

2 Way-0° 50Ω 680 to 6000 MHz

The Big Deal

- >3 octave bandwidth, 680 to 6000 MHz
- Low insertion loss, 1.0 dB
- Small size, 1.25 x 1.0 x 0.2"



CASE STYLE: JF1258

Product Overview

Mini-Circuits' SEPS-2-63+ is a 50Ω 2-way 0° surface mount splitter/combiner covering the 680 to 6000 MHz frequency range, supporting a wide variety of applications. This model can handle up to 5W RF input power as a splitter and provides low insertion loss, low phase and amplitude unbalance, and good isolation. Housed in a miniature, shielded package (1.25 x 1.0 x 0.2") with wrap-around terminations this unit interfaces with gold over nickel plate termination finish.

Key Features

Feature	Advantages
Wideband, 680 to 6000 MHz	>3 octave bandwidth supports a wide range of broadband applications.
Low insertion loss, 1.0 dB	The combination of 5W power handling and low insertion loss makes this model a suitable candidate for distributing signals while maintaining signal power.
Low unbalance: • 0.2 dB amplitude unbalance • 1.5° phase unbalance	SEPS-2-63+ produces nearly equal output signals, ideal for parallel path / multichannel systems.
Good isolation, 22 dB	Minimizes interference between input ports.
Good output matching VSWR, 1.3:1 typ.	Provides excellent thru-path transmission with low signal reflection.
Small size, 1.25 x 1.0 x 0.2"	Saves space in crowded PCB layouts.

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

Power Splitter/Combiner

SEPS-2-63+

2 Way-0° 50Ω 680 to 6000 MHz

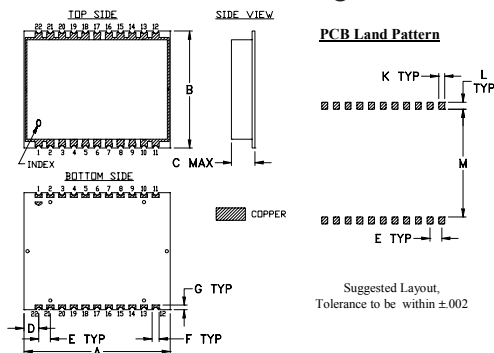
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	5W max.
Internal Dissipation	0.4W max.
DC Current	1.5A (750 mA for each port)
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

SUM PORT	17
PORT 1	4
PORT 2	8
GROUND	all others

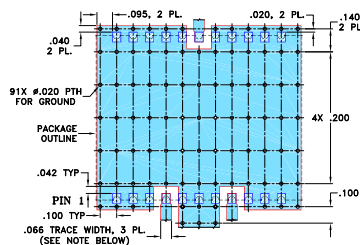
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
1.250	1.000	.200	.125	.100	.060	.040
31.75	25.40	5.08	3.18	2.54	1.52	1.02
H	J	K	L	M		wt
--	--	.050	.060	.920		grams
--	--	1.27	1.52	23.37		4.4

Demo Board MCL P/N: TB-760+ Suggested PCB Layout (PL-402)



NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

■ DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
■ DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Features

- wideband 680-6000 MHz
- good output matching, VSWR 1.3 typ.
- excellent amplitude unbalance, 0.2 dB typ.

Applications

- SATCOM
- broadband wireless
- test and measurement
- wireless telecom



Generic photo used for illustration purposes only

CASE STYLE: JF1258

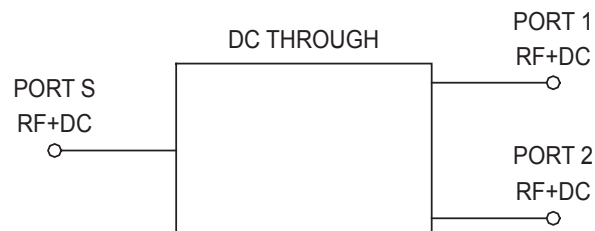
+RoHS Compliant

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

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		680		6000	MHz
Insertion Loss Above 3.0 dB	680 - 1200 1200 - 5000 5000 - 6000	— — —	0.6 0.8 1.0	1.0 1.5 2.5	dB
Isolation	680 - 1200 1200 - 6000	10 17	17.0 22.0	— —	dB
Phase Unbalance	680 - 1200 1200 - 6000	— —	0.3 1.5	2.0 5.0	Degree
Amplitude Unbalance	680 - 1200 1200 - 6000	— —	0.1 0.2	0.4 0.6	dB
VSWR (Port S)	680 - 1200 1200 - 6000	— —	1.6 1.5	2.0 1.82	:1
VSWR (Port 1-2)	680 - 6000	—	1.3	1.6	:1

