

Surface Mount

50Ω

5 to 1000 MHz



CASE STYLE: DB714
PRICE: Contact Sales Dept.

* Case temperature is defined as temperature on ground leads. Permanent damage may occur if any of these limits are exceeded.

INPUT	3
OUTPUT	4
COUPLED	1
GROUND	2
50Ω TERM EXTERNAL	6
NOT USED	5

The diagram illustrates the suggested layout for three vertical bars. The top row shows three bars with a total height dimensioned as 'J'. The distance between the centerlines of the top bars is dimensioned as 'D TYP'. The distance between the centerlines of the bottom bars is dimensioned as 'K TYP'. The height of the bottom bars is dimensioned as 'H TYP'. Below the diagram, the text reads: 'Suggested Layout, Tolerance to be within ± 0.002 '.

A	B	C	D	E	F
160	.150	.160	.050	.040	.025
4.06	3.81	4.06	1.27	1.02	0.64
G	H	J	K	wt	
.028	.065	.190	.030	grams	
0.71	1.65	4.83	0.76	0.15	

FIGURE 6

DIMENSIONS OF RESISTOR R1

.030 X 45° CHAMFER, TYP
6X .015 PTH FOR GROUND
.064 TYP TRACE WIDTH (SEE NOTE BELOW)
PIN 1
R1
PACKAGE OUTLINE
RESISTOR R1: 49.9 ± 1% Ohm, 0805 SIZE

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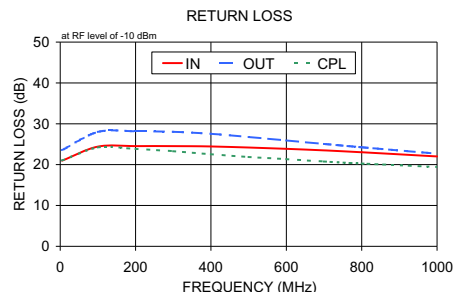
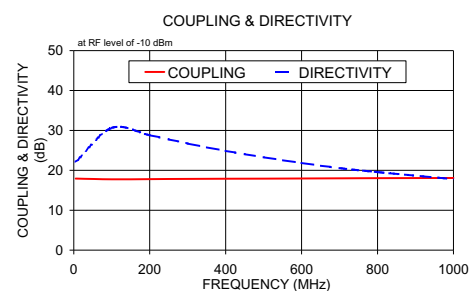
- wideband, 5 to 1000 MHz
- low mainline loss, 0.7 dB typ.
- aqueous washable
- leads for excellent solderability
- protected by US Patent 6,140,887

- communications
- signal sampling
- level detection

FREQ. RANGE (MHz)	COUPLING (dB)		MAINLINE LOSS ¹ (dB)						DIRECTIVITY (dB)						VSWR (:1)	POWER INPUT, W	
			L		M		U		L		M		U				
			Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.			
f _L -f _U	Nom.	Flatness															
5-1000	17.9±0.5	±0.6	0.7	1.3	0.7	1.1	1.0	1.4	22	11	20	15	18	—	1.20	1.0	1.0

L = low range [f_L to $10 f_L$] M = mid range [$10 f_L$ to $f_U/2$] U= upper range [$f_U/2$ to f_U]
1. Mainline loss includes theoretical power loss at coupled port.

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	In	Return Loss (dB) Out	Cpl
5.00	0.71	17.93	22.13	20.96	23.54	21.00
100.00	0.62	17.76	30.64	24.40	28.02	24.20
200.00	0.64	17.80	28.81	24.53	28.17	23.85
300.00	0.67	17.85	26.73	24.53	28.03	23.28
400.00	0.64	17.89	24.88	24.44	27.55	22.54
500.00	0.73	17.92	23.27	24.18	26.78	21.86
600.00	0.80	17.96	21.85	23.87	25.93	21.34
700.00	0.80	18.00	20.56	23.48	25.07	20.77
800.00	0.84	18.03	19.55	23.03	24.24	20.27
1000.00	0.92	18.08	17.79	22.00	22.68	19.42



* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) AND EXTERNAL TERMINATION.

For detailed performance specs
& shopping online see web site

REV. F
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Notes: 1. Performance and quality attributes and conons not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuits's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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/MCStore/terms.iso.

