

Table of Contents

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 Switching2-3, 2-4

MW4 & MW4HP Models, 4 GHz Switching2-5, 2-6

MW6 & MW6HP Models, 6 GHz Switching2-7, 2-8

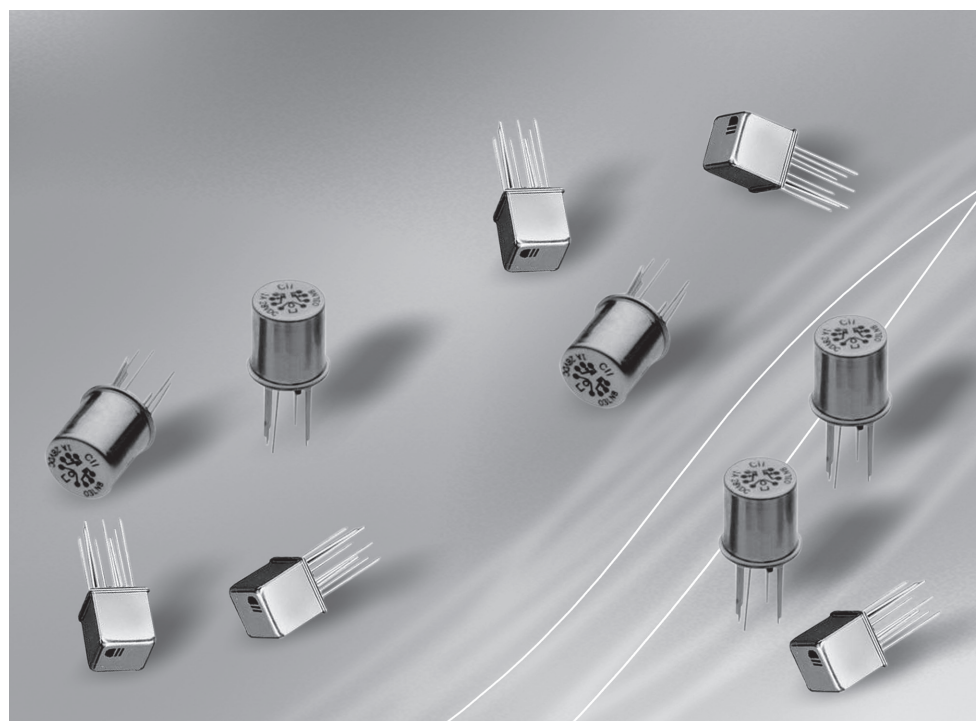
Double Pole, Electrically Held, 1 Amp and Less

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, DPDTMW3 & 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.
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

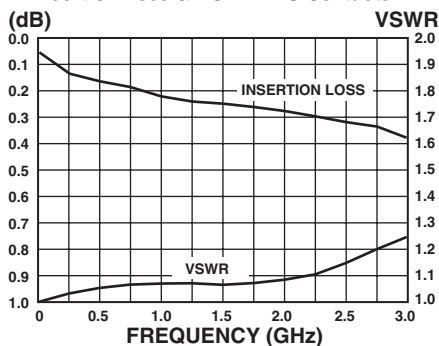
Nominal Coil Voltage (VDC)	Coil Res. in Ohms ±10% @ 25°C	Pickup V VDC (Max.) @ 25°C	Release V VDC (Max.) @ 25°C	Release V VDC (Min.) @ 25°C	Nominal Coil Power (mW) @ 25°C	Maximum Coil Voltage	Coil Desig.
Standard Coil							
5.0	50	2.7	1.4	0.22	500	5.8	5
6.0	98	3.5	2.0	0.28	367	8.0	6
9.0	220	5.3	3.0	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

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

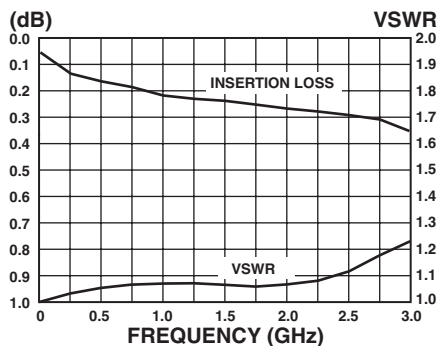
Microwave Switching, Hermetically Sealed, DPDT

MW3 & MW3HP Models, 3 GHz. Switching (Continued)

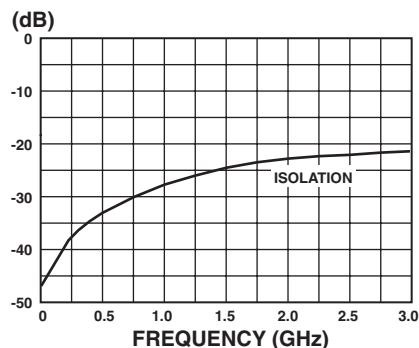
Insertion Loss & VSWR: NO Contacts



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.

