

Xtra Long Life SP6T Switch

MSP6T-12D+

50Ω DC to 12 GHz 24 Volt Reflective



CASE STYLE: HJ1143-1

The Big Deal

- Extra-long switching life - 10 million cycles guaranteed
- Low insertion loss, 0.25 dB typ. at 12 GHz
- High isolation, 90 dB typ. at 12 GHz
- Reflective
- Reliable sleep mode switching

Product Overview

Mini-Circuits' MSP6T-12D+ is an ultra-reliable, rugged-duty reflective fail-safe SP6T switch designed in break-before-make configuration offering an ultra long switching life. Powered by +24VDC, the device has a typical switching speed of 20 milliseconds, insertion loss of 0.25 dB and high isolation of 90 dB. The MSP6T-12D+ is suitable for use across a wide range of applications, including switching for automated test equipment and redundancy switching.

Key Features

Feature	Advantages
Extra long service life	Exceptionally long service life improves system reliability and reduces the need to replace switches often.
High isolation, 90 dB typ.	Prevents interference from unwanted signals, ensuring signal integrity and accuracy of testing.
Reliable sleep-mode switching	Offers dependable performance even after being set at a fixed position for prolonged periods. Highly-reliable sleep mode switching averts failures due to "wake up," making it suitable for automatic testing as well as redundancy switching applications.
High repeatability between switching cycles	High repeatability of switching cycles ensures reliable performance critical for automated testing and other measurement applications.
15-Pin D-Sub Connector	Easy and reliable connect/disconnect eliminating soldering and connection errors.



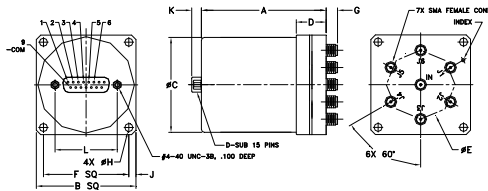
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50Ω DC to 12 GHz 24 Volt Reflective

Maximum Ratings

Operating Temperature	-15°C to +45°C
Storage Temperature	-15°C to +85°C
RF Power	20W
Control Voltage	26V
Permanent damage may occur if any of these limits are exceeded.	

Outline Drawing



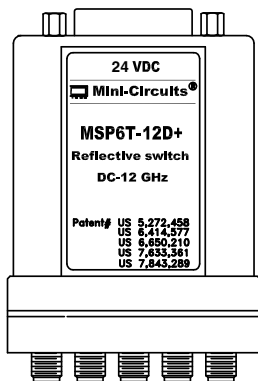
Outline Dimensions (inch/mm)

A	B	C	D	E	F
2.63	2.10	2.00	.63	1.45	1.800
66.80	53.34	50.80	16.00	36.83	45.72

G	H	J	K	L	wt
.24	.172	.15	.20	1.312	grams
6.10	4.37	3.81	5.08	33.32	230

CONTROL LOGIC	
24V TO PORT (1-6)	ON
1	IN-J1
2	IN-J2
3	IN-J3
4	IN-J4
5	IN-J5
6	IN-J6

Marking Drawing



Features

- low insertion loss, 0.25 dB typ. at 12 GHz
- high isolation, 90 dB typ. at 12 GHz
- ultra reliable
- break-before-make configuration
- reflective failsafe switch
- protected by US Patents 5,272,458; 6,414,577; 6,650,210; 7,633,361 and 7,843,289

