

# Surface Mount RF Transformer

50Ω      800 to 1900 MHz

TCL1-19G2+

## Features

- wideband, 800 to 1900 MHz
- balanced transmission line
- leadless surface mount
- aqueous washable

## Applications

- cellular
- PCN
- GPS
- baluns
- impedance matching



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.	Typ.	Max.	Unit
Impedance Ratio			1		
Frequency Range		800		1900	MHz
Insertion Loss*	800-1900 800-1400		3 2		dB

\*Insertion Loss is referenced to mid-band loss, 0.2 dB typ.

## Maximum Ratings

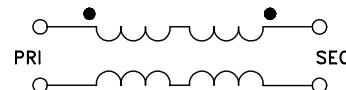
Parameter	Ratings
Operating Temperature	-20°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	0.25W
DC Current	30mA

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
NOT USED	2

## Config. G



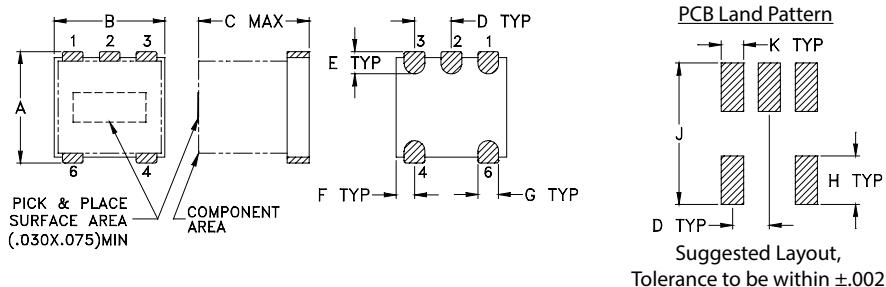
REV. B  
M151107  
TCL1-19G2+  
ED-7614/3  
WP/TD/CP/AM  
201120

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## Outline Drawing

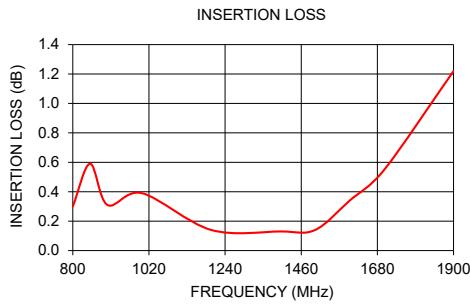


## Outline Dimensions (inch mm)

A	B	C	D	E	F
.150	.150	.150	.050	.030	.025
3.81	3.81	3.81	1.27	0.76	0.64
G	H	J	K	wt	
.028	.065	.190	.030	grams	
0.71	1.65	4.83	0.76		0.10

## Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)
800.00	0.30	11.91
850.00	0.59	12.02
900.00	0.31	12.44
1000.00	0.39	13.40
1200.00	0.14	17.22
1400.00	0.13	20.13
1500.00	0.14	16.01
1600.00	0.34	12.26
1700.00	0.55	9.49
1900.00	1.22	5.94



## Additional Notes

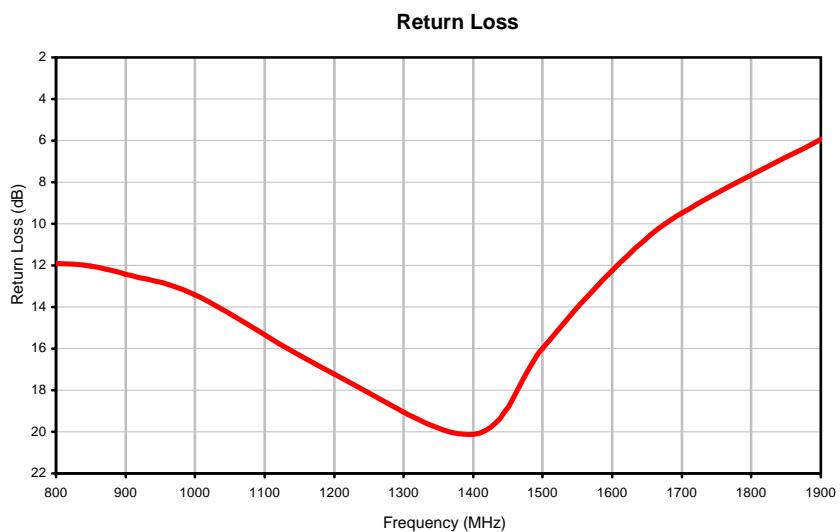
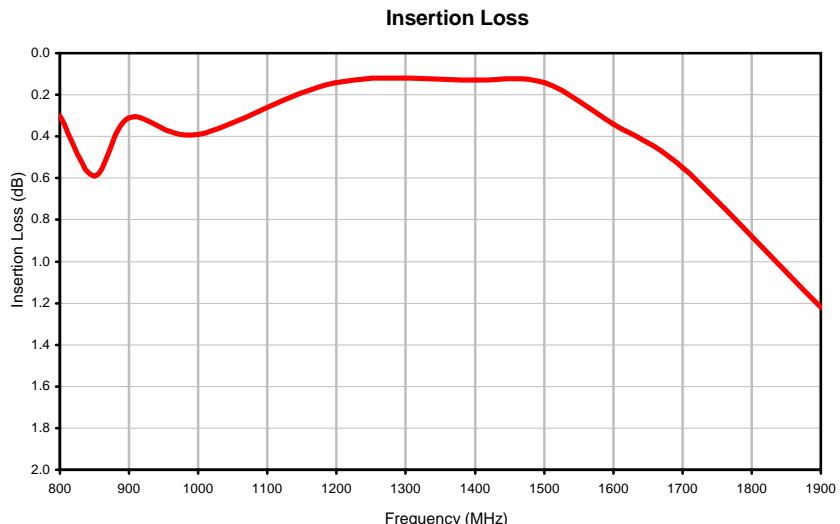
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## Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
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1500	0.14	16.01
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1700	0.55	9.49
1900	1.22	5.94



