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**Table of Contents**

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CII MW3 / MW4 / MW6 / MW3HP / MW4HP / MW6HP Series Relays

Double Pole, Electrically Held, 1 Amp and Less

Introduction .....	.2-2
MW3 & MW3HP Models, 3 GHz Switching .....	.2-3, 2-4
MW4 & MW4HP Models, 4 GHz Switching .....	.2-5, 2-6
MW6 & MW6HP Models, 6 GHz Switching .....	.2-7, 2-8



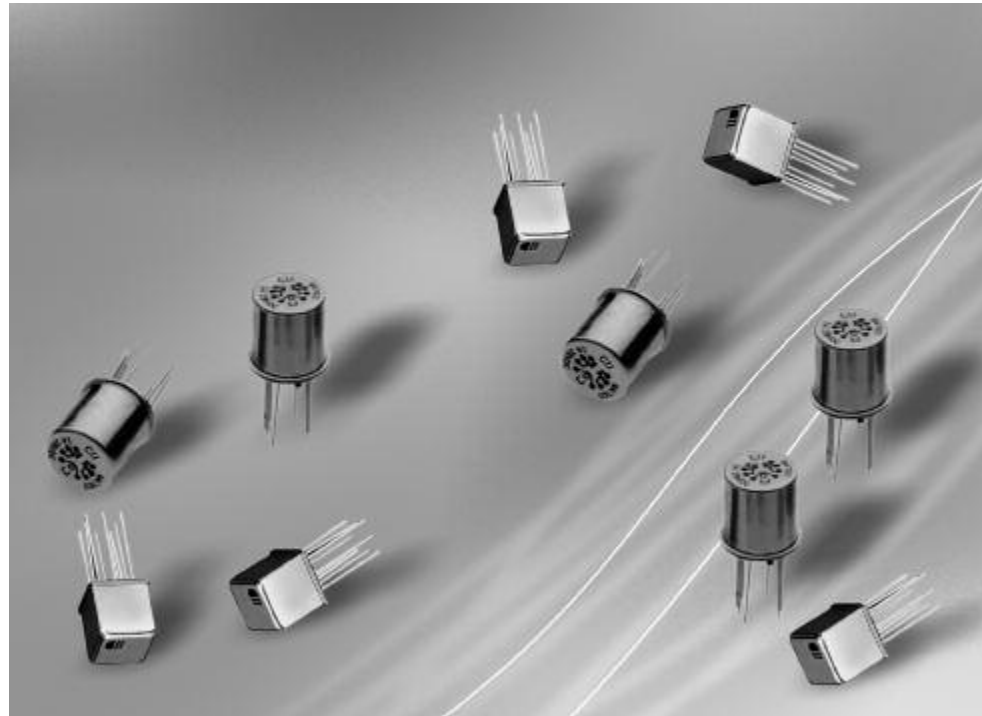
**Double Pole, Electrically Held, 1 Amp and Less**

**MW3 / MW4 / MW6 /  
MW3HP / MW4HP / MW6HP  
Series Relays**

**Microwave Switching,  
Hermetically Sealed, DPDT**

**Product Facts**

- Excellent signal isolation, stable insertion loss and low VSWR
- Provide repeatable RF performance at frequencies up to the 3 GHz. level (MW3/MW3HP), 4 GHz. level (MW4/MW4HP) & 6 GHz. level (MW6/MW6HP)
- Standard versions for applications ranging from wireless communications to precision high-speed test equipment
- High performance (HP) versions for use under more demanding environmental conditions
- Standard or sensitive (S) coils are offered in a range of DC input voltages
- 2 Form C (DPDT) contacts rated low-level to 1 amp
- Extended mechanical life expectancy of 10 million operations
- Robust, hermetically sealed enclosure



These CII relays provide microwave frequency switching in a hermetically sealed, subminiature package.

Both standard and high performance models are offered in 3 GHz., 4 GHz. and 6 GHz. types.

Standard models (MW3, MW4 and MW6) perform in temperature ranges from -55°C to +85°C and withstand 10G vibration and 30G shock.

High performance models (MW3HP, MW4HP and MW6HP) offer extended temperature ratings of -65°C to +125°C while providing 30G's vibration and 100G's shock (75G's for MW3) environmental ratings.

