MMIC WIDEBAND

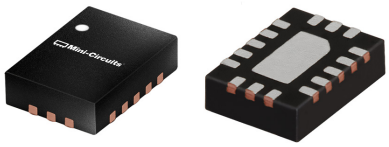
Bias Tee

MBT-283+

50Ω 1.5 to 28 GHz

THE BIG DEAL

- Ultra Wideband, 1.5 to 28 GHz
- Very Low Insertion Loss, 0.7 dB typ.
- Good Return Loss, 20 dB typ.
- Excellent Isolation, 47 dB typ.



Generic photo used for illustration purposes only

CASE STYLE: JV2579

+RoHS Compliant

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

APPLICATIONS

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

PRODUCT OVERVIEW

Mini-Circuits' MBT-283+ is an ultra-wideband MMIC surface mount bias tee covering applications from 1.5 GHz to 28 GHz with low insertion loss, excellent return loss, and high DC-RF isolation over its entire frequency range. This model is capable of handling up to +30 dBm (1W) RF input power and DC input current up to 500mA. MBT-283+ is enclosed in a 3.5 x 2.5mm, 16-lead MCLP package for good thermal performance.

KEY FEATURES

Feature	Advantages
Ultra-Wideband, 1.5 to 28 GHz	Supports a wide range of applications with a single device, including biasing broadband amplifier, laser diodes, active antennas and more.
Low Insertion Loss, 0.7 dB typ.	Minimizes RF leakage and interference with other elements in the system.
Excellent Return Loss, 20 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.
Excellent DC-RF isolation • 59 dB, 1.5 to 10 GHz • 47 dB, 10 to 20 GHz • 48 dB, 20 to 28 GHz	Minimizes RF Leakage and Interference with other elements in the system.

REV. B
ECO-011108
MBT-283+
GY/CP/PS
211215

ELECTRICAL SPECIFICATIONS[1] AT 25°C, UNLESS NOTED

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		1500		28000	MHz
Insertion Loss	1500 - 10000	-	0.7	1.3	dB
	10000 - 20000	-	0.7	1.6	
	20000 - 25000	-	0.7	1.8	
	25000 - 28000	-	1.0	2.1	
Isolation (RF Port to DC Port)	1500 - 10000	-	57	-	dB
	10000 - 20000	-	47	-	
	20000 - 25000	-	48	-	
	25000 - 28000	-	47	-	
Return Loss	1500 - 10000	-	19	-	dB
	10000 - 20000	-	21	-	
	20000 - 25000	-	16	-	
	25000 - 28000	-	14	-	
DC resistance from DC to RF & DC port		-	2.7	-	Ohm

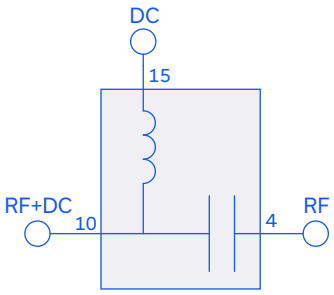
1. Measured on Mini-Circuits Characterization test Board TB-MBT-283+. See Characterization Test Circuit. (Figure 1)

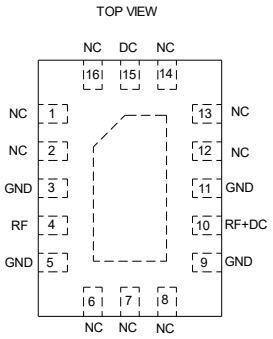
MAXIMUM RATINGS[2]

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.

SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION

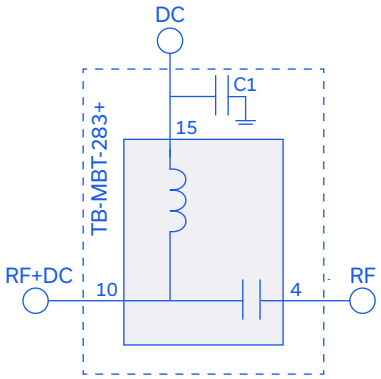




PAD CONNECTIONS

Function	Pad Number	Description (Fig. 1)
RF	4	RF Pad
RF + DC	10	RF + DC Pad
DC	15	DC Pad, Connects DC Port Via C1
N/C	1,2, 6-8, 12-14 &16	No connection, grounded on Test Board.
GROUND	3,5,9,11, & Paddle	Ground