Applications

- (ATE) automatic test equipment
- redundancy switching for microwave radio

MSP6T-12D+



+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

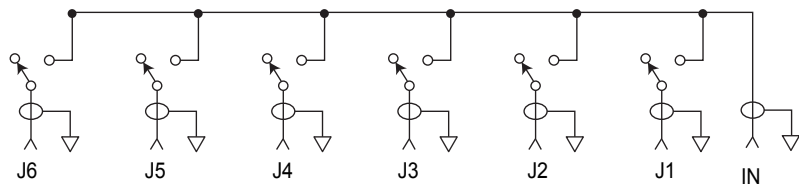
Electrical Specifications at 25°C

Parameter	Condition	Min.	Typ. (Note 1)	Max.	Unit
Frequency Range		DC	—	12	GHz
Insertion Loss	DC - 1 GHz	—	0.10	0.15	dB
	1 - 6	—	0.15	0.25	
	6 - 8	—	0.20	0.30	
	8 - 12	—	0.25	0.45	
Isolation	DC - 1 GHz	85	100	—	dB
	1 - 6	80	95	—	
	6 - 8	80	90	—	
	8 - 12	80	90	—	
VSWR (Note 2,3)	DC - 1 GHz	—	1.05	1.10	:1
	1 - 6	—	1.10	1.25	
	6 - 8	—	1.20	1.35	
	8 - 12	—	1.20	1.35	
Operating Voltage Range	DC - 12 GHz	—	24±1	—	V
Control Signal (Note 4)	24V	—	42	60	mA
RF Power Cold Switching	—	—	—	20	W
RF Power Hot Switching	0.1W	10million	—	—	Cycles
	1.0W	—	1 million	—	
Switching Time	DC - 12 GHz	—	20	—	ms

Notes

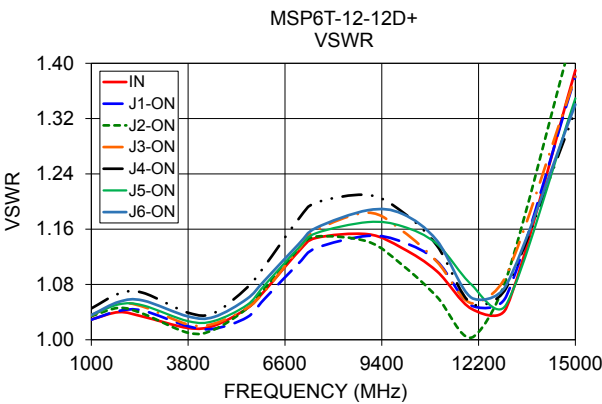
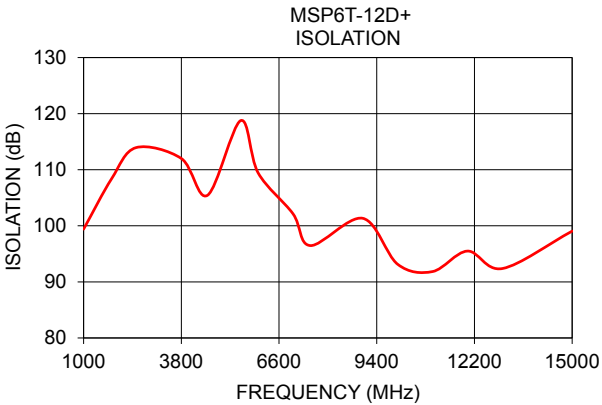
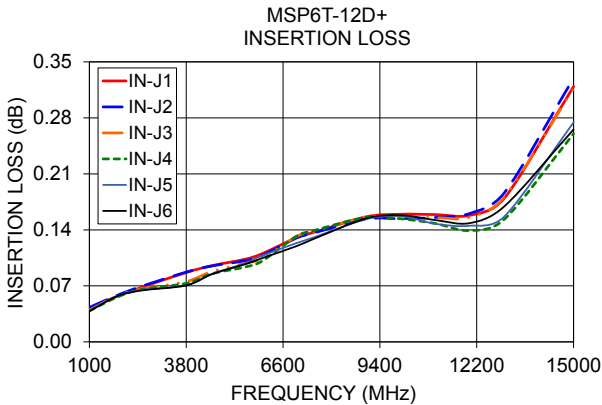
1. The performance values represents a common value for the frequency range. For typical performance across the frequency band, see performance graphs in the next page.
2. All ports when energized.
3. For port IN in Energized state only.
4. +24 Volt applied to energized port, COM is negative.

Switching Position (Non-Energized)