All are available with either standard or sensitive DC coils. Nominal coil power is 367-500mW (model dependent) for standard coils and 169-250mW for sensitive coils.

Signal isolation is 18dB at 6 GHz. (MW6/MW6HP), 18dB at 4 GHz. (MW4/MW4HP), and 22dB at 3 GHz. (MW3/MW3HP).

Insertion loss is 0.38dB for MW6/MW6HP, 0.27dB for MW4/MW4HP, and 0.36dB for MW3/MW3HP.

VSWR is a low 1.30:1 @ 6GHz. for MW6/MW6HP, 1.36:1 @ 4GHz. for MW4/MW4HP, and 1.24:1 @ 3GHz. for MW3/MW3HP.

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

**Microwave Switching,  
Hermetically Sealed, DPDT  
MW3 & MW3HP Models  
3 GHz. Switching**

**Electrical Characteristics**

**Contact Arrangement** —  
2 Form C (DPDT)

**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** —  
10 million operations

**Coil Voltages** —  
5, 12, 18 & 26.5 VDC (MW3)  
5, 6, 9, 12, 18 & 26.5 VDC (MW3HP)

**Coil Power** (mW max. @ 25°C) —  
MW3 MW3S MW3HP MW3HPS  
675 565 673 563

**Duty Cycle** — Continuous

**Pick-up Voltage** —  
MW3 — Approx 70% of nominal.  
MW3HP — Approx 50% of nominal.

**Pick-up Sensitivity** (mW max. @  
25°C) —  
MW3 MW3S MW3HP MW3HPS  
180 90 146 68

**Operating Characteristics**

**Operate Time** (ms max.) —  
MW3 MW3S MW3HP MW3HPS  
4.0 6.0 2.0 4.0

**Release Time** (ms max.)  
MW3 MW3S MW3HP MW3HPS  
3.0 3.0 1.5 2.0

**Bounce Time** (ms max.)  
MW3 MW3S MW3HP MW3HPS  
— — 1.5 1.5

**Dielectric Withstanding Voltage** —  
Between Open Contacts,  
Between Adjacent Contacts and Between  
Contacts and Coil —  
MW3 types — 350 Vrms, 60 Hz.  
MW3HP types — 500 Vrms, 60 Hz.

**Insulation Resistance** —  
1,000 megohms @ 500 VDC

**Environmental Characteristics**

**Temperature Range** —  
MW3 types — -55°C to +85°C.  
MW3HP types — -65°C to +125°C.

**Weight** —  
MW3, MW3HP: 0.09 oz. (2.55 g)  
MW3S, MW3HPS: 0.12 oz. (3.40 g).

**Vibration Resistance** —  
MW3 types — 10 G's, 10-500 Hz.  
MW3HP types — 30 G's, 10-3,000 Hz

**Shock Resistance** —  
MW3 types — 30 G's, 6 ± 1 ms.  
MW3HP types — 75 G's, 6 ± 1 ms.

**Contact Ratings**

Contact Load	Type	Operations Min.
1.0A @ 28VDC	Resistive	100,000
200mA @ 28VDC (300mH)*	Inductive	100,000
30µA @ 50mVDC	Low Level	10,000,000

\* The inductive rating is only applicable to high performance models (MW3HP and MW3HPS).

**Coil Data**

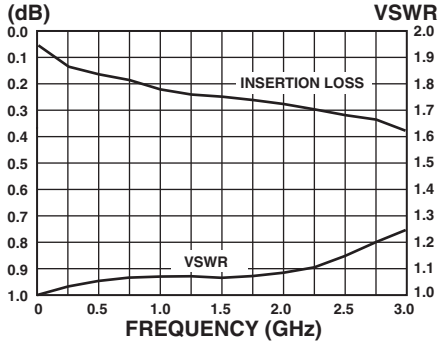
MW3 Models					
Nominal Coil Voltage (VDC)	Coil Resistance In Ohms ±20% @ 25°C	Pickup Voltage VDC (Max.) @ 25°C	Nominal Coil Power (mW) @ 25°C	Maximum Coil Voltage	Coil Desig.
<b>Standard Coil</b>					
5.0	50	3.6	500	5.8	5
12.0	390	8.4	369	16.0	12
18.0	880	13.0	368	24.0	18
26.5	1,560	17.0	450	32.0	26
<b>Sensitive Coil</b>					
5.0	100	3.5	250	7.5	5
12.0	850	9.0	169	20.0	12
18.0	1,600	13.5	203	30.0	18
26.5	3,300	18.0	213	40.0	26

