

**THE BIG DEAL**

- Ultra Wideband, 10-40 GHz
- Low Insertion Loss, 1 dB Typ.
- Good Return Loss, 15 dB Typ.
- Excellent Isolation, 46 dB Typ.

APPLICATIONS

- Biasing Amplifiers
- Biasing Laser Diodes
- Biasing of Active Antennas



Generic photo used for illustration purposes only

CASE STYLE: JV3002

+RoHS Compliant

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

PRODUCT OVERVIEW

Mini-Circuits' MBT-44+ is an ultra-wideband MMIC Surface mount bias tee covering applications from 10 GHz to 40 GHz with low insertion loss, good return loss, and high DC-RF isolation over its entire operating frequency range. This model is capable of handling up to +30 dBm (1W) RF Input power and DC input current up to 500 mA. MBT-44+ is enclosed in a 2.5 mm x 2.5 mm 8L MCLP package.

KEY FEATURES

Feature	Advantages
Ultra-Wideband, 10 to 40 GHz	Supports a wide range of applications with a single device, including biasing broadband amplifier, laser diodes, active antennas and more.
Excellent DC-RF isolation • 35 dB, 10-25 GHz • 43 dB, 25-30 GHz • 46 dB, 30-40 GHz	Minimizes RF Leakage and Interference with other elements in the system.
Good Return Loss, 15 dB Typ.	Provides excellent matching for 50 Ohm system with minimal signal reflection
RF power handling up to 1W	This model supports applications with a variety of power requirements.
Low Insertion Loss, 1dB Typ.	Minimizes RF leakage and interference with other elements in the system.

ELECTRICAL SPECIFICATIONS¹ AT 25°C, UNLESS NOTED

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		10000		40000	MHz
Insertion Loss	10000-25000	-	0.5	1.2	dB
	25000-30000	-	0.8	1.6	
	30000-35000	-	1.1	2.1	
	35000-40000	-	1.0	2.1	
Return Loss	10000-25000	-	24.4	-	dB
	25000-30000	-	17.9	-	
	30000-35000	-	13.1	-	
	35000-40000	-	15.3	-	
Isolation (RF Port to DC Port)	10000-25000	20	34.2	-	dB
	25000-30000	20	43.0	-	
	30000-35000	20	46.2	-	
	35000-40000	20	45.4	-	
DC resistance from DC to RF & DC port		-	1.3	-	Ohm

1. Measured on Mini-Circuits Characterization test Board TB-MBT-44+. See Characterization Test Circuit. (Figure 1)

MAXIMUM RATINGS²

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C
RF Power at DC & RF Port	30 dBm
Voltage at DC Port	35V
Current at DC Port	500 mA

2. Permanent damage may occur if any of those limits are exceeded.
Electrical maximum ratings are not intended for continuous normal operation.



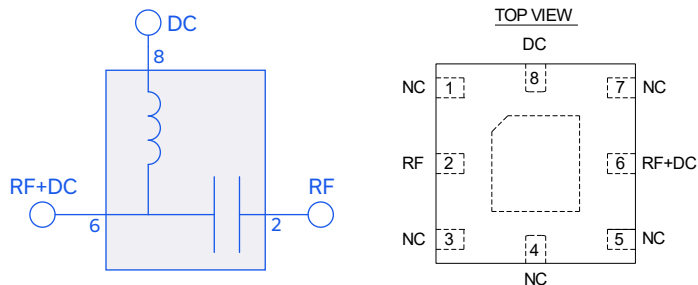
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MMIC WIDEBAND

Bias Tee

MBT-44+

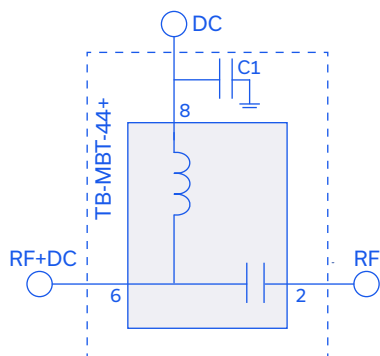
SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION



