

Double Pole, Electrically Held, 1 Amp and Less

MA, MAD, MADD

MA
Standard TO-5
High Performance Relay
Qualified to
MIL-R-39016/9



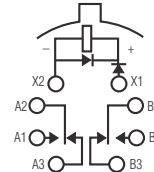
Terminal View

MAD
Standard TO-5
Diode Suppressed
High Performance Relay
Qualified to
MIL-R-39016/15



Terminal View

MADD
Standard TO-5 Diode
Suppressed/Protected
High Performance Relay
Qualified to
MIL-R-39016/20



Terminal View

Product Facts

- Hermetically sealed
- High shock & vibration ratings
- Spreader pads
- Excellent RF switching

Product Facts

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Product Facts

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- Excellent RF switching

Electrical Characteristics

Contact Arrangement —
 2 Form C (DPDT)

Contact Material —
 Stationary —
 Gold/platinum/palladium/silver alloy
 (gold plated)
 Moveable —
 Gold/platinum/palladium/silver alloy
 (gold plated)

Contact Resistance —
 Before Life — 100 milliohms max.
 (measured @ 10 mA @ 6 Vdc)
 After Life — 200 milliohms max.
 (measured @ 1 A @ 28 Vdc)

Mechanical Life Expectancy —
 1 million operations

Coil Voltage —
 5 to 30 Vdc (MA/MAD)
 5 to 26.5 Vdc (MADD)

Coil Power — 675 mW max. @ 25°C

Duty Cycle — Continuous

Pick-up Voltage — Approximately
 50% of nominal coil voltage

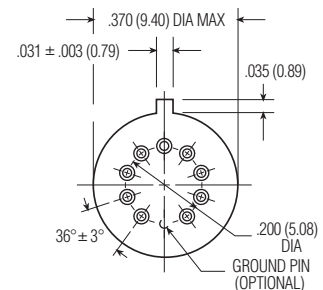
Pick-up Sensitivity —
 130 mW max. @ 25°C

Contact Ratings

| Contact Load | Type | Operations Min. |
|----------------------------------|-------------------------------|-----------------|
| 1.0 A @ 28 Vdc | Resistive | 100,000 |
| 250 mA @ 115 Vac, 60 Hz & 400 Hz | Resistive (case not grounded) | 100,000 |
| 100 mA @ 115 Vac, 60 Hz & 400 Hz | Resistive | 100,000 |
| 0.2 A @ 28 Vdc | Inductive (0.32 Henry) | 100,000 |
| 0.1 A @ 28 Vdc | Lamp | 100,000 |
| 30 µA @ 50 mVdc | Low Level | 1,000,000 |
| 0.1 A @ 28 Vdc | Intermediate Current | 50,000 |



Enclosure



Double Pole, Electrically Held, 1 Amp and Less (Continued)

MA, MAD, MADD (Continued)

Operating Characteristics

Timing —
 Operate Time — 2.0 ms max.
 Release Time —
 MA — 1.5 ms max.
 MAD/MADD — 4.0 ms max.
 (suppression diode, suppression/
 steering diodes)

Contact Bounce — 1.5 ms max

Dielectric Withstanding Voltage —

Between Open Contacts —
 500 Vrms 60 Hz
 Between Adjacent Contacts —
 500 Vrms 60 Hz
 Between Contacts & Coil —
 500 Vrms 60 Hz

Insulation Resistance —

10,000 megohms min. @ 500 Vdc
 1,000 megohms @ 500 Vdc
 (coil to case @ +125°C)

Environmental Characteristics

Temperature Range —
 -65°C to +125°C

Weight —
 0.09 oz. (2.55 grms)
 0.10 oz. (2.80 grms) with spreader pad
 attached

Vibration Resistance —

30 G's, 10 to 3,000 Hz

Shock Resistance —

75 G's, 6 ±1 ms max.

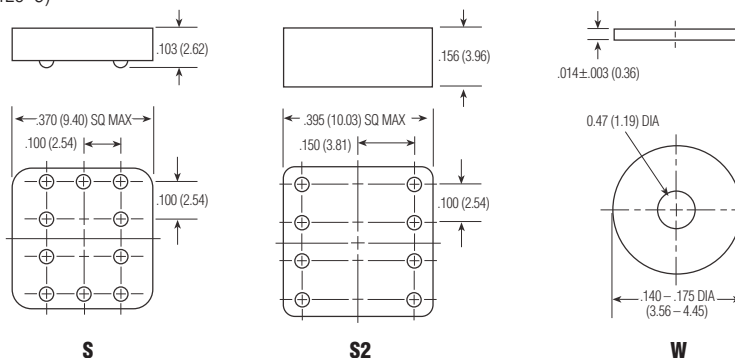
QPL Approval —

MIL-R-39016/9 (JMA)
 MIL-R-39016/15 (JMAD)
 MIL-R-39016/20 (JMADD)

