Xtra Long Life

SP4T Switch

MSP4TA-18+

50Ω DC to 18 GHz, 24 Volt, Absorptive

The Big Deal

- Extra long life - 10 million cycles
- Low insertion loss, 0.2 dB
- High isolation, 90 dB
- Absorptive
- Reliable sleep mode switching

CASE STYLE: HJ1768

Product Overview

Mini-Circuits' MSP4TA-18+ is an ultra-reliable, rugged-duty absorptive fail-safe SP4T 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 0.2 dB and high isolation of 90 dB. The MSP4TA-18+ 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, making it ideal for automatic test systems.
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 insertion loss between switching cycles ensures reliable performance critical for automated testing and other measurement applications.

Xtra Long Life

SP4T Switch

MSP4TA-18+

50Ω DC to 18 GHz, 24 Volt, Absorptive

front view

back view

CASE STYLE: HJ1768

Connectors	Model
SMA	MSP4TA-18+

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

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.

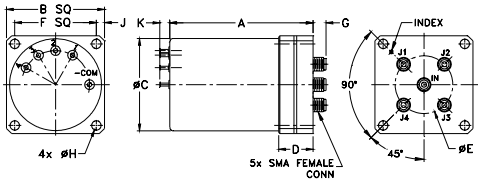
Features

- ultra-reliable, 10 million cycles
- low insertion loss, 0.2 dB typ.
- high isolation, 90 dB typ
- break-before-make configuration
- absorptive fail-safe switch
- reliable "sleep-time" switching
- protected by US Patents 5,272,458; 6,414,577; 7,633,361; 7,843,289 and 6,650,210

Applications

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

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F
2.63	1.80	1.70	.63	1.06	1.500
66.80	45.72	43.18	16.00	26.92	38.10

G	H	J	K		wt
.24	.172	.15	.19		grams
6.10	4.37	3.81	4.83		160

Electrical Specifications at 25°C

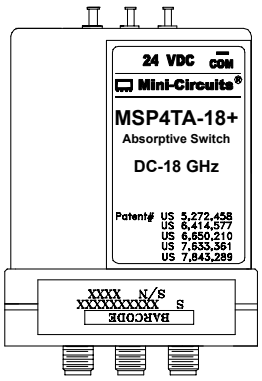
Parameter	Condition	Min.	Typ. (Note 1)	Max.	Unit
Frequency Range		DC	—	18	GHz
Insertion Loss	DC - 1 GHz	—	0.10	0.20	dB
	1 - 8	—	0.15	0.30	
	8 - 12	—	0.25	0.40	
	12 - 18	—	0.50	0.80	
Isolation	DC - 1 GHz	85	105	—	dB
	1 - 8	80	100	—	
	8 - 12	75	95	—	
	12 - 18	60	80	—	
VSWR (Note 2,3)	DC - 1 GHz	—	1.05	1.10	:1
	1 - 8	—	1.20	1.40	
	8 - 12	—	1.20	1.40	
	12 - 18	—	1.30	1.60	
Control Signal (Note 4)	24V	—	85	125	mA
Switching Lifetime	0.1W	10 million	—	—	cycles
Hot Switching	1.0W	—	1 million	—	
RF Power Cold Switching	—	—	—	20	W

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, all states
3. For port IN in Energized state only.
4. +24 Volt applied to energized port, COM is negative.

