Engineering Development Model

RF Transformer TC1.33-ED13445/12

Impedance Ratio : 1.33

Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability.
At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.

Please click "Back", and then click "Contact Us" for Applications support.

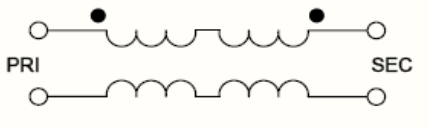
CASE STYLE : AT224-1

ELECTRICAL SPECIFICATIONS 75Ω @ +25°C					
Parameter		**Min.**	**Typ.**	**Max.**	**Units**
Frequency		40		2400	MHz
Insertion Loss *	**3 dB Bandwidth**		40-2400		MHz
	2 dB Bandwidth		40-2000		MHz
	1 dB Bandwidth		40-300		MHz
Amplitude Unbalance	**Over 3 dB Bandwidth**		0.83		dB
	Over 2 dB Bandwidth		0.85		dB
	Over 1 dB Bandwidth		1.29		dB
Phase Unbalance	**Over 3 dB Bandwidth**		1.40		Deg.
	Over 2 dB Bandwidth		1.43		Deg.
	Over 1 dB Bandwidth		0.47		Deg.

Note:
* Insertion Loss is referenced to mid-band loss, 0.96 dB typ.

MAXIMUM RATINGS	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C

Configuration : G



PIN CONNECTIONS	
PRIMARY DOT	6
PRIMARY	4
SECONDARY DOT	1
SECONDARY	3
NOT USED	2

RF Transformer TC1.33-ED13445/12

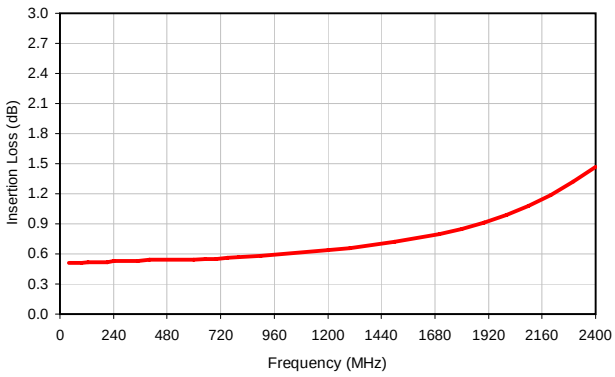
Typical Performance Data

FREQUENCY MHz	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
39.00	0.51	19.12	1.37	1.61
68.00	0.51	18.96	1.34	0.92
97.00	0.51	18.85	1.32	0.58
126.00	0.52	18.79	1.31	0.37
155.00	0.52	18.77	1.30	0.18
184.00	0.52	18.72	1.30	0.03
213.00	0.52	18.69	1.29	0.08
242.00	0.53	18.67	1.27	0.18
271.00	0.53	18.64	1.26	0.28
300.00	0.53	18.60	1.25	0.40
350.00	0.53	18.52	1.23	0.54
400.00	0.54	18.42	1.20	0.69
450.00	0.54	18.36	1.16	0.88
500.00	0.54	18.32	1.12	1.06
550.00	0.54	18.19	1.08	1.17
600.00	0.54	18.05	1.04	1.42
650.00	0.55	17.83	0.99	1.56
700.00	0.55	17.68	0.94	1.74
750.00	0.56	17.51	0.88	1.91
800.00	0.57	17.30	0.83	2.03
900.00	0.58	16.90	0.71	2.29
1000.00	0.60	16.45	0.58	2.49
1100.00	0.62	16.03	0.47	2.66
1200.00	0.64	15.62	0.35	2.68
1300.00	0.66	15.18	0.25	2.68
1400.00	0.69	14.79	0.14	2.68
1500.00	0.72	14.44	0.04	2.59
1600.00	0.76	14.09	0.06	2.53
1700.00	0.80	13.72	0.15	2.32
1800.00	0.85	13.28	0.25	2.09
1900.00	0.91	12.76	0.35	1.79
2000.00	0.99	12.22	0.44	1.29
2100.00	1.08	11.61	0.53	0.68
2200.00	1.19	10.98	0.62	0.21
2300.00	1.32	10.27	0.70	1.25
2400.00	1.47	9.53	0.75	2.36