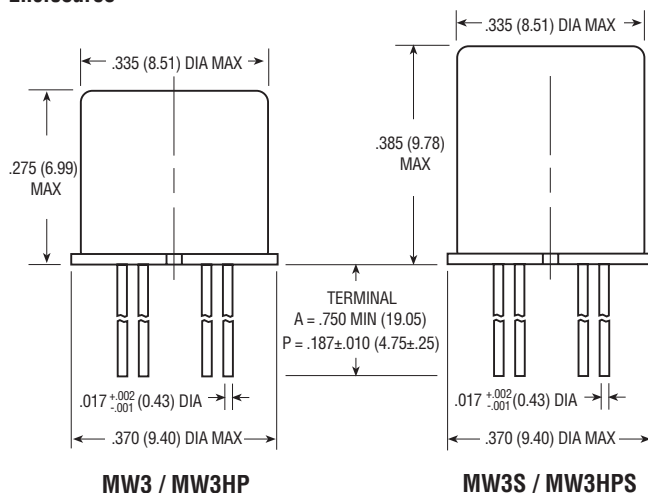
Temperature — Room ambient.

Signal Strength — 0 dBm.

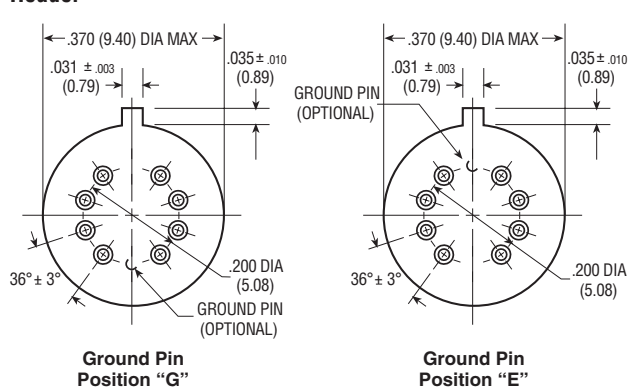
Notes:

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

Enclosures



Header



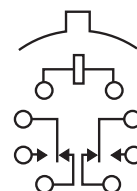
For other ground pin configurations consult factory.

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

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

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

Microwave Switching,
Hermetically Sealed, DPDTMW4 & 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).

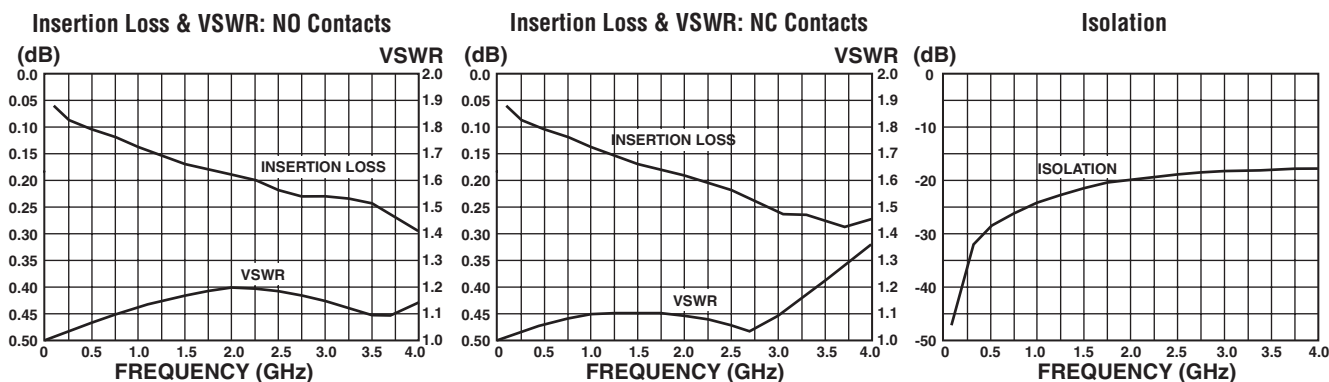
Coil Data

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.	
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 Desig.
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

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.

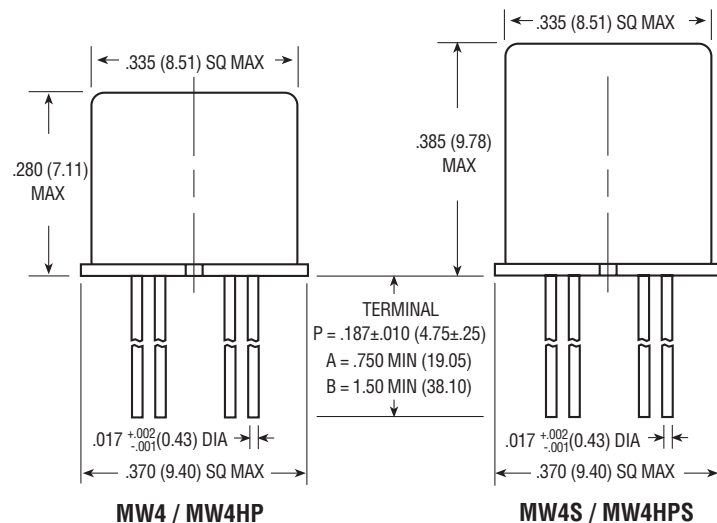
Temperature — Room ambient.