Electrical Schematic



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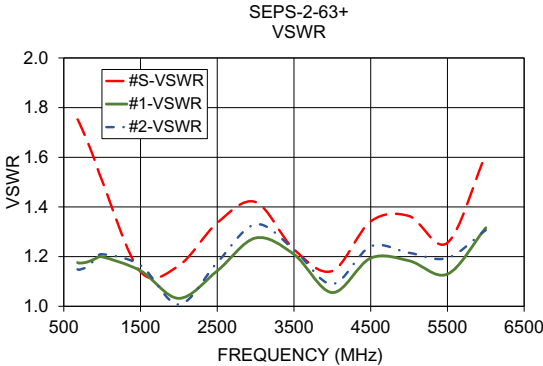
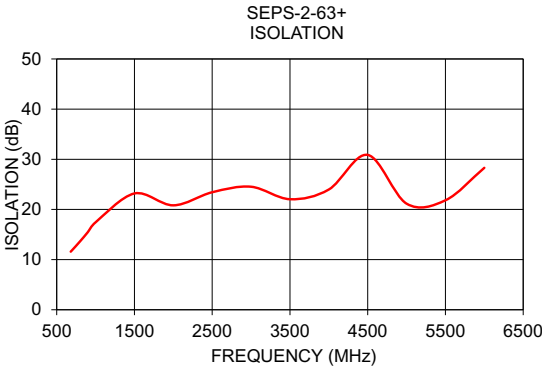
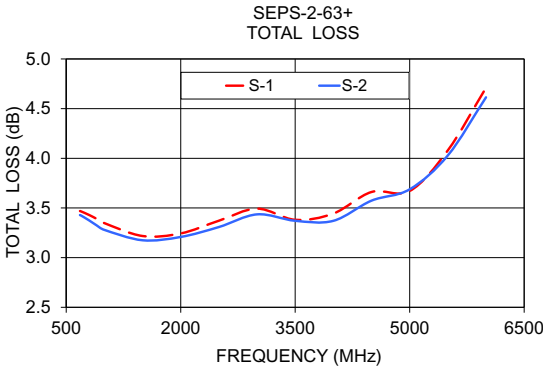
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Typical Performance Data

Frequency (MHz)	Total Loss ¹ (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
680	3.47	3.43	0.04	11.58	0.27	1.75	1.18	1.15
700	3.46	3.42	0.04	11.91	0.26	1.74	1.17	1.15
800	3.43	3.37	0.05	13.63	0.18	1.67	1.18	1.16
900	3.39	3.32	0.07	15.47	0.10	1.59	1.19	1.19
1000	3.35	3.28	0.07	17.43	0.01	1.51	1.20	1.21
1500	3.22	3.17	0.04	23.19	0.01	1.14	1.14	1.17
2000	3.24	3.21	0.04	20.82	0.01	1.16	1.03	1.01
2500	3.37	3.31	0.06	23.43	0.21	1.34	1.14	1.18
3000	3.49	3.44	0.06	24.53	0.12	1.42	1.28	1.33
3500	3.38	3.37	0.01	22.04	0.18	1.23	1.21	1.23
4000	3.44	3.37	0.07	23.97	0.36	1.14	1.06	1.09
4500	3.66	3.57	0.09	30.87	0.11	1.34	1.19	1.24
5000	3.67	3.69	0.02	21.15	0.12	1.36	1.18	1.22
5500	4.08	4.03	0.05	21.83	0.41	1.26	1.13	1.19
6000	4.71	4.61	0.10	28.30	0.21	1.61	1.32	1.31

1. Total Loss = Insertion Loss + 3dB splitter theoretical loss.



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2 Way-0° Power Splitter/Combiner