MW3HP (High Performance) Models							
Nominal Coil Voltage (VDC)	Coil Res. in Ohms ±10% @ 25°C	Pickup V VDC (Max.) @ 25°C	Release V VDC (Max.) @ 25°C	Release V VDC (Min.) @ 25°C	Nominal Coil Power (mW) @ 25°C	Maximum Coil Voltage	Coil Desig.
<b>Standard Coil</b>							
5.0	50	2.7	1.4	0.22	500	5.8	5
6.0	98	3.5	2.0	0.28	367	8.0	6
9.0	220	5.3	3.0	0.54	368	12.0	9
12.0	390	7.0	4.0	0.63	369	16.0	12
18.0	880	10.5	6.0	0.91	368	24.0	18
26.5	1,560	14.2	8.0	1.37	450	32.0	26
<b>Sensitive Coil</b>							
5.0	100	2.6	1.4	0.23	250	7.5	5
6.0	200	3.4	2.0	0.28	180	10.0	6
9.0	400	4.85	3.0	0.55	203	15.0	9
12.0	850	7.0	4.0	0.64	169	20.0	12
18.0	1,600	9.8	6.0	0.92	203	30.0	18
26.5	3,300	14.0	8.0	1.4	213	40.0	26

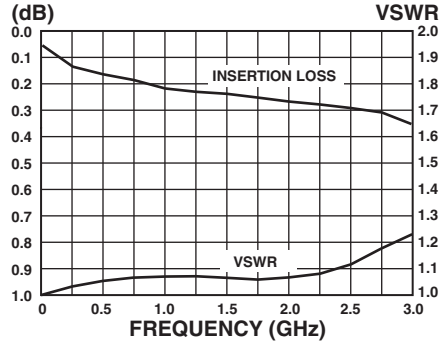
**Double Pole, Electrically Held, 1 Amp and Less (Continued)**

**Microwave Switching, Hermetically Sealed, DPDT  
MW3 & MW3HP Models, 3 GHz. Switching (Continued)**

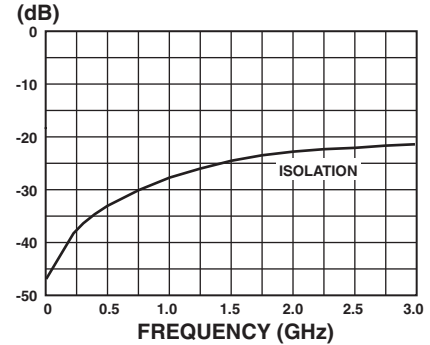
**Insertion Loss & VSWR: NO Contacts**



**Insertion Loss & VSWR: NC Contacts**



**Isolation**



**Test Conditions**

**Test Board** — 0.031" double sided copper clad, PTFE based laminate.

**Connections** — Relay header is soldered to ground plane. Relay terminals are soldered to through holes. SMA connectors are soldered to circuit traces.

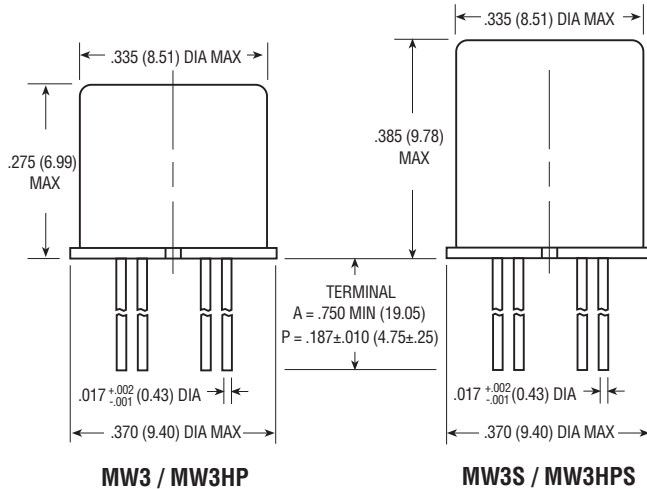
**Temperature** — Room ambient.