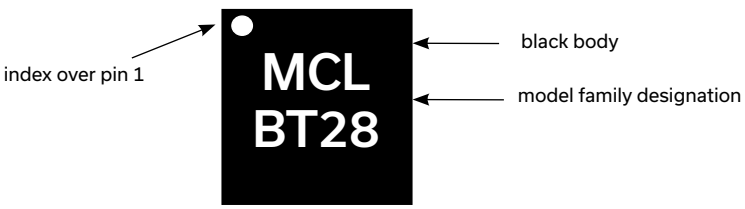
CHARACTERIZATION TEST & APPLICATION CIRCUIT



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-283+
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

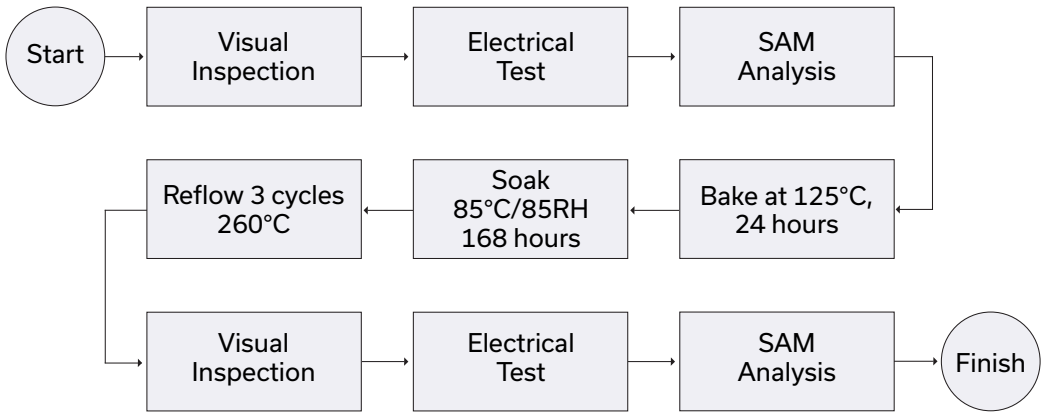
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE

Performance Data	Data Table Swept Graphs S-Parameter (S3P Files) Data Set (.zip file)
Case Style	JV2579 Plastic package, exposed paddle, lead finish: Matt Tin Plate
Tape & Reel **Standard quantities available on reel**	F104 7" reels with 2000 devices
Suggested Layout for PCB Design	PL-692
Evaluation Board	TB-MBT-283+ & TB-MBT-283C+
Environmental Ratings	ENV08T1

ESD RATING

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

MSL TEST FLOW CHART



NOTES

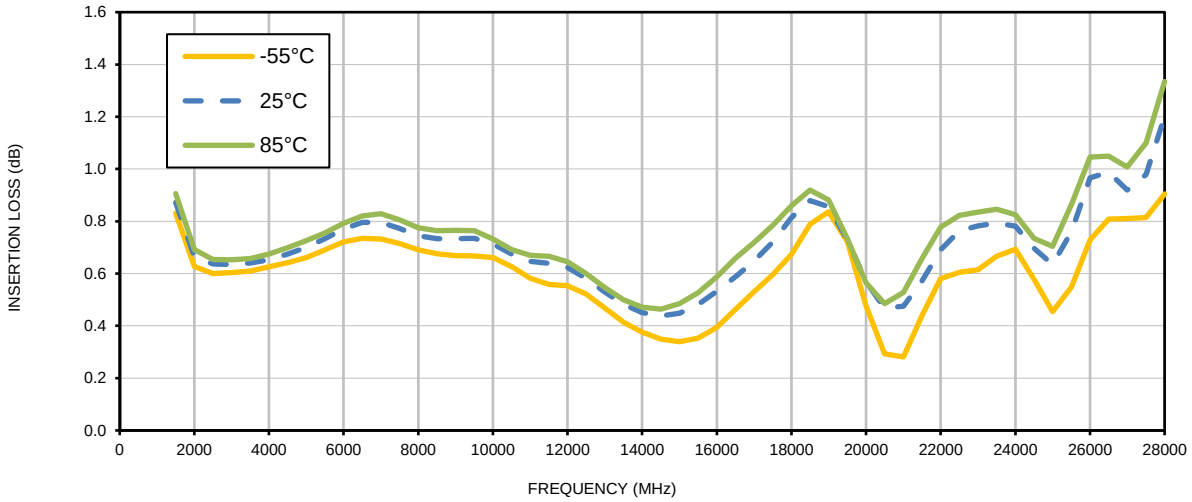
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Typical Performance Curves