SEPS-2-63+

Typical Performance Data

FREQUENCY	TOTAL LOSS ¹		AMPLITUDE UNBALANCE	ISOLATION	PHASE UNBALANCE	FREQUENCY	VSWR		
(MHz)	(dB)		(dB)	(dB)	(deg.)	(MHz)	(:1)		
	S-1	S-2		1-2			S	1	2
600	3.49	3.47	0.03	10.29	0.30	600	1.80	1.20	1.18
620	3.49	3.46	0.03	10.62	0.28	620	1.79	1.19	1.17
640	3.48	3.45	0.03	10.94	0.29	640	1.78	1.18	1.16
660	3.47	3.44	0.04	11.25	0.27	660	1.76	1.18	1.15
680	3.47	3.43	0.04	11.58	0.27	680	1.75	1.18	1.15
700	3.46	3.42	0.04	11.91	0.26	700	1.74	1.17	1.15
750	3.45	3.40	0.05	12.75	0.21	750	1.71	1.17	1.15
800	3.43	3.37	0.05	13.63	0.18	800	1.67	1.18	1.16
850	3.41	3.35	0.06	14.54	0.13	850	1.63	1.18	1.17
900	3.39	3.32	0.07	15.47	0.10	900	1.59	1.19	1.19
950	3.37	3.30	0.07	16.44	0.04	950	1.55	1.20	1.20
1000	3.35	3.28	0.07	17.43	0.01	1000	1.51	1.20	1.21
1200	3.27	3.22	0.06	21.37	0.08	1200	1.33	1.20	1.23
1400	3.23	3.18	0.05	23.41	0.02	1400	1.19	1.16	1.19
1500	3.22	3.17	0.04	23.19	0.01	1500	1.14	1.14	1.17
2000	3.24	3.21	0.04	20.82	0.01	2000	1.16	1.03	1.01
2200	3.28	3.24	0.04	21.19	0.09	2200	1.22	1.02	1.06
2400	3.33	3.28	0.05	22.51	0.19	2400	1.29	1.10	1.13
2500	3.37	3.31	0.06	23.43	0.21	2500	1.34	1.14	1.18
2600	3.41	3.34	0.07	24.39	0.23	2600	1.38	1.18	1.22
2800	3.47	3.39	0.07	25.33	0.23	2800	1.43	1.24	1.29
3000	3.49	3.44	0.06	24.53	0.12	3000	1.42	1.28	1.33
3200	3.45	3.42	0.03	23.26	0.12	3200	1.37	1.27	1.32
3400	3.40	3.39	0.01	22.32	0.14	3400	1.28	1.24	1.27
3500	3.38	3.37	0.01	22.04	0.18	3500	1.23	1.21	1.23
3600	3.37	3.36	0.01	21.89	0.24	3600	1.18	1.17	1.18
3800	3.39	3.35	0.04	22.26	0.32	3800	1.12	1.09	1.09
4000	3.44	3.37	0.07	23.97	0.36	4000	1.14	1.06	1.09
4100	3.49	3.40	0.09	25.72	0.35	4100	1.17	1.08	1.13
4200	3.52	3.43	0.09	28.32	0.30	4200	1.21	1.12	1.16
4300	3.56	3.46	0.10	31.78	0.23	4300	1.25	1.15	1.20
4400	3.62	3.52	0.10	33.63	0.17	4400	1.30	1.17	1.22
4500	3.66	3.57	0.09	30.87	0.11	4500	1.34	1.19	1.24
4600	3.70	3.63	0.07	27.58	0.07	4600	1.37	1.21	1.26
4700	3.75	3.70	0.05	25.25	0.04	4700	1.39	1.21	1.26
4800	3.80	3.77	0.03	23.51	0.12	4800	1.40	1.22	1.26
4900	3.73	3.74	0.01	21.93	0.16	4900	1.42	1.21	1.25
5000	3.67	3.69	0.02	21.15	0.12	5000	1.36	1.18	1.22
5100	3.67	3.68	0.01	20.81	0.22	5100	1.27	1.15	1.18
5200	3.72	3.72	0.00	20.67	0.36	5200	1.17	1.12	1.14
5300	3.84	3.83	0.01	20.68	0.48	5300	1.06	1.08	1.12
5400	4.07	4.05	0.03	20.70	0.50	5400	1.10	1.05	1.12
5500	4.08	4.03	0.05	21.83	0.41	5500	1.26	1.13	1.19
5600	3.95	3.86	0.09	24.67	0.29	5600	1.33	1.22	1.28
5700	3.95	3.84	0.11	28.85	0.21	5700	1.38	1.28	1.34
5800	4.05	3.93	0.13	33.97	0.12	5800	1.41	1.33	1.37
5900	4.27	4.14	0.12	32.45	0.00	5900	1.45	1.34	1.35
6000	4.71	4.61	0.10	28.30	0.21	6000	1.61	1.32	1.31
6100	5.55	5.48	0.07	28.39	0.47	6100	1.96	1.31	1.30