Directional Coupler

TCD-18-4

Typical Performance Data

TEST CONDITIONS: INPUT POWER =0 dBm @Temperature = +25°C

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING LOSS (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	(dB) OUT	CPL
5	0.60	17.72	32.43	22.70	24.99	22.66
10	0.59	17.70	32.68	23.13	25.73	23.09
20	0.58	17.68	33.19	23.97	27.22	23.94
50	0.59	17.69	33.64	24.25	27.82	24.18
100	0.61	17.72	34.27	24.50	28.01	24.34
150	0.62	17.74	35.47	24.67	28.08	24.37
200	0.63	17.75	37.18	24.82	28.21	24.33
250	0.63	17.76	38.20	24.92	28.23	24.26
300	0.64	17.77	37.20	25.06	28.23	24.13
350	0.65	17.78	34.85	25.25	28.15	24.02
400	0.66	17.79	32.14	25.43	28.01	23.88
450	0.67	17.80	29.72	25.53	27.98	23.72
500	0.69	17.80	27.68	25.66	28.03	23.54
550	0.70	17.82	25.81	25.81	27.91	23.37
600	0.71	17.82	24.19	26.01	27.84	23.22
650	0.73	17.84	22.78	26.05	27.79	23.04
700	0.74	17.85	21.43	26.10	27.84	22.85
750	0.76	17.86	20.30	26.17	27.81	22.68
800	0.78	17.87	19.22	26.36	27.76	22.54
850	0.80	17.87	18.28	26.50	27.66	22.40
900	0.81	17.87	17.42	26.49	27.65	22.27
950	0.82	17.86	16.62	26.52	27.68	22.13
1000	0.84	17.85	15.92	26.64	27.57	21.99
1050	0.86	17.84	15.25	26.76	27.52	21.87
1100	0.88	17.82	14.67	26.91	27.59	21.75
1200	0.92	17.77	13.51	26.97	27.55	21.56
1300	0.95	17.67	12.66	27.21	27.51	21.32
1400	0.99	17.55	11.90	27.19	27.30	21.10
1500	1.04	17.42	11.24	27.20	27.10	20.89
1600	1.08	17.25	10.71	27.30	27.01	20.71
1700	1.14	17.10	10.16	27.31	26.67	20.50
1800	1.19	16.91	9.75	27.24	26.16	20.30
1900	1.25	16.69	9.46	27.11	25.58	20.15
2000	1.31	16.49	9.04	27.01	24.91	20.04
2250	1.50	15.96	8.43	26.74	23.14	19.91
2500	1.73	15.45	8.01	26.15	20.88	20.19
2750	2.00	15.02	7.83	24.53	18.63	20.91
3000	2.31	14.79	7.64	21.80	16.77	21.58
3250	2.65	14.69	7.64	18.82	15.08	21.06
3500	2.99	14.78	7.61	16.20	13.59	19.20
3750	3.34	15.04	7.86	14.19	12.49	17.03
4000	3.64	15.40	8.09	12.72	11.64	15.40
4250	3.93	15.72	8.50	11.77	11.08	14.18
4500	4.22	16.02	8.96	11.18	10.63	13.38
4750	4.52	16.32	9.41	10.86	10.43	12.92
5000	4.88	16.44	9.72	10.71	10.38	12.36
5250	5.32	16.46	9.42	10.48	10.40	11.64
5500	5.81	16.49	8.77	10.14	10.32	10.62
5750	6.45	16.46	8.19	9.68	10.39	9.52
6000	7.06	16.21	6.95	8.73	10.35	8.33
6250	7.95	16.11	6.13	8.25	10.03	7.38
6500	8.55	15.90	5.16	7.28	9.78	6.52
7000	10.02	15.61	4.68	6.48	9.84	5.52

