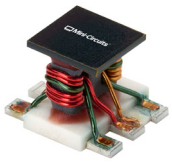
SURFACE MOUNT top hat

Power Splitter/Combiner SBTCJ-182-75X+

75Ω (2 Way-180°) 5 to 1800 MHz

KEY FEATURES

- Low Insertion Loss, 2.2 dB Typ.
- Good Return Loss, 19 dB Typ.
- Good Power Handling, 1W
- Good Isolation, 22 dB Typ.

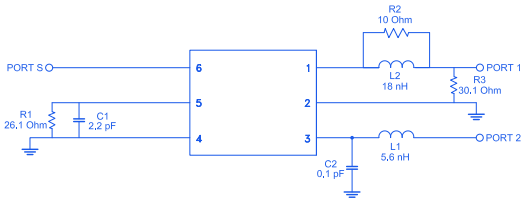


Generic photo used for illustration purposes only

APPLICATIONS

- DOCSIS® 3.1 Systems
- CATV
- cellular
- UHV/VHV

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' SBTCJ-182-75X+ is a 75Ω 2 Way 180° Surface Mount Power Splitter/Combiner covering 5 - 1800 MHz frequency range. This model can handle 1W RF input power as a splitter and provides low Insertion Loss and good Return Loss. The unit measures .0160" x 0.150" x 0.160" and easy to pick and place assembly.

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		5	—	1800	MHz
Insertion Loss (above 3 dB)	5 - 50	—	1.6	2.2	dB
	50 - 1000	—	2.2	2.6	
	1000 - 1800	—	3.3	4.3	
Isolation	5 - 50	25	31	—	dB
	50 - 1000	19	22	—	
	1000 - 1800	9	12	—	
Phase Unbalance (±)	5 - 50	—	2.4	3	Degree
	50 - 1000	—	12	17	
	1000 - 1800	—	16	—	
Amplitude Unbalance (±)	5 - 50	—	1.15	1.3	dB
	50 - 1000	—	1.4	1.7	
	1000 - 1800	—	2.5	2.9	
Return Loss (Port S)	5 - 50	12	15	—	dB
	50 - 1000	16	19	—	
	1000 - 1800	14	18	—	
Return Loss (Port 1 to Port 2)	5 - 50	11	15	—	dB
	50 - 1000	9	12	—	
	1000 - 1800	8	12	—	

ABSOLUTE MAXIMUM RATINGS[1]

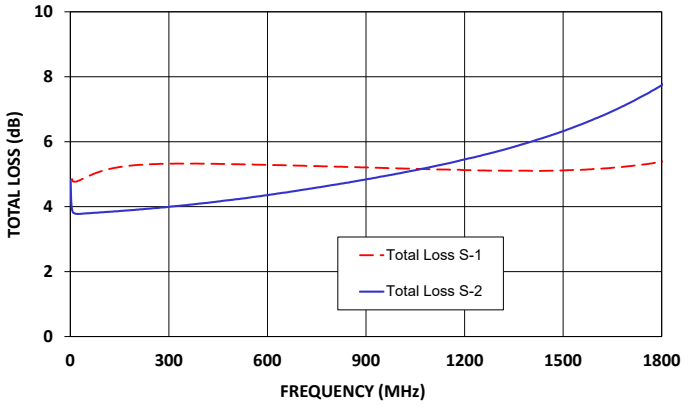
Operating Case Temperature		-40°C to +85°C
Storage Temperature		-55°C to +100°C
Input Power	**as splitter**	1 W
	as combiner per port	100 mW

1. Permanent damage may occur if any of these limits are exceeded.

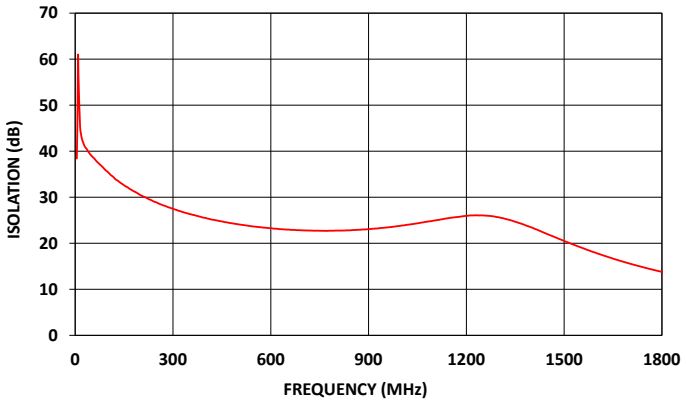
REV. OR
ECO-027983
EDU5263
SBTCJ-182-75X+
URJ
251208