Typical Performance Data

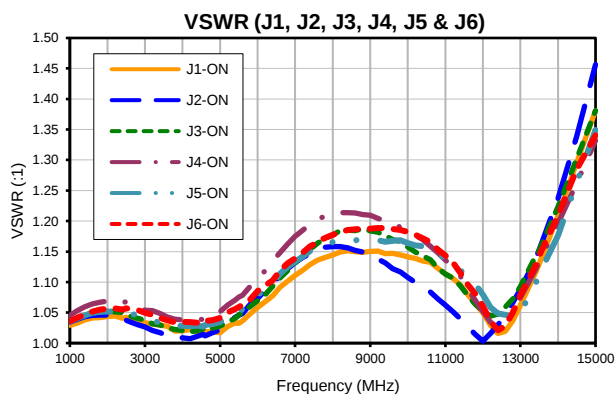
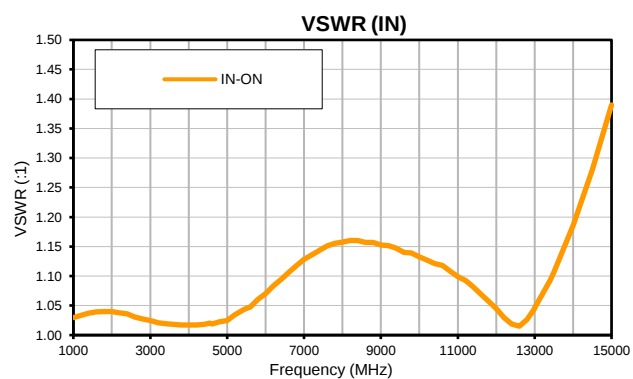
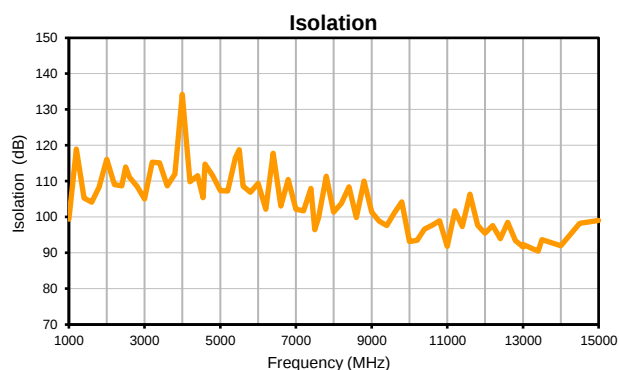
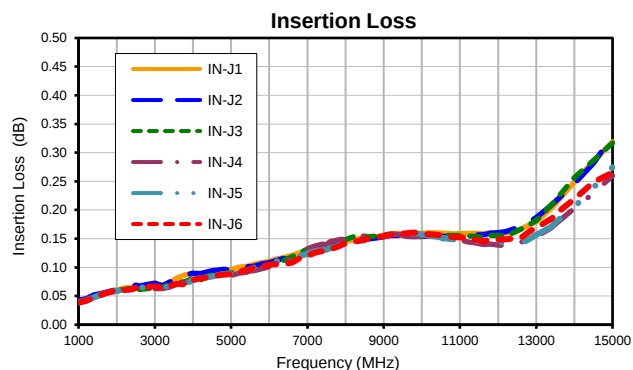
FREQ. (MHz)	ON INSERTION LOSS (dB)						ISOLATION (dB)		VSWR					
	IN-J1	IN-J2	IN-J3	IN-J4	IN-J5	IN-J6	IN	J1-ON	J2-ON	J3-ON	J4-ON	J5-ON	J6-ON	
1000	0.04	0.04	0.04	0.04	0.04	0.04	99.41	1.03	1.03	1.03	1.04	1.05	1.04	
1800	0.06	0.06	0.06	0.06	0.06	0.06	108.37	1.04	1.04	1.05	1.05	1.07	1.05	
2500	0.07	0.07	0.07	0.07	0.06	0.06	113.94	1.03	1.04	1.04	1.05	1.07	1.06	
3800	0.09	0.09	0.08	0.07	0.07	0.07	112.01	1.02	1.02	1.01	1.02	1.04	1.03	
4550	0.10	0.09	0.09	0.09	0.08	0.08	105.44	1.02	1.02	1.01	1.02	1.04	1.03	
5500	0.10	0.10	0.10	0.09	0.10	0.10	118.76	1.05	1.03	1.05	1.05	1.08	1.06	
6000	0.11	0.11	0.10	0.10	0.11	0.10	109.45	1.07	1.06	1.07	1.07	1.11	1.08	
7000	0.13	0.13	0.13	0.13	0.12	0.12	102.15	1.13	1.11	1.13	1.13	1.18	1.14	
7500	0.14	0.14	0.14	0.14	0.13	0.13	96.47	1.15	1.13	1.15	1.16	1.20	1.16	
9000	0.16	0.15	0.16	0.16	0.15	0.15	101.34	1.15	1.15	1.14	1.18	1.21	1.17	
10000	0.16	0.15	0.16	0.15	0.16	0.16	93.14	1.13	1.14	1.11	1.16	1.18	1.18	
11000	0.16	0.16	0.16	0.15	0.15	0.15	91.84	1.10	1.11	1.06	1.11	1.14	1.14	
12000	0.16	0.16	0.16	0.14	0.15	0.15	95.49	1.04	1.05	1.00	1.05	1.05	1.06	
13005	0.18	0.19	0.18	0.15	0.16	0.17	92.38	1.05	1.06	1.09	1.09	1.08	1.08	
15000	0.32	0.33	0.32	0.26	0.27	0.27	99.05	1.39	1.38	1.46	1.38	1.33	1.34	



