Surface Mount

Power Splitter/Combiner AMT-32+

2 Way-0°/180° 50Ω 1 to 300 MHz

The Big Deal

- Low amplitude unbalance, 0.2 dB typ.
- Low phase unbalance, ±3° typ.
- High isolation, 35 dB typ.



CASE STYLE: CD636

Product Overview

Mini-Circuits' AMT-32+ is a wideband, 2 way, 0°/180° surface mount magic T splitter/combiner. It provides very low amplitude and phase unbalance with good isolation over the full frequency range. It handles up to 0.5W of input power and comes in a small case with excellent thermal performance (-40°C to 85°C operating).

Key Features

Feature	Advantages
Wideband	Wide frequency coverage from 1 to 300 MHz supports many applications DOCSIS 3.1
Low amplitude unbalance and phase unbalance 0.2 dB typ. for amplitude unbalance ±3° typ. for phase unbalance	0.2 dB typ for amplifier unbalance ±3° typ. for phase unbalance produces nearly equal output signals.
Good return loss: • 18 dB typ., for all ports	Well matched for 50Ω systems.
Good isolation • 30 dB typ., for ports 1 & 2 • 35 dB typ., for S, J - ports	Good isolation over the entire band minimizes effect of load changes at one output port on another output port.
0.5W max. input power	High power handling accommodates a wide range of system power requirements.
Small size, 0.27 x 0.31 x 0.22 in.	Accommodates dense PCB layouts.

*Does not include coupling loss

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

Surface Mount

Power Splitter/Combiner

AMT-32+

2 Way-0°/180° 50Ω 1 to 300 MHz



Generic photo used for illustration purposes only

CASE STYLE: CD636

+RoHS Compliant

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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200
13"	500, 1000

Features

- low insertion S-1 and S-2, 0.5 dB typ; J-1 and J-2, 0.5 dB typ.
- very good input VSWR, 1.3 typ. and good output VSWR, 1.35 typ.
- excellent amplitude unbalance, 0.2 dB typ.
- excellent phase unbalance, 2 deg. typ.
- high isolation S-J ports and 1-2 ports, 35 dB typ.
- protected under US Patent 6,133,525

Applications

- HF, VHF radios, Aircraft communications, FM Broadcast
- IF receiver

Maximum Ratings

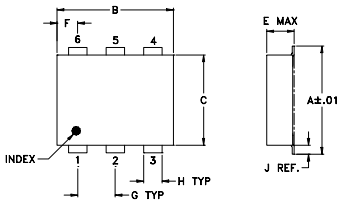
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	0.5W max.
Internal Dissipation	0.125W max.

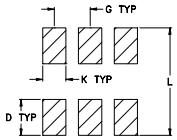
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

SUM PORT	3
PORT 1	6
PORT 2	4
PORT J	1
GROUND	2,5

Outline Drawing



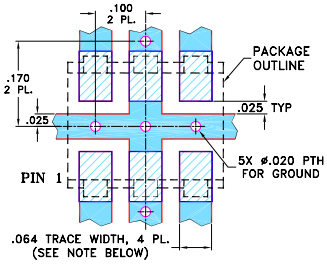


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.272	.310	.220	.100	.162	.055	.100
6.91	7.87	5.59	2.54	4.11	1.40	2.54

H	J	K	L	wt
.030	.026	.065	.300	grams
0.76	0.66	1.65	7.62	0.25

Demo Board MCL P/N: TB-211
Suggested PCB Layout (PL-097)



NOTES: 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

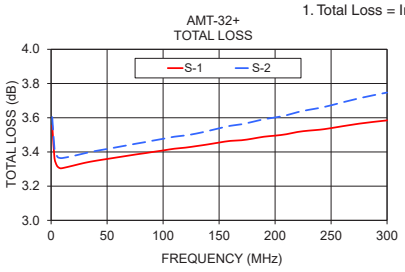
Electrical Specifications at 25°C

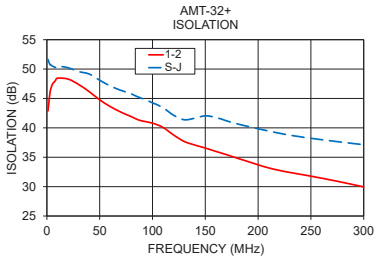
Parameter		Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency			1		300	MHz
Insertion Loss	S-1, S-2	1-300		0.5	1.0	dB
(above theoretical 3.0 dB)	J-1, J-2	1-300		0.7	1.1	
Isolation	J-S	1-100	30	40		dB
		100-300	27	35		
	1-2	1-100	30	38		
		100-300	25	28		
Phase Unbalance		1-100		1.0	3.0	Degree
		100-200		2.0	5.0	
		200-300		4.0	8.0	
Amplitude Unbalance		1-300		0.2	0.5	dB
VSWR (Port S) (Port J)		1-300		1.3		:1
VSWR (Port 1-2)		1-300		1.35		:1