TYPICAL PERFORMANCE GRAPHS AT +25°C

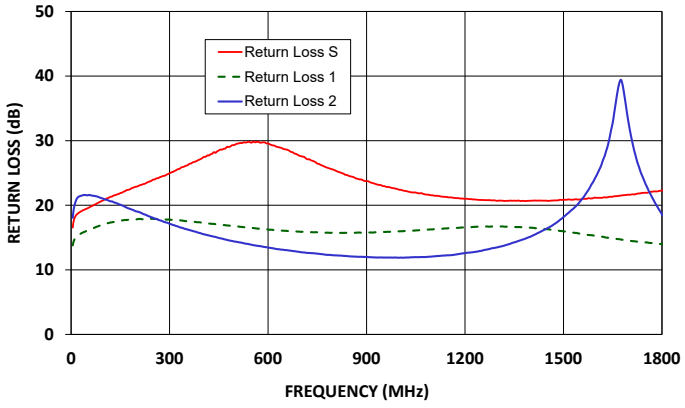
TOTAL LOSS



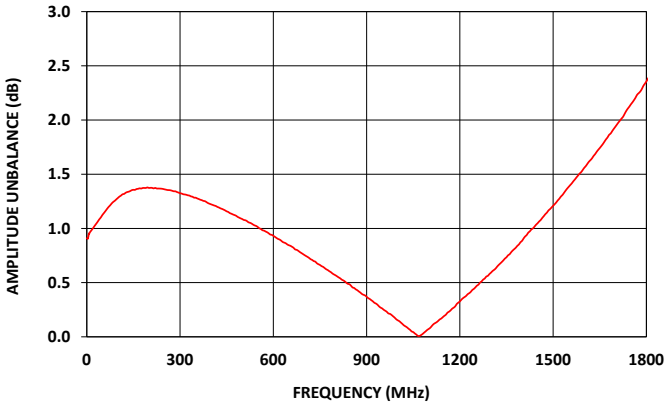
ISOLATION



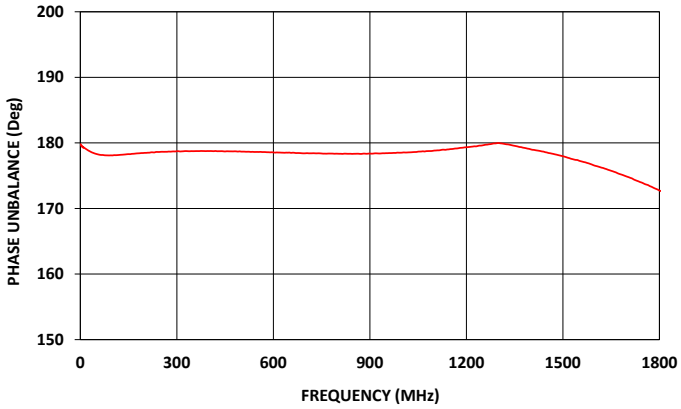
RETURN LOSS



AMPLITUDE UNBALANCE



PHASE UNBALANCE



SURFACE MOUNT top hat

Power Splitter/Combiner SBTCJ-182-75X+

75Ω (2 Way-180°) 5 to 1800 MHz

FUNCTIONAL DIAGRAM

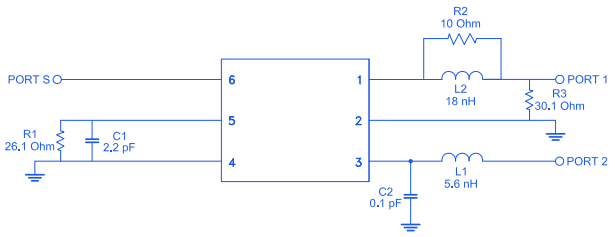
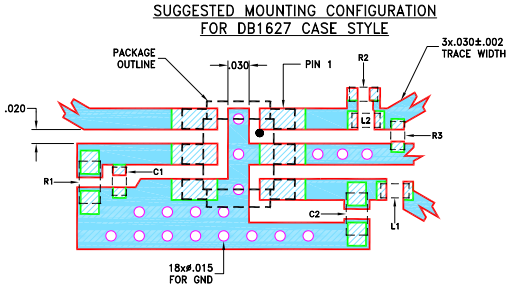


Figure 1. SBTCJ-182-75X+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
Sum Port	6	Connects to Sum Port
Port 1 (180°)	1	Connects to 1 Port
Port 2 (0°)	3	Connects to 2 Port
Ground	4,5	Connects to Ground
Not Used	2	—
EXT. RESISTOR 26.1Ω	—	4 to Ground
EXT. CAPACITOR 2.2 pF	—	4 to Ground
EXT. CAPACITOR 0.1 pF	—	3 to Ground
EXT. COMPONENTS (INDUCTOR 5.6nH & 18nH, RESISTOR 10Ω & 30.1Ω)	—	1,2,3