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Directional Coupler

TCD-18-4

Typical Performance Data

TEST CONDITIONS: INPUT POWER =0 dBm @Temperature = -40°C

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING LOSS (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	(dB) OUT	CPL
5	0.66	17.60	25.75	20.36	21.75	20.31
10	0.61	17.53	29.73	21.82	23.71	21.73
20	0.50	17.38	37.68	24.76	27.64	24.55
50	0.47	17.35	45.83	26.52	29.71	26.28
100	0.47	17.38	42.35	26.35	30.88	26.15
150	0.48	17.38	41.08	26.37	31.37	26.27
200	0.49	17.39	39.67	26.37	30.28	26.12
250	0.49	17.39	36.12	26.05	30.03	25.55
300	0.50	17.39	34.58	26.35	29.30	25.31
350	0.51	17.39	32.37	26.18	28.79	24.79
400	0.52	17.39	30.64	26.21	28.49	24.61
450	0.54	17.39	29.05	26.02	28.02	24.16
500	0.55	17.39	27.39	25.83	27.60	23.80
550	0.56	17.38	26.13	25.82	27.18	23.47
600	0.57	17.38	24.77	25.81	26.89	23.16
650	0.58	17.37	23.64	25.87	26.79	22.90
700	0.60	17.36	22.53	25.75	26.59	22.70
750	0.61	17.35	21.60	25.71	26.28	22.43
800	0.63	17.34	20.62	25.52	26.09	22.06
850	0.65	17.32	19.74	25.48	25.97	21.81
900	0.67	17.31	18.93	25.33	25.74	21.51
950	0.69	17.29	18.16	25.28	25.58	21.38
1000	0.71	17.26	17.47	25.12	25.34	21.09
1050	0.73	17.24	16.72	24.93	25.24	20.99
1100	0.75	17.21	16.06	24.95	25.19	20.98
1200	0.79	17.13	15.00	24.89	24.95	20.76
1300	0.83	17.04	13.89	24.60	24.63	19.97
1400	0.88	16.93	13.05	24.44	24.28	19.78
1500	0.93	16.81	12.21	24.46	24.33	19.52
1600	0.99	16.66	11.57	24.46	24.18	19.34
1700	1.05	16.56	10.87	24.31	24.05	18.84
1800	1.12	16.35	10.39	24.09	23.60	19.38
1900	1.18	16.16	9.97	23.85	23.17	18.11
2000	1.26	15.97	9.58	23.46	22.62	18.50
2250	1.47	15.48	8.67	23.55	21.60	17.85
2500	1.75	14.98	8.10	23.51	19.76	18.44
2750	2.07	14.66	7.84	23.72	18.14	18.60
3000	2.42	14.37	7.67	22.18	16.52	19.65
3250	2.79	14.41	7.76	18.85	14.70	19.67
3500	3.15	14.59	7.72	16.11	13.28	18.54
3750	3.48	14.94	7.86	14.02	12.13	17.06
4000	3.77	15.40	8.09	12.31	11.33	15.45
4250	4.02	15.86	8.56	11.43	10.86	14.49
4500	4.25	16.17	8.80	10.89	10.54	14.12
4750	4.50	16.41	9.43	10.66	10.53	13.93
5000	4.78	16.51	9.51	10.39	10.47	13.42
5250	5.03	16.50	9.78	10.65	10.81	12.40
5500	5.45	16.32	9.21	10.36	10.94	11.24
5750	5.90	16.18	8.55	9.80	11.28	9.89
6000	6.53	16.00	7.28	8.90	11.41	8.18
6250	7.10	15.62	6.82	8.28	11.16	6.99
6500	7.84	15.44	6.15	7.63	10.73	6.03
7000	9.19	14.65	5.40	6.62	10.24	4.83

