

0.4 to 500 MHz

Features

- suitable for tin/lead and RoHS solder systems
- usable over 0.4-500 MHz
- excellent amplitude unbalance, 0.1 dB typ. and phase unbalance, 2 deg typ. in 1 dB bandwidth
- good return loss
- · aqueous washable

Applications

- VHF/UHF receivers/transmitters
- · push-pull amplifiers

TC1-1TG2+



Generic photo used for illustration purposes only CASE STYLE: AT224-3

+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, 500
13"	1000, 2000

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Тур.	Max.	Unit
Impedance Ratio			1		
Frequency Range		0.4		500	MHz
	04-500		3		
Insertion Loss*	0.5-300		2		dB
	1-100		1		
Phase Unbalance	1-100		2		Don
Phase Unbalance	0.5-300		5		Deg.
Association of the lands of the	1-100		0.1		-ID
Amplitude Unbalance	0.5-300		0.6		dB

^{*} Insertion Loss is referenced to mid-band loss, 0.6 dB typ.

Maximum Ratings

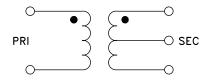
Parameter	Ratings			
Operating Temperature	-40°C to 85°C			
Storage Temperature	-55°C to 100°C			
RF Power	0.25W			
DC Current	30mA			

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

Pin Connections

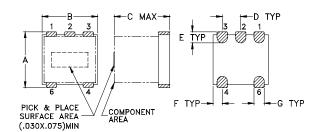
Function	Pin Number
PRIMARY DOT	6
PRIMARY	4
SECONDARY DOT	1
SECONDARY	3
SECONDARY CT	2

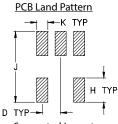
Config. A





Outline Drawing





Suggested Layout, Tolerance to be within ±.002

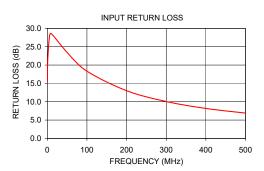
Outline Dimensions (inch)

F	E	D	С	В	Α
.025	.030	.050	.150	.150	.150
0.64	0.76	1.27	3.81	3.81	3.81
wt		K	J	Н	G
grams		.030	.190	.065	.028
0.10		0.76	4.83	1.65	0.71

Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
0.30	0.88	15.46	0.06	0.03
1.00	0.57	21.01	0.04	0.05
5.00	0.33	27.35	0.02	0.01
10.00	0.32	28.55	0.02	0.15
50.00	0.40	23.46	0.02	0.63
100.00	0.51	18.34	0.06	1.24
200.00	0.78	13.01	0.21	2.57
300.00	1.10	10.06	0.47	3.99
400.00	1.46	8.16	0.82	5.66
500.00	1.84	6.90	1.26	7.50





Additional 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

TC1-1TG2+ **RF Transformer**

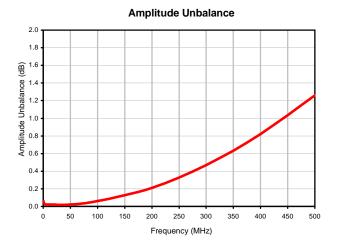
Typical Performance Data

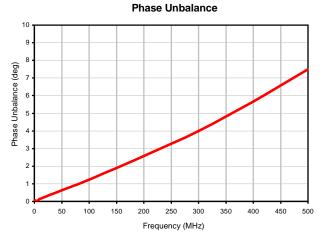
FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg)		
	()	(*)	(* /	(**3)		
0.3	0.88	15.46	0.06	0.03		
1.0	0.57	21.01	0.04	0.05		
5.0	0.33	27.35	0.02	0.01		
10.0	0.32	28.55	0.02	0.15		
50.0	0.40	23.46	0.02	0.63		
100.0	0.51	18.34	0.06	1.24		
200.0	0.78	13.01	0.21	2.57		
300.0	1.10	10.06	0.47	3.99		
400.0	1.46	8.16	0.82	5.66		
500.0	1.84	6.90	1.26	7.50		

Typical Performance Curves



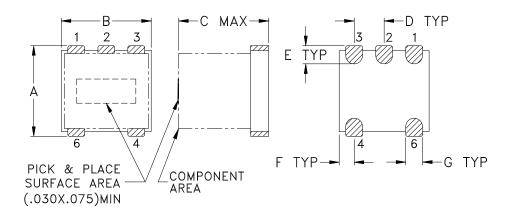




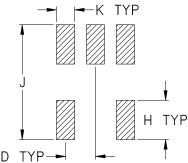


Outline Dimensions

AT224-3



PCB Land Pattern



Suggested Layout, Tolerance to be within ±.002

CASE #	A	В	С	D	Е	F	G	Н	J	K	L	WT. GRAMS
AT224-3	.150	.150	.150	.050	.030	.025	.028	.065	.190	.030		.10
	(3.81)	(3.81)	(3.81)	(1.27)	(0.76)	(0.64)	(0.71)	(1.65)	(4.83)	(0.76)		

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

Notes:

- 1. Open style, ceramic base.
- 2. Termination finish: $3.15-5.12 \mu$ inch (.08-.130 microns) Gold over 78–236 μ inch (1.98-6.0 microns) Nickel plate.