SUGGESTED PCB LAYOUT (PL-848)



COMPONENT	SIZE
R1,C2	0603
R2,R3,C1	0402
L1,L2	0402

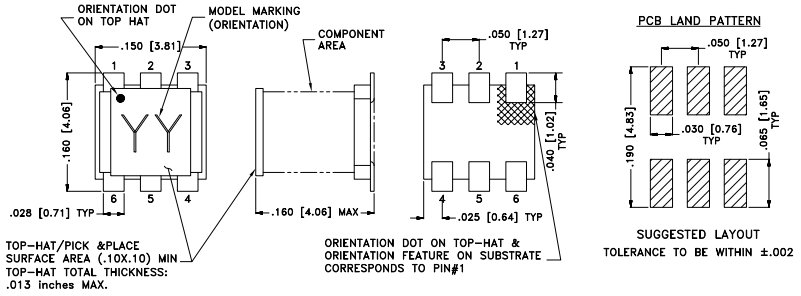
NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .030±.002 COPPER: 1/2 Oz ON EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-1322.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK.

Figure 2. Suggested PCB Layout PL-848

CASE STYLE DRAWING



Weight: .15 grams
Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3Pl. ± .005

PRODUCT MARKING*: BT

*Marking may contain other features or characters for internal lot control.

SURFACE MOUNT top hat

Power Splitter/Combiner SBTCJ-182-75X+

75Ω (2 Way-180°) 5 to 1800 MHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD CLICK HERE

Performance Data & Graphs	Data Graphs S-Parameter (S3P Files) Data Set (.zip file) De-embedded to device pads
Case Style	DB1627 Lead Finish: Tin over Nickel Plate
RoHS Status	Compliant
Tape and Reel	F47
Suggested Layout for PCB Design	PL-848
Evaluation Board	TB-SBTCJ18275X+ Gerber File
Environmental Rating	ENV02T1