PAD CONNECTIONS

Function	Pad Number	Description (Fig. 1)
RF	2	RF Pad
RF + DC	6	RF + DC Pad
DC	8	DC Pad, Connects DC Port Via C1
N/C	1,3,4,5,7	No connection, grounded on Test Board.
GROUND	Paddle	Ground

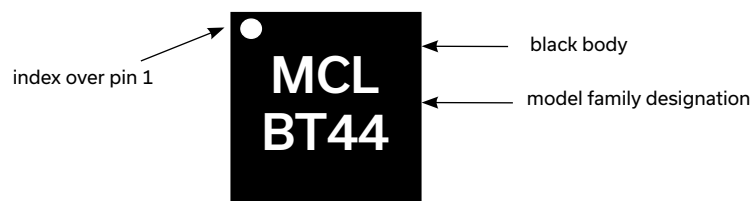
CHARACTERIZATION TEST & APPLICATION CIRCUIT



Component	Value	Size	Part Number	Manufacturer
C1	100pF	0402	GRM1555C1H101JA01D	Murata

Fig 1. Block Diagram of Test Circuit used for characterization. Test Board TB-MBT-44+
Parameter to measure: Insertion Loss, Isolation, Return Loss
Condition: Pin = 0 dBm

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

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ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

Performance Data	Data Table
	Swept Graphs
	S-Parameter (S3P Files) Data Set (.zip file)
Case Style	JV3002 Plastic package, exposed paddle, lead finish: Matt Tin
Tape & Reel Standard quantities available on reel	TR-F68 7" reels with 20, 50, 100, 200, 500 or 1K devices
Suggested Layout for PCB Design	PL-717
Evaluation Board	TB-MBT-44+ & TB-MBT-44C+
Environmental Ratings	ENV129

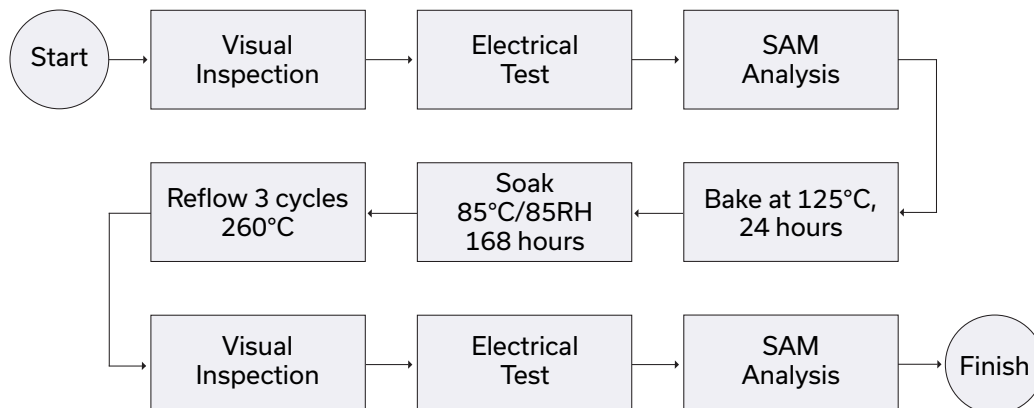
ESD RATING

Human Body Model (HBM): Class 1B (500 V) in accordance with ANSI/ESD STM 5.1 - 2001