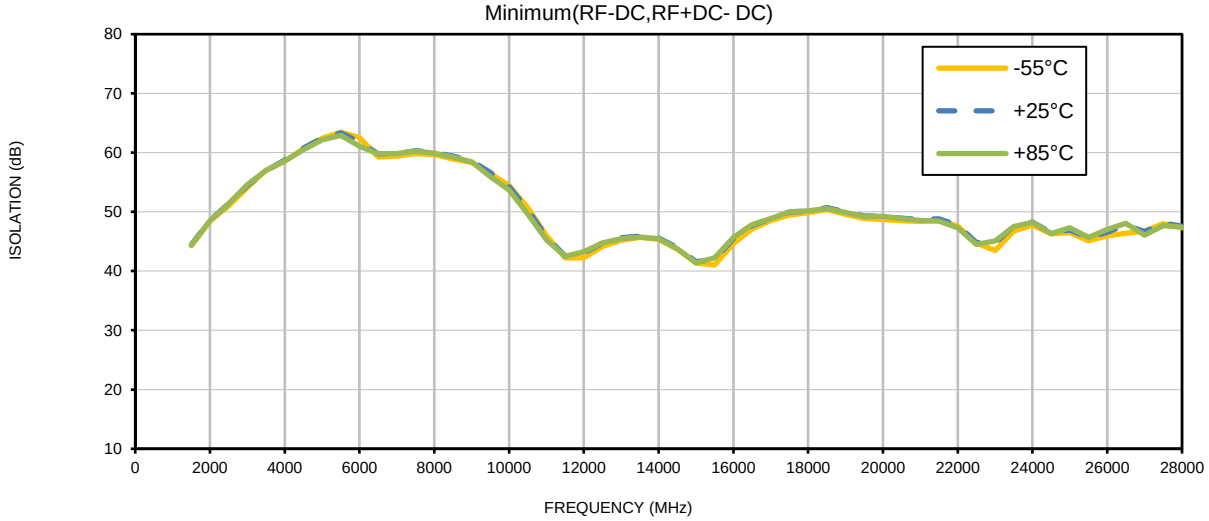
FREQ.	INSERTION LOSS RF - RF&DC (dB)			ISOLATION RF&DC - DC (dB)			VSWR RF&DC (:1)		
(MHz)	-55°C	25°C	85°C	-55°C	25°C	85°C	-55°C	25°C	85°C
1500	0.83	0.87	0.91	44.29	44.46	44.41	1.52	1.49	1.47
2000	0.63	0.66	0.69	48.46	48.62	48.52	1.19	1.17	1.16
2500	0.60	0.64	0.65	51.05	51.42	51.40	1.09	1.08	1.07
3000	0.60	0.63	0.65	54.12	54.42	54.58	1.08	1.07	1.06
3500	0.61	0.64	0.66	57.06	56.94	56.98	1.08	1.08	1.07
4000	0.63	0.65	0.68	58.53	58.75	58.58	1.11	1.11	1.11
4500	0.64	0.67	0.70	60.64	60.77	60.51	1.17	1.17	1.18
5000	0.66	0.70	0.73	62.43	62.51	62.15	1.21	1.21	1.22
5500	0.69	0.73	0.76	63.45	63.34	62.91	1.24	1.25	1.25
6000	0.72	0.77	0.79	62.55	61.87	61.07	1.28	1.29	1.29
6500	0.74	0.80	0.82	59.28	59.79	59.81	1.32	1.33	1.32
7000	0.73	0.80	0.83	59.44	59.86	59.84	1.33	1.34	1.35
7500	0.71	0.77	0.81	59.86	60.31	60.26	1.30	1.31	1.32
8000	0.69	0.74	0.78	59.68	60.01	59.87	1.24	1.24	1.26
8500	0.68	0.73	0.76	58.93	59.41	59.22	1.19	1.19	1.20
9000	0.67	0.73	0.77	58.35	58.63	58.42	1.18	1.18	1.20
9500	0.67	0.74	0.76	56.47	56.65	55.93	1.20	1.21	1.22
10000	0.66	0.71	0.73	54.43	54.23	53.66	1.22	1.21	1.20
10500	0.63	0.67	0.69	50.70	50.39	49.63	1.18	1.14	1.12
11000	0.58	0.65	0.67	45.98	45.73	45.24	1.09	1.05	1.04
11500	0.56	0.64	0.67	42.25	42.58	42.52	1.07	1.08	1.10
12000	0.55	0.62	0.65	42.25	43.05	43.26	1.14	1.13	1.14
12500	0.52	0.58	0.60	44.17	44.74	44.76	1.17	1.14	1.13
13000	0.47	0.53	0.55	45.18	45.64	45.49	1.15	1.12	1.11
13500	0.41	0.48	0.50	45.71	45.92	45.76	1.11	1.09	1.07