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/terms/viewterm.html

2 Way-0° Power Splitter/Combiner SBTCJ-182-75X+

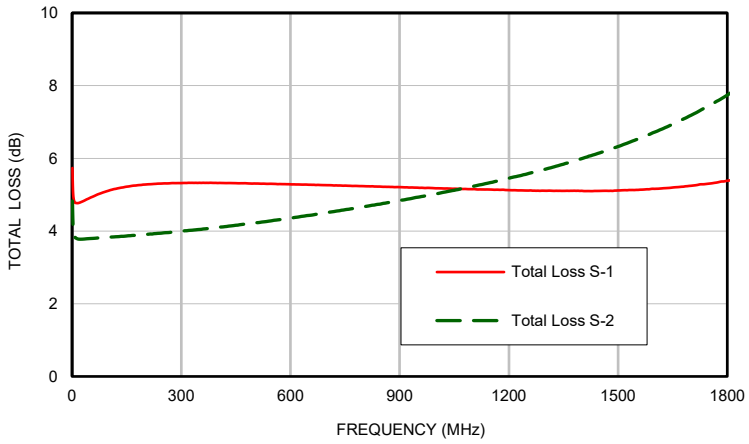
Typical Performance Data

FREQ. (MHz)	TOTAL LOSS[1] (dB)		AMPLITUDE UNBALANCE (dB)	ISOLATION (dB)	PHASE UNBALANCE (deg.)	RETURN LOSS (dB)		
	S-1	S-2		1-2		S	1	2
5	4.85	3.93	0.92	38.42	179.58	16.54	13.79	18.06
10	4.77	3.81	0.96	56.65	179.33	17.97	14.69	19.92
20	4.78	3.78	1.00	42.90	179.00	18.71	15.33	21.20
50	4.92	3.79	1.12	39.01	178.31	19.52	16.10	21.54
80	5.04	3.81	1.23	36.84	178.11	20.33	16.70	21.34
100	5.11	3.83	1.28	35.50	178.10	20.82	17.06	20.97
140	5.20	3.85	1.35	33.08	178.24	21.68	17.49	20.29
145	5.21	3.86	1.35	32.86	178.27	21.75	17.55	20.17
150	5.22	3.86	1.36	32.61	178.29	21.88	17.61	20.08
155	5.23	3.87	1.36	32.36	178.29	21.95	17.65	19.99
160	5.24	3.87	1.36	32.21	178.33	22.11	17.68	19.87
165	5.24	3.88	1.37	31.93	178.34	22.20	17.73	19.74
170	5.25	3.88	1.37	31.71	178.37	22.36	17.71	19.62
200	5.28	3.91	1.37	30.47	178.48	22.89	17.82	19.04
225	5.30	3.93	1.37	29.61	178.57	23.34	17.88	18.56
260	5.31	3.96	1.35	28.52	178.64	24.17	17.88	17.88
290	5.32	3.98	1.34	27.74	178.70	24.71	17.78	17.33
300	5.32	3.99	1.32	27.51	178.74	24.94	17.79	17.12
350	5.33	4.04	1.28	26.38	178.74	26.13	17.54	16.32
380	5.33	4.08	1.25	25.84	178.76	26.79	17.40	15.89
400	5.32	4.10	1.22	25.49	178.76	27.32	17.30	15.56
440	5.32	4.15	1.17	24.87	178.74	28.12	17.07	15.09
470	5.31	4.19	1.13	24.47	178.71	28.78	16.92	14.70
500	5.31	4.22	1.09	24.13	178.67	29.39	16.73	14.37
530	5.30	4.26	1.04	23.83	178.63	29.72	16.58	14.07
560	5.30	4.30	0.99	23.55	178.64	29.74	16.44	13.79
590	5.29	4.34	0.94	23.33	178.56	29.74	16.32	13.53
600	5.29	4.35	0.93	23.28	178.56	29.59	16.26	13.45
650	5.27	4.43	0.84	22.98	178.53	28.67	16.05	13.07
700	5.26	4.51	0.75	22.81	178.42	27.61	15.89	12.73
750	5.25	4.59	0.66	22.72	178.39	26.45	15.81	12.51
770	5.24	4.62	0.62	22.71	178.38	26.04	15.76	12.39
800	5.24	4.67	0.57	22.76	178.35	25.50	15.73	12.26
850	5.22	4.75	0.47	22.87	178.34	24.49	15.72	12.08
870	5.22	4.79	0.43	22.93	178.32	24.12	15.75	12.03
900	5.21	4.84	0.37	23.06	178.38	23.73	15.75	12.00
950	5.19	4.93	0.26	23.39	178.44	22.96	15.86	11.91
970	5.18	4.97	0.22	23.54	178.46	22.79	15.88	11.91
1000	5.18	5.02	0.15	23.84	178.52	22.39	15.97	11.88
1040	5.17	5.10	0.06	24.22	178.61	21.97	16.08	11.95
1080	5.16	5.18	0.03	24.70	178.75	21.67	16.20	11.99
1120	5.15	5.27	0.13	25.16	178.91	21.42	16.33	12.14
1160	5.14	5.36	0.22	25.62	179.10	21.20	16.46	12.29
1200	5.13	5.45	0.33	25.97	179.33	21.00	16.58	12.59
1240	5.12	5.55	0.43	26.05	179.59	20.84	16.68	12.85
1280	5.11	5.65	0.54	25.88	179.87	20.75	16.72	13.32
1320	5.11	5.76	0.65	25.30	179.83	20.66	16.68	13.76
1360	5.11	5.87	0.76	24.44	179.45	20.71	16.62	14.42
1400	5.11	5.99	0.89	23.45	179.02	20.70	16.53	15.15
1440	5.10	6.12	1.02	22.25	178.67	20.71	16.34	16.16
1480	5.11	6.25	1.15	21.09	178.21	20.75	16.09	17.36
1500	5.12	6.33	1.21	20.52	177.97	20.84	15.95	18.17
1560	5.14	6.55	1.42	18.88	177.15	20.98	15.51	21.18
1600	5.16	6.72	1.56	17.85	176.52	21.15	15.25	24.54
1640	5.19	6.89	1.71	16.91	175.91	21.32	14.92	30.34
1680	5.22	7.09	1.86	16.03	175.20	21.55	14.65	38.64
1700	5.24	7.18	1.94	15.61	174.85	21.63	14.54	32.27
1710	5.26	7.23	1.98	15.41	174.66	21.69	14.45	29.68
1720	5.27	7.29	2.01	15.22	174.43	21.72	14.40	27.60
1750	5.30	7.45	2.14	14.65	173.84	21.94	14.25	23.29
1780	5.35	7.62	2.26	14.13	173.20	22.14	14.07	20.27
1800	5.38	7.74	2.36	13.80	172.74	22.28	14.01	18.59

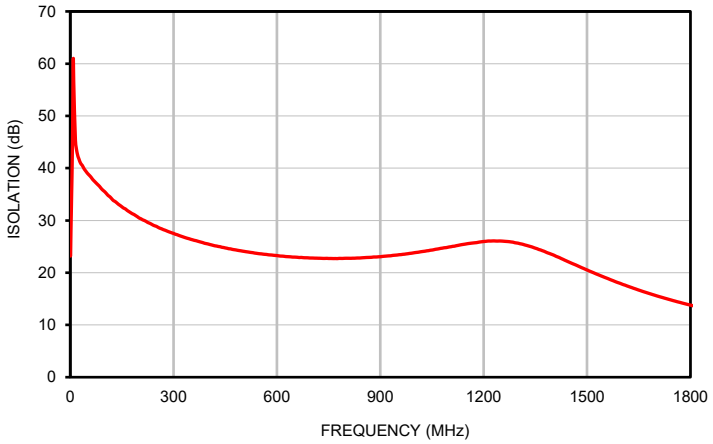
[1]Total Loss = Insertion Loss + 3dB Splitter Loss