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

MSL TEST FLOW CHART



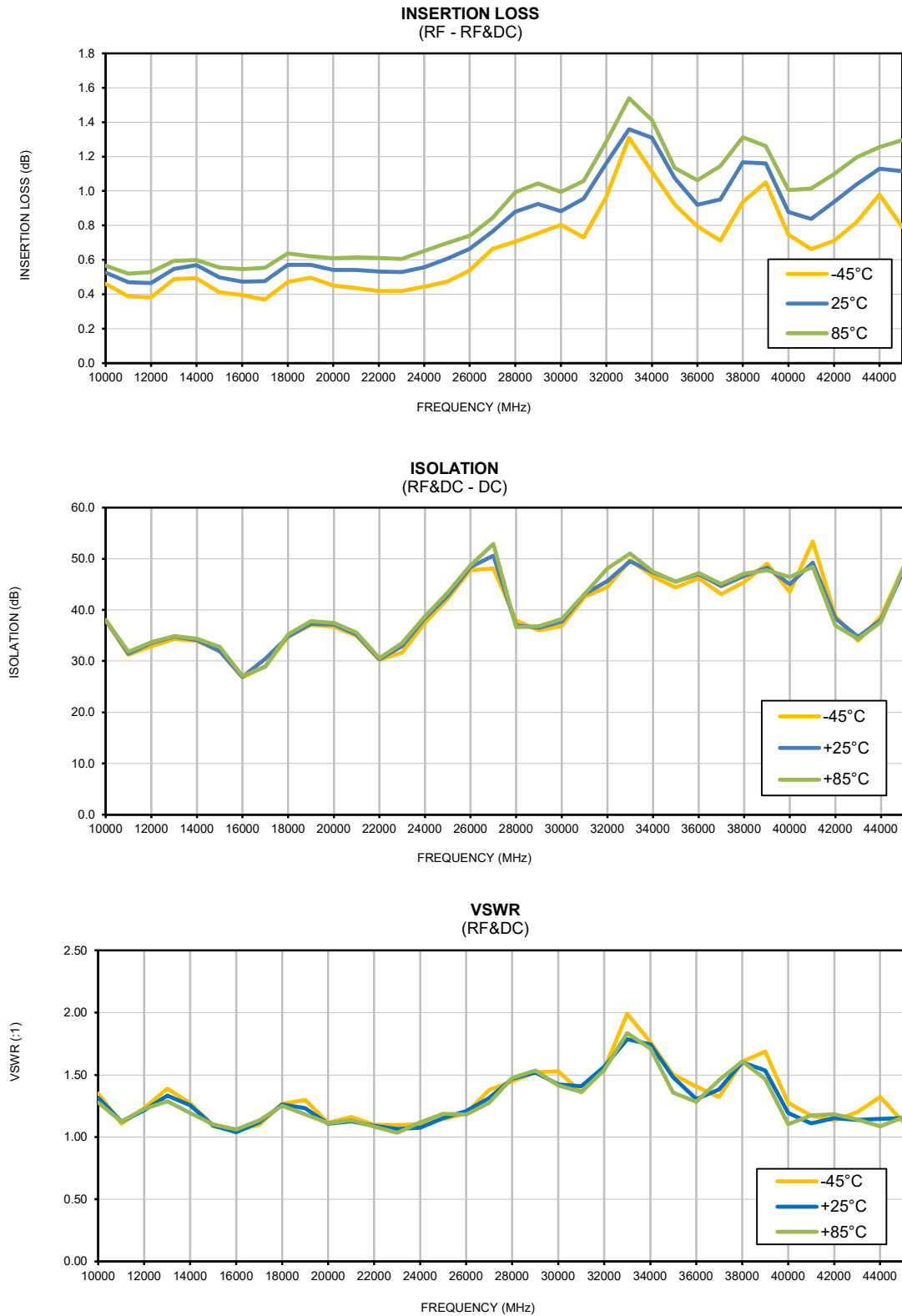
NOTES

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

Typical Performance Curves

FREQ. (MHz)	INSERTION LOSS RF - RF&DC (dB)			ISOLATION RF&DC - DC (dB)			VSWR RF&DC (:1)		
	-45°C	25°C	85°C	-45°C	25°C	85°C	-45°C	25°C	85°C
10000	0.46	0.53	0.57	37.98	38.04	38.06	1.35	1.32	1.28
11000	0.39	0.47	0.52	31.24	31.45	31.81	1.11	1.12	1.12
12000	0.38	0.46	0.53	32.91	33.54	33.66	1.23	1.21	1.23
13000	0.49	0.55	0.59	34.36	34.76	34.90	1.39	1.33	1.29
14000	0.49	0.57	0.60	33.94	34.12	34.39	1.27	1.26	1.19
15000	0.41	0.50	0.56	31.87	31.95	32.74	1.09	1.09	1.10
16000	0.39	0.47	0.55	26.78	26.93	27.07	1.05	1.04	1.06
17000	0.37	0.48	0.55	29.03	30.47	28.90	1.10	1.12	1.13
18000	0.47	0.57	0.64	34.71	34.78	35.22	1.27	1.26	1.25
19000	0.50	0.57	0.62	37.08	37.30	37.78	1.30	1.23	1.18
20000	0.45	0.54	0.61	36.72	37.13	37.48	1.11	1.11	1.11
21000	0.44	0.54	0.61	34.98	35.20	35.59	1.16	1.13	1.14
22000	0.42	0.53	0.61	30.24	30.35	30.57	1.10	1.09	1.09
23000	0.42	0.53	0.60	31.68	32.89	33.54	1.09	1.06	1.03
24000	0.44	0.56	0.65	37.51	38.38	38.78	1.11	1.07	1.12
25000	0.47	0.61	0.70	42.23	42.82	43.43	1.14	1.15	1.19