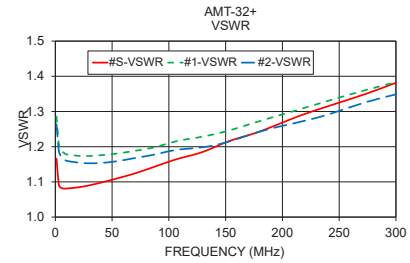
Typical Performance Data

Freq. (MHz)	Total Loss[1] (dB)		Amplitude Unbal. (dB)	Insertion Loss (dB)		Amplitude Unbal. (dB)	Isolation (dB)		Phase Unbal. (deg.)		VSWR S	VSWR 1	VSWR 2
	S-1	S-2	(S-1)-(S-2)	J-1	J-2	(J-1)-(J-2)	1-2	S-J	(S-1)-(S-2)	(J-1)-(J-2)			
1	3.56	3.60	0.05	3.52	3.61	0.09	42.87	51.63	0.13	0.24	1.17	1.29	1.26
3	3.36	3.42	0.05	3.37	3.46	0.08	46.10	50.74	0.03	0.13	1.09	1.21	1.19
5	3.32	3.38	0.06	3.35	3.43	0.08	47.34	50.52	0.01	0.12	1.08	1.19	1.17
10	3.31	3.36	0.06	3.34	3.42	0.08	48.45	50.50	0.09	0.14	1.08	1.18	1.16
20	3.32	3.38	0.06	3.37	3.44	0.08	48.30	50.23	0.22	0.22	1.08	1.17	1.15
30	3.34	3.39	0.06	3.38	3.46	0.07	47.39	49.58	0.32	0.32	1.09	1.17	1.15
50	3.36	3.42	0.06	3.42	3.48	0.07	44.77	48.11	0.55	0.49	1.11	1.18	1.16
100	3.41	3.48	0.07	3.49	3.53	0.04	40.80	44.26	1.10	0.98	1.16	1.21	1.19
130	3.43	3.51	0.07	3.53	3.55	0.02	37.68	41.38	1.46	1.28	1.19	1.23	1.20
150	3.45	3.54	0.08	3.56	3.57	0.01	36.57	42.04	1.67	1.47	1.21	1.24	1.21
200	3.50	3.60	0.11	3.63	3.59	0.04	33.71	39.85	2.30	2.04	1.27	1.29	1.26
230	3.52	3.65	0.12	3.68	3.61	0.07	32.41	38.76	2.70	2.42	1.30	1.32	1.28
250	3.54	3.67	0.13	3.71	3.62	0.09	31.78	38.22	2.99	2.69	1.33	1.34	1.30
300	3.58	3.75	0.16	3.79	3.64	0.15	29.96	37.13	3.73	3.41	1.38	1.38	1.35

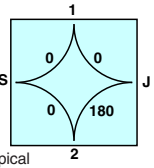
1. Total Loss = Insertion Loss + 3dB splitter loss.







electrical schematic



- S-J ports, isolation 40 typical
- Inphase ports, S-1 and S-2 insertion loss 0.2 dB typical
- Amplitude unbalance defined by input S or J ports to output 1 and 2

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REV. B
ECO-009311
AMT-32+
TD/CP/AM
210818

