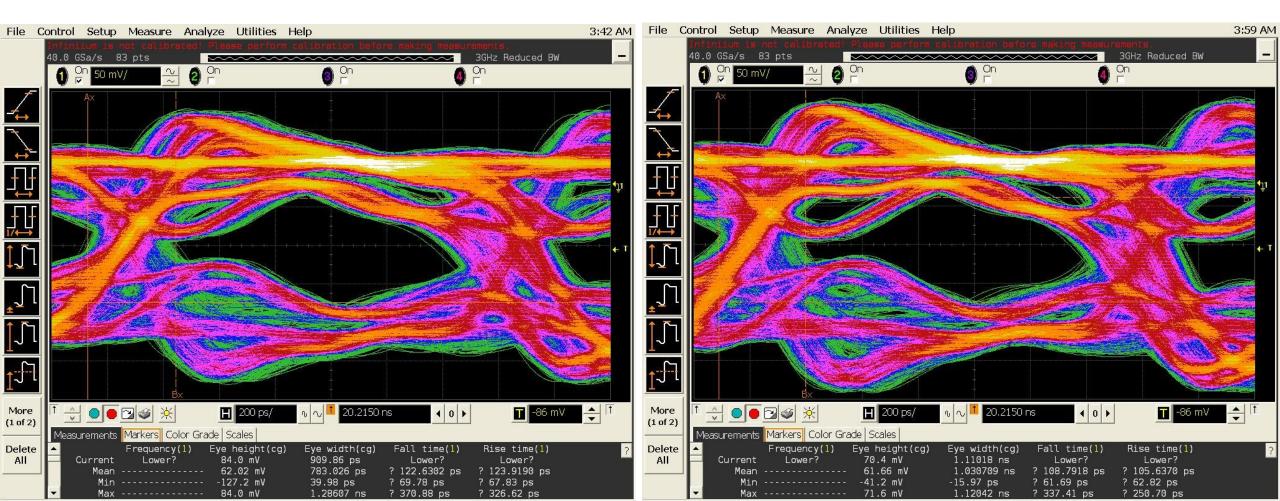
	品牌 Brand	TELEDYNE RELAYS		CII High	Frequency	
外	觀形狀 Appearance		E CONTRACTOR			
	高頻特性	3 GHz	3 GHz	4 GHz	6 GHz	
	建議售價	5X.xx (USD)	4X.xx (USD)			
	Part / No.	RF303-5 (712-5) RF303-12 (712-12)	MW3S-5A MW3S-12A	MW4S-5A MW4S-12A	MW6S-5A MW6S-12A	
3	表面積 L×W (mm)	ψ9.4 mm MAX	ψ9.4 mm MAX	9.40mm So	quare MAX	
1	回路接續圖 Figure. (TOP VIEW)		ر در	ر م ا		
	接點構成 Contact Form 線圈電壓/阻抗	2 from C 5 V / 100Ω	MW35-5A     RF303-5     2 from C       5 V / 100Ω     5 V / 100Ω			
	Coil Rating Voltage 接點容量 (max)	12 V / 850Ω		12 V / 850Ω (只有 6V / 9V / 18V /26V 可骥)		
電氣	<u>切換電流 (max)</u> <u>通電電流 (max)</u> 切換電壓 (max)	1.0 Amp 28VDC		1.0 Amp 28VDC		
規	接點間耐電壓 接點阻抗 (max)	150 mΩ		150 mΩ		
格	絕緣阻抗(各導體相	$10^{9}\Omega$ min.		$10^9\Omega$ min.		
	動作時間 (max)	6.0 ms. Max.		6.0 ms. Max.		
	回復時間 (max)	3.0 ms. Max.		3.0 ms. Max.		
	操作溫度 (度C)	-55°C to +85°C.		-55°C to +85°C. (可選-65°C to +125°C.)		
	機械壽命 (min) Mechanical Life	10×10 <sup>6</sup>		10×10 <sup>6</sup>		
外觀尺寸	DIMENSION	RF303-5 MW3S-5A		← .335 (8.51) SO MAX → 	Header $\begin{array}{c} & & & & & & \\ & & & & & & & \\ & & & & $	