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Directional Coupler

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Typical Performance Data

TEST CONDITIONS: INPUT POWER =0 dBm @Temperature = +85°C

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING LOSS (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	OUT	CPL
5	0.74	17.96	28.44	21.33	23.50	21.44
10	0.74	17.96	28.77	21.52	23.88	21.62
20	0.74	17.94	29.43	21.90	24.64	21.97
50	0.76	17.96	30.40	21.85	25.15	21.86
100	0.77	17.99	30.87	22.36	25.11	22.23
150	0.78	18.00	31.60	22.70	25.26	22.42
200	0.78	18.03	33.02	22.81	25.81	22.45
250	0.78	18.05	33.17	23.15	26.07	22.67
300	0.79	18.08	31.87	23.26	26.43	22.61
350	0.80	18.11	30.46	23.49	26.66	22.65
400	0.81	18.15	28.46	23.67	26.82	22.64
450	0.82	18.19	26.48	23.87	27.18	22.63
500	0.83	18.23	24.66	24.15	27.43	22.66
550	0.85	18.28	23.13	24.49	27.71	22.70
600	0.86	18.32	21.71	24.83	27.97	22.76
650	0.87	18.36	20.46	25.10	28.32	22.73
700	0.88	18.40	19.25	25.35	28.72	22.75
750	0.89	18.43	18.29	25.72	28.90	22.79
800	0.91	18.45	17.38	26.03	29.25	22.77
850	0.92	18.46	16.57	26.39	29.60	22.78
900	0.94	18.47	15.84	26.89	30.00	22.74
950	0.95	18.47	15.22	27.31	30.20	22.73
1000	0.97	18.47	14.60	27.67	30.48	22.81
1050	0.98	18.45	14.06	28.18	30.83	22.81
1100	1.00	18.43	13.59	28.41	30.75	22.67
1200	1.03	18.36	12.70	29.00	30.74	22.52