26000	0.54	0.67	0.74	47.80	48.36	48.71	1.19	1.21	1.18
27000	0.66	0.76	0.85	48.10	50.61	52.90	1.38	1.31	1.27
28000	0.71	0.88	0.99	37.92	36.98	36.59	1.45	1.47	1.48
29000	0.75	0.92	1.04	35.98	36.48	36.86	1.52	1.52	1.53
30000	0.80	0.88	0.99	36.88	37.71	38.23	1.53	1.42	1.41
31000	0.73	0.96	1.06	42.54	43.07	43.14	1.36	1.41	1.36
32000	0.97	1.16	1.29	44.53	45.63	48.13	1.54	1.56	1.54
33000	1.31	1.36	1.54	49.76	49.51	51.02	1.99	1.79	1.84
34000	1.11	1.31	1.41	46.56	47.33	47.43	1.76	1.74	1.71
35000	0.92	1.08	1.13	44.37	45.54	45.50	1.50	1.48	1.36
36000	0.79	0.92	1.06	46.19	47.00	47.23	1.41	1.30	1.28
37000	0.71	0.95	1.15	43.10	44.67	45.03	1.32	1.38	1.46
38000	0.94	1.17	1.31	45.44	46.63	47.13	1.61	1.60	1.61
39000	1.05	1.16	1.26	49.04	48.27	47.72	1.69	1.53	1.46
40000	0.75	0.88	1.01	43.50	45.00	46.45	1.27	1.19	1.10
41000	0.66	0.84	1.01	53.37	49.25	48.43	1.17	1.11	1.17
42000	0.71	0.94	1.10	38.75	38.35	36.94	1.13	1.15	1.18
43000	0.82	1.04	1.20	33.97	34.71	34.35	1.20	1.14	1.14
44000	0.98	1.13	1.26	38.69	38.05	37.59	1.32	1.14	1.09
45000	0.79	1.12	1.30	48.44	47.75	48.52	1.12	1.15	1.16

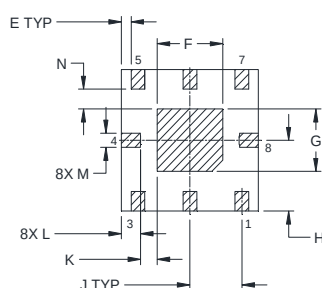
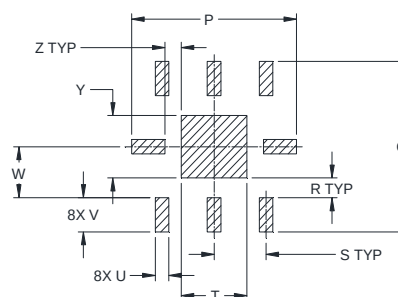
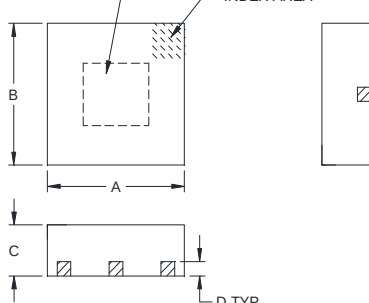
Typical Performance Curves