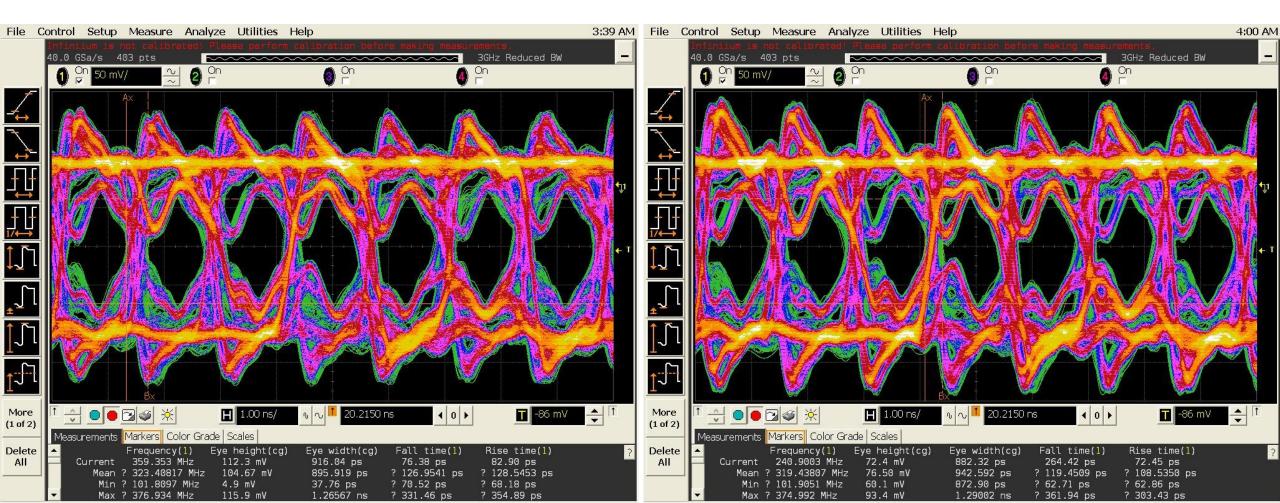


驗證pattern : LVDS high, data rate 700Mbps Loop run 100次穩定pass

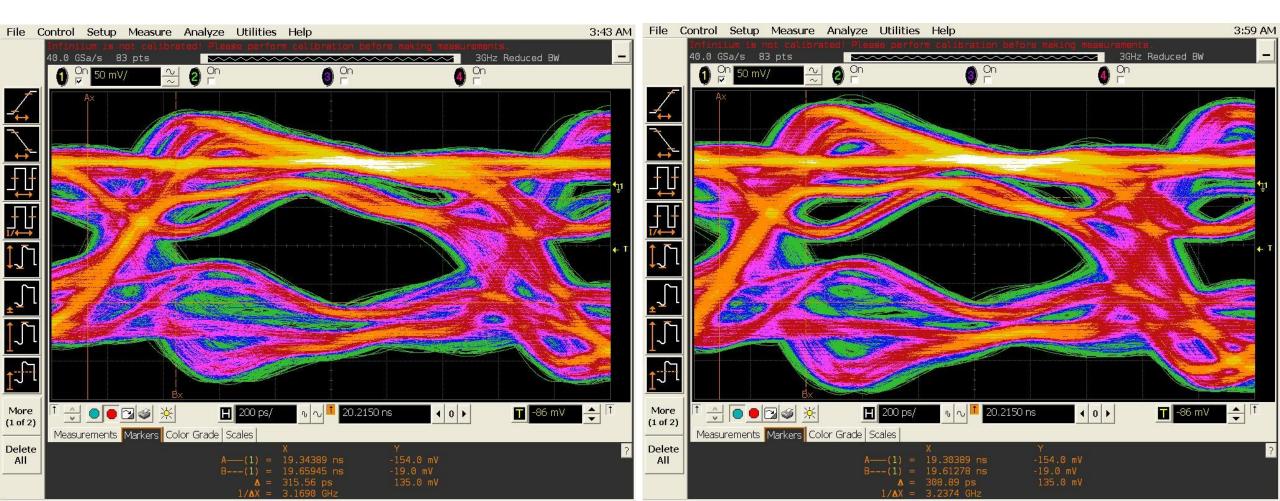
## MW3S(左), RF303(右) overshoot/undershoot MW3S好一些,其餘差不多