¹Total Loss = Insertion Loss + 3dB Splitter Loss



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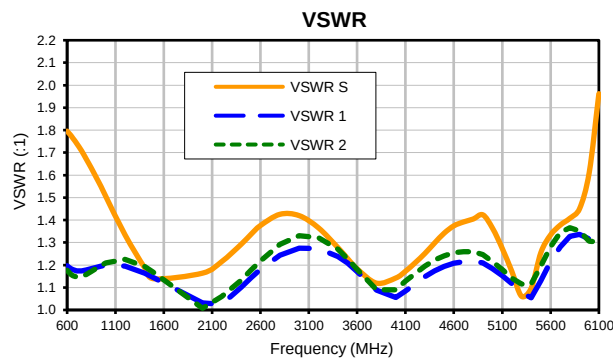
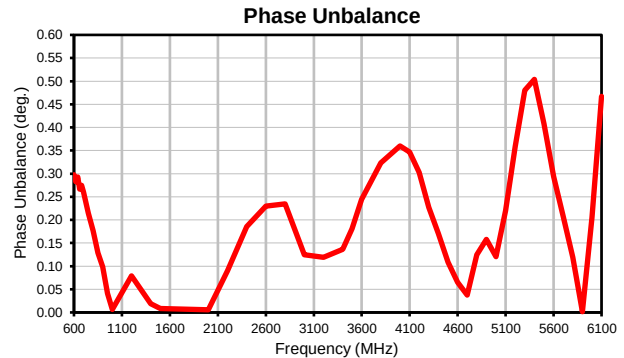
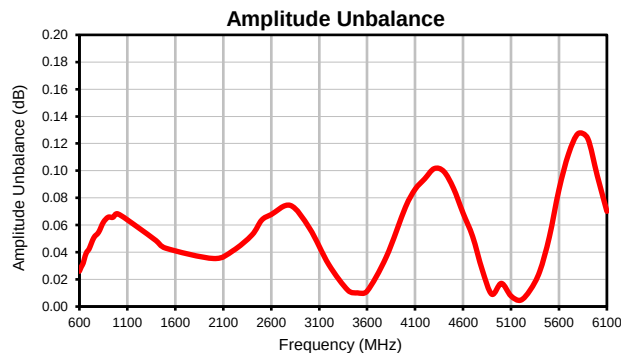
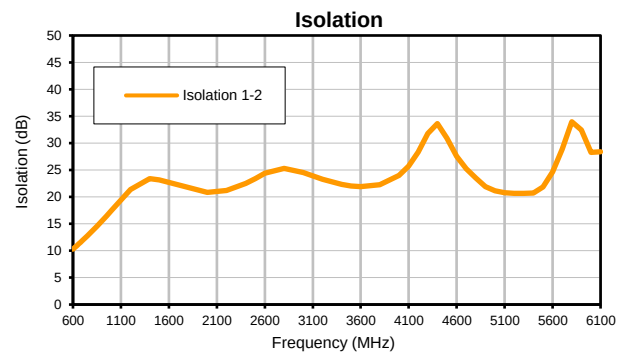
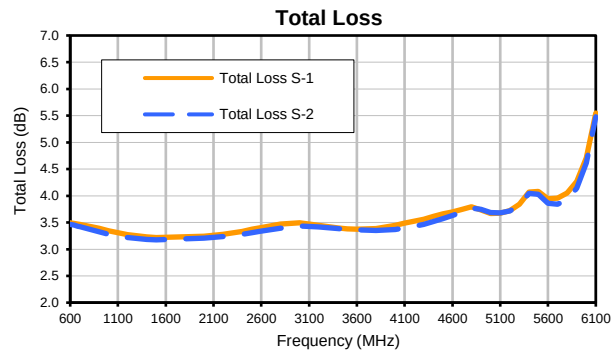
IF/RF MICROWAVE COMPONENTS

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2 Way-0° Power Splitter/Combiner