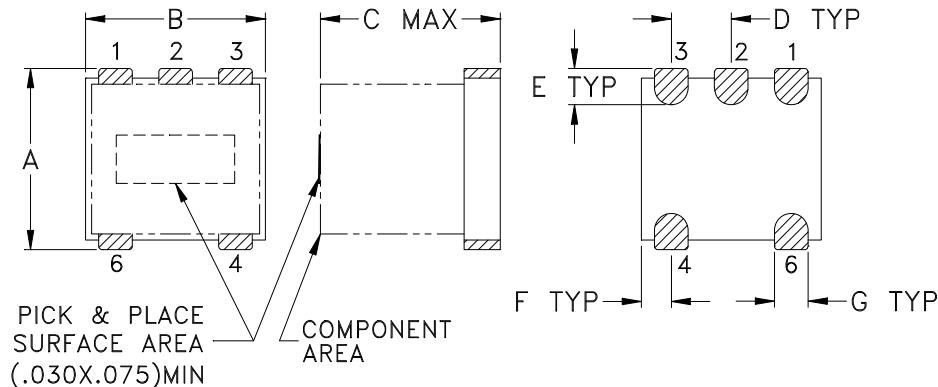
## Typical Performance Curves



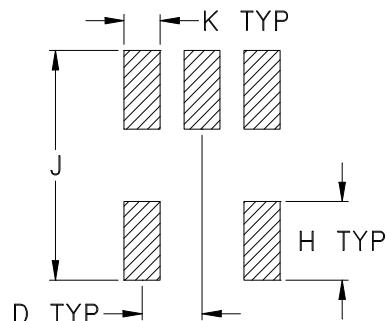
# Case Style **AT**

## Outline Dimensions

AT224-3



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

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

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

## Notes:

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



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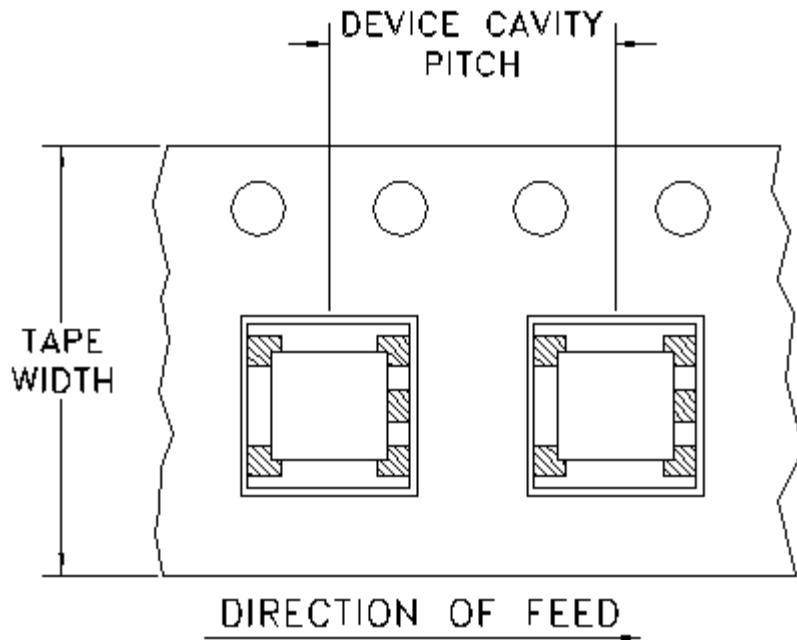
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RF/IF MICROWAVE COMPONENTS

# 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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



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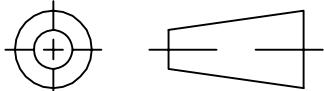
RF/IF MICROWAVE COMPONENTS