14000	0.38	0.45	0.47	45.36	45.57	45.45	1.11	1.08	1.06
14500	0.35	0.44	0.46	43.70	43.97	43.73	1.14	1.13	1.12
15000	0.34	0.45	0.49	41.38	41.59	41.39	1.20	1.21	1.21
15500	0.35	0.48	0.53	41.02	41.94	42.25	1.25	1.30	1.30
16000	0.39	0.53	0.59	44.67	45.48	45.71	1.32	1.37	1.38
16500	0.46	0.59	0.66	47.12	47.71	47.86	1.43	1.42	1.46
17000	0.53	0.65	0.72	48.56	48.86	48.87	1.50	1.48	1.51
17500	0.60	0.72	0.78	49.49	49.97	49.99	1.56	1.56	1.57
18000	0.67	0.81	0.86	49.85	50.13	50.15	1.65	1.68	1.65
18500	0.79	0.88	0.92	50.37	50.72	50.53	1.81	1.74	1.71
19000	0.84	0.86	0.88	49.59	50.02	49.88	1.86	1.69	1.66
19500	0.72	0.73	0.73	48.87	49.32	49.19	1.69	1.53	1.49
20000	0.48	0.57	0.56	48.70	49.24	49.24	1.39	1.35	1.30
20500	0.29	0.47	0.49	48.48	48.94	48.90	1.20	1.24	1.21
21000	0.28	0.48	0.53	48.40	48.70	48.55	1.18	1.25	1.24
21500	0.44	0.57	0.66	48.56	48.81	48.43	1.36	1.35	1.39
22000	0.58	0.69	0.78	47.60	47.74	47.31	1.50	1.46	1.49
22500	0.61	0.76	0.82	44.70	44.85	44.47	1.49	1.49	1.48
23000	0.61	0.78	0.84	43.47	44.71	45.08	1.46	1.47	1.45
23500	0.67	0.79	0.85	46.79	47.57	47.52	1.49	1.46	1.45
24000	0.69	0.78	0.82	47.77	48.30	48.23	1.59	1.49	1.49
24500	0.58	0.70	0.73	46.31	46.50	46.36	1.56	1.45	1.41
25000	0.45	0.63	0.70	46.51	46.94	47.32	1.34	1.33	1.31
25500	0.55	0.76	0.86	45.11	45.61	45.67	1.34	1.42	1.45
26000	0.73	0.97	1.05	45.96	46.56	47.05	1.55	1.64	1.64
26500	0.81	0.99	1.05	46.37	47.77	48.07	1.62	1.65	1.63
27000	0.81	0.92	1.01	46.70	46.68	46.08	1.53	1.46	1.44
27500	0.81	0.98	1.10	47.99	48.13	47.71	1.43	1.34	1.33
28000	0.90	1.20	1.33	47.29	47.60	47.44	1.47	1.48	1.48

