



Electronics

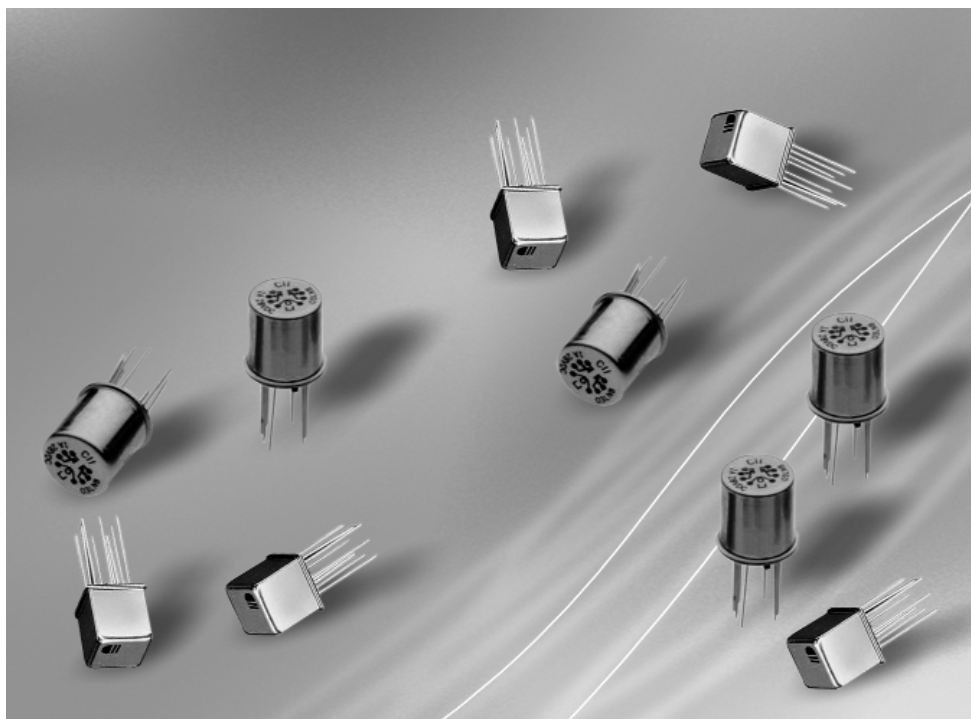
MW3/MW4/MW6/MW3HP/MW4HP/MW6HP Series Relays



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 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.



Electronics

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



Microwave Switching, Hermetically Sealed, DPDT (Continued)

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
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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
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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



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

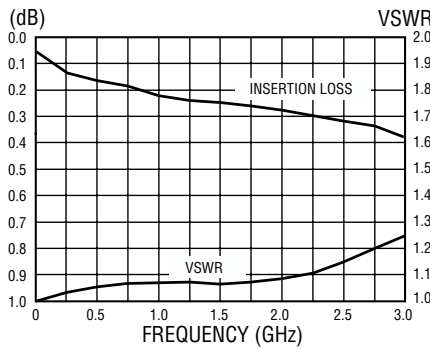


Electronics

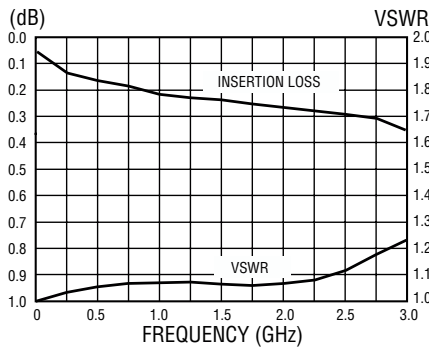
Microwave Switching, Hermetically Sealed, DPDT (Continued)