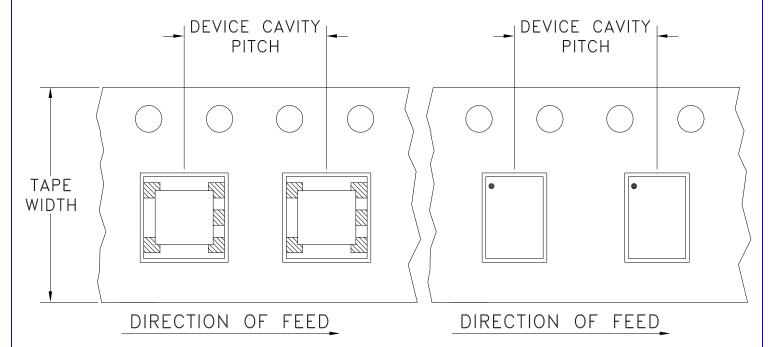


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

Tape & Reel Packaging TR-F17

DEVICE ORIENTATION IN T&R



Tape Width,	Device Cavity	Reel Size,	Devices	per Reel
mm	Pitch, mm	inches		
			Small	20
	8		quantity	50
		7	standards	100
12			(see note)	200
				500
		12	C4 1 1	1000
		13	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





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

The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
RF/IF MICROWAVE COMPONENTS:

98-TR- Rev.: C (02/13/18) M166283 File: 98-TR-F17.docx

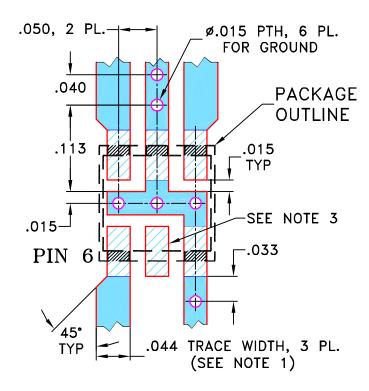
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Sheet 1 of 1

THIRD ANGLE PROJECTION	
Ψ	

		REVISIONS			
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M106563	NEW RELEASE	08/23/06	AV	IG

SUGGESTED MOUNTING CONFIGURATION FOR AT224/DB714 CASE STYLE, "gs/ha/hd" PIN CONNECTIONS (FOR SINGLE ENDED TO BALANCED APPLICATION)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. ON EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
 - 3. THIS PAD IS NOT REQUIRED FOR AT224 CASE STYLE.

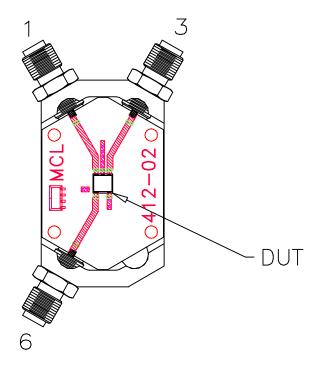
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

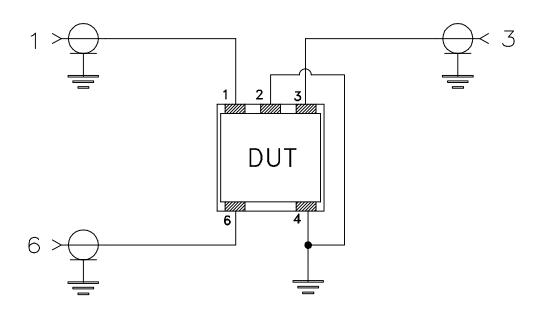
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TOLERANCES ON:	CHECKED	IL	08/23/06		Brooklyn NY 1123					
3 PL DECIMALS ± .005	APPROVED	IG	08/23/06							
FRACTIONS ±				PL.	gs/ha/hd	. AT22	24/DB714	4. TC/T(CM.	TB-145
□ Mini	-Circuits ®		•]	6-77	,	-,	-,, -	,	
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Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-145



Schematic Diagram

Notes:

- 1. 50 Ohm SMA Female connectors.
- 2. PCB Material: Rogers RO4350B or its equivalent, III Mini-Circuits® Dielectric Constant=3.5, Thickness=.020"

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

ENV02T1 Rev: B

02/25/11

M130240 File: ENV02T1.pdf

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