**Signal Strength** — 0 dBm.

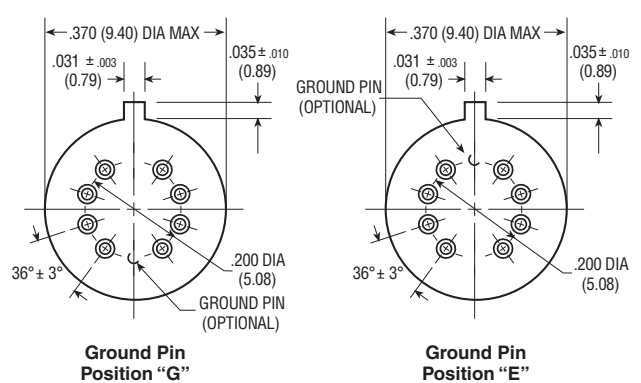
**Notes:**

1. Unused terminals were terminated with 50 ohm impedance load.
2. All readings are typical.

**Enclosures**



**Header**

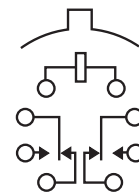


For other ground pin configurations consult factory.

**Header and Terminal Finish:**  
Nickel plated on MW3 & MW3S.  
Tin-lead plated on MW3HP & MW3HPS.

<b>Typical Part Number</b>	MW3	S	5	A	G
<b>Series:</b>	MW3 = 3 GHz. switching relay MW3HP = High performance 3 GHz. switching relay				
<b>Coil Sensitivity:</b>	Leave Blank = Standard Coil    S = Sensitive Coil				
<b>Coil Designator:</b>	5 = 5VDC    6 = 6VDC†    9 = 9VDC† 12 = 12VDC    18 = 18VDC    26 = 26.5VDC † 6 and 9 volt coil only available on high performance models.				
<b>Terminal Length:</b>	A = 0.750 in (19.05 mm)    P = 0.187 ± 0.010 in (4.75 ± 0.25 mm)				
<b>Ground Pin Position (see header drawings above):</b>	G = Opposite locating tab    E = Near locating tab. Consult factory for other ground pin configurations.				

**Wiring Diagram**



**Terminal View**

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

**Microwave Switching,  
Hermetically Sealed, DPDT  
MW4 & MW4HP Models  
4 GHz. Switching**

**Electrical Characteristics**

**Contact Arrangement** —  
2 Form C (DPDT)

**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** —  
10 million operations

**Coil Voltages** —  
5, 12, 18 & 26.5 VDC (MW4)  
5, 6, 9, 12, 18 & 26.5 VDC (MW4HP)

**Coil Power** (mW max. @ 25°C) —  
MW4 MW4S MW4HP MW4HPS  
675 565 673 563

**Duty Cycle** — Continuous

**Pick-up Voltage** —  
MW4 — Approx 70% of nominal.  
MW4HP — Approx 50% of nominal.

**Pick-up Sensitivity** (mW max. @  
25°C) —  
MW4 MW4S MW4HP MW4HPS  
180 90 123 68

**Operating Characteristics**

**Operate Time** (ms max.) —  
MW4 MW4S MW4HP MW4HPS  
4.0 6.0 2.0 4.0

**Release Time** (ms max.)  
MW4 MW4S MW4HP MW4HPS  
3.0 3.0 1.5 2.0

**Bounce Time** (ms max.)  
MW4 MW4S MW4HP MW4HPS  
— — 1.5 1.5

**Dielectric Withstanding Voltage** —  
Between Open Contacts,  
Between Adjacent Contacts and Between  
Contacts and Coil —  
MW4 types — 350 Vrms, 60 Hz.  
MW4HP types — 500 Vrms, 60 Hz.

**Insulation Resistance** —  
1,000 megohms @ 500 VDC

**Environmental Characteristics**

**Temperature Range** —  
MW4 types — -55°C to +85°C.  
MW4HP types — -65°C to +125°C.

**Weight** —  
MW4, MW4HP: 0.09 oz. (2.55 g)  
MW4S, MW4HPS: 0.12 oz. (3.40 g).

**Vibration Resistance** —  
MW4 types — 10 G's, 10-500 Hz.  
MW4HP types — 30 G's, 10-3,000 Hz

**Shock Resistance** —  
MW4 types — 30 G's, 6 ± 1 ms.  
MW4HP types — 100 G's, 6 ± 1 ms.

**Contact Ratings**

Contact Load	Type	Operations Min.
1.0A @ 28VDC	Resistive	100,000
200mA @ 28VDC (300mH)*	Inductive	100,000
30µA @ 50mVDC	Low Level	10,000,000

\* The inductive rating is only applicable to high performance models (MW4HP and MW4HPS).