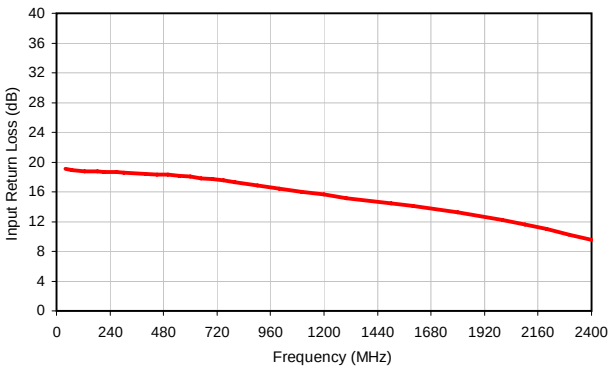
RF Transformer TC1.33-ED13445/12

Typical Performance Data

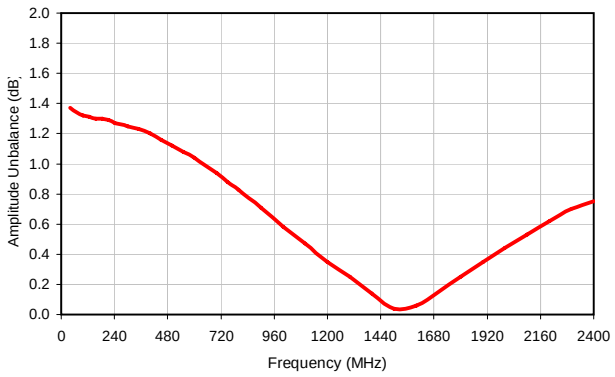
Average Insertion Loss



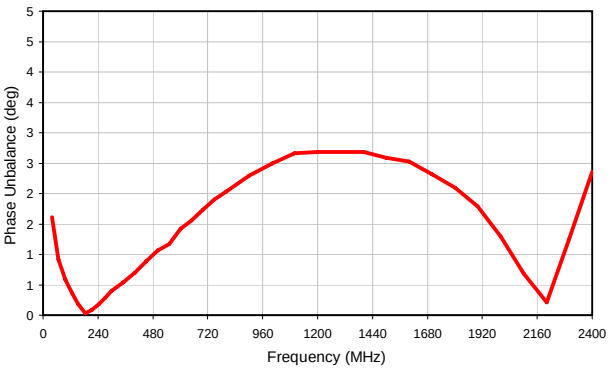
Input Return Loss



Amplitude Unbalance



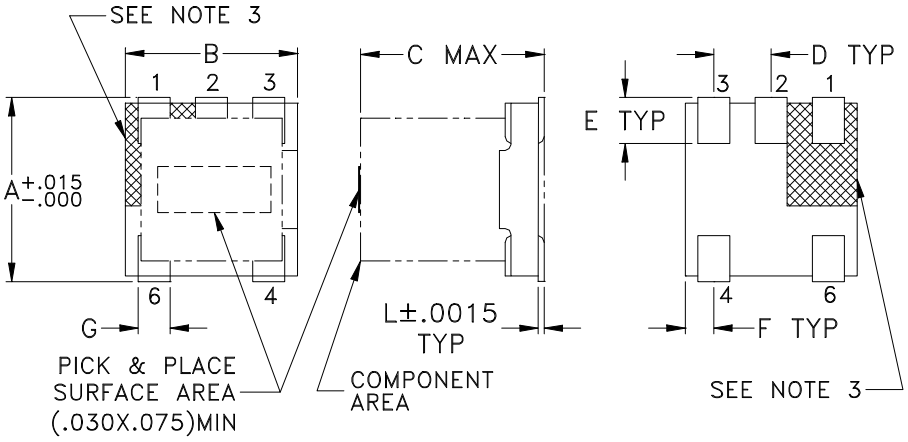
Phase Unbalance



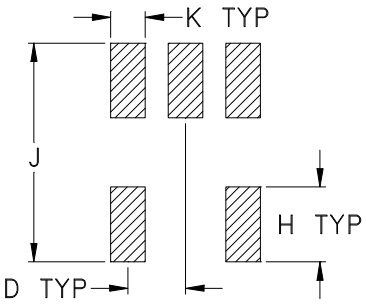
Case Style AT

Outline Dimensions

AT224-1



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	WT. GRAMS
AT224-1	.150 (3.81)	.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)	.007 (0.18)	.15

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

Notes:

1. Case material: Plastic.
2. Termination finish: Tin plate over Nickel plate.
3. Lead #1 identifier shall be located in the cross-hatched area shown. Identifier may be either a molded or marked feature.

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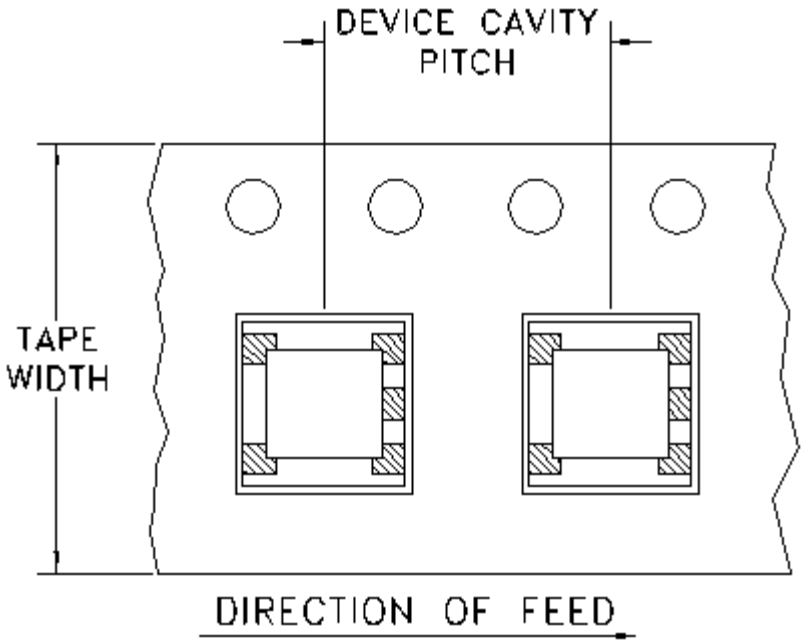
Tape & Reel Packaging TR-F17

DEVICE ORIENTATION IN T&R



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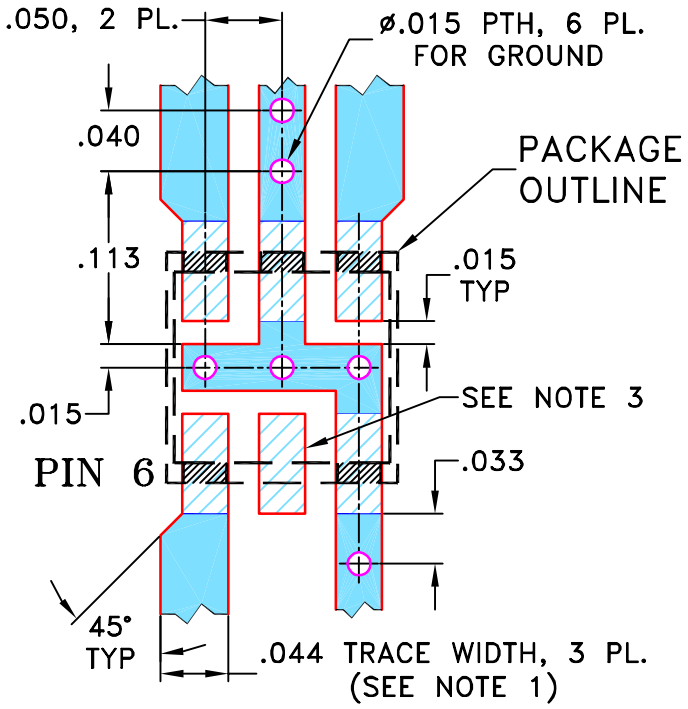
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	AV	07/28/06
TOLERANCES ON:	CHECKED	IL	08/23/06
2 PL DECIMALS ±	APPROVED	IG	08/23/06
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