2 Way-0°/180 Power Splitter/Combiner AMT-32+

Typical Performance Data

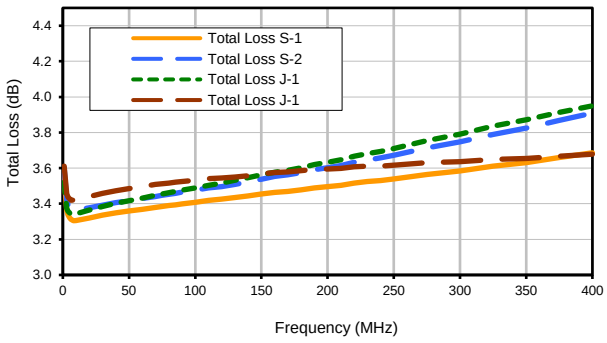
FREQUENCY (MHz)	TOTAL LOSS[1] (dB)				AMPLITUDE UNBALANCE (dB)		ISOLATION (dB)		PHASE UNBALANCE (deg.)		FREQUENCY (MHz)	VSWR (:1)		
	S-1	S-2	J-1	J-2	(S1)-(S2)	(J1)-(J2)	1-2	S-J	(S1)-(S2)	(J1)-(J2)		S	1	2
1	3.56	3.60	3.52	3.61	0.05	0.09	42.87	51.63	0.13	179.76	1	1.17	1.29	1.26
3	3.36	3.42	3.37	3.46	0.05	0.08	46.10	50.74	0.03	179.87	3	1.09	1.21	1.19
4	3.34	3.39	3.36	3.44	0.06	0.08	46.78	50.68	0.00	179.87	4	1.09	1.20	1.18
5	3.32	3.38	3.35	3.43	0.06	0.08	47.34	50.52	0.01	179.88	5	1.08	1.19	1.17
6	3.31	3.37	3.34	3.42	0.06	0.08	47.62	50.45	0.03	179.90	6	1.08	1.19	1.17
8	3.30	3.36	3.34	3.42	0.06	0.08	48.02	50.28	0.06	179.88	8	1.08	1.18	1.16
10	3.31	3.36	3.34	3.42	0.06	0.08	48.45	50.50	0.09	179.86	10	1.08	1.18	1.16
20	3.32	3.38	3.37	3.44	0.06	0.08	48.30	50.23	0.22	179.78	20	1.08	1.17	1.15
30	3.34	3.39	3.38	3.46	0.06	0.07	47.39	49.58	0.32	179.68	30	1.09	1.17	1.15
40	3.35	3.41	3.40	3.47	0.06	0.07	46.17	49.16	0.44	179.61	40	1.10	1.18	1.15
50	3.36	3.42	3.42	3.48	0.06	0.07	44.77	48.11	0.55	179.51	50	1.11	1.18	1.16
60	3.37	3.43	3.43	3.50	0.06	0.06	43.62	47.13	0.65	179.41	60	1.11	1.18	1.16
70	3.38	3.44	3.45	3.51	0.06	0.06	42.69	46.38	0.76	179.32	70	1.12	1.19	1.17
75	3.38	3.45	3.45	3.51	0.06	0.06	42.28	46.10	0.82	179.28	75	1.13	1.19	1.17
80	3.39	3.45	3.46	3.52	0.06	0.06	41.90	45.77	0.88	179.23	80	1.13	1.19	1.17
85	3.39	3.46	3.47	3.52	0.06	0.05	41.48	45.36	0.93	179.18	85	1.14	1.20	1.18
90	3.40	3.47	3.48	3.52	0.07	0.05	41.18	45.01	0.99	179.13	90	1.15	1.20	1.18
100	3.41	3.48	3.49	3.53	0.07	0.04	40.80	44.26	1.10	179.02	100	1.16	1.21	1.19
110	3.42	3.49	3.50	3.54	0.07	0.04	40.07	43.42	1.22	178.92	110	1.17	1.22	1.19
120	3.43	3.50	3.52	3.54	0.07	0.03	38.78	42.14	1.34	178.82	120	1.18	1.22	1.20
130	3.43	3.51	3.53	3.55	0.07	0.02	37.68	41.38	1.46	178.72	130	1.19	1.23	1.20
140	3.44	3.52	3.55	3.56	0.08	0.01	37.08	41.64	1.57	178.63	140	1.20	1.24	1.20
150	3.45	3.54	3.56	3.57	0.08	0.01	36.57	42.04	1.67	178.53	150	1.21	1.24	1.21
160	3.46	3.55	3.58	3.58	0.09	0.00	35.99	41.78	1.79	178.43	160	1.22	1.25	1.22
170	3.47	3.56	3.59	3.58	0.09	0.01	35.44	41.20	1.92	178.31	170	1.23	1.26	1.23
180	3.48	3.58	3.60	3.59	0.10	0.02	34.85	40.69	2.05	178.19	180	1.24	1.27	1.24
190	3.49	3.59	3.62	3.59	0.10	0.03	34.29	40.25	2.17	178.07	190	1.26	1.28	1.25
200	3.50	3.60	3.63	3.59	0.11	0.04	33.71	39.85	2.30	177.96	200	1.27	1.29	1.26
210	3.50	3.61	3.65	3.60	0.11	0.05	33.18	39.47	2.43	177.83	210	1.28	1.30	1.27
220	3.52	3.63	3.67	3.61	0.12	0.06	32.77	39.09	2.56	177.71	220	1.29	1.31	1.27
230	3.52	3.65	3.68	3.61	0.12	0.07	32.41	38.76	2.70	177.58	230	1.30	1.32	1.28
240	3.53	3.66	3.69	3.61	0.13	0.08	32.10	38.48	2.85	177.44	240	1.31	1.33	1.29
250	3.54	3.67	3.71	3.62	0.13	0.09	31.78	38.22	2.99	177.31	250	1.33	1.34	1.30
275	3.57	3.71	3.75	3.63	0.15	0.12	30.91	37.66	3.35	176.96	275	1.35	1.36	1.33
300	3.58	3.75	3.79	3.64	0.16	0.15	29.96	37.13	3.73	176.59	300	1.38	1.38	1.35
325	3.61	3.79	3.84	3.65	0.18	0.19	29.04	36.68	4.14	176.18	325	1.41	1.40	1.37
350	3.63	3.83	3.87	3.65	0.19	0.22	28.23	36.29	4.58	175.74	350	1.44	1.42	1.39
375	3.66	3.87	3.91	3.67	0.21	0.25	27.54	35.91	5.04	175.26	375	1.46	1.44	1.42
400	3.69	3.91	3.95	3.68	0.22	0.27	26.83	35.49	5.53	174.73	400	1.49	1.45	1.44

