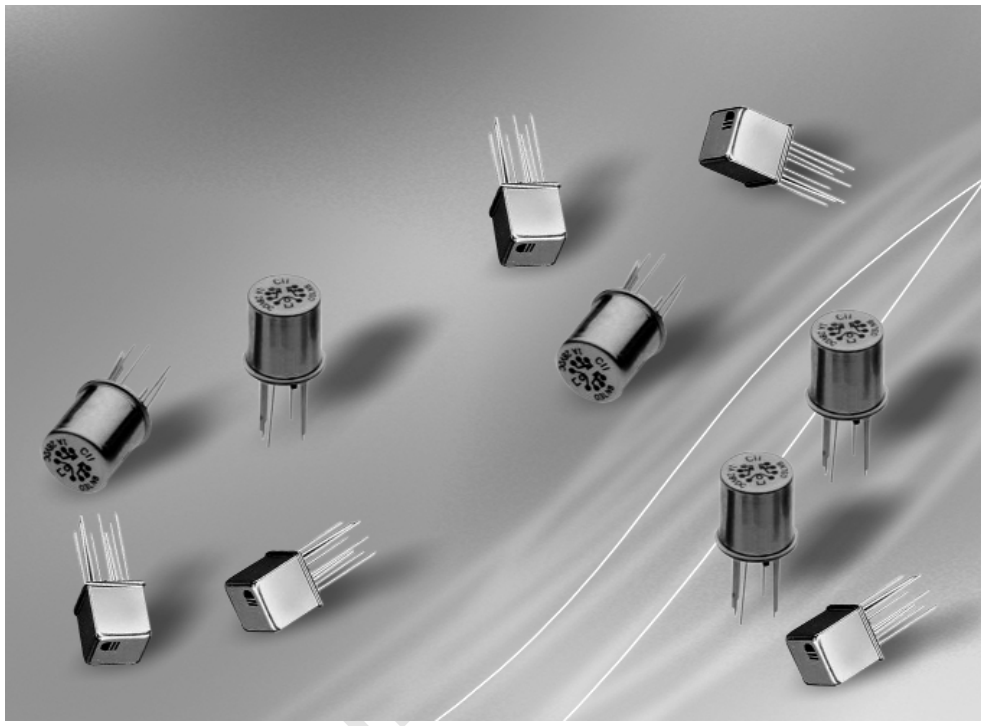
tyco Electronics

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 opertions.
- 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.

Catalog 1654542
Issued 12-03

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MW3 & MW3HP Models
3 GHz. Switching

Electrical Characteristics

Contact Arrangement:
2 Form C (DPDT)

Contact Resistance:
Before life: 100 milliohms, max
(measured @ 10mA @ 6VDC.)
After life: 200 milliohms, max
(measured @ 1A @ 28VDC.)

Mechanical Life Expectancy:
10 million operations

Coil Voltages:
5, 12, 18 & 26.5VDC (MW3)
5, 6, 9, 12, 18 & 26.5VDC (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

Timing:
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: 350Vrms, 60 Hz.
MW3HP types: 500Vrms, 60 Hz.

Insulation Resistance:
1,000 megohms @ 500VDC.

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 Designator
Standard Coil					
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
Sensitive Coil					
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 Designator
Standard Coil							
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
Sensitive Coil							
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

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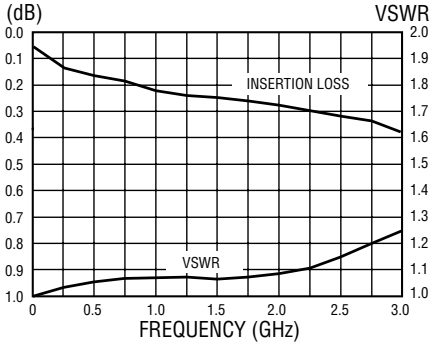
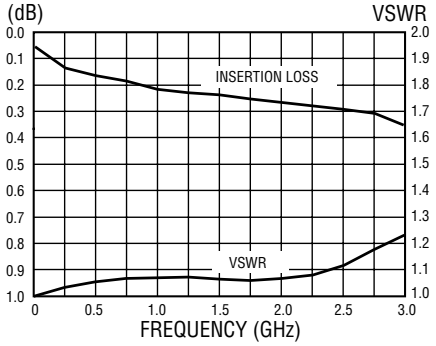
MW3 & MW3HP Models
3 GHz. Switching