SEPS-2-63+

Typical Performance Curves



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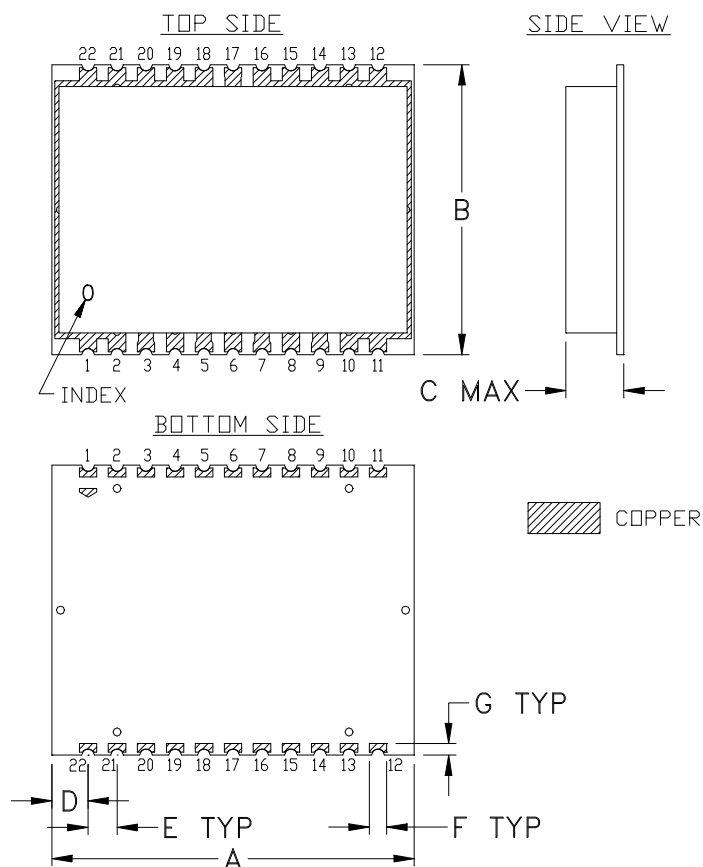


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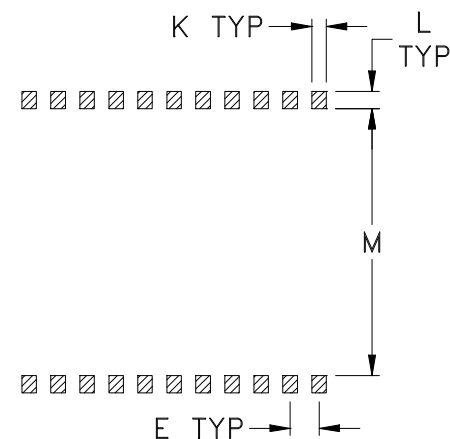
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Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	WT. GRAM
JF1258	1.250 (31.75)	1.000 (25.40)	.200 (5.08)	.125 (3.17)	.100 (2.54)	.060 (1.52)	.040 (1.02)	-	-	.050 (1.27)	.060 (1.52)	.920 (23.37)	4.4

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

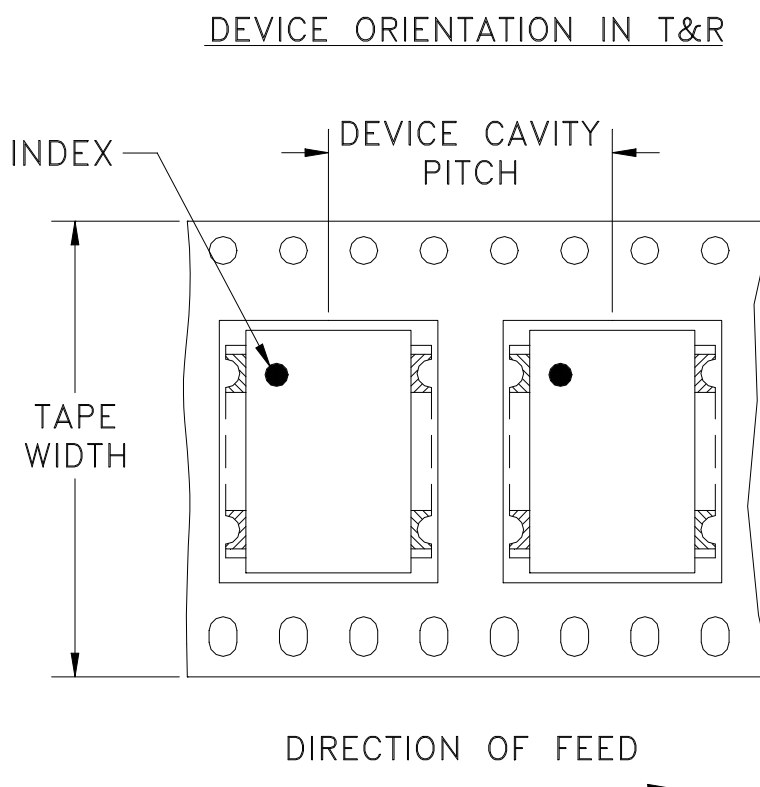
Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
For RoHS Case Styles: 3-5 μ inch (.08-.13 μ m) Gold over 120-240 μ inch (3-6 μ m) Nickel plate.
All models, (+) suffix.