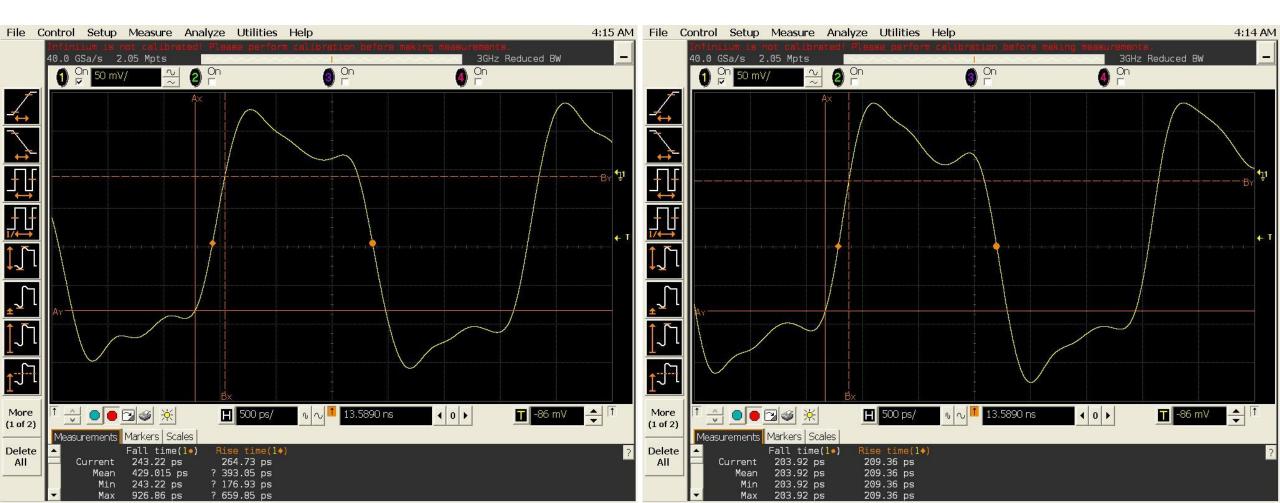
# MW3S(左), RF303(右) data rate 700Mbps



MW3S(左), RF303(右) jitter差不多



# MW3S(左), RF303(右) rising/falling time RF303好一些



## **Table of Contents**

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## 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.

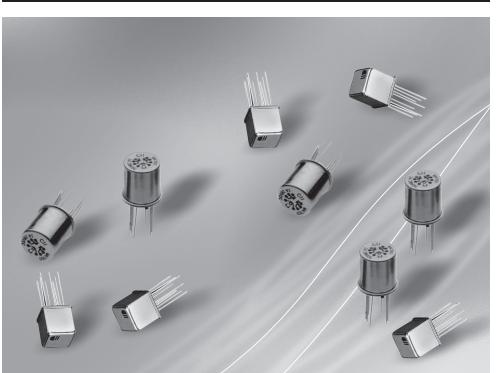
Both standard and high performance models are offered in 3 GHz., 4 GHz. and 6 GHz. types.

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.





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

#### **Operating Characteristics**

146

68

90

180

Operate	Time (m	s max.) —	-
			MW3HPS
4.0	6.0	2.0	4.0
Release	Time (m	is max.)	
MW3	MW3S	MW3HP	MW3HPS
3.0	3.0	1.5	2.0
Bounce	Time (ms	s max.)	
MW3	MW3S	MW3HP	MW3HPS
—	_	1.5	1.5
Dielectr	ic Withst	tanding V	oltage —
Between (	Open Con	tacts,	
Between /	Adjacent C	Contacts ar	nd 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	Туре	Operations Min.		
1.0A @ 28VDC	Resistive	100,000		
200mA @ 28VDC (300mH)*	Inductive	100,000		
30µA @ 50mVDC	Low Level	10,000,000		