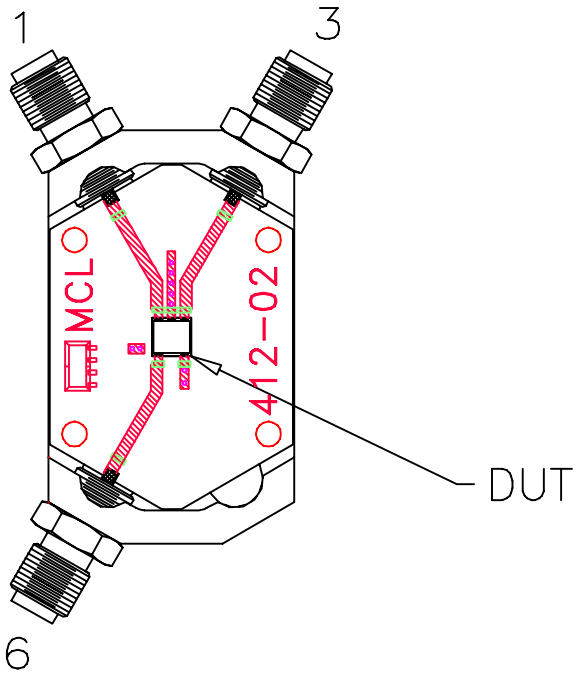
PL, gs/ha/hd, AT224/DB714, TC/TCM, TB-145

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-244	OR

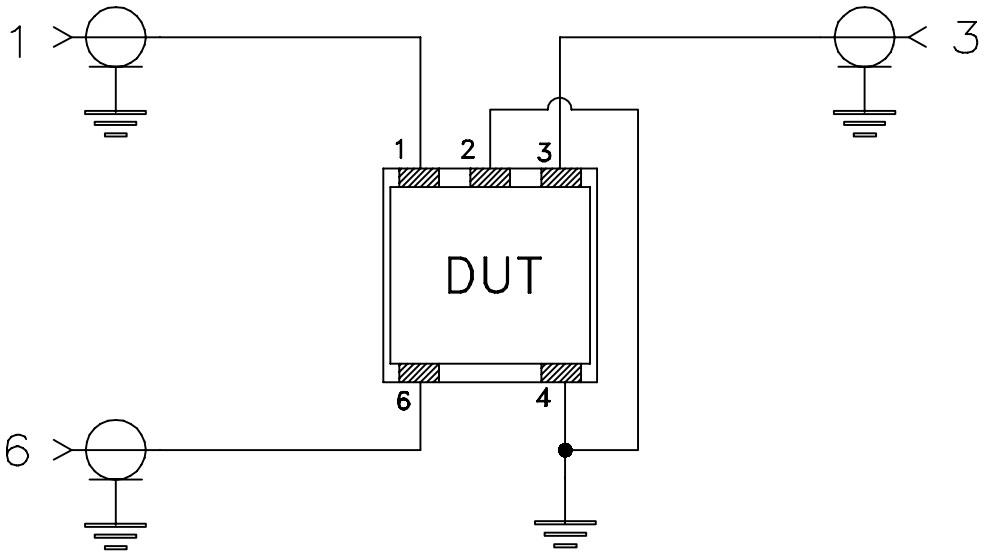
FILE:	SCALE:	SHEET:
98PL244	8:1	1 OF 1

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, Dielectric Constant=3.5, Thickness=.020"

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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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