**Coil Data**

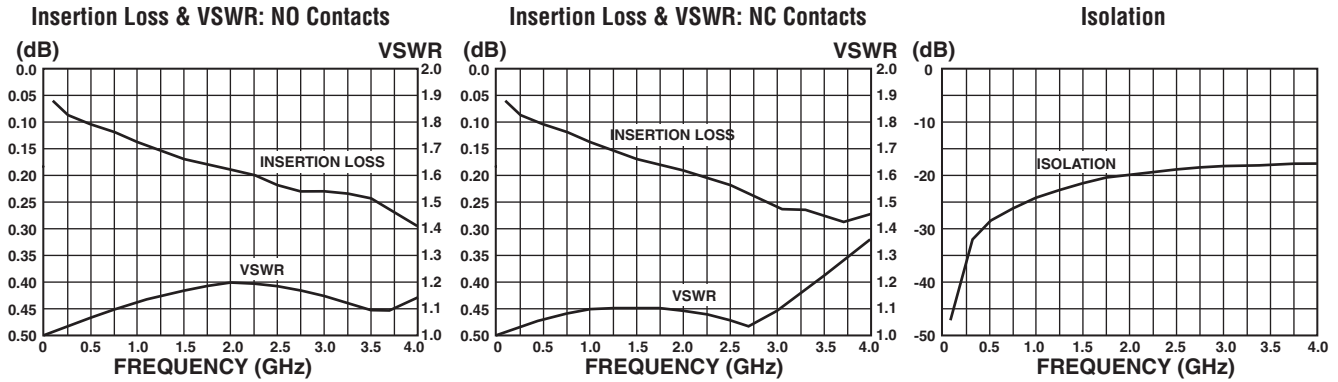
MW4 Models					
Nominal Coil Voltage (VDC)	Coil Resistance In Ohms ±20% @ 25°C	Pickup Voltage VDC (Max.) @ 25°C	Nominal Coil Power (mW) @ 25°C	Maximum Coil Voltage	Coil Desig.
<b>Standard Coil</b>					
5.0	50	3.6	500	5.8	5
12.0	390	8.4	369	16.0	12
18.0	880	13.0	368	24.0	18
26.5	1,560	17.0	450	32.0	26
<b>Sensitive Coil</b>					
5.0	100	3.5	250	7.5	5
12.0	850	9.0	169	20.0	12
18.0	1,600	13.5	203	30.0	18
26.5	3,300	18.0	213	40.0	26

**MW4HP (High Performance) Models**

Nominal Coil Voltage (VDC)	Coil Res. in Ohms ±10% @ 25°C	Pickup V VDC (Max.) @ 25°C	Release V VDC (Max.) @ 25°C	Release V VDC (Min.) @ 25°C	Nominal Coil Power (mW) @ 25°C	Maximum Coil Voltage	Coil Desig.
<b>Standard Coil</b>							
5.0	50	2.7	1.4	0.22	500	5.8	5
6.0	98	3.5	2.0	0.28	367	8.0	6
9.0	220	5.3	3.0	0.54	368	12.0	9
12.0	390	7.0	4.0	0.63	369	16.0	12
18.0	880	10.5	6.0	0.91	368	24.0	18
26.5	1,560	14.2	8.0	1.37	450	32.0	26
<b>Sensitive Coil</b>							
5.0	100	2.6	1.4	0.23	250	7.5	5
6.0	200	3.4	2.0	0.28	180	10.0	6
9.0	400	4.85	3.0	0.55	203	15.0	9
12.0	850	7.0	4.0	0.64	169	20.0	12
18.0	1,600	9.8	6.0	0.92	203	30.0	18
26.5	3,300	14.0	8.0	1.4	213	40.0	26