MW3 & MW3HP Models 3 GHz. Switching

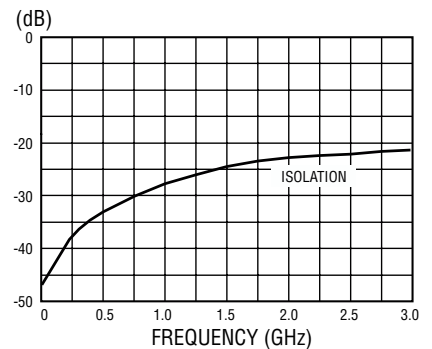
Insertion Loss & VSWR: NO Contacts



Insertion Loss & VSWR: NC Contacts



Isolation



Test Conditions

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

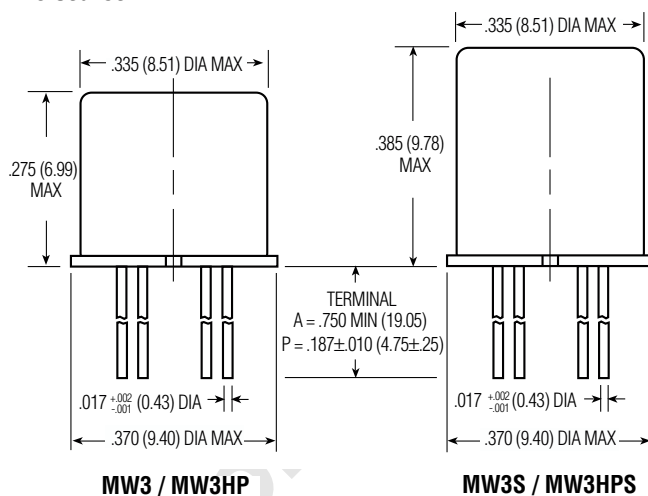
Connections: Relay header is soldered to ground plane. Relay terminals are soldered to through holes. SMA connectors are soldered to circuit traces.

Temperature: Room ambient.

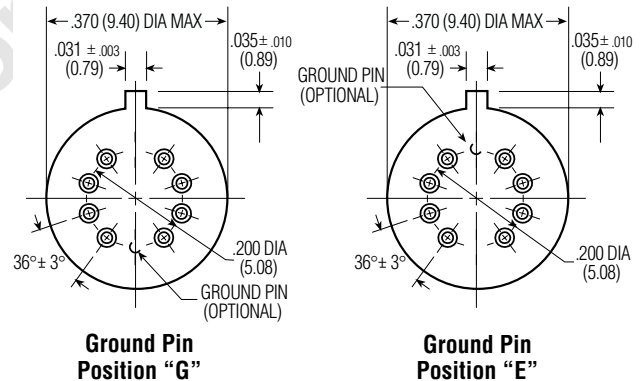
Signal Strength: 0 dBm.

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

Enclosures



Header



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

Series: MW3 S - 5 A G

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

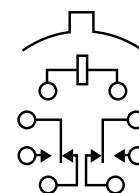
Coil Sensitivity:
Leave Blank = Standard Coil S = Sensitive Coil

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



Electronics

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



Microwave Switching, Hermetically Sealed, DPDT (Continued)

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
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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
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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



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

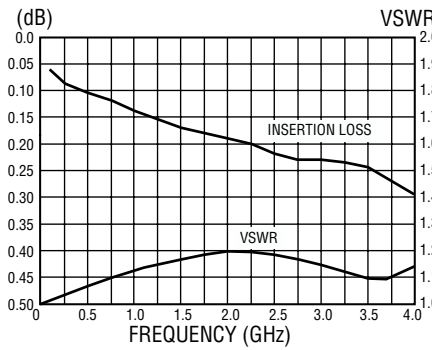


Electronics

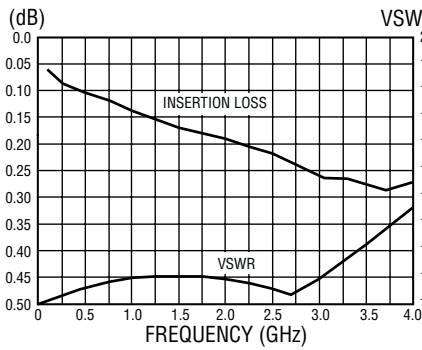
Microwave Switching, Hermetically Sealed, DPDT (Continued)

