



TO-5 CASE RELAY SPDT

Series
1MA

• Basic • Suppression • Suppression/Steering • Transistor Driven

Product Description

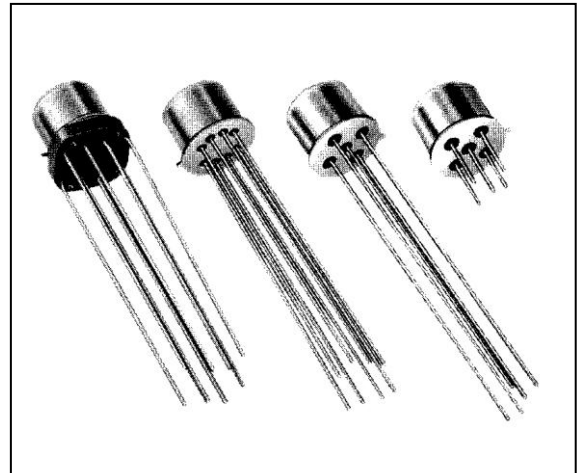
A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities contact configurations and hybrid versions, to provide a most versatile element to the circuit designer. The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 ampere switching
- 1 form C, SPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

Series Types (note 1)

- **1MA*** Basic Relay, 1 form C, SPDT
- **1MA*D** Basic Relay combined with an internal diode for coil transient suppression
- **1MA*DD** Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection
- **1MA*T** Basic Relay incorporating an internal transistor driver and diode for coil transient suppression



Environmental and Physical Specifications

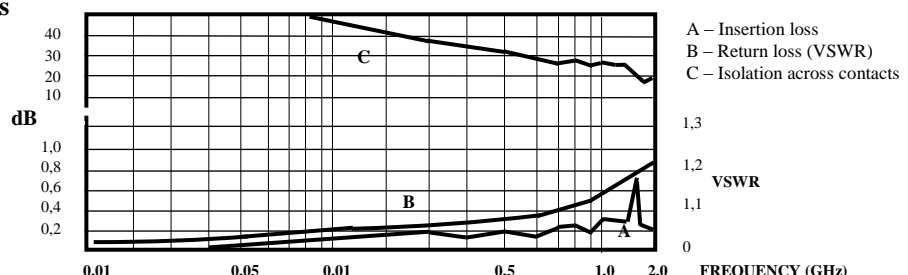
| | |
|------------------------|--|
| Temperature (Ambient) | - 65°C to + 125°C |
| Shock | 75 g, 6 ms. |
| Vibration (sinusoidal) | 30 g, 10 to 3000 Hz |
| Vibration (random) | 0,4 g ² / Hz, 50 to 2000 Hz |
| Acceleration | 50 g |
| Sealing | All welded, Hermetic |
| Weight | 0,08 oz. (2,27 grams) max. |

Electrical Characteristics (over the Temperature range. Unless otherwise noted)

| Coil Data | See Typical Characteristics chart | | |
|--|---|--|--|
| Contact Rating | Type Load | Contact Load | Cycles min. |
| (Note: All ratings with grounded case) | Low Level | 10 to 50 μ A / 10 to 50 mV | 1.000.000 |
| | Resistive | 1 A / 28 Vdc 250 mA / 115Vac, 60 and 400 Hz (Case not grounded) | 100.000 100.000 |
| | Resistive overload | 100 mA / 115 Vac, 60 and 400 Hz | 100.000 |
| | Inductive | 2 A / 28 Vdc | 100 |
| | Lamp | 200 mA / 28 Vdc (320 mH) 100 mA / 28 Vdc | 100.000 100.000 |
| Contact Resistance | 0,1 Ω max. initial, 0,2 Ω max. after life | | |
| Operate Time | 2,0 ms. max. | | |
| Release Time | 2,0 ms. max. Series: 1MA* | | 4,0 ms. max. Series: 1MA*D, 1MA*DD, 1MA*T |
| Contact Bounce | 1,5 ms. max. | | |
| Dielectric Strength | 500 Vrms min., 60 Hz, all points at sea level | | 300 Vrms min., 60 Hz, all points at 70.000 ft. |
| Insulation Resistance | 10.000 M Ω min. all points at 500 Vdc | | |
| Intercontact Capacitance | 0,7 pF typical | | |
| Sensitivity | 100 mW at pick-up, 400 mW at nominal rated coil voltage, at 25 °C | | |
| Diode P.I.V. | 100 Vdc min. Series: 1MA*D, 1MA*DD, 1MA*T | | |
| Negative Coil Transient | 1,0 Vdc max. Series: 1MA*D, 1MA*DD, 1MA*T | | |
| Transistor Characteristics at 25 °C (Series 1MA*T) | Emitter-Base Voltage (Vebo) | | 6,0 Vdc min. |
| | Collector-Base Breakdown Voltage (Vcbo) (Ic = 10 μ A) | | 70 Vdc min. |
| | Base Turn-Off Voltage | | 0,3 Vdc max. |

Figure 1 - Radio Frequency Curves

Note:
Radio frequency curves are typical characteristics based on factory knowledge. Tests to ensure compliance on RF performance, are not performed.