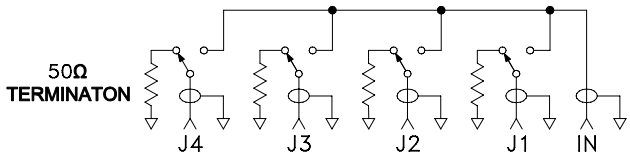
Additional Specifications

Operating Voltage Range	24V (nom) ±0.5V
Switching Time (Typ.)	20ms

Marking Drawing

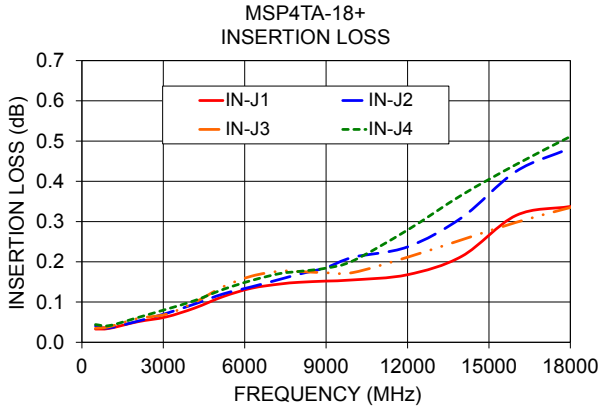


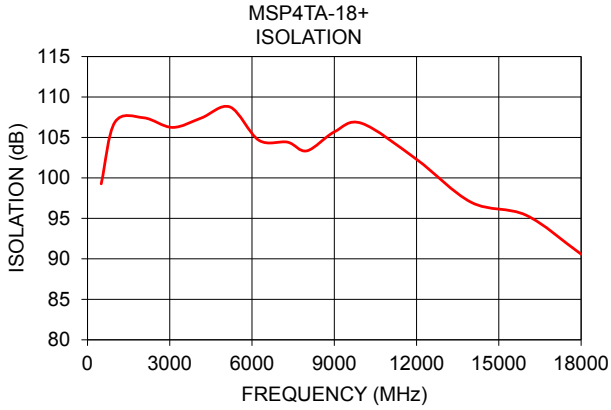
Switching Position (Non-Energized)