Typical Performance Curves

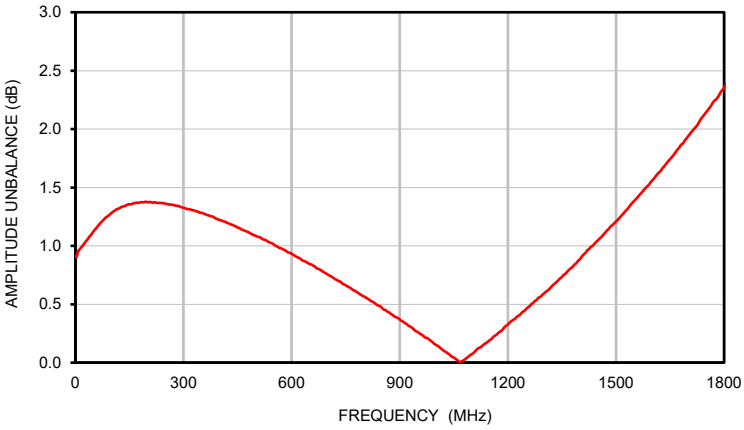
TOTAL LOSS



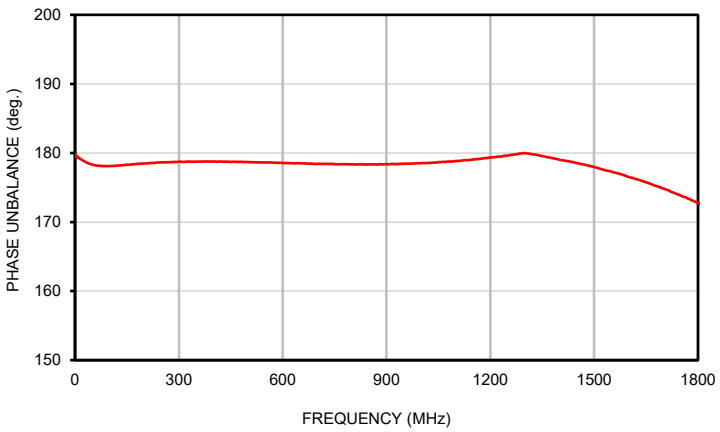
ISOLATION



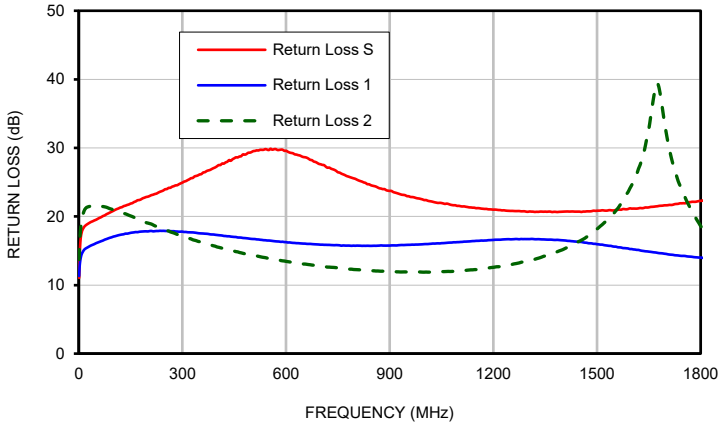
AMPLITUDE UNBALANCE



PHASE UNBALANCE



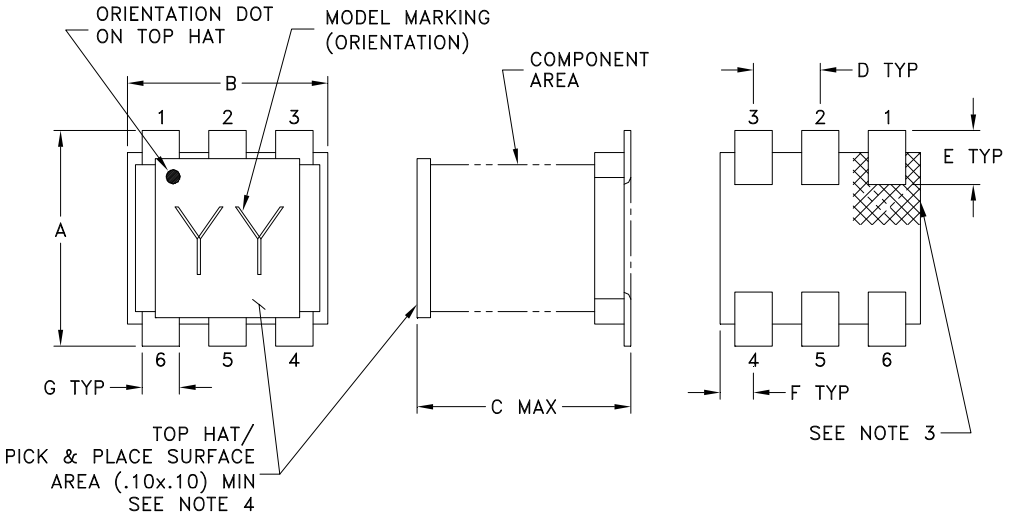
RETURN LOSS



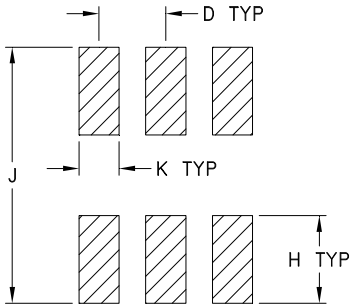
Case Style DB

DB1627

Outline Dimensions



PCB Land Pattern



SUGGESTED LAYOUT
TOLERANCE TO BE WITHIN ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
DB1627	.160 (4.06)	.150 (3.81)	.160 (4.06)	.050 (1.27)	.040 (1.02)	.025 (0.64)	.028 (0.71)	.065 (1.65)	.190 (4.83)	.030 (0.76)	.15