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Tape & Reel Packaging TR-F27



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
44	32	13	125

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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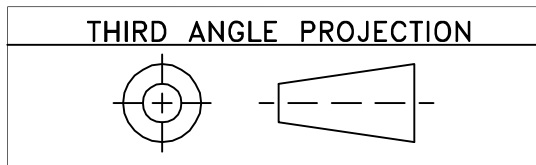


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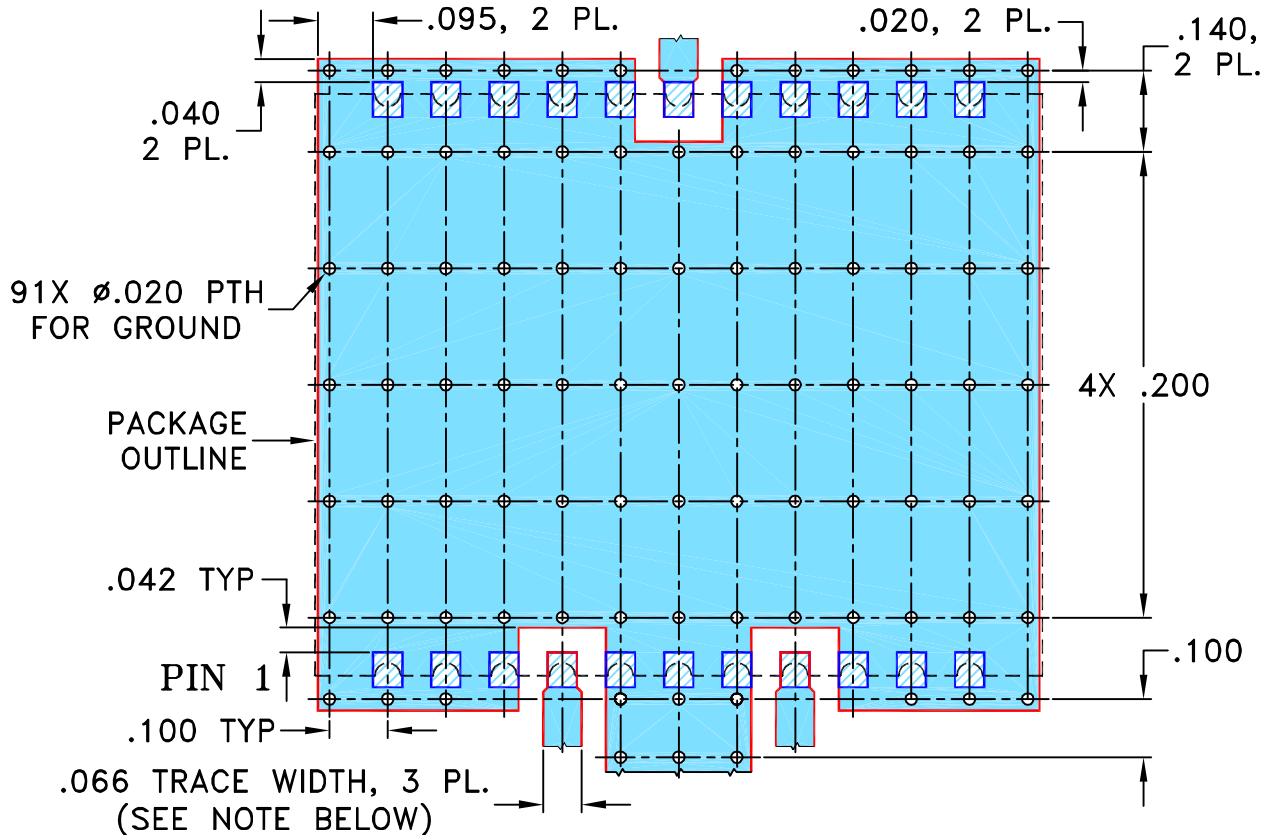
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REVISIONS					
REV OR	ECN No.	DESCRIPTION	DATE	DR	AUTH
	M147511	NEW RELEASE	07/28/14	GF	JC