Additional Notes

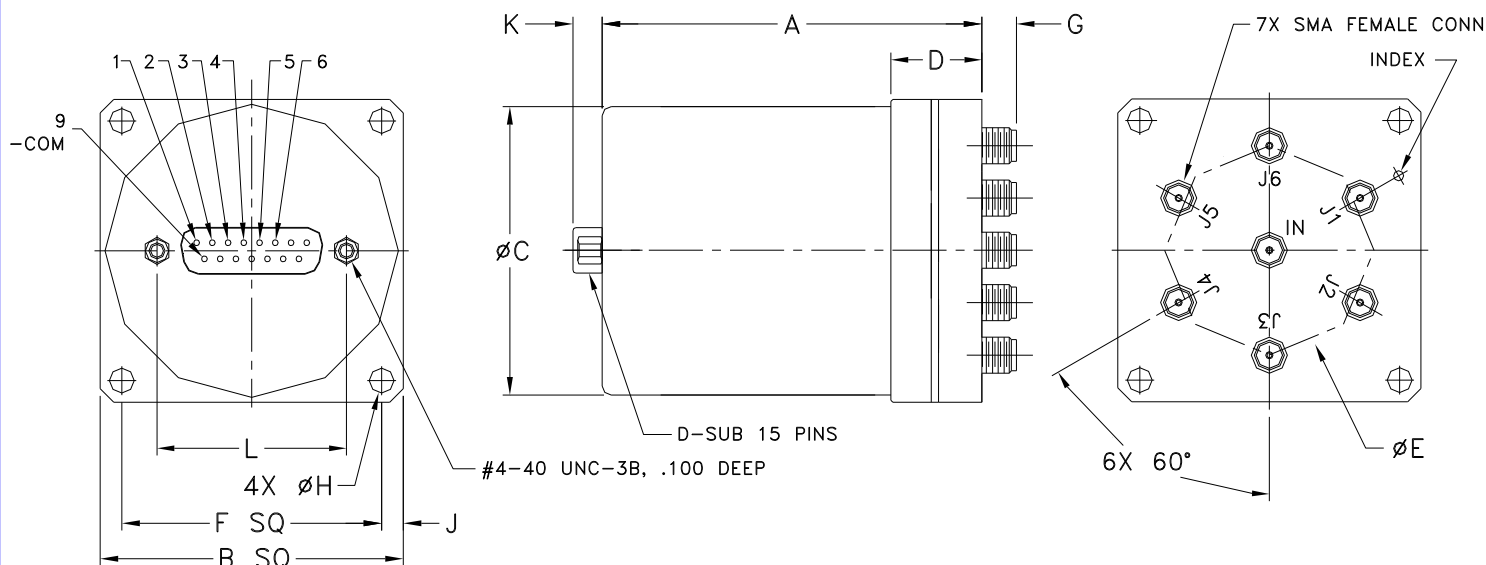
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Typical Performance Curves



Outline Dimensions

HJ1143-1



CASE#	A	B	C	D	E	F	G	H	J	K	L	WT. GRAM
HJ1143-1	2.63 (66.80)	2.10 (53.34)	2.00 (50.80)	.63 (16.00)	1.45 (36.83)	1.800 (45.72)	.24 (6.10)	.172 (4.37)	.15 (3.81)	.20 (5.08)	1.312 (33.32)	230

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .03$; 3 Pl. $\pm .015$

Note:

- Case material: Copper-Nickel alloy.



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Mini-Circuits ISO 9001 & ISO 14001 Certified



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-15° to 45°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-15° to 85°C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 96 hours, 40°C	MIL-STD-202, Method 103B, Condition B, Except 50°C
Thermal Shock	-55° to 100°C, 50 cycles	MIL-STD-202, Method 107, Condition B, except -55° to +100°C and 50 cycles
Vibration (High Frequency)	0.06-inch double amplitude, 10-55 Hz, 2 hours in each of three perpendicular directions (total 6 hours)	MIL-STD-202, Method 204, Condition C, Part 1
Mechanical Shock	50G, 11 ms sawtooth, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition G
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215