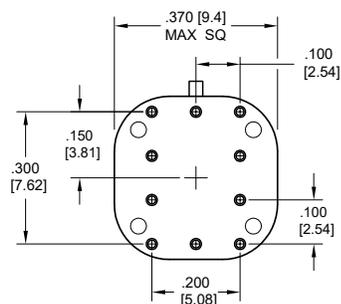
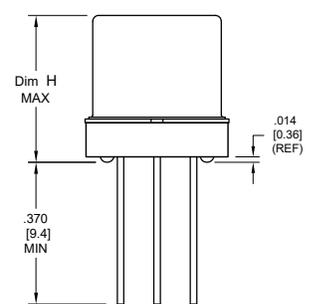


**APPENDIX A : Spacer Pads, Spreader Pads, and Ground Pin Positions**

Pad designation and bottom view dimensions	Height	For use with the following:	Dim. H Max.
 <p>"M4" Spacer Pad for TO-5</p>		ER432, J432	.400 (10.16)

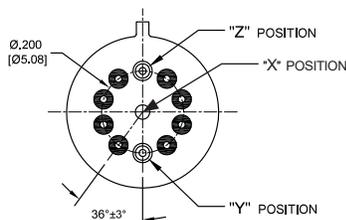
**Notes:**

1. Spacer pad material: Polyester film.
2. To specify an "M4" 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 $\Omega$  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.

Pad designation and bottom view dimensions	Height	For use with the following:	Dim. H Max.
 <p>"M" Spreader Pad <u>5/</u> <u>6/</u></p>		ER432, J432	.493 (12.52)

**Notes:**

1. Spreader pad material: Diallyl Phthalate.
2. To specify an "M" 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 $\Omega$  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.



**TO-5 Relays:**  
ER412, ER412T, ER422, ER432, ER432T, 712, 712TN, 400H, 400K, 400V, RF300, RF303, RF312, RF332, RF700, RF703

- 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.
7. "X" and "Z" Positions are not applicable for JAN Relays