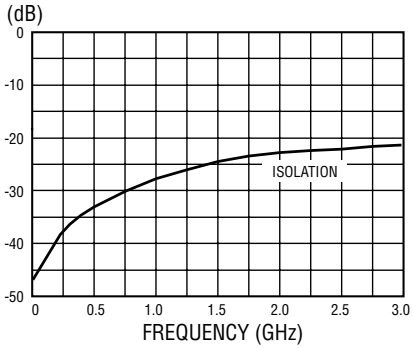
Insertion Loss & VSWR: NO Contacts



Insertion Loss & VSWR: NC Contacts



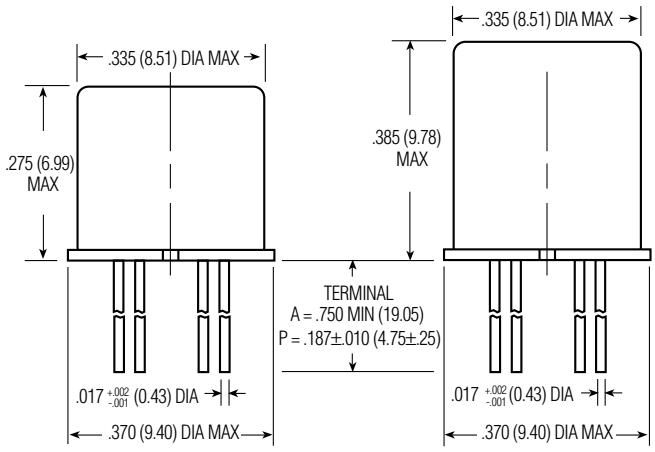
Isolation



Test Conditions

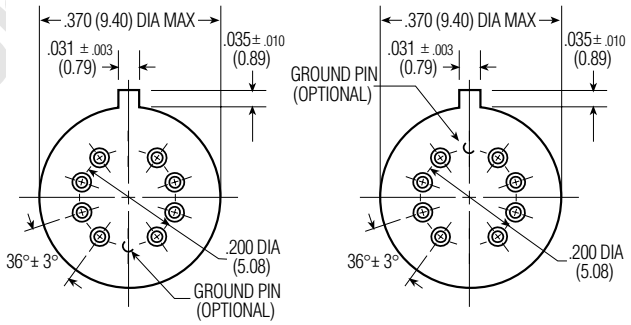
Test Board: 0.031" double sided copper clad, PTFE based laminate.
Connections: Relay header is soldered to ground place. Relay terminals are soldered to through holes. SMA connectors are soldered to circuit traces.
Temperature: Room ambient.
Signal Strength: 0 dBm.
Notes: 1. Unused terminals were terminated with 50 ohm impedance load. 2. All readings are typical.

Enclosures



MW3 / MW3HP | MW3S / MW3HPS

Header



Ground Pin Position "G" | **Ground Pin Position "E"**

For other ground pin configurations consult factory.

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

Part Numbering System

Typical Part Number	MW3	S	– 5	A	G

Series:
MW3 = 3 GHz. switching relay
MW3HP = High performance 3 GHz. switching relay

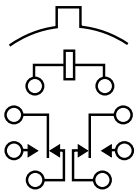
Coil Sensitivity:
Leave Blank = Standard Coil S = Sensitive Coil

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) P = 0.187 ± 0.010 in (4.75 ± 0.25 mm)

Ground Pin Position (see header drawings above):
G = Opposite locating tab E = Near locating tab.
Consult factory for other ground pin configurations.

Wiring Diagram



Terminal View

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MW4 & MW4HP Models
4 GHz. Switching

Electrical Characteristics

Contact Arrangement:
2 Form C (DPDT)

Contact Resistance:
Before life: 100 milliohms, max
(measured @ 10mA @ 6VDC.)
After life: 200 milliohms, max
(measured @ 1A @ 28VDC.)

Mechanical Life Expectancy:
10 million operations

Coil Voltages:
5, 12, 18 & 26.5VDC (MW4)
5, 6, 9, 12, 18 & 26.5VDC (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

Timing:
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: 350Vrms, 60 Hz.
MW4HP types: 500Vrms, 60 Hz.

Insulation Resistance:
1,000 megohms @ 500VDC.