98-TR- Rev.: D (20 SEP 25) ECO-027008 File: 98-TR-F17 1

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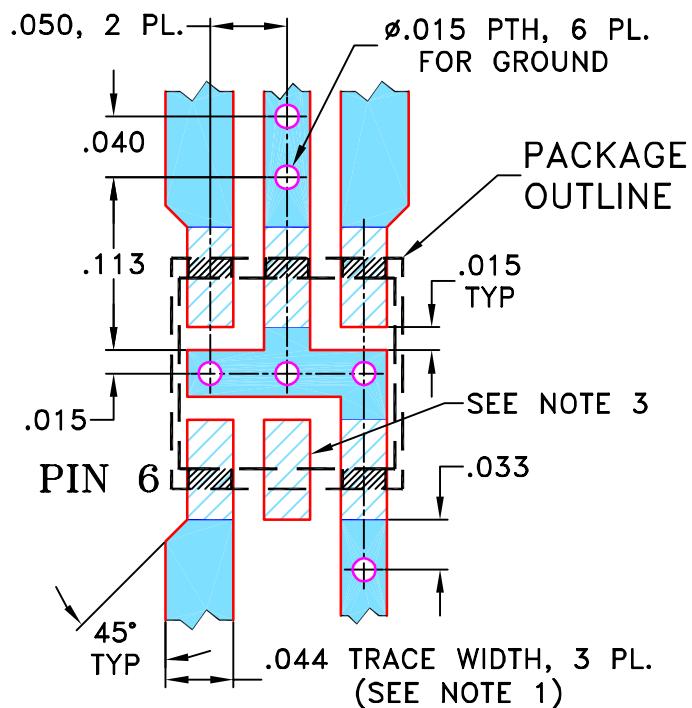
## THIRD ANGLE PROJECTION



## REVISI0NS

REV OR	ECN No. M106563	DESCRIPTION NEW RELEASE	DATE 08/23/06	DR AV	AUTH 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  $.020" \pm .0015"$ ; 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

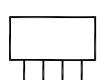
TOLERANCES ON:

CHECKED  IL  08/23/062 PL DECIMALS  $\pm$ APPROVED  IG  08/23/063 PL DECIMALS  $\pm .005$ ANGLES  $\pm$ FRACTIONS  $\pm$ 

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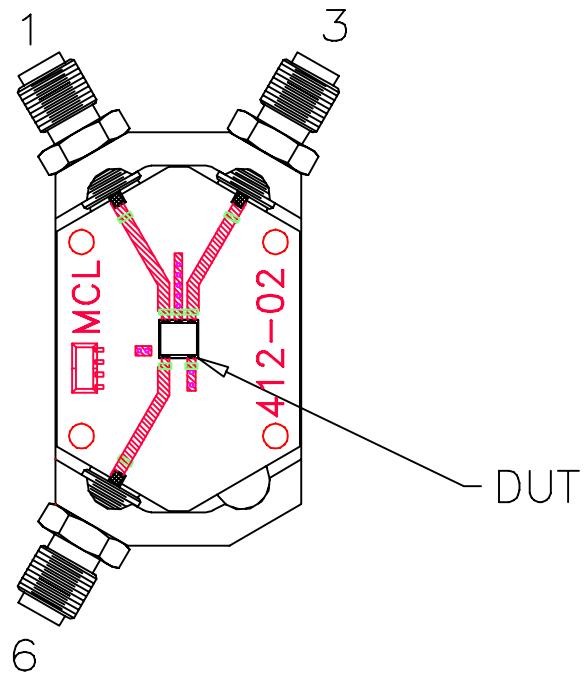
13 Neptune Avenue  
Brooklyn NY 11235

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

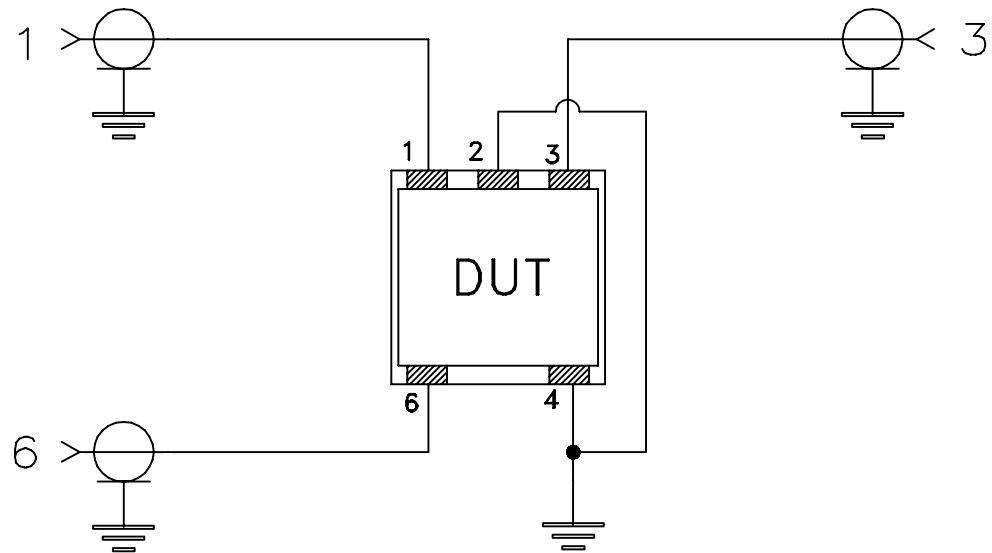
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-244	REV: OR
FILE: 98PL244	SCALE: 8:1	SHEET: 1 OF 1	

# 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 R04350B or its equivalent, **Dielectric Constant=3.5, Thickness=.020"**



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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	-20° 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 + propylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215