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

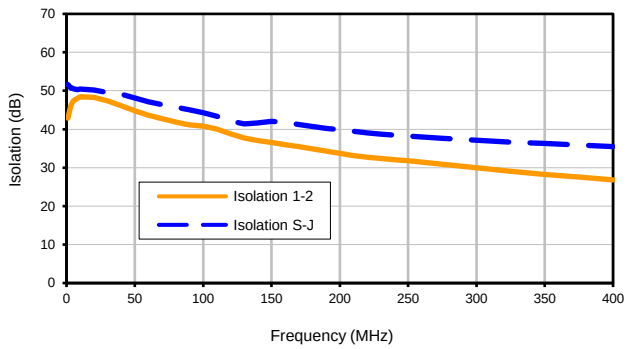
2 Way-0°/180 Power Splitter/Combiner AMT-32+

Typical Performance Curves

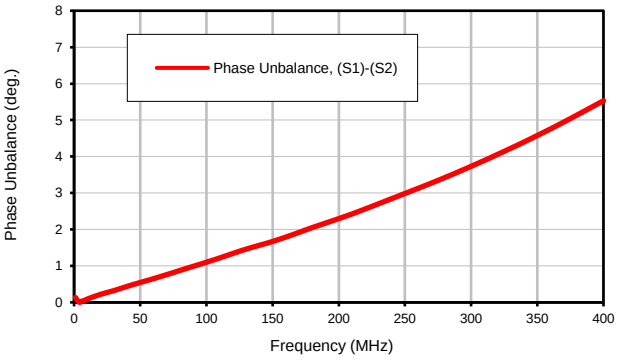
Total Loss



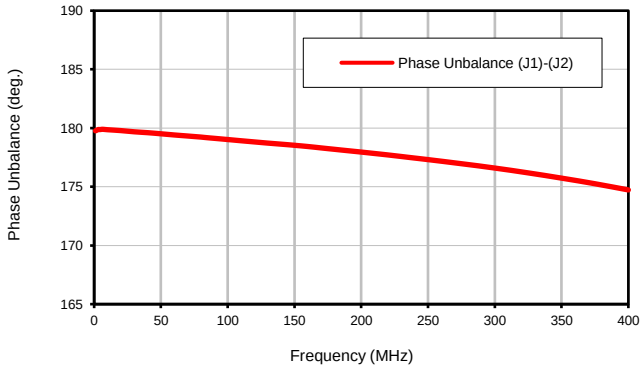
Isolation



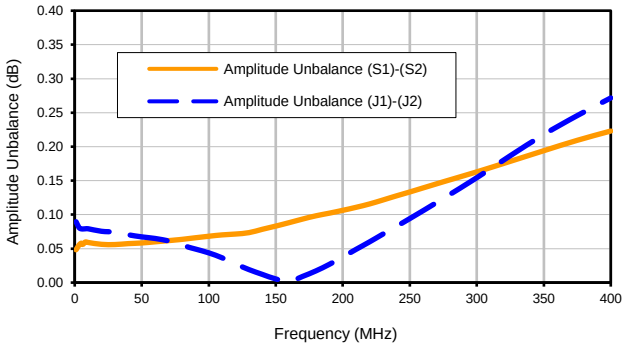
Phase Unbalance



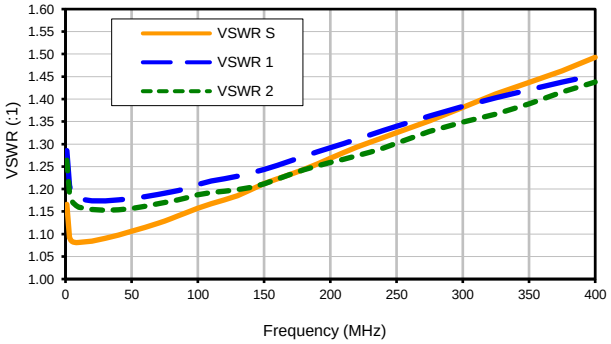
Phase Unbalance



Amplitude Unbalance



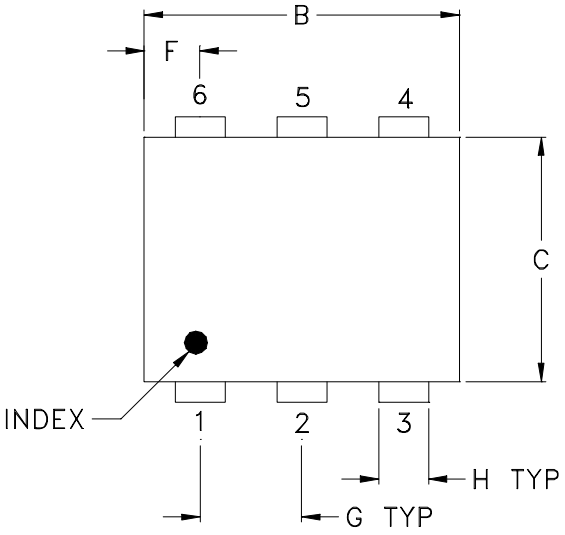
VSWR

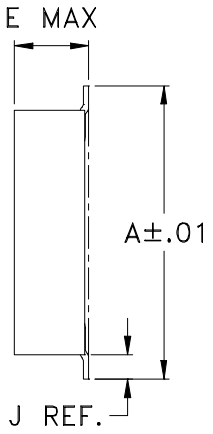


Case Style CD

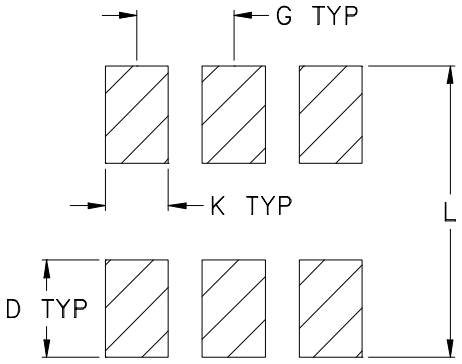
CD541
CD542
CD636
CD637