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 Designator
Standard Coil					
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
Sensitive Coil					
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 Designator
Standard Coil							
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
Sensitive Coil							
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

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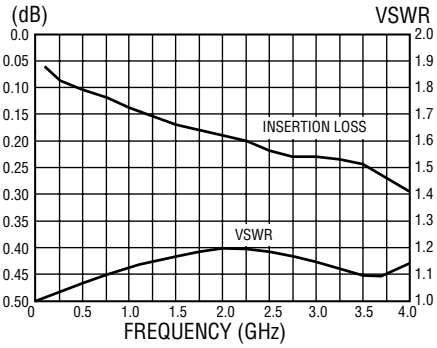
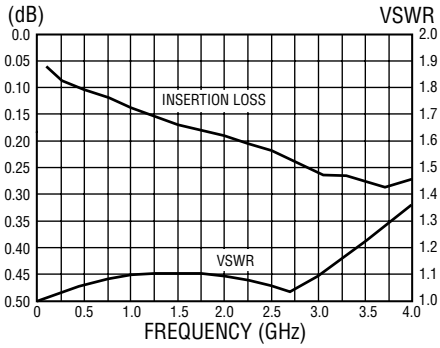
MW4 & MW4HP Models
4 GHz. Switching

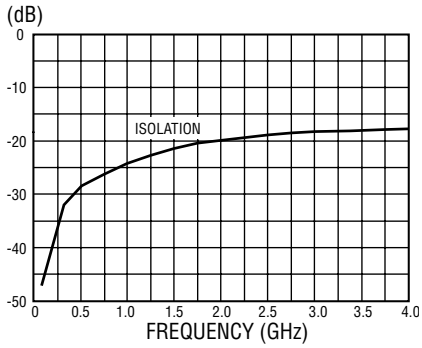
Insertion Loss & VSWR: NO Contacts



Insertion Loss & VSWR: NC Contacts



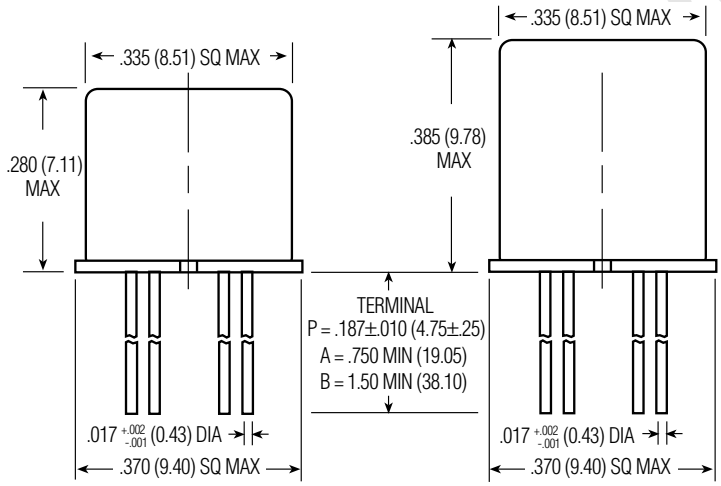
Isolation



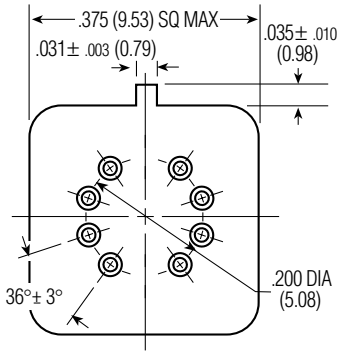
Test Conditions

Test Board: 0.031" double sided copper clad, PTFE based laminate.
Connections: Relay header is soldered to ground place. 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

Part Numbering System

Typical Part Number	MW4	S	– 5	P

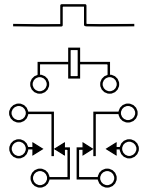
Series:
MW4 = 4 GHz. switching relay
MW4HP = High performance 4 GHz. switching relay

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



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UK: 44-141-810-8967

MW6 & MW6HP Models
6 GHz. Switching

Electrical Characteristics

Contact Arrangement:
2 Form C (DPDT)

Contact Resistance:
Before life: 100 milliohms, max (measured @ 10mA @ 6VDC.)
After life: 200 milliohms, max (measured @ 1A @ 28VDC.)