SUGGESTED MOUNTING CONFIGURATION FOR
JF1258 CASE STYLE, "22SP03" PIN CONNECTION



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 FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC
 (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005 ANGLES $\pm$ FRACTIONS $\pm$	DRAWN	GF	07/22/14
	CHECKED	ITG	07/28/14
	APPROVED	JC	07/28/14



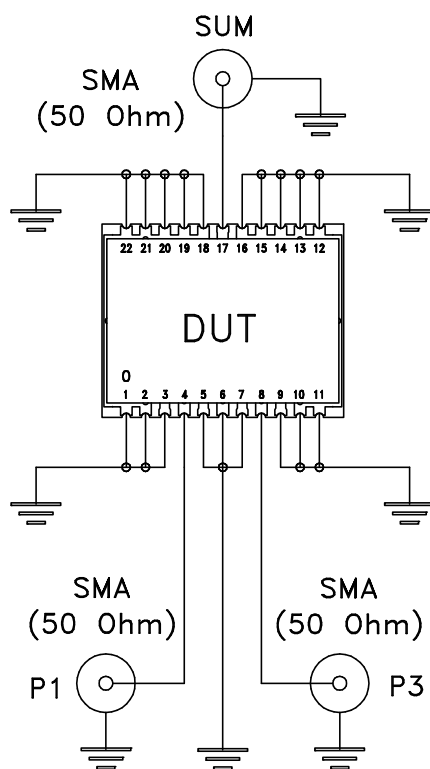
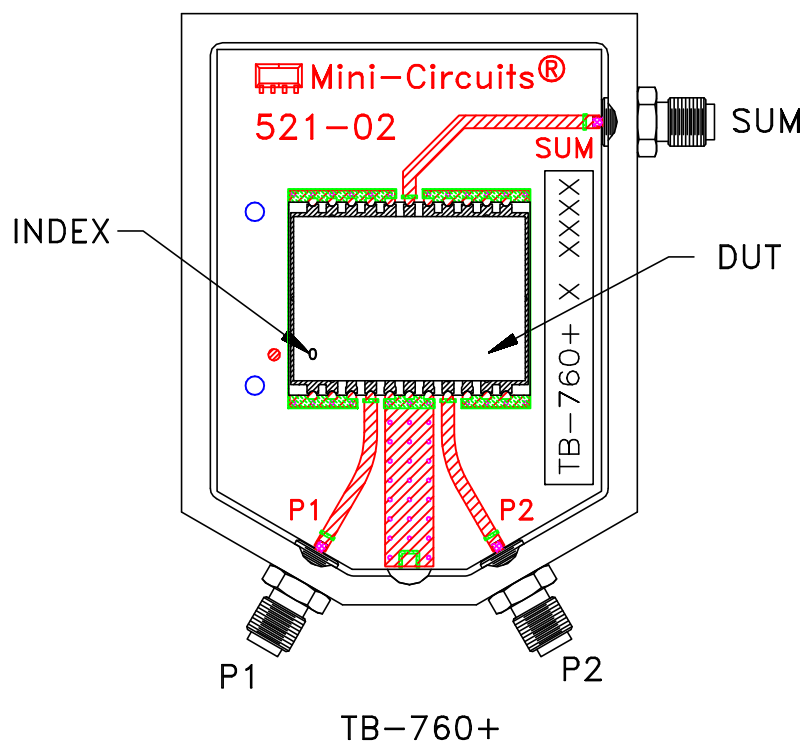
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PL, 22SP03, JF1258, TB-760+

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ASHEETA1.DWG REV:A	DATE:01/12/95

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-402	OR
FILE:	98PL402	SCALE:	SHEET:
		3:1	1 OF 1

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
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