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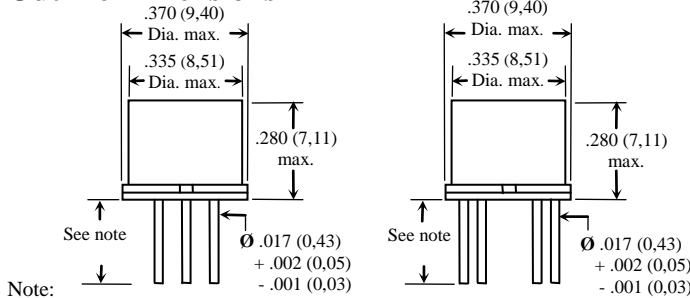
Series
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Typical Characteristics

| Description | Meas. | Series Types | | Coil Voltage Code | | | | | |
|--------------------------|------------------|--|-------|-------------------|------|------|------|------|------|
| | | | | 5 | 6 | 9 | 12 | 18 | 26 |
| Coil Voltage | Vdc | 1MA*, 1MA*D, 1MA*DD, 1MA*T | Nom. | 5,0 | 6,0 | 9,0 | 12,0 | 18,0 | 26,5 |
| | | 1MA*, 1MA*D, 1MA*DD, 1MA*T | Max. | 5,8 | 8,0 | 12,0 | 16,0 | 24,0 | 32,0 |
| Coil Resistance at 25°C | Ω | 1MA*, 1MA*D, 1MA*T | ±10 % | 63 | 125 | 280 | 500 | 1130 | 2000 |
| | | 1MA*DD | | 50 | 98 | | | | |
| Coil Current at 25°C | mA _{dc} | 1MA*DD | Min. | 72,7 | 46,3 | 25,9 | 20,0 | 13,6 | 11,5 |
| | | | Max. | 100 | 62,4 | 33,7 | 25,6 | 17,2 | 14,4 |
| | | 1MA*T | Min. | 66,6 | 42,0 | 28,0 | 20,9 | 13,8 | 11,5 |
| | | | Max. | 89,6 | 55,5 | 38,1 | 28,1 | 18,8 | 15,5 |
| Pick-up Voltage at 25°C | Vdc | 1MA*, 1MA*D | Typ. | 2,8 | 3,5 | 5,3 | 7,0 | 10,5 | 14,2 |
| | | 1MA*DD | Typ. | 3,5 | 4,1 | 6,3 | 8,0 | 11,6 | 15,4 |
| | | 1MA*T | Typ. | 3,0 | 3,8 | 5,6 | 7,2 | 10,7 | 14,4 |
| Drop-Out Voltage at 25°C | Vdc | 1MA*, 1MA*D, 1MA*DD, 1MA*T | Min. | 1,7 | 2,0 | 3,0 | 4,0 | 6,0 | 8,0 |
| | | | Max. | 0,23 | 0,28 | 0,47 | 0,62 | 0,91 | 1,25 |
| Base Current to Turn-on | mA _{dc} | 1MA*T (limit for base / emitter current to 15 mA max.) | Max. | 2,38 | 1,60 | 1,07 | 0,80 | 0,53 | 0,40 |

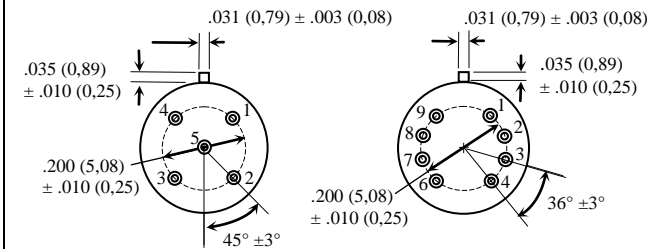
Outline Dimensions



Note:
 - Dimensions are shown in inches (millimetres)
 - Terminal Variants: - (C) Standard Wire Terminal = .500 (12,7) min,
 - (W) Long Wire Terminal = 1.500 (38,1) min,
 - (P) Pin Terminal = .187 ± .010 (4,75 ± 0,25)

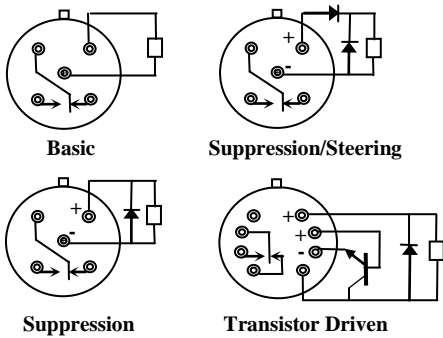
Terminal Locations

Basic and Suppressed Transistor Driven



Note:
 - Dimensions are shown in inches (millimetres)
 - Viewed from terminals, numbers are for reference only

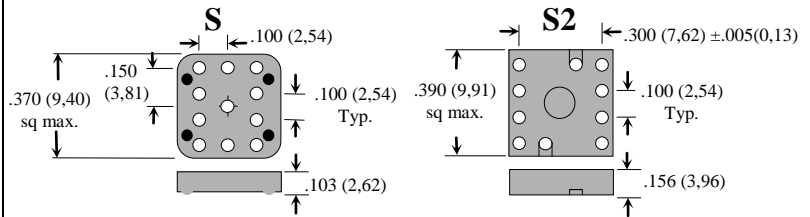
Schematic Diagrams



Note: Schematics are viewed from terminals

Spreader Pads

Relays can be supplied with a spreader pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add. "S" or "S2" to Part Number, Example: **1MAWD - 26S**



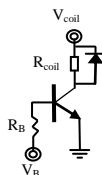
Note:
 - Dimensions are in inches (millimetres)
 - Pad Type S2 is used only on series 1MA*T
 - Pad Type S is used on series: 1MA*, 1MA*D, 1MA*DD, 1MA*T

Note:

1 " * " Indicates Terminal Variants: C, P or W

2 Tr ON: I_b = 0,4 to 2,38 mA,
 Tr OFF: V_B = 0,3 Vdc max.

$$3 \quad R_B = \frac{V_B - 0,7}{I_{Bsat}} \quad I_{Bsat} = \frac{V_{coil} - 0,4}{5R_{coil}}$$



How to Order, (Part Numbering System)