Semiconductor Characteristics

Diode —

100 Vdc peak inverse voltage (PIV)
 1.0 Vdc max. transient voltage



Spreader & Mounting Pads

Coil Data

| Nom. Coil Voltage (Vdc) | Coil Resistance in Ohms ±10% @ 25°C (Note 1) | Coil Circuit Current mA (Max.) (Note 1&2) | Coil Circuit Current mA (Min.) (Note 1&2) | Pickup Voltage Vdc (Max.) @ 25°C (Note 2) | Base Turn On Current mA (Max.) @ 25°C | Pickup Voltage Vdc (Max.) @ 125°C (Note 2) | Base Turn On Current mA (Max.) @ 125°C | Drop-Out Voltage Vdc (Min.) @ 25°C (Note 2) | Drop-Out Voltage Vdc (Min.) @ -65°C (Note 2) | Nom. Coil Power (mW) @ 25°C | Max. Coil Voltage | Coil Desig. |
|-------------------------|--|---|---|---|---------------------------------------|--|--|---|--|-----------------------------|-------------------|-------------|
| MA/MAD | | | | | | | | | | | | |
| 5.0 | 50 | n/a | n/a | 2.7 | n/a | 3.5 | n/a | 0.22 | 0.14 | 500 | 5.8 | 5 |
| 6.0 | 98 | n/a | n/a | 3.5 | n/a | 4.5 | n/a | 0.28 | 0.18 | 367 | 8.0 | 6 |
| 9.0 | 220 | n/a | n/a | 5.3 | n/a | 6.8 | n/a | 0.54 | 0.35 | 368 | 12.0 | 9 |
| 12.0 | 390 | n/a | n/a | 7.0 | n/a | 9.0 | n/a | 0.63 | 0.41 | 369 | 16.0 | 12 |
| 18.0 | 880 | n/a | n/a | 10.5 | n/a | 13.5 | n/a | 0.91 | 0.59 | 368 | 24.0 | 18 |
| 26.5 | 1,560 | n/a | n/a | 14.2 | n/a | 18.0 | n/a | 1.37 | 0.89 | 450 | 32.0 | 26 |
| 30.0 | 2,500 | n/a | n/a | 17.7 | n/a | 22.0 | n/a | 1.50 | 1.00 | 360 | 36.0 | 30 |
| MADD | | | | | | | | | | | | |
| 5.0 | 39 | 128.2 | 93.2 | 3.2 | n/a | 4.0 | n/a | 0.6 | 0.6 | 641 | 5.8 | 5 |
| 6.0 | 78 | 78.3 | 58.3 | 4.0 | n/a | 5.0 | n/a | 0.7 | 0.7 | 462 | 8.0 | 6 |
| 9.0 | 220 | 42.9 | 33.0 | 6.3 | n/a | 7.8 | n/a | 0.9 | 0.8 | 368 | 12.0 | 9 |
| 12.0 | 390 | 32.8 | 25.6 | 8.0 | n/a | 10.0 | n/a | 1.1 | 0.9 | 369 | 16.0 | 12 |
| 18.0 | 880 | 22.1 | 17.5 | 11.5 | n/a | 14.5 | n/a | 1.4 | 1.1 | 368 | 24.0 | 18 |
| 26.5 | 1,560 | 18.5 | 14.8 | 15.2 | n/a | 19.0 | n/a | 1.8 | 1.4 | 450 | 32.0 | 26 |

Notes: 1. Coil resistance not directly measurable. Coil current should be within limits shown when tested at nominal voltage at 25°C for 5 seconds max.
 2. Set base current at 3 mA to 15 mA during measurements.

Ordering Instructions

Catalog-selected Relays: The catalog number is derived by choosing the proper CODE for each of the relay characteristics in the order in which the codes are listed.

| Specifying a Part Number Example: | Type | Terminal | Diodes | Ground Pins | Coils | Spreader/Mounting Pads |
|-----------------------------------|------|----------|--------|-------------|-------|------------------------|
| | MA | C | D | G | -26 | S |

* The part number example shown on this page is for catalog items. For a list of specific QPL part numbers, please see the index in Section 15.