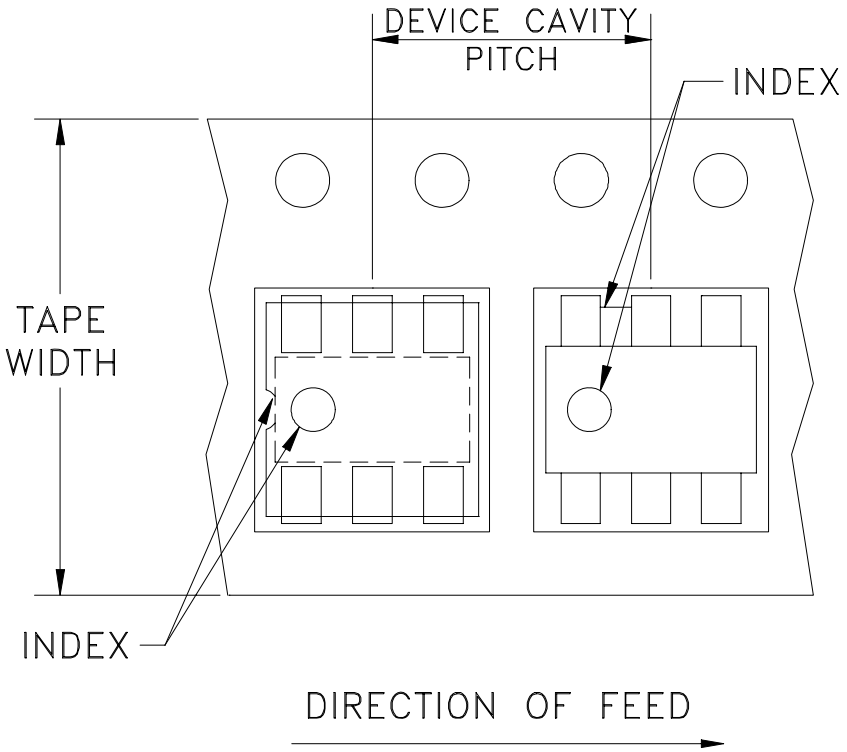
Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3Pl. ± .005

Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.
3 Orientation dot on top hat & orientation feature on substrate correspondence to pin #1.
4 Top-Hat total thickness: .013 inches MAX.

Tape & Reel Packaging TR-F47

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note
12	8	13	1000, 2000
		7	20, 50, 100, 200, 500

Note: Please consult individual model data sheet to determine device per reel availability.