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

**Microwave Switching, Hermetically Sealed, DPDT  
MW4 & MW4HP Models 4 GHz. Switching (Continued)**



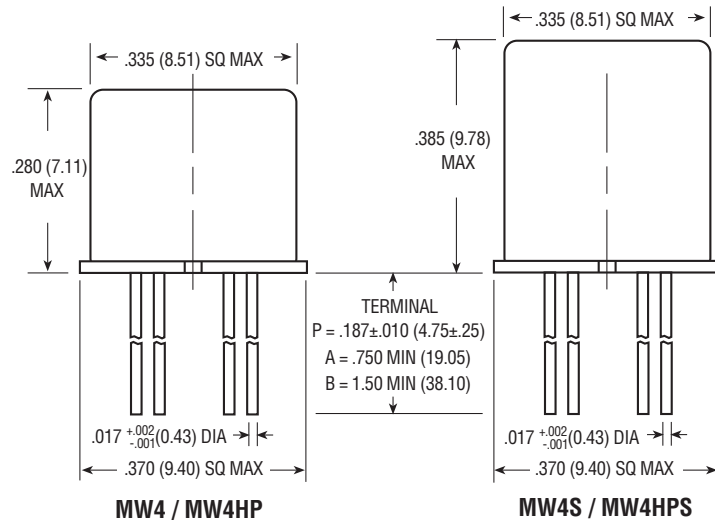
**Test Conditions**

**Test Board** — 0.031" double sided copper clad, PTFE based laminate.  
**Connections** — Relay header is soldered to ground plane. Relay terminals are soldered to through holes. SMA connectors are soldered to circuit traces.

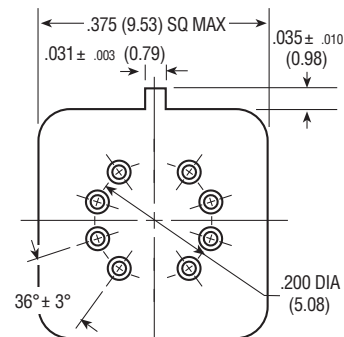
**Temperature** — Room ambient.  
**Signal Strength** — 0 dBm.

**Notes:**  
 1. Unused terminals were terminated with 50 ohm impedance load.  
 2. All readings are typical.

**Enclosures**



**Header**



**Header and Terminal Finish:**  
**Gold plated**

**Typical Part Number** MW4 S - 5 P

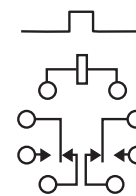
**Series:**  
 MW4 = 4 GHz. switching relay  
 MW4HP = High performance 4 GHz. switching relay

**Coil Sensitivity:**  
 Leave Blank = Standard Coil    S = Sensitive Coil

**Coil Designator:**  
 5 = 5VDC    6 = 6VDC†    9 = 9VDC†  
 12 = 12VDC    18 = 18VDC    26 = 26.5VDC  
 † 6 and 9 volt coil only available on high performance models.

**Terminal Length:**  
 A = 0.750 in (19.05 mm)  
 B = 1.50 in (38.105 mm) — only available on high performance models  
 P = 0.187 ± 0.010 in (4.75 ± 0.25 mm)

**Wiring Diagram**



**Terminal View**

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

**Microwave Switching,  
Hermetically Sealed, DPDT  
MW6 & MW6HP Models  
6 GHz. Switching**

**Electrical Characteristics**

**Contact Arrangement** —  
2 Form C (DPDT)

**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** —  
10 million operations

**Coil Voltages** —  
5, 12, 18 & 26.5 VDC (MW6)  
5, 6, 9, 12, 18 & 26.5 VDC (MW6HP)

**Coil Power** (mW max. @ 25°C) —  
MW6 MW6S MW6HP MW6HPS  
675 565 673 563

**Duty Cycle** — Continuous

**Pick-up Voltage** —  
MW6 — Approx 70% of nominal.  
MW6HP — Approx 50% of nominal.

**Pick-up Sensitivity** (mW max. @  
25°C) —  
MW6 MW6S MW6HP MW6HPS  
180 90 123 68

**Operating Characteristics**

**Operate Time** (ms max.) —  
MW6 MW6S MW6HP MW6HPS  
4.0 6.0 2.0 4.0

**Release Time** (ms max.)  
MW6 MW6S MW6HP MW6HPS  
3.0 3.0 1.5 2.0

**Bounce Time** (ms max.)  
MW6 MW6S MW6HP MW6HPS  
— — 1.5 1.5

**Dielectric Withstanding Voltage** —  
Between Open Contacts,  
Between Adjacent Contacts and  
Between Contacts and Coil —  
MW6 types — 350 Vrms, 60 Hz.  
MW6HP types — 500 Vrms, 60 Hz.