Mechanical Life Expectancy:
10 million operations

Coil Voltages:
5, 12, 18 & 26.5VDC (MW6)
5, 6, 9, 12, 18 & 26.5VDC (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

Timing:
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: 350Vrms, 60 Hz.
MW6HP types: 500Vrms, 60 Hz.

Insulation Resistance:
1,000 megohms @ 500VDC.

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 (300mH)*	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 Designator
Standard Coil					
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
Sensitive Coil					
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 Designator
Standard Coil							
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
Sensitive Coil							
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

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Dimensions are shown for reference purposes only. Specifications subject to change.

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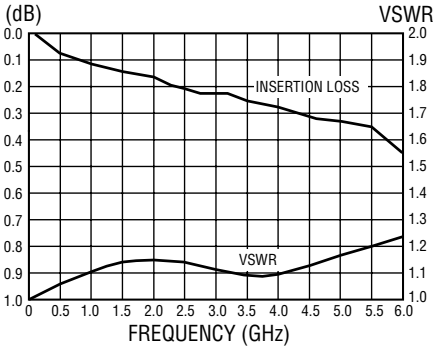
C. America: 52-55-5-729-0425

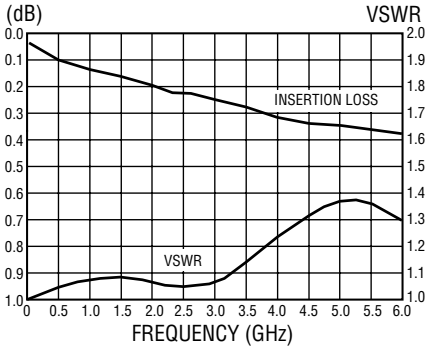
South America: 55-11-3611-1514
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-141-810-8967

MW6 & MW6HP Models
6 GHz. Switching

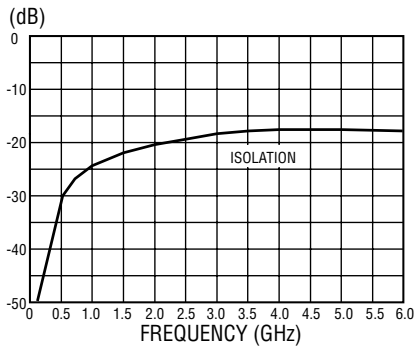
Insertion Loss & VSWR: NO Contacts



Insertion Loss & VSWR: NC Contacts



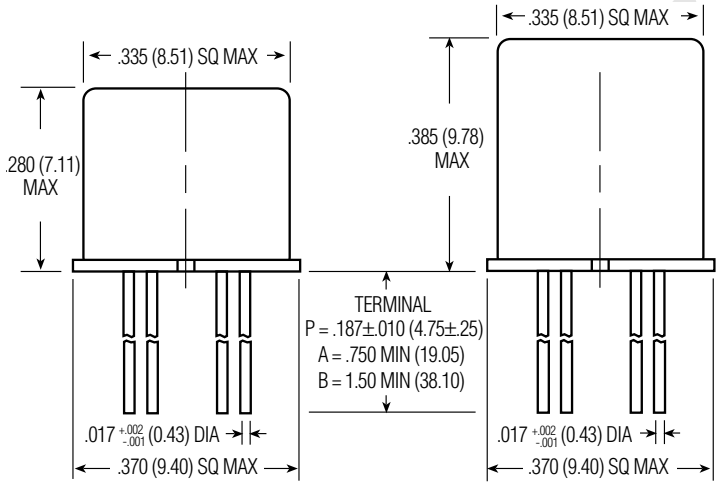
Isolation



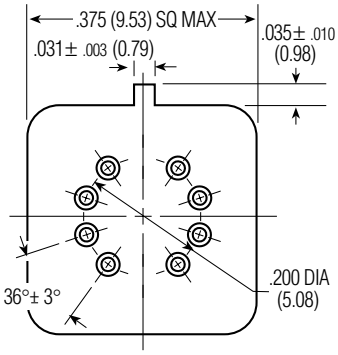
Test Conditions

Test Board: 0.031" double sided copper clad, PTFE based laminate.
Connections: Relay header is soldered to ground place. 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

Part Numbering System

Typical Part Number	MW6	S	– 5	P

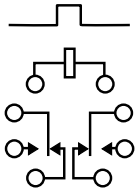
Series:
MW6 = 6 GHz. switching relay
MW6HP = High performance 6 GHz. switching relay

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

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