Typical Performance Curves

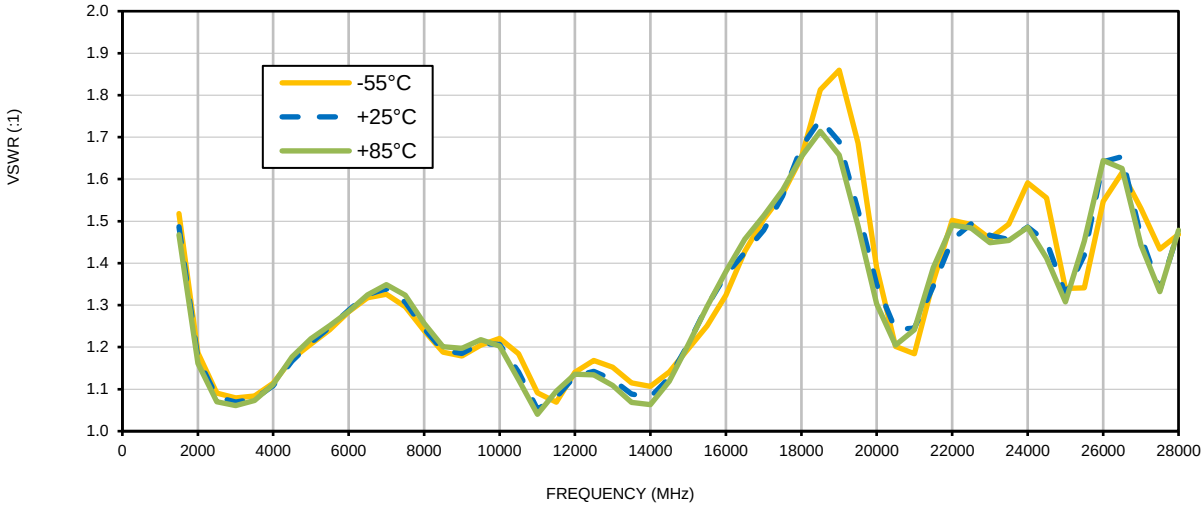
INSERTION LOSS
(RF - RF&DC)



ISOLATION
Minimum(RF-DC,RF+DC- DC)



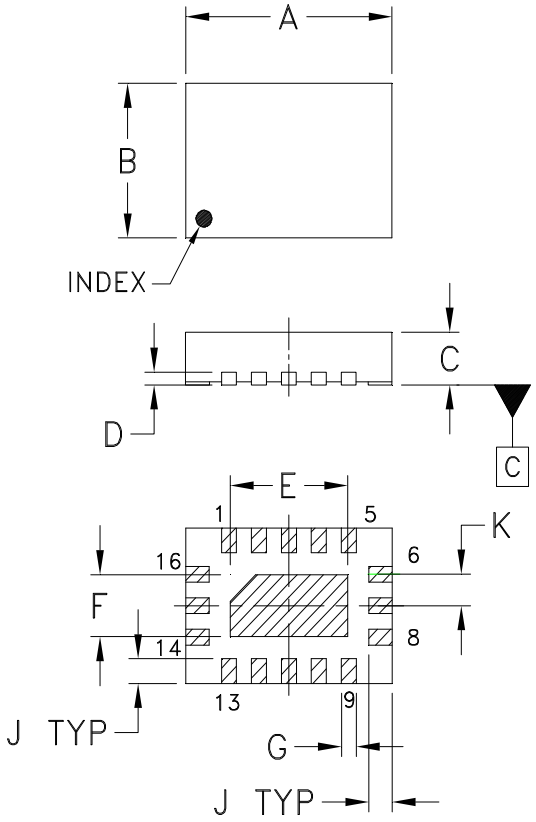
VSWR
Maximum(RF, RF+DC)



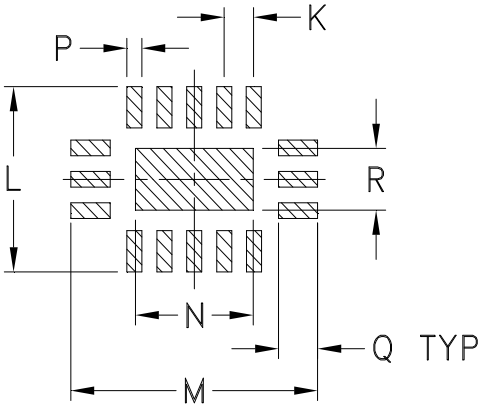
Case Style JV

Outline Dimensions

JV2579



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N
JV2579	.138 (3.5)	.098 (2.5)	.033 (0.85)	.008 (0.20)	.079 (2.01)	.039 (0.99)	.010 (0.25)	- -	.016 (0.41)	.020 (.51)	.118 (3.00)	.157 (4.00)	.079 (2.01)