**Insulation Resistance** —  
1,000 megohms @ 500 VDC

**Environmental Characteristics**

**Temperature Range** —  
MW6 types — -55°C to +85°C.  
MW6HP types — -65°C to +125°C.

**Weight** —  
MW6, MW6HP: 0.09 oz. (2.55 g)  
MW6S, MW6HPS: 0.12 oz. (3.40 g).

**Vibration Resistance** —  
MW6 types — 10 G's, 10-500 Hz.  
MW6HP types — 30 G's, 10-3,000 Hz

**Shock Resistance** —  
MW6 types — 30 G's, 6 ± 1 ms.  
MW6HP types — 100 G's, 6 ± 1 ms.

**Contact Ratings**

Contact Load	Type	Operations Min.
1.0A @ 28VDC	Resistive	100,000
200mA @ 28VDC (300 mH)*	Inductive	100,000
30µA @ 50mVDC	Low Level	10,000,000

\* The inductive rating is only applicable to high performance models (MW6HP and MW6HPS).

**Coil Data**

MW6 Models					
Nominal Coil Voltage (VDC)	Coil Resistance in Ohms ±20% @ 25°C	Pickup Voltage VDC (Max.) @ 25°C	Nominal Coil Power (mW) @ 25°C	Maximum Coil Voltage	Coil Desig.
<b>Standard Coil</b>					
5.0	50	3.6	500	5.8	5
12.0	390	8.4	369	16.0	12
18.0	880	13.0	368	24.0	18
26.5	1,560	17.0	450	32.0	26
<b>Sensitive Coil</b>					
5.0	100	3.5	250	7.5	5
12.0	850	9.0	169	20.0	12
18.0	1,600	13.5	203	30.0	18
26.5	3,300	18.0	213	40.0	26

**MW6HP (High Performance) Models**

Nominal Coil Voltage (VDC)	Coil Res. in Ohms ±10% @ 25°C	Pickup V VDC (Max.) @ 25°C	Release V VDC (Max.) @ 25°C	Release V VDC (Min.) @ 25°C	Nominal Coil Power (mW) @ 25°C	Maximum Coil Voltage	Coil Desig.
<b>Standard Coil</b>							
5.0	50	2.7	1.4	0.22	500	5.8	5
6.0	98	3.5	2.0	0.28	367	8.0	6
9.0	220	5.3	3.0	0.54	368	12.0	9
12.0	390	7.0	4.0	0.63	369	16.0	12
18.0	880	10.5	6.0	0.91	368	24.0	18
26.5	1,560	14.2	8.0	1.37	450	32.0	26
<b>Sensitive Coil</b>							
5.0	100	2.6	1.4	0.23	250	7.5	5
6.0	200	3.4	2.0	0.28	180	10.0	6
9.0	400	4.85	3.0	0.55	203	15.0	9
12.0	850	7.0	4.0	0.64	169	20.0	12
18.0	1,600	9.8	6.0	0.92	203	30.0	18
26.5	3,300	14.0	8.0	1.4	213	40.0	26

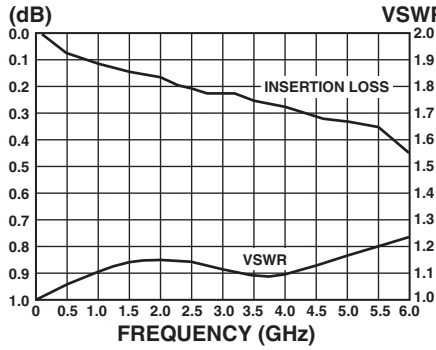


**Double Pole, Electrically Held, 1 Amp and Less** (Continued)

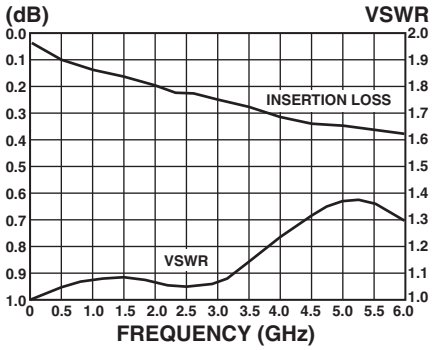
**Microwave Switching, Hermetically Sealed, DPDT**