Signal Strength — 0 dBm.

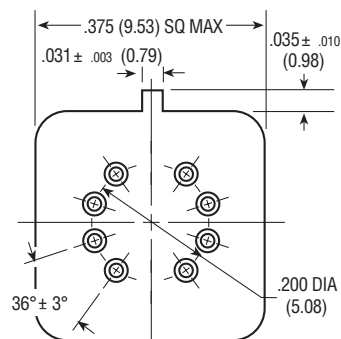
Notes:

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

Enclosures



Header



Header and Terminal Finish:
Gold plated

Part Numbering System

Typical Part Number

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.

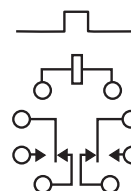
Terminal Length:

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, DPDTMW6 & 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.
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

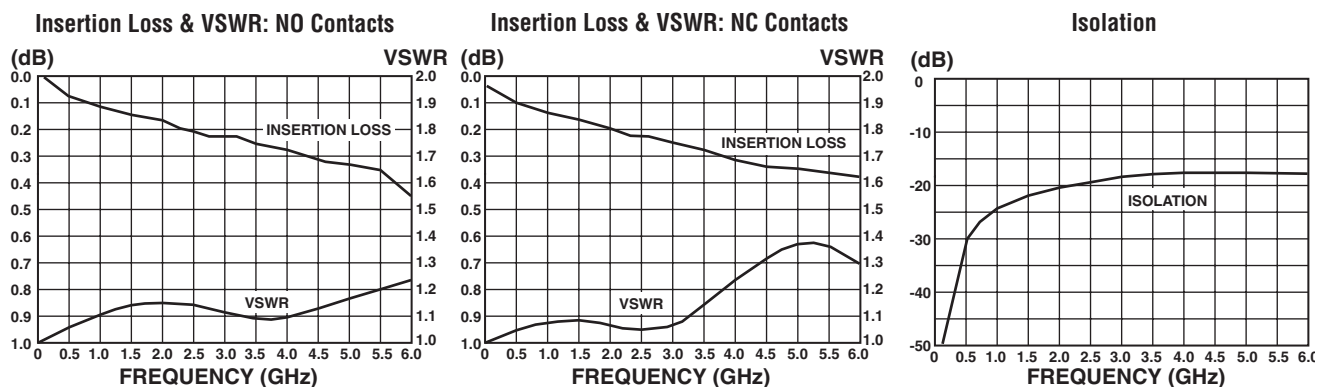
MW6HP (High Performance) Models

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 Desig.
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

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

Microwave Switching, Hermetically Sealed, DPDT

MW6 & MW6HP Models 6 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.

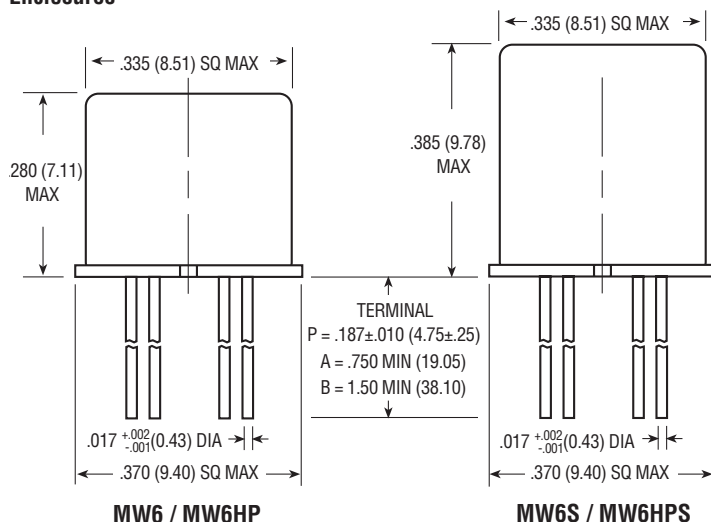
Temperature — Room ambient.

Signal Strength — 0 dBm.

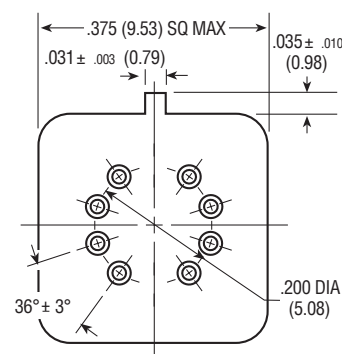
Notes:

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

Enclosures



Header

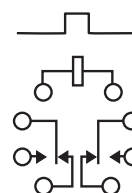


Header and Terminal Finish:
Gold plated

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 $\pm$ 0.010 in (4.75 $\pm$ 0.25 mm)			

Wiring Diagram



Terminal View