MW4 & MW4HP Models
4 GHz. Switching

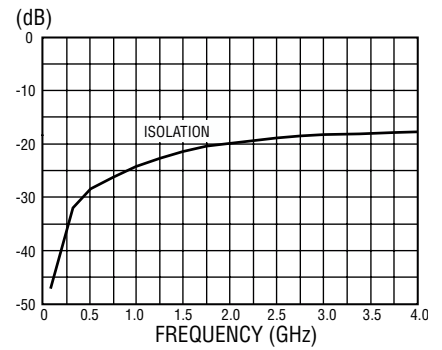
Insertion Loss & VSWR: NO Contacts



Insertion Loss & VSWR: NC Contacts



Isolation



Test Conditions

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

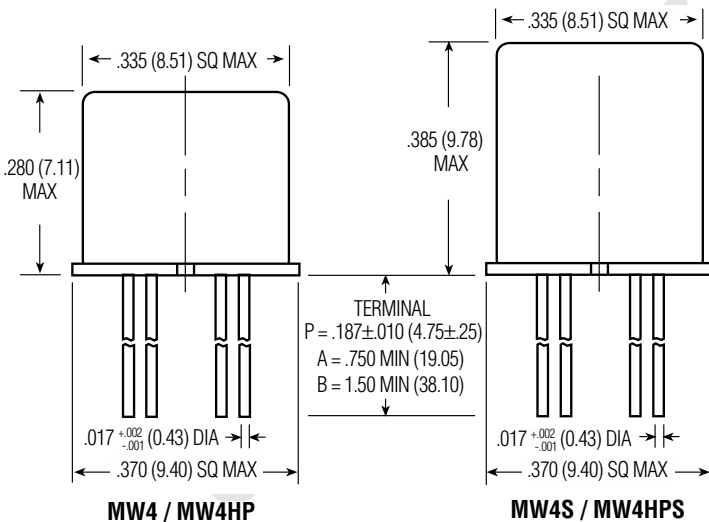
Connections: Relay header is soldered to ground plane. Relay terminals are soldered to through holes. SMA connectors are soldered to circuit traces.

Temperature: Room ambient.

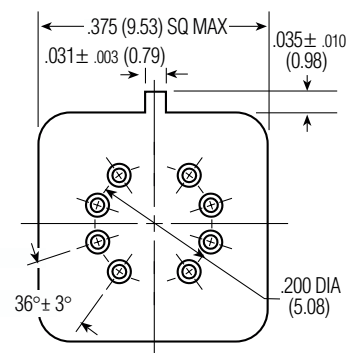
Signal Strength: 0 dBm.

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

Enclosures



Header



Header and Terminal Finish:
Gold plated

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.

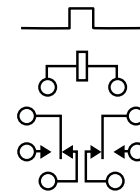
Terminal Length:

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



Terminal View



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



Electronics

Microwave Switching, Hermetically Sealed, DPDT (Continued)

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
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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
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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



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

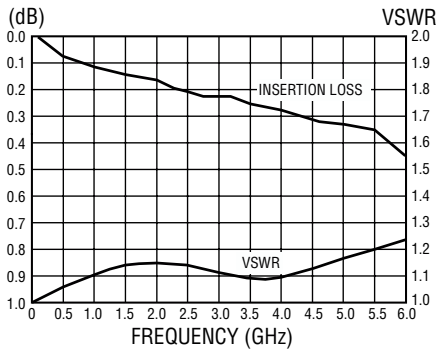


Electronics

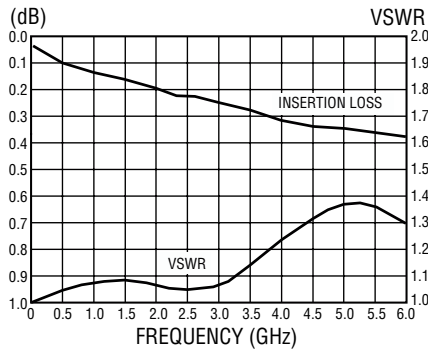
Microwave Switching, Hermetically Sealed, DPDT (Continued)

MW6 & MW6HP Models 6 GHz. Switching

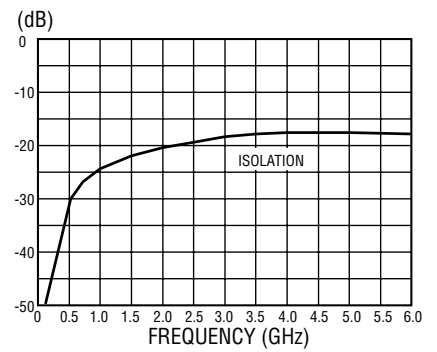
Insertion Loss & VSWR: NO Contacts



Insertion Loss & VSWR: NC Contacts



Isolation



Test Conditions

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

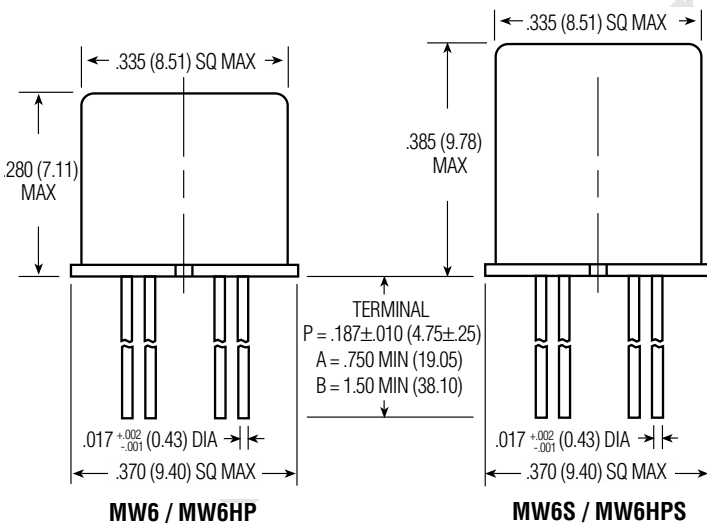
Connections: Relay header is soldered to ground plane. Relay terminals are soldered to through holes. SMA connectors are soldered to circuit traces.