Outline Dimensions

JV3002

ALPHANUMERIC MARKING
MAY APPEAR ON THE
DEVICE
SEE SPECIFIC MODELS



BOTTOM VIEW

SUGGESTED LAYOUT

FOR PCB LAND PATTERN

PATTERN TO BE WITHIN ± 0.002



CASE #	A	B	C	D	E	F	G	H	J	K	L	M
JV3002	.098 (2.50)	.098 (2.50)	.035 (.90)	.010 (.25)	.007 (.18)	.047 (1.20)	.043 (1.10)	.049 (1.25)	.037 (.95)	.012 (.30)	.014 (.35)	.010 (.25)

CASE #	N	P	Q	R	S	T	U	V	W	Y	Z	WEIGHT (GRAMS)
JV3002	.014 (.35)	.118 (3.01)	.118 (3.01)	.014 (.35)	.037 (.95)	.047 (1.20)	.010 (.25)	.024 (.60)	.035 (.90)	.043 (1.10)	.012 (.30)	0.016

Dimensions are in inches (mm). Tolerances: 3 Pl. ± 0.002 [.050]

Notes:

1. Open style, Plastic.
2. Termination finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Matte-Tin plate.
3. Pad tolerance is non-cumulative. Minimum spacing between each pad is .004.
4. Pin numbers do not appear on unit. For reference only.



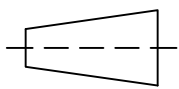
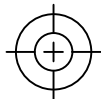
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

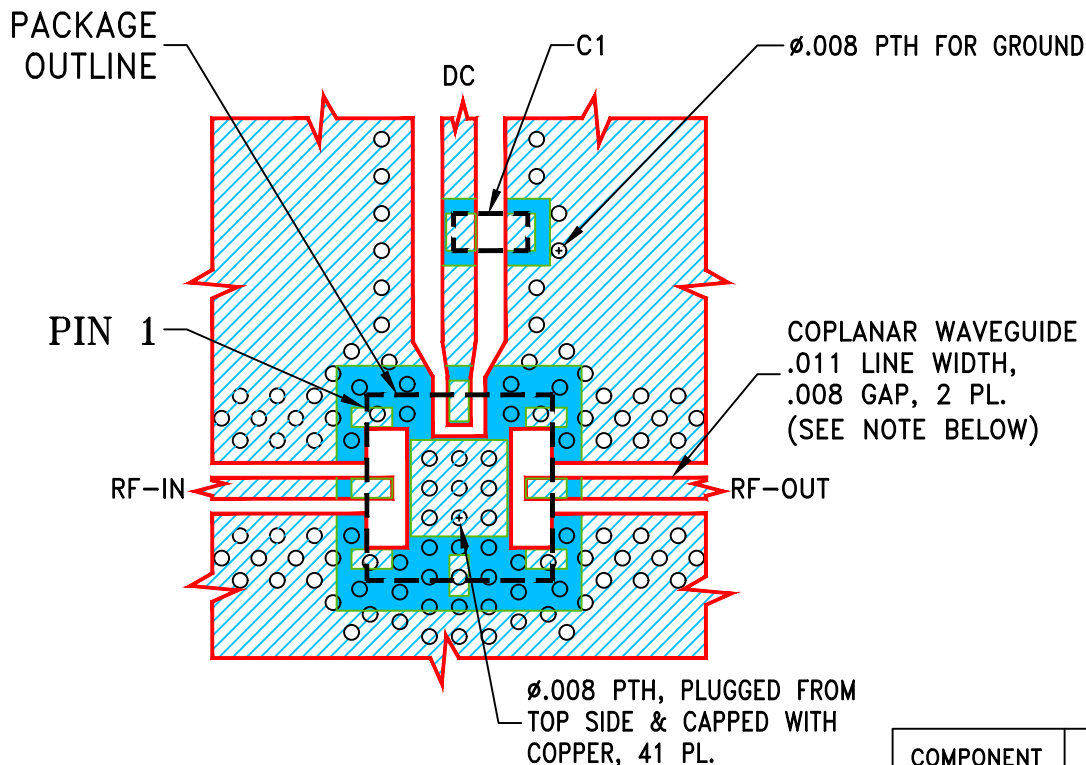
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-010195	NEW RELEASE	10/19/21	ITG	IL