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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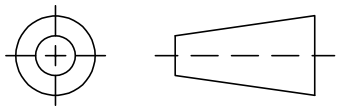
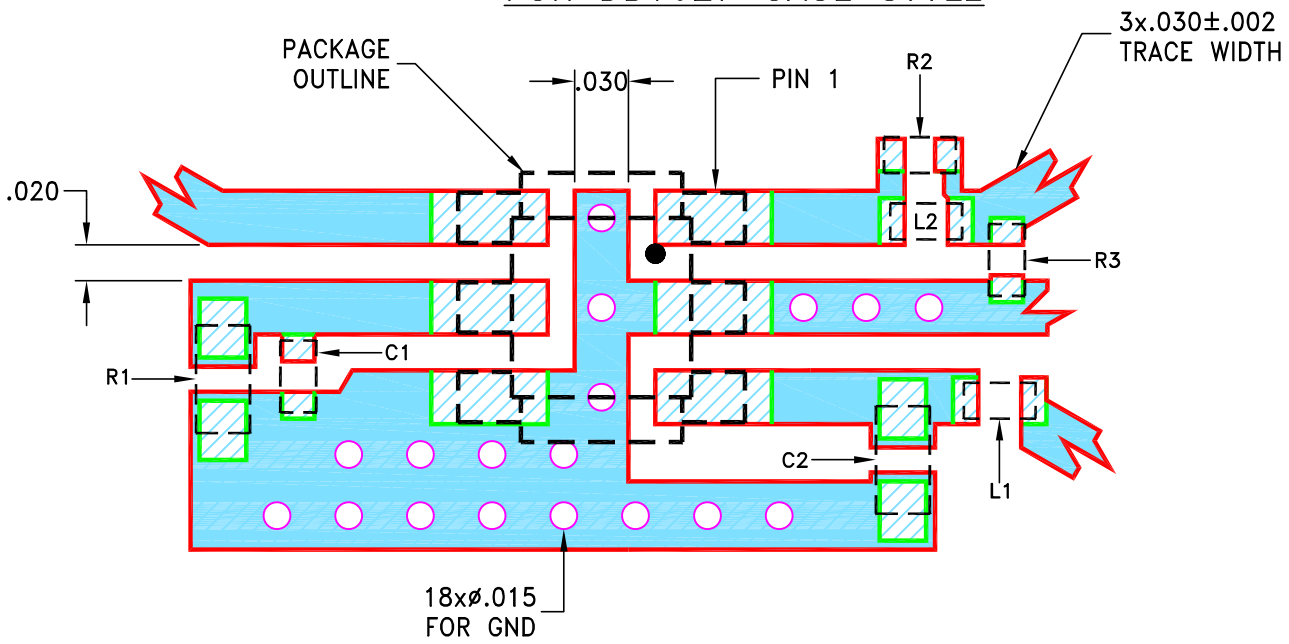
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	NPO-005814	NEW RELEASE	DEC 25	SKH	VR

SUGGESTED MOUNTING CONFIGURATION FOR DB1627 CASE STYLE



COMPONENT	SIZE
R1,C2	0603
R2,R3,C1	0402
L1,L2	0402

NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .030±.002 COPPER: 1/2 Oz ON EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-1322.
3. 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 SOLDERMASK.

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	SKH	02 DEC 25
TOLERANCES ON:	CHECKED	MD	02 DEC 25
2 PL DECIMALS ±	APPROVED	PV	02 DEC 25
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