Outline Dimensions





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	WT, GRAM
CD541	.272 (6.91)	.310 (7.87)	.220 (5.58)	.100 (2.54)	.082 (2.08)	.055 (1.40)	.100 (2.54)	.030 (0.76)	.026 (0.66)	.065 (1.65)	.300 (7.62)	.15
CD542					.112 (2.84)							.20
CD636					.162 (4.11)							.25
CD637					.206 (5.23)							.40

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

Notes:

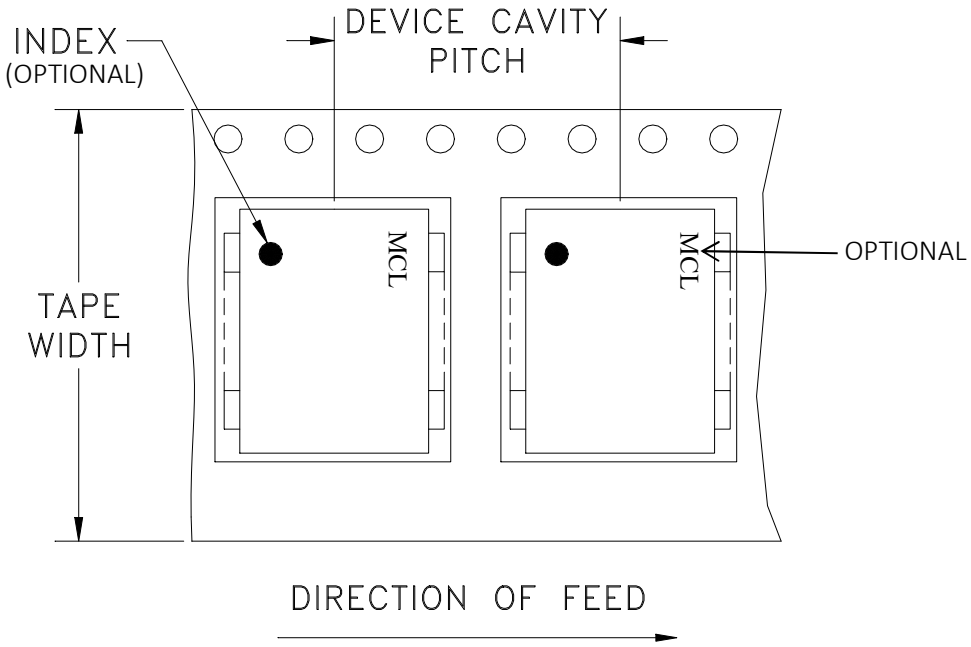
1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Mini-Circuits®
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Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