**SUGGESTED MOUNTING CONFIGURATION FOR
JV3002 CASE STYLE**



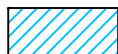
COMPONENT	SIZE
C1	0402

NOTES:

1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS $.0066 \pm .0007$ "; COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS LINE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINT SHOWN FOR REFERENCE. FOR COMPONENT VALUE REFER TO TB-MBT-44+.
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 SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN ITG	10/19/21
TOLERANCES ON:	CHECKED GF	10/19/21
2 PL DECIMALS $\pm$	APPROVED IL	10/19/21
3 PL DECIMALS $\pm$.003		
ANGLES $\pm$		
FRACTIONS $\pm$		

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



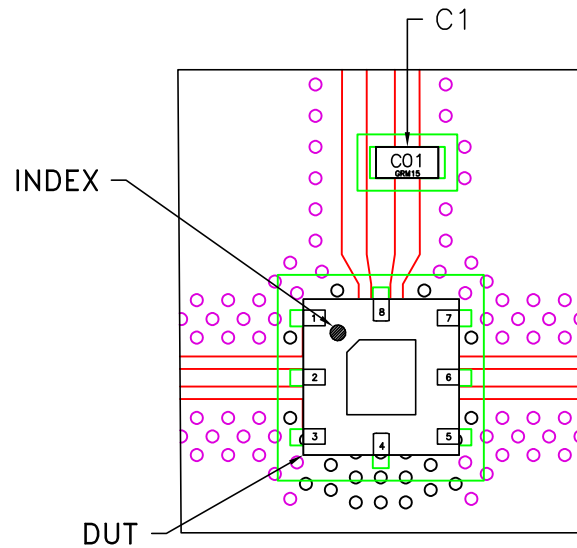
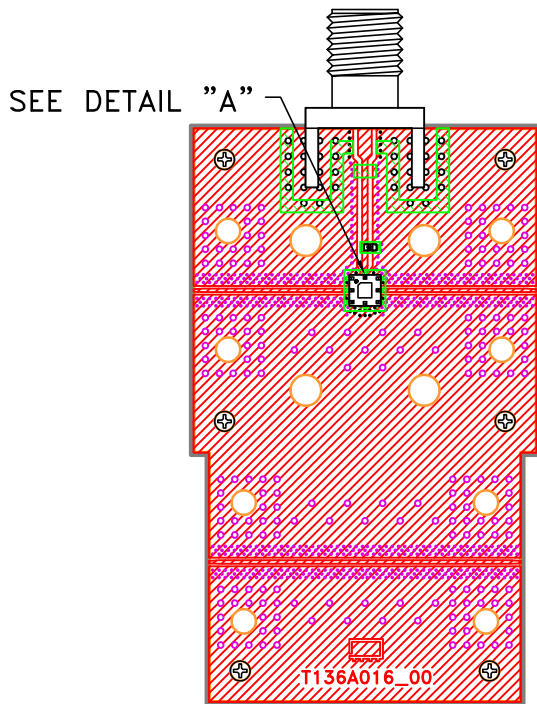
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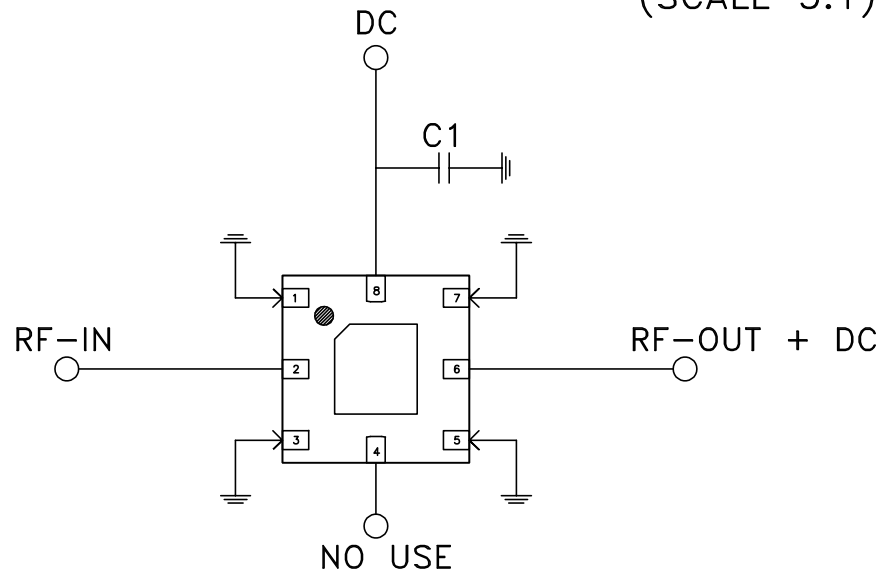
PL, JV3002, TB-MBT-44+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-717	OR
FILE:	98PL717	SCALE:	10:1
SHEET:	1	OF	1