Temperature: Room ambient.

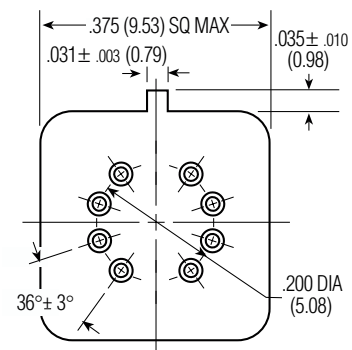
Signal Strength: 0 dBm.

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

Enclosures

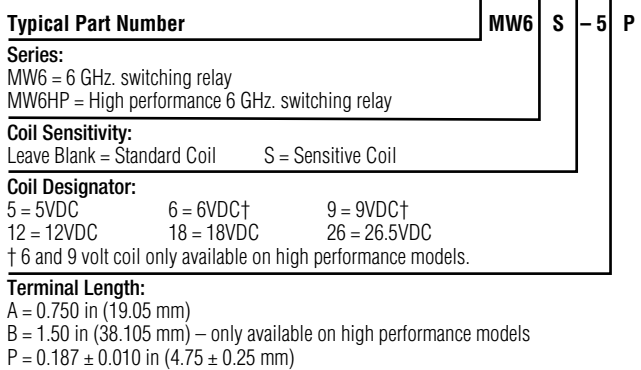


Header

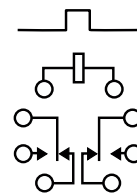


Header and Terminal Finish:
Gold plated

Part Numbering System



Wiring Diagram



Terminal View



Electronics

Global Contacts

Americas

Argentina – Buenos Aires
Phone: +54-11-4733-2200
Fax: +54-11-4733-2250

Brasil – São Paulo
Phone: +55-11-3611-1311
Fax: +55-11-3611-0397

Canada – Markham
Phone: +905-475-6222
Fax: +905-474-5520

**Product Information Center:
(Technical Support)**
Phone: +905-470-4425
Fax: +905-474-5525

Colombia – Bogota
Phone: +57-1-240-9396
Fax: +57-1-660-0206

Mexico – Mexico City
Phone: +52-55-5-729-0425
Fax: +52-55-5-398-1430

United States – Harrisburg, PA
Phone: +717-564-0100
Fax: +717-986-7575

**Product Information Center:
(Technical Support)**
Phone: +800-522-6752
Fax: +717-986-7575

**For Latin/South American
Countries not shown**
Phone: +57-1-240-9396
Fax: +57-1-660-0206

Asia/Pacific

Australia – Sydney
Phone: +61-2-9840-8200
Fax: +61-2-9899-5649
**Product Information Center:
(Technical Support)**
Phone: +61-2-9554-2600
Fax: +61-2-9502-2556

India – Bangalore
Phone: +91-80-841-0200
Fax: +91-80-841-0210

Indonesia – Jakarta
Phone: +6221-526-7852
Fax: +6221-526-7856

Japan – Kawasaki, Kanagawa
Phone: +81-44-844-8079
Fax: +81-44-844-8733
**Product Information Center:
(Technical Support)**
Phone: +81-44-844-8013
Fax: +81-44-812-3200

Raychem Products
Phone: +81-44-900-5102
Fax: +81-44-5025-5027

Korea – Seoul
Phone: +82-2-3274-0535
Fax: +82-2-3274-0524/0531

Malaysia – Selangor
Phone: +60-3-7053055
Fax: +60-3-7053066

New Zealand – Auckland
Phone: +64-9-634-4580
Fax: +64-9-634-4586

Philippines – Makati City
Phone: +632-867-8641
Fax: +632-867-8661

People's Republic of China
Hong Kong
Phone: +852-2735-1628
Fax: +852-2735-0243

Shanghai
Phone: +86-21-6485-0602
Fax: +86-21-6485-0728

Shunde
Phone: +86-765-775-1368
Fax: +86-765-775-2823

Singapore – Singapore
Phone: +65-4820-311
Fax: +65-4821-012
Raychem Products
Phone: +65-4866-151
Fax: +65-6545-514