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

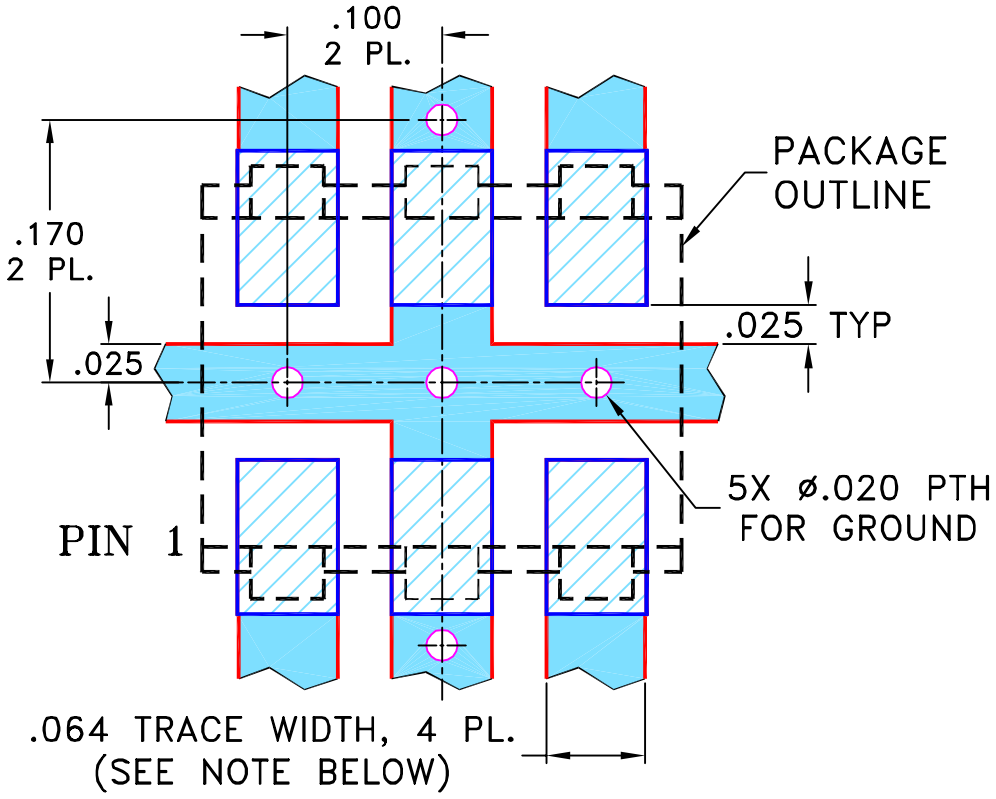
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THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82476	NEW RELEASE	11/26/02	MMG	HY
A	M102713	ADDED "ay", "ls" PIN CONNECTIONS,	01/17/06	MMG	IL
		CD636/637 CASE STYLES & "...WITH SMOBC"			

SUGGESTED MOUNTING CONFIGURATION FOR BH292, CD636/CD637 CASE STYLES, "ay", "jg", "ls" PIN CONNECTIONS



NOTES:
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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	10/30/02
TOLERANCES ON:	CHECKED	AV	11/26/02
2 PL DECIMALS ±	APPROVED	HY	11/26/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, ay/jg/lb, BH292, CD636/637, ADPQ/AMT/JPS, TB-211

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-097	A

FILE:	SCALE:	SHEET:
98PL097	8:1	1 OF 1

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

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