CASE #	P	Q	R	WT. GRAM
JV2579	.010 (0.25)	.026 (0.66)	.039 (0.99)	.03

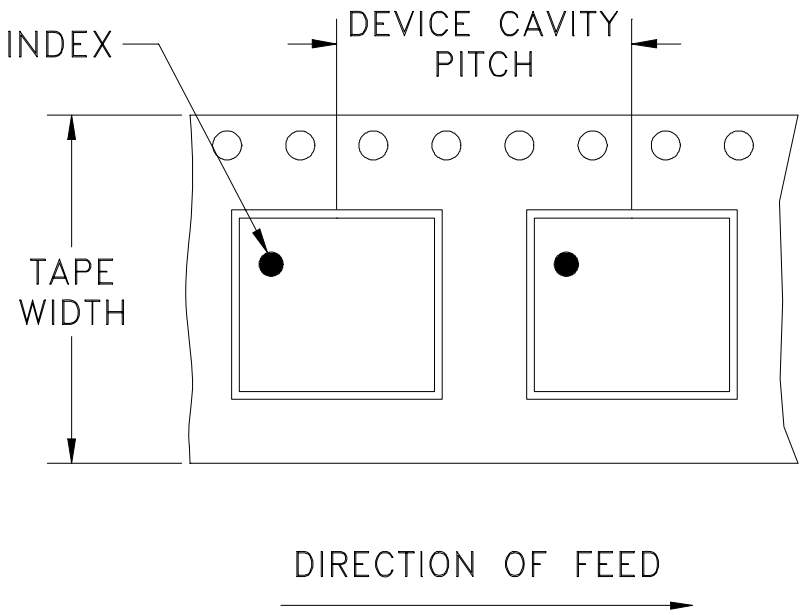
Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3 Pl. ± .005

Notes:

1. Case material: Plastic.
2. Termination finish: **as shown below or indicated on Data Sheet.**
   For RoHS Case Styles: Matte-Tin plate.

Tape & Reel Packaging TR-F104

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
		7	Standard	2000

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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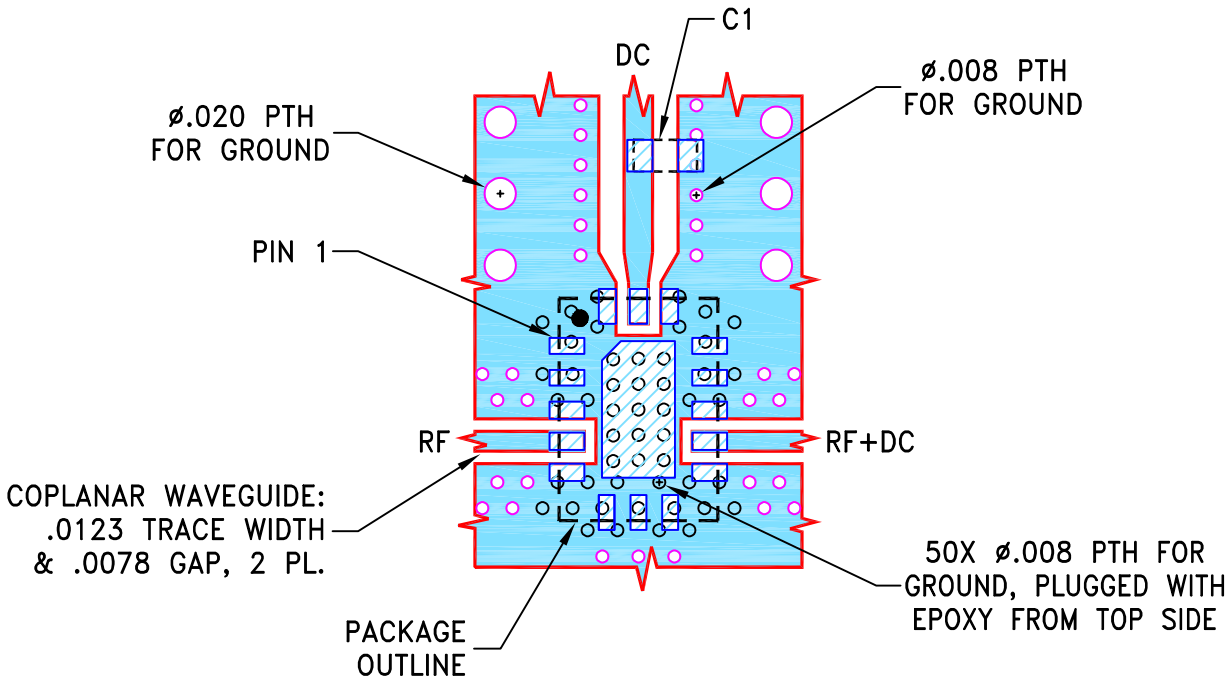
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-004037	NEW RELEASE	09/18/20	ITG	IL