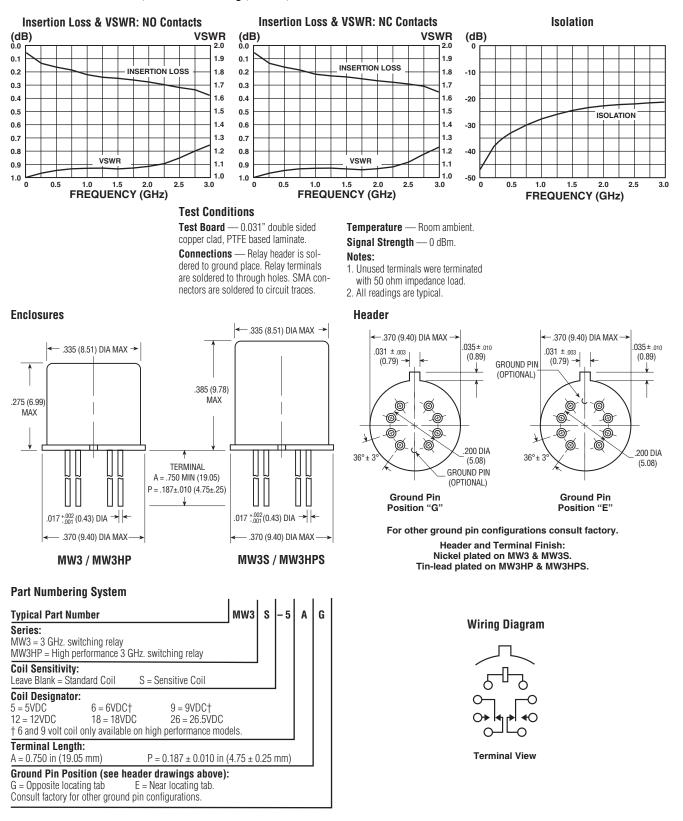
\* The inductive rating is only applicable to high performance models (MW3HP and MW3HPS).

### **Coil Data**

MW3 Models							
Nominal Coil Voltage (VDC)	Coil Resis In Ohm ±20% @ 2	IS	ickup Voltage VDC (Max.) @ 25°C	Nomi Coil Po (mW) @	ower	ximum Coil oltage	Coil Desig.
Standard Coil							
5.0	50		3.6	500	)	5.8	5
12.0	390		8.4	369	9	16.0	12
18.0	880		13.0	368	3	24.0	
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	9	20.0	12
18.0	1,600		13.5	203	3	30.0	18
26.5	3,300		18.0	213	3	40.0	26
MW3HP (High P	erformance) Mo	dels					
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

20.5	3,300	)	18.0	21.	3	40.0	20
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$							
Coil Voltage	in Ohms	VDC (Max.)	VDC (Max.)	VDC (Min.)	Coil Power	Coil	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

## Microwave Switching, Hermetically Sealed, DPDT MW3 & MW3HP Models, 3 GHz. Switching (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 (m	s max.) —	-
MW4	MW4S	MW4HP	MW4HPS
4.0	6.0	2.0	4.0
Release	Time (m	is max.)	
MW4	MW4S	MW4HP	MW4HPS
3.0	3.0	1.5	2.0
Bounce '	Time (ms	s max.)	
MW4	MW4S	MW4HP	MW4HPS
_	_	1.5	1.5
Dielectri	ic Withs	tanding V	oltage —
Between (	)pen Con	tacts,	
Between A	Adjacent (	Contacts ar	nd Between
Contacts a	and Coil -		
MW4 typ	pes — 35	60 Vrms, 6	0 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	Туре	Operations Min.		
1.0A @ 28VDC	Resistive	100,000		
200mA @ 28VDC (300mH)*	Inductive	100,000		
30µA @ 50mVDC	Low Level	10,000,000		