Evaluation Board and Circuit



DETAIL "A"
(SCALE 5:1)



SCHEMATIC DIAGRAM
(SCALE 5:1)

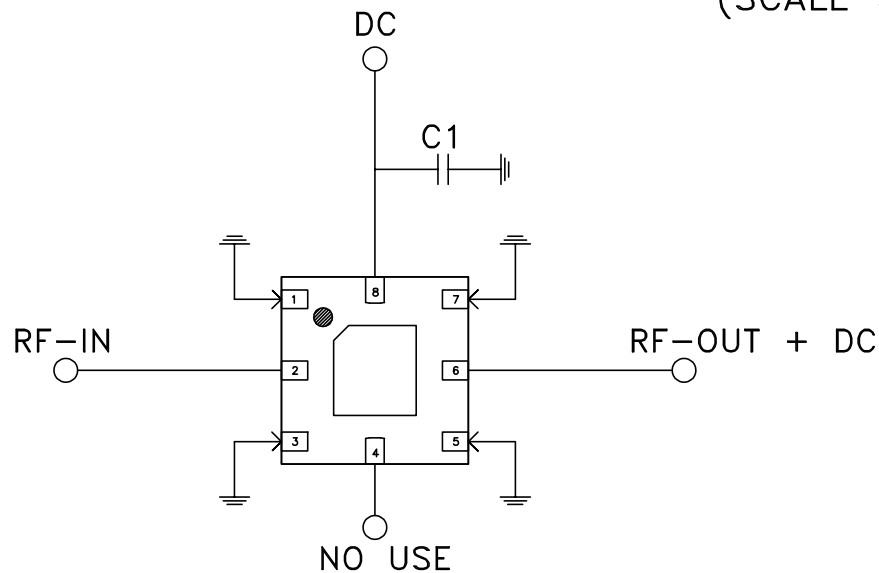
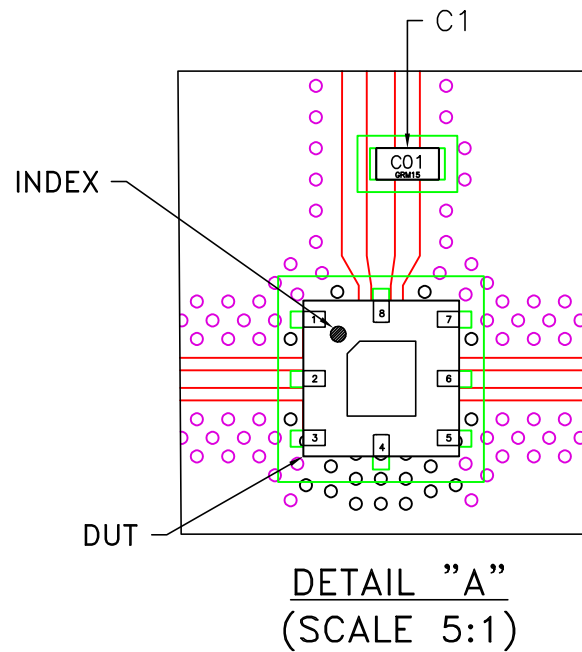
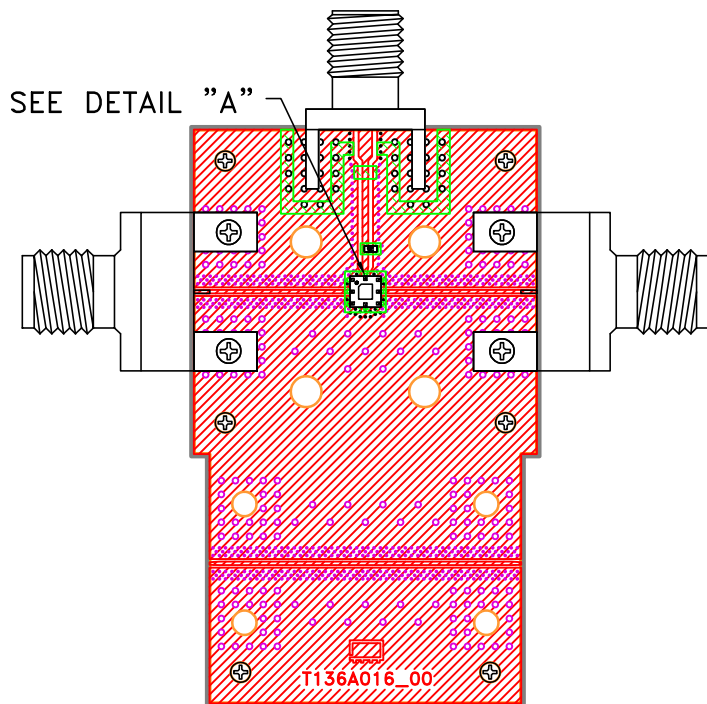
Component	Size	Value	Part Number	Manufacturer
C1	0402	100pF	GRM1555C1H101JA01D	Murata

NOTES:

1. 2.4mm Female Connectors.
2. PCB Material: Roger R04350B or equivalent,
Dielectric constant=3.5, Thickness=0.0066 inch

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Evaluation Board and Circuit



SCHEMATIC DIAGRAM
(SCALE 5:1)

Component	Size	Value	Part Number	Manufacturer
C1	0402	100pF	GRM1555C1H101JA01D	Murata

NOTES:

- 2.4mm Female Connectors.
- PCB Material: Roger RO4350B or equivalent,
Dielectric constant=3.5, Thickness=0.0066 inch

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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	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Temperature Cycling	-65° C to 150°C, 500 cycles Dwell Time: 10 min	JESD22-A104E, Test Condition C
Autoclave	29.7 psia, 100% RH, 121°C, 96 Hours	JESD22-A102E, Test Condition C
HAST	150°C, 168 Hours	JESD22-A103E, Test Condition B
Solderability (Dip&Look Method)	SnAgCu Solder Pot: 245°C, Steam: 93°C, 8 Hours	JESD22-B102E, Method 1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020E, Level 1