SUGGESTED MOUNTING CONFIGURATION FOR JV2579 CASE STYLE



COMPONENT	SIZE
C1	0402

NOTES:

1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .0066±.0007". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-MBT-283C+.
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	09/15/20
TOLERANCES ON:	CHECKED	GF	09/15/20
2 PL DECIMALS ±	APPROVED	IL	09/15/20
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

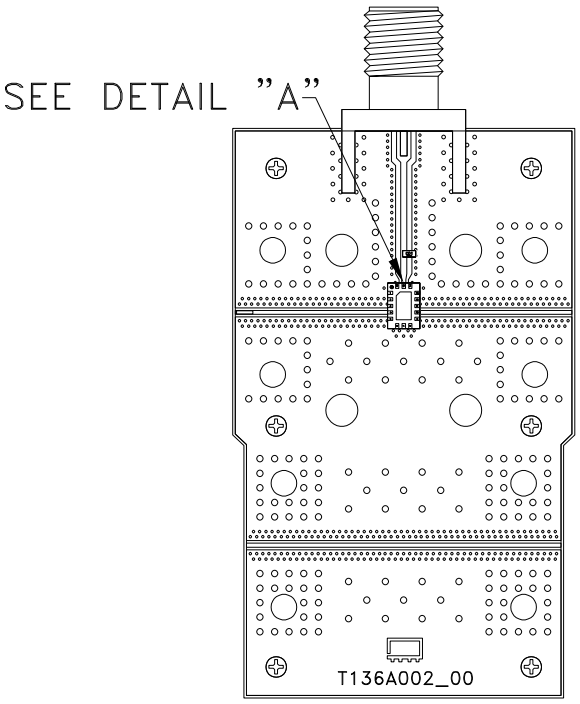
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

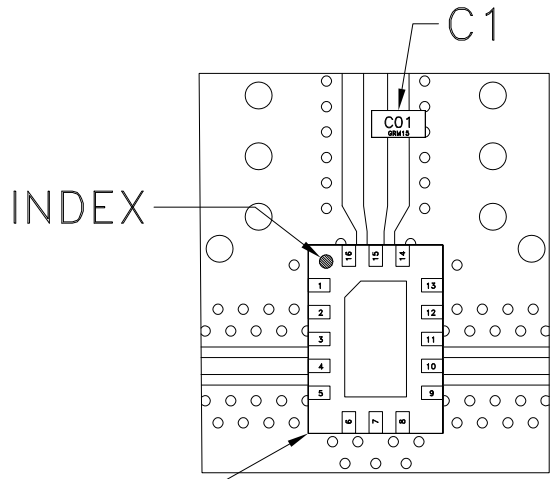
PL, JV2579, TB-MBT-283C+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-692	OR

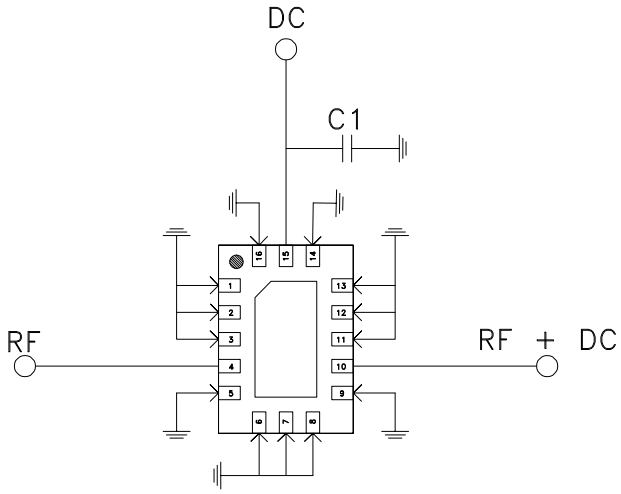
FILE:	SCALE:	SHEET:
98PL692	8:1	1 OF 1

Evaluation Board and Circuit





DETAIL "A"
(SCALE 5:1)



SCHEMATIC DIAGRAM
(SCALE 4:1)