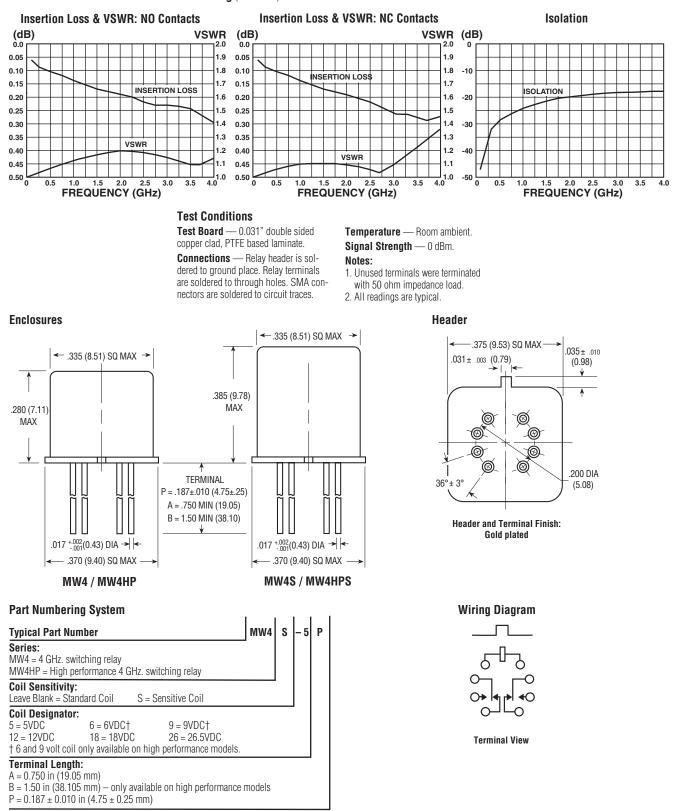
\* The inductive rating is only applicable to high performance models (MW4HP and MW4HPS).

## **Coil Data**

MW4 Models							
Nominal Coil Resistand Coil Voltage In Ohms (VDC) ±20% @ 25°(		IS	Pickup Voltage VDC (Max.) @ 25°C	Coil Power		laximum Coil Voltage	Coil Desig.
Standard Coil							
5.0	50		3.6	50	C	5.8	5
12.0	390		8.4	36	9	16.0	12
18.0	880		13.0	36	3	24.0	18
26.5	1,560		17.0	45	C	32.0	26
Sensitive Coil							
5.0	100		3.5	250		7.5	5
12.0	850		9.0	169 2		20.0	12
18.0	1,600	)	13.5	203 30.0		30.0	18
26.5	3,300	)	18.0	21	3	40.0	26
MW4HP (High Per	formance) 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 100 2.6 0.23 250 5.0 1.4 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 7.0 12.0 850 4.0 0.64 169 20.0 12 0.92 203 18.0 1,600 9.8 6.0 30.0 18 3,300 26.5 14.0 8.0 1.4 213 40.0 26

## Microwave Switching, Hermetically Sealed, DPDT MW4 & MW4HP Models4 GHz. Switching (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

90 180 123 68

#### **Operating Characteristics**

Operate	Time (m	s max.) —	-
MW6	MW6S	MW6HP	MW6HPS
4.0	6.0	2.0	4.0
Release	Time (m	is max.)	
MW6	MW6S	MW6HP	MW6HPS
3.0	3.0	1.5	2.0
Bounce '	Time (ms	s max.)	
MW6	MW6S	MW6HP	MW6HPS
_	_	1.5	1.5
Dielectri	ic Withs	tanding V	/oltage —

#### 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	Туре	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**

18.0

26.5

1,600

3,300

MW6 Models							
Nominal Coil Voltage (VDC)	Coil Resist In Ohm ±20% @ 2	S	Pickup Voltage VDC (Max.) @ 25°C	Nomi Coil Po (mW) @	ower	Aaximum Coil Voltage	Coil Desig.
Standard Coil							
5.0	50		3.6	50	0	5.8	5
12.0	390	390		36	9	16.0	12
18.0	880		13.0	36	8	24.0	18
26.5	1,560		17.0	45	0	32.0	26
Sensitive Coil							
5.0	100		3.5	250		7.5	5
12.0	850		9.0	16	9	20.0	12
18.0	1,600	)	13.5	20	3	30.0	18
26.5	3,300	)	18.0	213		40.0	26
MW6HP (High Per	formance) 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

0.92

1.4

6.0

8.0

9.8

14.0



24.0

32.0

7.5

10.0

15.0

20.0

30.0

40.0

203

213

18

26

5

6

9

12

18

26