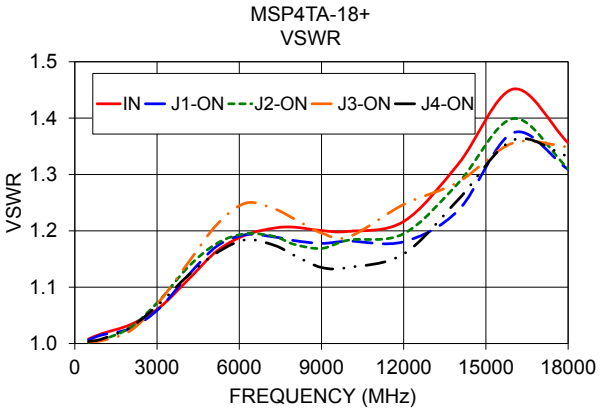


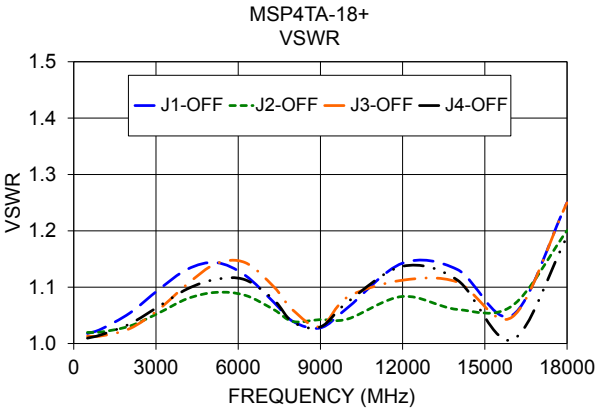
Typical Performance Data

FREQ. (MHz)	ON INSERTION LOSS (dB)				ISOLATION (dB)	VSWR								
	IN-J1	IN-J2	IN-J3	IN-J4		IN	J1-ON	J2-ON	J3-ON	J4-ON	J1-OFF	J2-OFF	J3-OFF	J4-OFF
500	0.03	0.04	0.03	0.04	99.27	1.01	1.01	1.00	1.00	1.00	1.02	1.02	1.01	1.01
1000	0.03	0.04	0.04	0.04	106.89	1.02	1.02	1.01	1.01	1.01	1.03	1.02	1.01	1.02
2050	0.05	0.05	0.06	0.06	107.43	1.03	1.03	1.03	1.02	1.03	1.05	1.03	1.03	1.03
3100	0.06	0.07	0.07	0.08	106.24	1.06	1.06	1.08	1.08	1.07	1.10	1.05	1.06	1.07
4150	0.08	0.10	0.10	0.10	107.40	1.11	1.12	1.14	1.14	1.12	1.13	1.08	1.11	1.10
5200	0.11	0.12	0.14	0.13	108.76	1.16	1.17	1.18	1.21	1.16	1.14	1.09	1.14	1.11
6250	0.13	0.14	0.16	0.15	104.65	1.19	1.19	1.20	1.25	1.18	1.12	1.09	1.14	1.11
7300	0.14	0.16	0.18	0.17	104.41	1.21	1.19	1.19	1.24	1.17	1.07	1.06	1.10	1.08
8000	0.15	0.17	0.18	0.18	103.35	1.21	1.18	1.18	1.22	1.16	1.04	1.04	1.06	1.04
9000	0.15	0.19	0.17	0.18	105.69	1.20	1.18	1.17	1.20	1.13	1.03	1.04	1.03	1.03
10000	0.16	0.21	0.17	0.20	106.75	1.20	1.18	1.18	1.19	1.14	1.06	1.04	1.08	1.07
12000	0.17	0.24	0.21	0.28	102.29	1.22	1.18	1.19	1.25	1.16	1.14	1.08	1.11	1.14
14000	0.21	0.31	0.25	0.37	96.97	1.32	1.24	1.29	1.29	1.26	1.13	1.06	1.11	1.11
16000	0.32	0.42	0.30	0.44	95.38	1.45	1.37	1.40	1.36	1.36	1.05	1.07	1.05	1.01
18000	0.34	0.48	0.33	0.51	90.58	1.36	1.31	1.31	1.35	1.33	1.25	1.20	1.25	1.19









Additional Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Xtra Long Life SP4T Switch MSP4TA-18+