Taiwan – Taipei
Phone: +886-2-2664-9977
Fax: +886-2-2664-9900

Thailand – Bangkok
Phone: +66-2-955-0500
Fax: +66-2-955-0505

Vietnam – Ho Chi Minh City
Phone: +84-8-8232-5467
Fax: +84-8-8221-443

Europe/Middle East/Africa

Austria – Vienna
Phone: +43-190-560-0
Fax: +43-190-560-1333

Belgium – Kessel-Lo
Phone: +32-16-352-300
Fax: +32-16-352-352

Bulgaria – Sofia
Phone: +359-2-971-2152
Fax: +359-2-971-2153

Czech Republic – Kurim
Phone: +420-5-41-162-111
Fax: +420-5-41-162-223

Denmark – Viby J
Phone: +45-70-15-52-00
Fax: +45-86-29-51-33

Egypt – Cairo
Phone: +20-2-417-76-47
Fax: +20-2-419-23-34

Estonia – Tallinn
Phone: +372-65-05-474
Fax: +372-65-05-470

Finland – Helsinki
Phone: +358-95-12-34-20
Fax: +358-95-12-34-250

France – Cergy-Pontoise
Phone: +33-1-3420-8888
Fax: +33-1-3420-8600
**Product Information Center:
(Technical Support)**
Phone: +33-1-3420-8943
Fax: +33-1-3420-8623

France – Tyco Electronics Export – St Ouen L'Aumone
Phone: +33-1-3440-7200
Fax: +33-1-3440-7220 or +33-1-3440-7230

Germany – Bensheim
Phone: +49-6251-133-0
Fax: +49-6251-133-1600
**Product Information Center:
(Technical Support)**
Phone: +49-6251-133-1999
Fax: +49-6251-133-1988

Germany – Langen
Phone: +49-6103-709-0
Fax: +49-6103-709-1223

Germany – Speyer
Phone: +49-6232-30-0
Fax: +49-6232-30-2243

Germany – HTS Division – Neunkirchen
Phone: +49-2247-305-0
Fax: +49-2247-305-122

Great Britain – Stanmore Middlesex
Phone: +44-181-954-2356
Fax: +44-181-954-6234
**Product Information Center:
(Technical Support)**
Freephone GB: 0800-267-666
Phone: +44-141 810 8967...69
Fax: +44-141 810 8971
Great Britain – Dorcan, Swindon
Raychem Products
Phone: +44-1793-528171
Fax: +44-1793-572516

Greece – Athens
Phone: +30-1-9370-396/397
Fax: +30-1-9370-655

Hungary – Budapest
Phone: +36-1-289-1000
Fax: +36-1-289-1010

Ireland – Dublin
Phone: +353-1-820-3000
Fax: +353-1-820-9790

Israel – Yokneam
Phone: +972-4-959-0508
Fax: +972-4-959-0506

Italy – Collegno (Torino)
Phone: +39-011-4012-111
Fax: +39-011-4031-116

Lithuania – Vilnius
Phone: +370-5-21-31-402
Fax: +370-5-21-31-403

Netherlands – 's-Hertogenbosch
Phone: +31-73-6246-246
Fax: +31-73-6212-365
**Product Information Center:
(Technical Support)**
Phone: +31-73-6246-999
Fax: +31-73-6246-998

Norway – Nesbru
Phone: +47-66-77-88-99
Fax: +47-66-77-88-55

Poland – Warsaw
Phone: +48-22-45-76-700
Fax: +48-22-45-76-720

Romania – Bucharest
Phone: +40-1-311-3479+3596
Fax: +40-1-312-0574

Russia – Moscow
Phone: +7-095-926-55-06...09
Fax: +7-095-926-55-05

Russia – St. Petersburg
Phone: +7-812-325-30-83
Fax: +7-812-325-32-88

Scotland – Dundee
Madison Cable Products
Phone: +44-1382-508080
Fax: +44-1382-505060

Slovakia – Banská Bystrica
Phone: +421-48-415-20-11/12
Fax: +421-48-415-20-13

Slovenia – Ljubljana
Phone: +386-1561-3270
Fax: +386-1561-3240

South Africa – Port Elizabeth
Phone: +27-41-405-4500
Fax: +27-41-486-1314

Spain – Barcelona
Phone: +34-93-291-0330
Fax: +34-93-201-7879
**Product Information Center:
(Technical Support):**
Phone: +34-93-291-0330
Fax: +34-93-200-3779

Sweden – Upplands Väsby
Phone: +46-8-50-72-50-00
Fax: +46-8-50-72-50-01

Switzerland – Steinach
Phone: +41-71-447-0447
Fax: +41-71-447-0444

Turkey – Istanbul
Phone: +90-212-281-8181...3
+90-212-282-5130/5430
Fax: +90-212-281-8184

Ukraine – Kiev
Phone: +38-044-238-6908
Fax: +38-044-568-5740