1300	1.07	18.25	12.01	29.84	30.61	22.59
1400	1.11	18.13	11.45	30.15	29.90	22.37
1500	1.16	17.98	10.94	30.11	29.23	22.17
1600	1.20	17.82	10.53	29.82	28.30	22.00
1700	1.26	17.69	10.21	29.76	27.71	21.70
1800	1.31	17.48	9.74	29.67	26.72	21.65
1900	1.36	17.27	9.52	28.86	25.54	21.55
2000	1.42	17.08	9.18	28.47	24.77	21.22
2250	1.58	16.62	8.59	26.21	22.26	20.99
2500	1.79	16.16	8.18	24.74	20.18	20.83
2750	2.02	15.81	7.85	22.38	18.33	21.03
3000	2.28	15.45	7.59	20.45	16.90	21.10
3250	2.57	15.23	7.37	18.24	15.44	20.41
3500	2.89	15.06	7.09	16.25	14.13	18.94
3750	3.26	15.07	7.02	14.30	12.90	16.97
4000	3.62	15.02	6.95	12.82	11.97	15.54
4250	4.01	15.16	7.22	11.57	11.04	13.75
4500	4.40	15.20	7.21	10.81	10.28	12.64
4750	4.80	15.29	7.65	10.23	9.68	11.88
5000	5.20	15.31	7.79	9.93	9.15	11.41
5250	5.62	15.30	8.16	9.85	8.67	11.18
5500	6.12	15.10	8.23	9.94	8.48	11.03
5750	6.59	14.73	8.30	9.97	8.17	10.48
6000	7.30	14.44	7.23	10.05	8.15	9.91
6250	7.97	14.05	6.69	9.61	7.90	9.26
6500	8.87	13.53	6.39	9.16	7.76	8.22
7000	10.09	12.43	5.50	7.36	8.78	6.00

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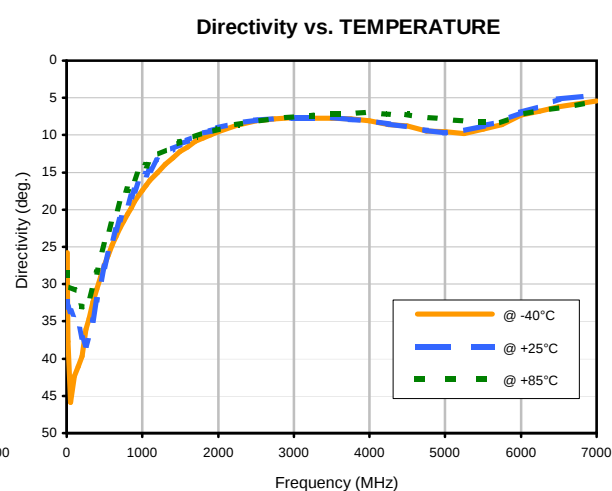
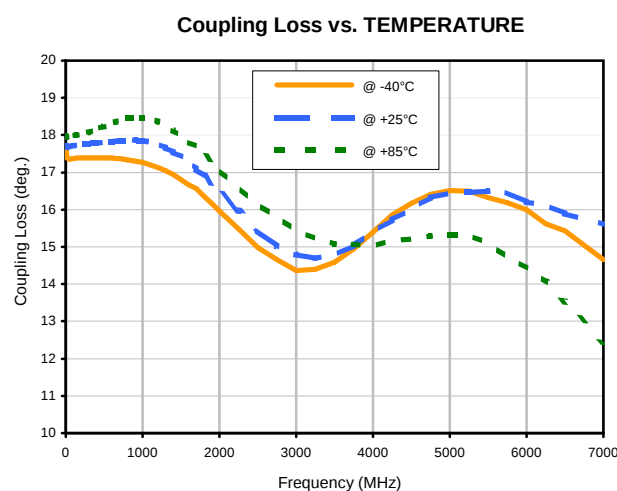
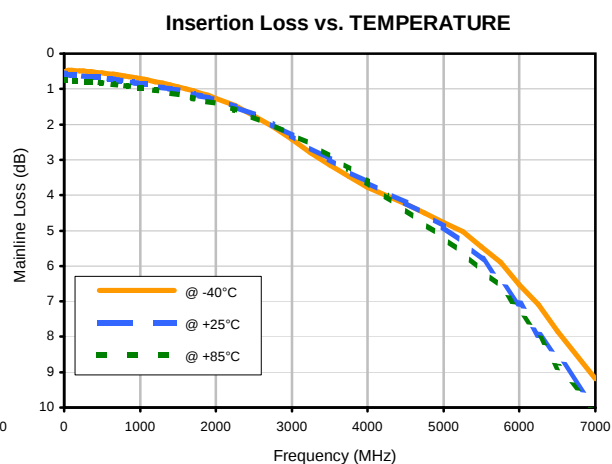
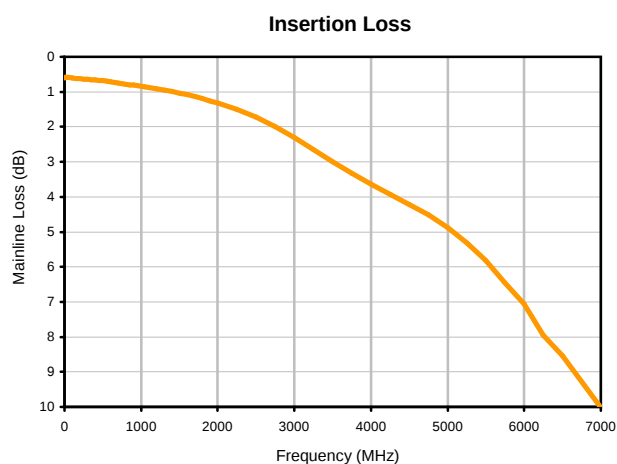
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Directional Coupler