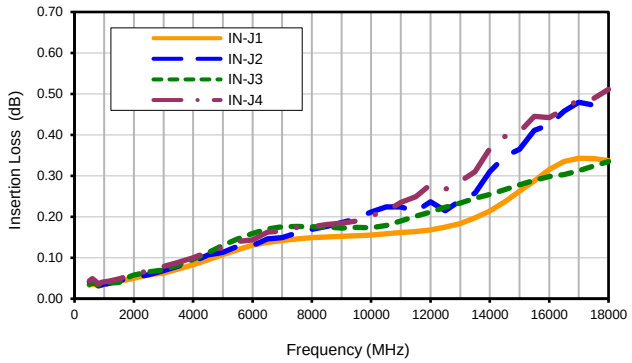
Typical Performance Data

FREQUENCY	INSERTION LOSS (dB)				ISOLATON (dB)	VSWR (:1)								
(MHz)	IN-J1	IN-J2	IN-J3	IN-J4		IN	J1-ON	J2-ON	J3-ON	J4-ON	J1-OFF	J2-OFF	J3-OFF	J4-OFF
500	0.03	0.04	0.03	0.04	99.27	1.01	1.01	1.00	1.00	1.00	1.02	1.02	1.01	1.01
600	0.04	0.05	0.04	0.05	100.17	1.01	1.01	1.00	1.00	1.00	1.02	1.02	1.01	1.01
700	0.03	0.04	0.04	0.04	103.63	1.01	1.01	1.00	1.00	1.00	1.02	1.02	1.01	1.01
800	0.03	0.03	0.03	0.04	103.67	1.01	1.01	1.00	1.00	1.00	1.02	1.02	1.01	1.01
900	0.03	0.03	0.04	0.04	102.92	1.02	1.01	1.00	1.00	1.01	1.02	1.02	1.01	1.01
1000	0.03	0.04	0.04	0.04	106.89	1.02	1.02	1.01	1.01	1.01	1.03	1.02	1.01	1.02
1100	0.04	0.04	0.04	0.04	107.08	1.02	1.02	1.01	1.01	1.01	1.03	1.02	1.01	1.02
1200	0.04	0.04	0.04	0.04	107.34	1.02	1.02	1.01	1.01	1.01	1.03	1.02	1.02	1.02
1300	0.04	0.04	0.04	0.05	106.37	1.02	1.02	1.01	1.01	1.01	1.03	1.02	1.02	1.02
1400	0.04	0.04	0.04	0.05	106.24	1.02	1.02	1.01	1.01	1.01	1.03	1.02	1.02	1.02
1500	0.04	0.04	0.04	0.05	106.88	1.03	1.02	1.01	1.01	1.02	1.04	1.02	1.02	1.02
1600	0.04	0.05	0.04	0.05	107.90	1.03	1.02	1.02	1.01	1.02	1.04	1.03	1.02	1.02
1700	0.05	0.05	0.05	0.05	108.31	1.03	1.02	1.02	1.01	1.02	1.04	1.03	1.02	1.03
1800	0.05	0.05	0.05	0.06	108.13	1.03	1.02	1.02	1.02	1.02	1.05	1.03	1.02	1.03
1900	0.05	0.05	0.06	0.06	108.21	1.03	1.03	1.02	1.02	1.02	1.05	1.03	1.02	1.03
2000	0.05	0.05	0.06	0.06	108.32	1.03	1.03	1.03	1.02	1.03	1.05	1.03	1.02	1.03
2500	0.06	0.06	0.07	0.07	112.68	1.04	1.04	1.05	1.04	1.04	1.07	1.04	1.04	1.05
3000	0.06	0.07	0.07	0.08	108.81	1.06	1.06	1.07	1.07	1.07	1.09	1.05	1.06	1.06
3500	0.07	0.08	0.08	0.09	107.49	1.08	1.08	1.10	1.10	1.09	1.11	1.06	1.08	1.08
4000	0.08	0.09	0.10	0.10	108.42	1.11	1.11	1.13	1.13	1.11	1.13	1.08	1.10	1.09
4500	0.10	0.11	0.11	0.11	111.26	1.13	1.14	1.15	1.17	1.14	1.14	1.09	1.12	1.10
5000	0.11	0.11	0.13	0.12	111.18	1.16	1.16	1.17	1.20	1.15	1.14	1.09	1.14	1.11
5500	0.12	0.13	0.15	0.14	110.32	1.17	1.18	1.19	1.23	1.17	1.14	1.09	1.15	1.12