**MW6 & MW6HP Models 6 GHz. Switching** (Continued)

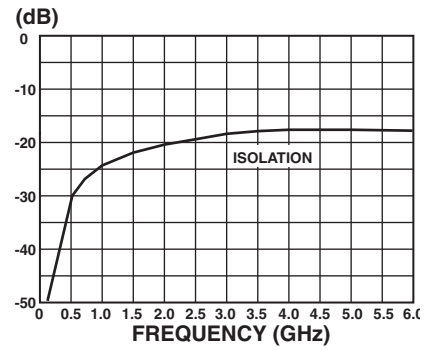
**Insertion Loss & VSWR: NO Contacts**



**Insertion Loss & VSWR: NC Contacts**



**Isolation**



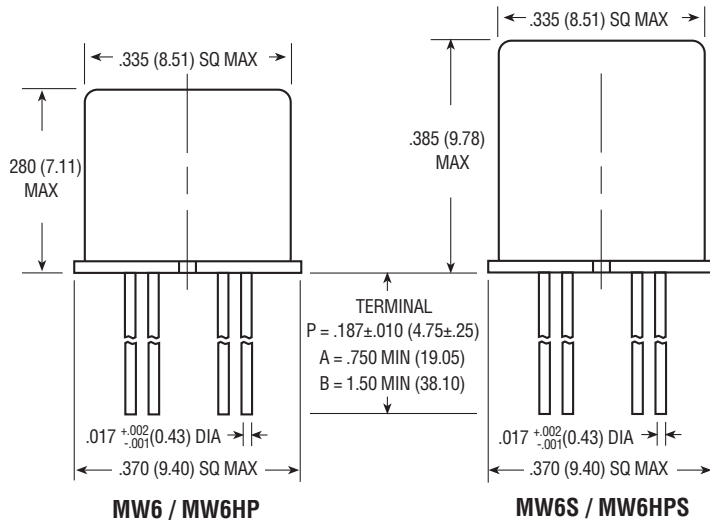
**Test Conditions**

**Test Board** — 0.031" double sided copper clad, PTFE based laminate.  
**Connections** — Relay header is soldered to ground plane. Relay terminals are soldered to through holes. SMA connectors are soldered to circuit traces.

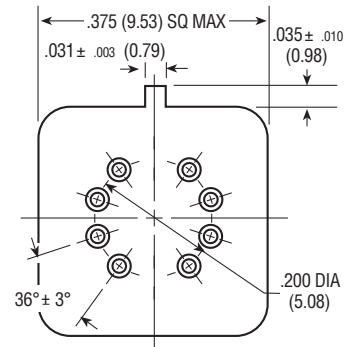
**Temperature** — Room ambient.  
**Signal Strength** — 0 dBm.

- Notes:**
1. Unused terminals were terminated with 50 ohm impedance load.
  2. All readings are typical.

**Enclosures**



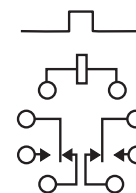
**Header**



**Header and Terminal Finish:**  
**Gold plated**

<b>Typical Part Number</b>	MW6	S	-	5	P
<b>Series:</b>	MW6 = 6 GHz. switching relay MW6HP = High performance 6 GHz. switching relay				
<b>Coil Sensitivity:</b>	Leave Blank = Standard Coil    S = Sensitive Coil				
<b>Coil Designator:</b>	5 = 5VDC    6 = 6VDC†    9 = 9VDC† 12 = 12VDC    18 = 18VDC    26 = 26.5VDC † 6 and 9 volt coil only available on high performance models.				
<b>Terminal Length:</b>	A = 0.750 in (19.05 mm) B = 1.50 in (38.105 mm) — only available on high performance models P = 0.187 ± 0.010 in (4.75 ± 0.25 mm)				

**Wiring Diagram**



**Terminal View**