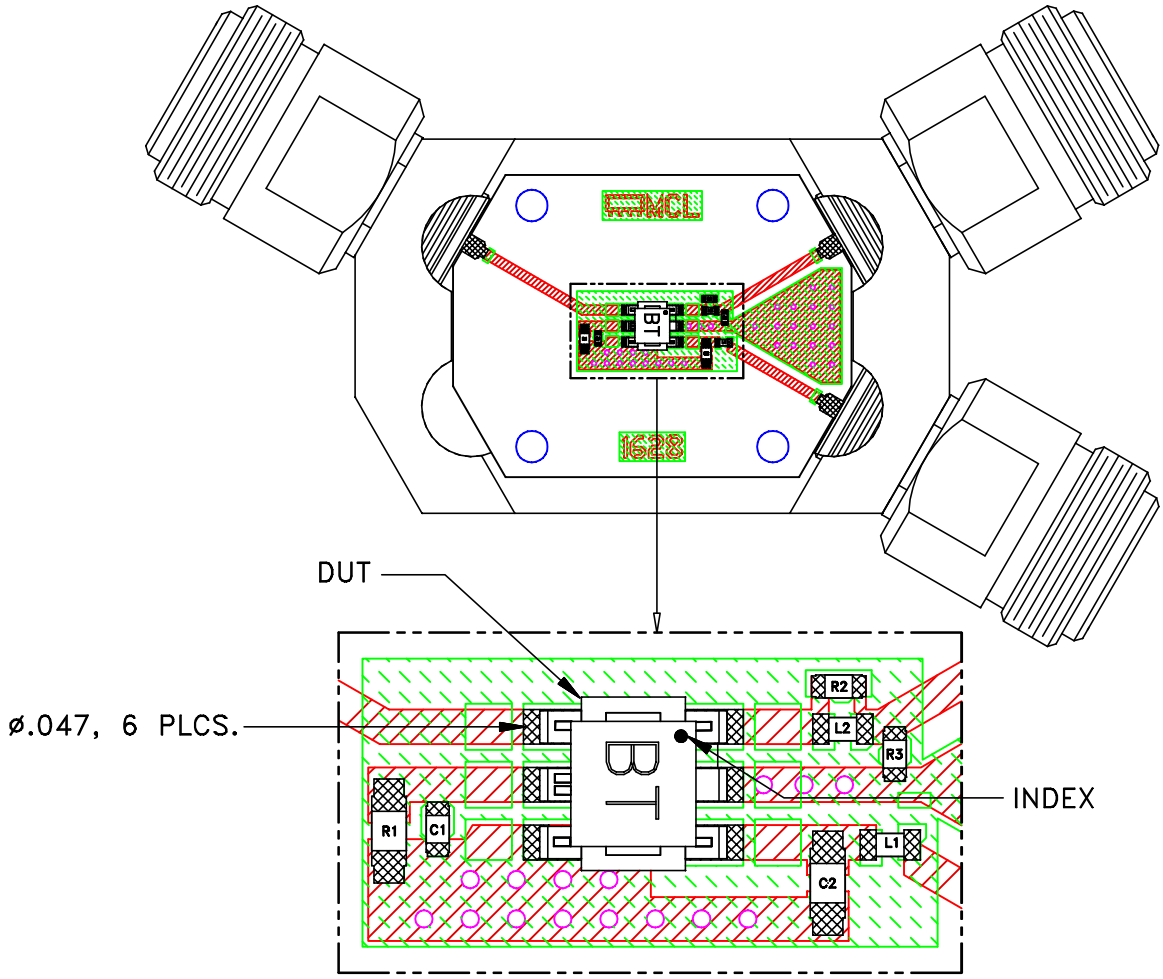
PL, 75, DB1627, TB-1322

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-848	OR

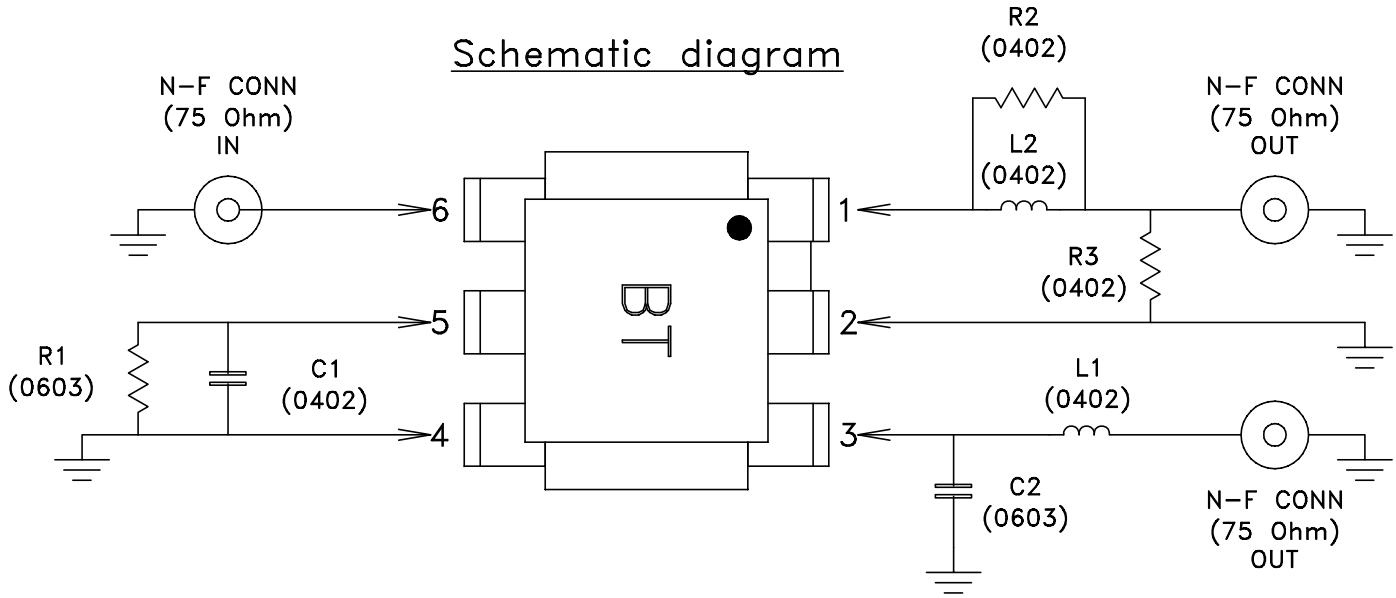
FILE:	SCALE:	SHEET:
98-PL-848	9:1	1 OF 1

Evaluation Board and Circuit

TB-SBTCJ18275X+



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48
   Thickness=.030±.002 inch
2. 75 Ohm N Female Connectors.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV02T1

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