

Double Pole, Electrically Held, 1 Amp and Less

MA, MAD, MADD

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



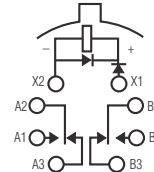
Terminal View

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

- Suppression & protection diodes
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- Spreader pads
- 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

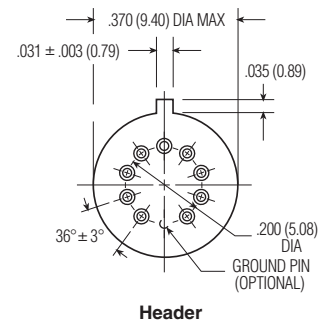
Pick-up Sensitivity —
 130 mW max. @ 25°C

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



Header

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 —

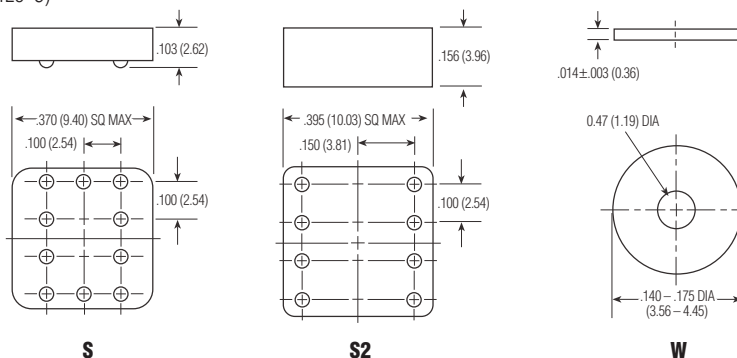
75 G's, 6 ±1 ms max.

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:

<u>Type</u>	<u>Terminal</u>	<u>Diodes</u>	<u>Ground Pins</u>	<u>Coils</u>	<u>Spreader/Mounting Pads</u>
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.