Typical Performance Curves

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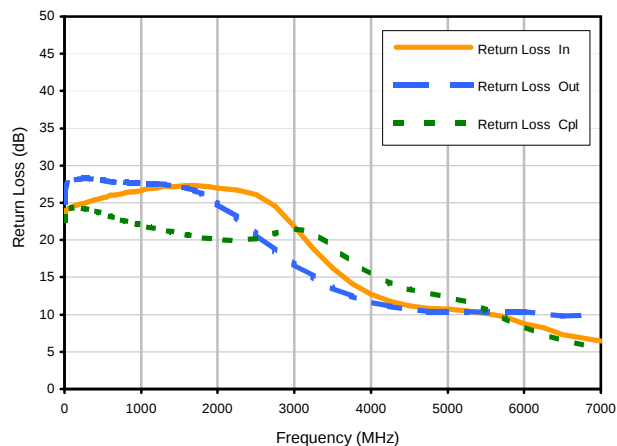


Directional Coupler

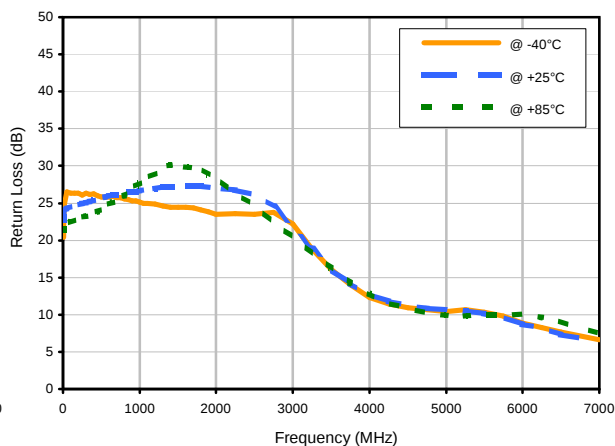
Typical Performance Curves

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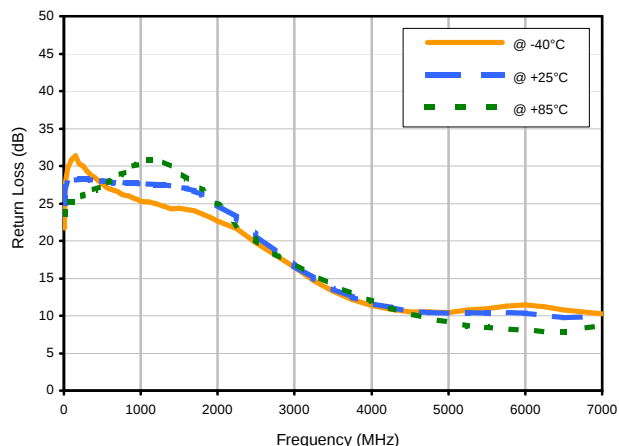
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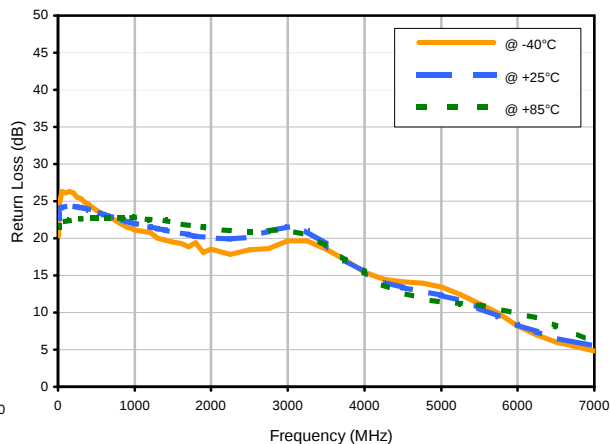
Return Loss In vs. TEMPERATURE



Return Loss Out vs. TEMPERATURE

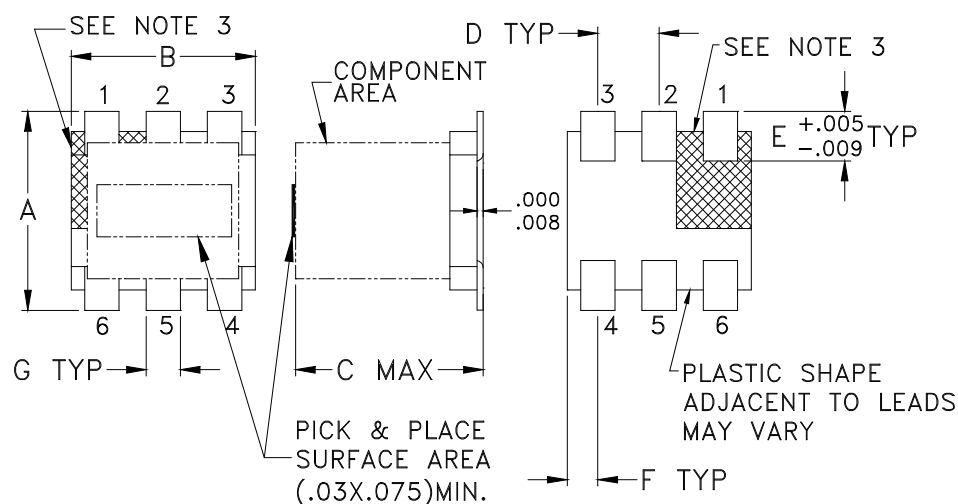


Return Loss Cpl vs. TEMPERATURE

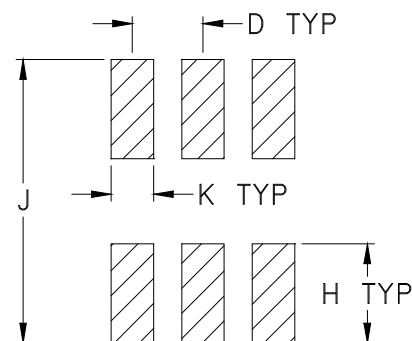


Outline Dimensions

DB714



PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
DB714	.160 (4.06)	.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)	.15