6000	0.13	0.13	0.16	0.14	108.81	1.19	1.19	1.20	1.25	1.18	1.13	1.09	1.15	1.11
6500	0.14	0.15	0.17	0.16	105.74	1.20	1.19	1.20	1.25	1.19	1.11	1.08	1.14	1.11
7000	0.14	0.15	0.18	0.17	106.40	1.20	1.19	1.19	1.25	1.18	1.09	1.07	1.12	1.09
7500	0.15	0.16	0.18	0.17	104.24	1.21	1.19	1.19	1.23	1.17	1.06	1.05	1.09	1.07
8000	0.15	0.17	0.18	0.18	103.35	1.21	1.18	1.18	1.22	1.16	1.04	1.04	1.06	1.04
8500	0.15	0.18	0.18	0.18	106.59	1.20	1.18	1.18	1.21	1.15	1.02	1.03	1.03	1.01
9000	0.15	0.19	0.17	0.18	105.69	1.20	1.18	1.17	1.20	1.13	1.03	1.04	1.03	1.03
9500	0.15	0.20	0.17	0.19	106.18	1.20	1.18	1.18	1.19	1.14	1.04	1.03	1.06	1.05
10000	0.16	0.21	0.17	0.20	106.75	1.20	1.18	1.18	1.19	1.14	1.06	1.04	1.08	1.07
10500	0.16	0.22	0.18	0.21	103.89	1.20	1.19	1.21	1.20	1.14	1.08	1.03	1.10	1.09
11000	0.16	0.22	0.19	0.24	103.77	1.21	1.19	1.19	1.21	1.14	1.10	1.05	1.11	1.11
11500	0.16	0.21	0.20	0.25	102.84	1.21	1.18	1.21	1.23	1.15	1.13	1.06	1.11	1.12
12000	0.17	0.24	0.21	0.28	102.29	1.22	1.18	1.19	1.25	1.16	1.14	1.08	1.11	1.14
12500	0.17	0.21	0.22	0.27	101.39	1.23	1.18	1.22	1.26	1.19	1.16	1.08	1.11	1.13
13000	0.18	0.24	0.23	0.29	97.95	1.25	1.19	1.23	1.27	1.21	1.16	1.08	1.11	1.14
13500	0.20	0.26	0.25	0.31	98.99	1.28	1.21	1.25	1.28	1.24	1.15	1.08	1.11	1.12
14000	0.21	0.31	0.25	0.37	96.97	1.32	1.24	1.29	1.29	1.26	1.13	1.06	1.11	1.11
14500	0.24	0.35	0.27	0.40	97.38	1.36	1.28	1.31	1.30	1.29	1.10	1.05	1.10	1.10
15000	0.26	0.36	0.28	0.41	99.12	1.41	1.32	1.35	1.32	1.30	1.06	1.02	1.08	1.08
15500	0.29	0.41	0.29	0.45	97.43	1.44	1.35	1.37	1.34	1.34	1.02	1.03	1.05	1.04
16000	0.32	0.42	0.30	0.44	95.38	1.45	1.37	1.40	1.36	1.36	1.05	1.07	1.05	1.01
16500	0.33	0.46	0.30	0.46	96.37	1.45	1.39	1.39	1.37	1.37	1.11	1.10	1.08	1.04
17000	0.34	0.48	0.31	0.49	96.50	1.43	1.37	1.37	1.37	1.35	1.16	1.14	1.14	1.09
17500	0.34	0.47	0.32	0.49	94.92	1.39	1.35	1.34	1.37	1.35	1.22	1.18	1.20	1.16
18000	0.34	0.48	0.33	0.51	90.58	1.36	1.31	1.31	1.35	1.33	1.25	1.20	1.25	1.19