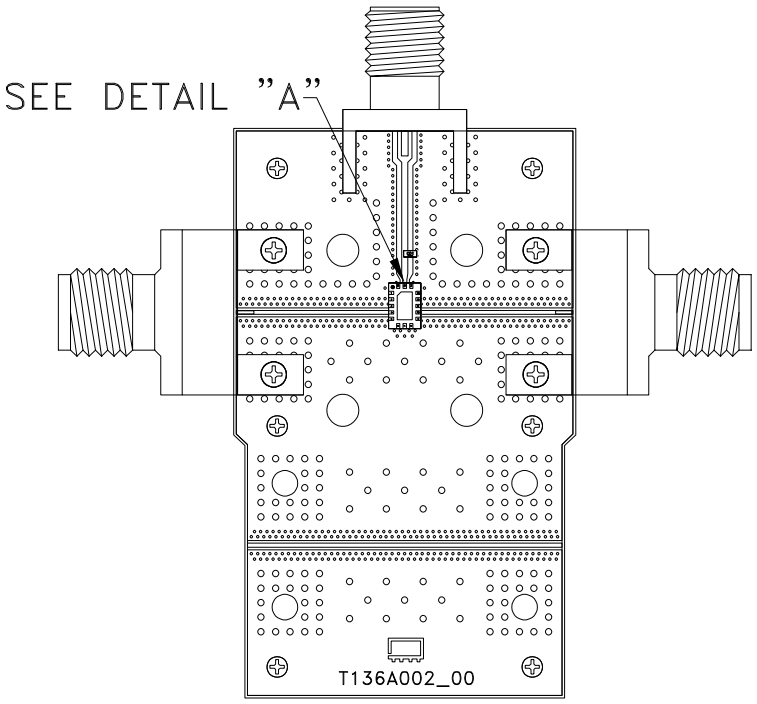
Component	Size	Value	Part Number	Manufacturer
C1	0402	0.1uF	GRM155R71H104KE14J	Murata

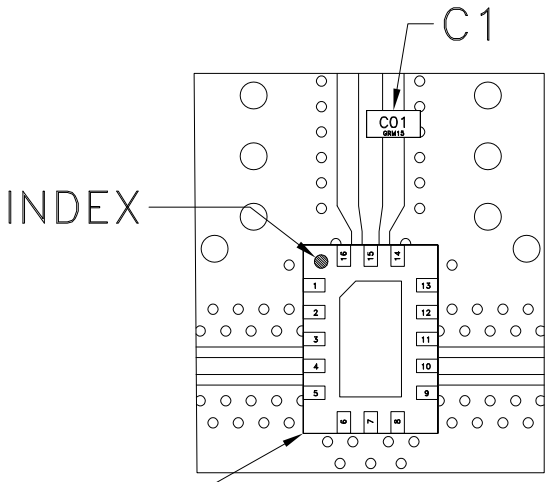
Notes:

1. 2.92mm Female Connectors.
2. PCB Material: Roger RO4350B or equivalent,
   Dielectric constant=3.5, Thickness=0.0066 inch

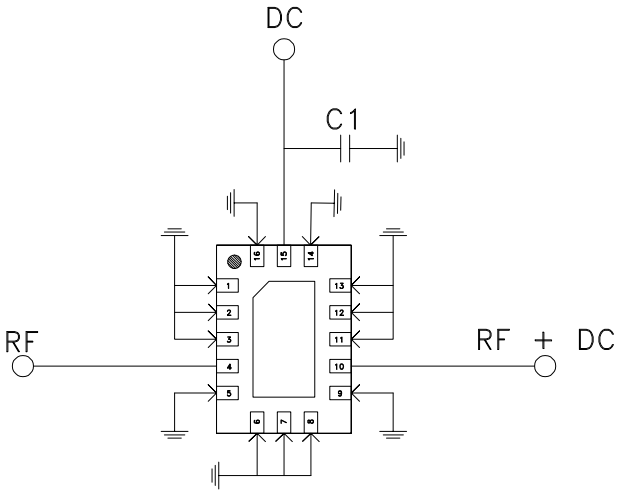
Mini-Circuits®

Evaluation Board and Circuit





DETAIL "A"
(SCALE 5:1)



SCHEMATIC DIAGRAM
(SCALE 4:1)

Component	Size	Value	Part Number	Manufacturer
C1	0402	0.1uF	GRM155R71H104KE14J	Murata

Notes:

1. 2.92mm Female Connectors.
2. PCB Material: Roger RO4350B or equivalent,
   Dielectric constant=3.5, Thickness=0.0066 inch

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV08T1

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 or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
HTOL	1000 hours at 125°C	MIL-STD-883, Method 1005, Condition B
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
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-020

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
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