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

Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.
- 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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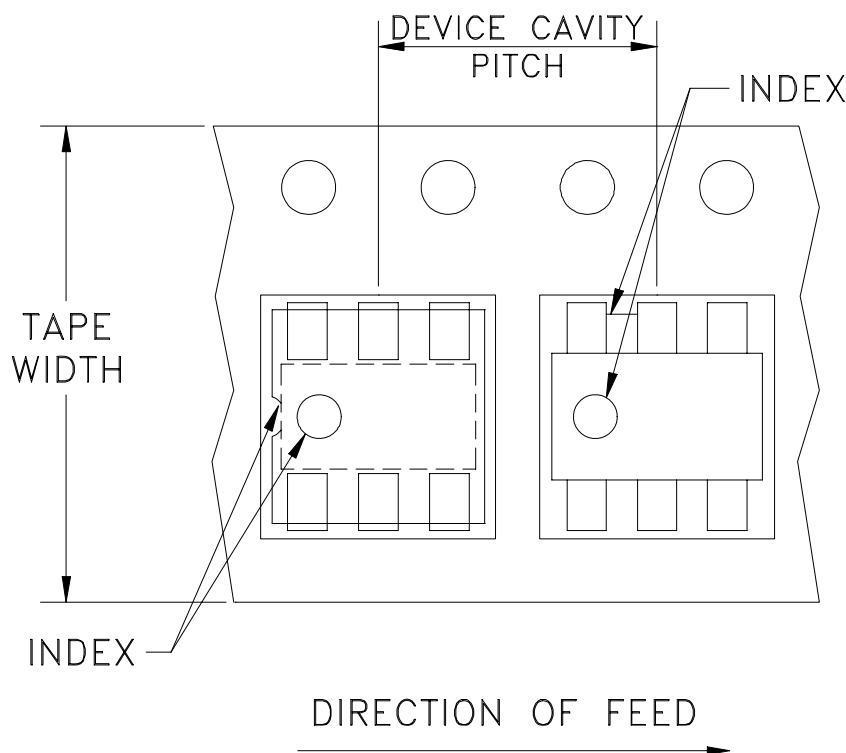


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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F47

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note
12	8	13	1000, 2000
		7	20, 50, 100, 200, 500

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



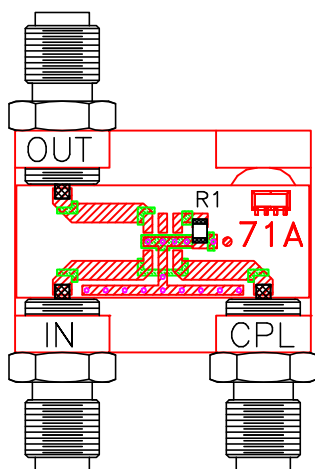
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

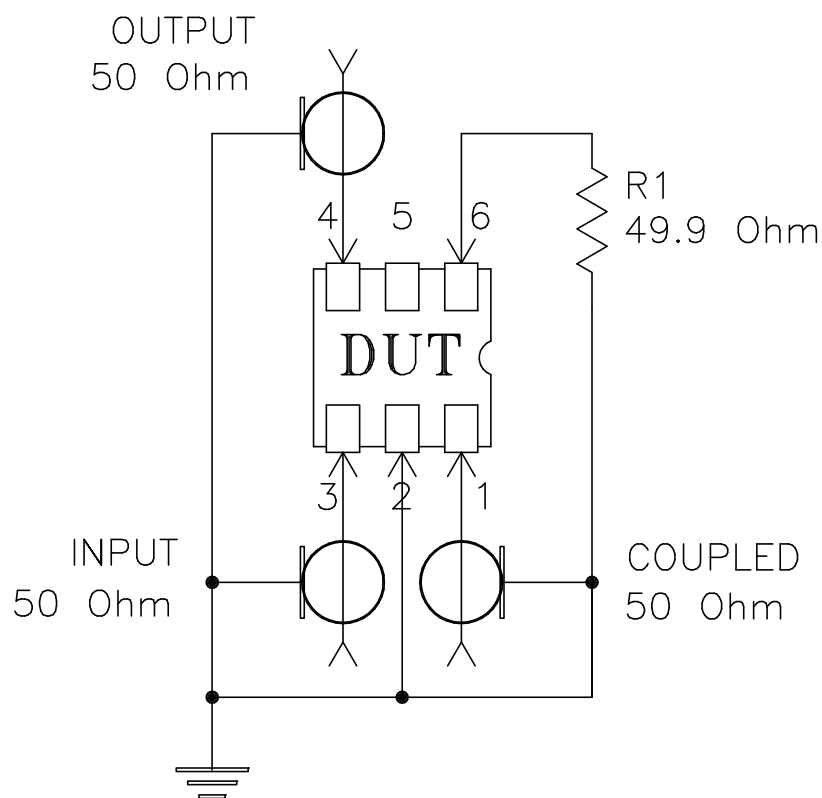
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Mini-Circuits ISO 9001 & ISO 14001 Certified

Evaluation Board and Circuit



TB-71



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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