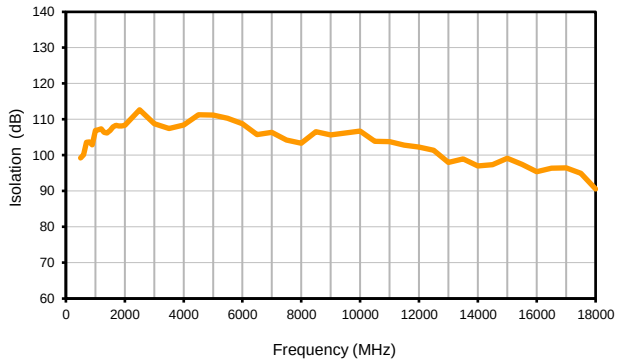
Xtra Long Life SP4T Switch MSP4TA-18+

Typical Performance Curves

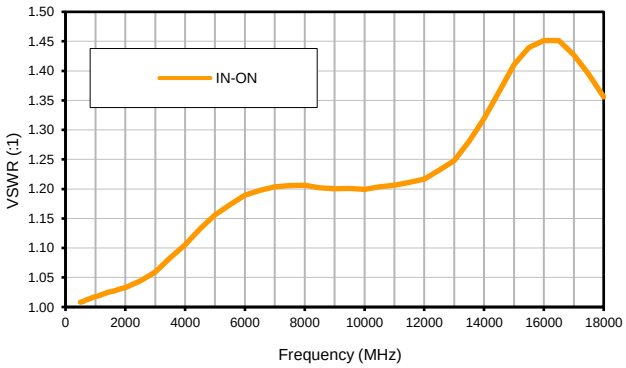
Insertion Loss



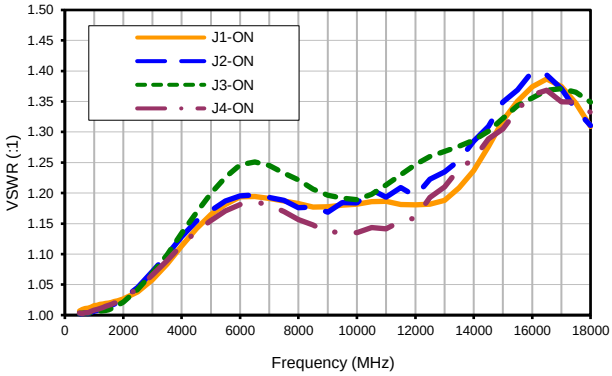
Isolation



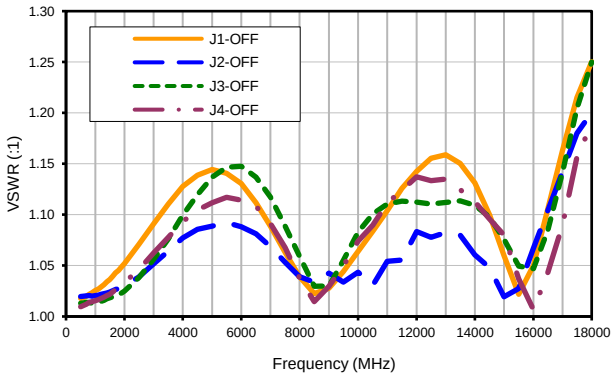
VSWR (IN)



VSWR (J1, J2, J3 & J4)



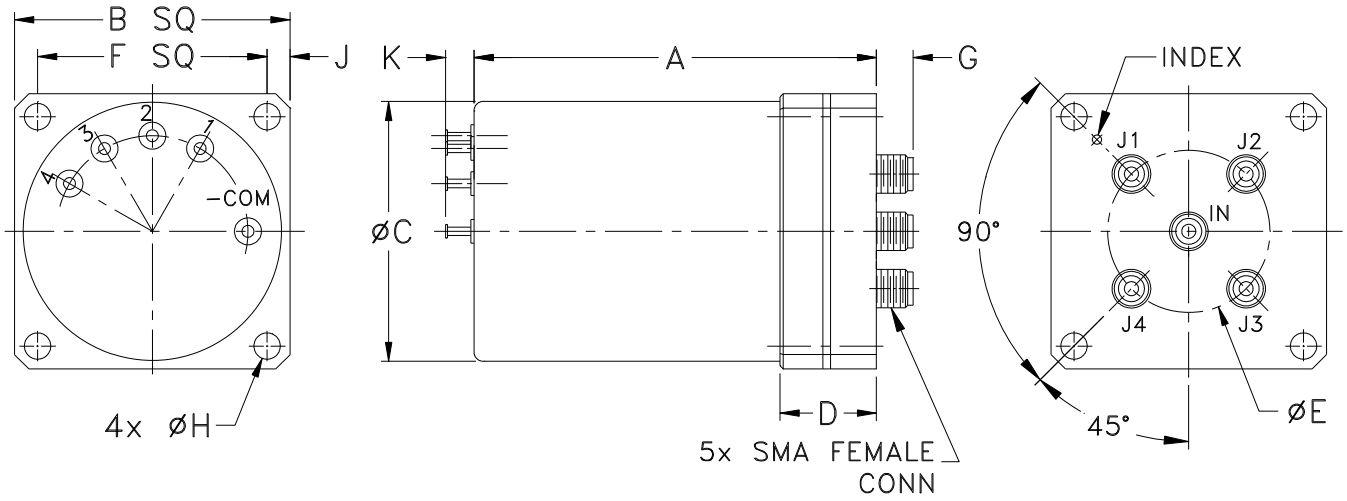
VSWR (J1, J2, J3 & J4)



Case Style HJ

HJ1768

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L
HJ1768	2.63 (66.80)	1.80 (45.72)	1.70 (43.18)	.63 (16.00)	1.06 (26.92)	1.500 (38.10)	.24 (6.10)	.172 (4.37)	.15 (3.81)	.19 (4.83)	- -

CASE#	M	N	WT. GRAM
HJ1768	- -	- -	160

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .015; 3 Pl. ± .005

Note:

1. Case material: Copper-Nickel alloy.

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

Mini-Circuits

Environmental Specifications ENV22

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