



Mini-Circuits®

SURFACE MOUNT

Directional Coupler

TCD-13-4+

50Ω 5 to 1000 MHz

FEATURES

- 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

APPLICATIONS

- VHF/UHF
- CATV
- Cellular



Generic photo used for illustration purposes only

CASE STYLE: DB714

+RoHS Compliant

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

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range	—	5	—	1000	MHz
Mainline Loss ¹	5-50	—	0.7	1.3	dB
	50-500	—	0.7	1.3	
	500-1000	—	0.8	1.5	
Coupling	5-1000	—	13±0.5	—	dB
Coupling Flatness (±)	5-1000	—	±0.6	—	dB
Directivity	5-50	17	21	—	dB
	50-500	12	18	—	
	500-1000	—	15	—	
VSWR	5-1000	—	1.2	—	:1
Input Power	5-50	—	—	0.5	W
	50-1000	—	—	1.0	

1. Mainline loss includes theoretical power loss at coupled port.

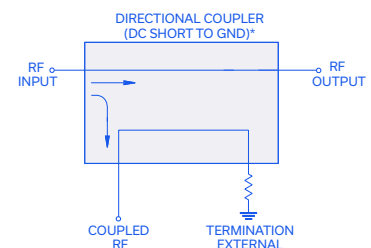
MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to 85°C*
Storage Temperature	-55°C to 100°C

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

* Case temperature is defined as temperature on ground leads.

ELECTRICAL SCHEMATIC



*Electrical schematic is for Directional coupler with internal transformer(s) and external termination

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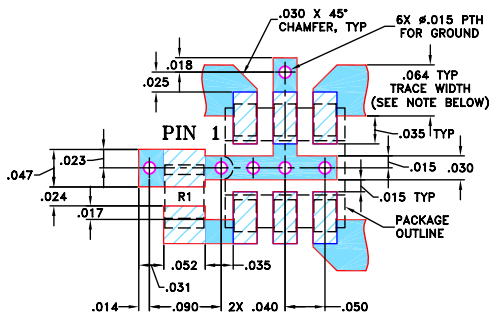
Directional Coupler

TCD-13-4+

50Ω 5 to 1000 MHz

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

DEMO BOARD MCL P/N: TB-71
SUGGESTED PCB LAYOUT (PL-009)

 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Lead #1 identifier shall be located in the cross-hatched area shown. Identifier may be either a molded or marked feature.

The diagram illustrates a component with six leads, numbered 1 through 6. Lead 1 is highlighted with a cross-hatched area. Dimensions and tolerances are specified as follows:

- A**: Overall height of the component.
- B**: Overall width of the component.
- C MAX**: Maximum length of the component.
- D TYP**: Typical distance from the top edge to the top of lead 1.
- E**: Distance from the top edge to the top of lead 1, with a tolerance of $+0.005$ to -0.009 TYP.
- F TYP**: Typical distance from the bottom edge to the bottom of lead 1.
- G TYP**: Typical distance from the left edge to the left of lead 1.
- COMPONENT AREA**: The area of the component body.
- PICK & PLACE SURFACE AREA (.03X.075)MIN.**: The area of the component body used for picking and placing.
- PLASTIC SHAPE ADJACENT TO LEADS MAY VARY**: A note indicating that the plastic shape adjacent to the leads may vary.

The diagram shows a three-layered structure. The top layer has a thickness labeled D TYP. The middle layer has a thickness labeled K TYP. The bottom layer has a thickness labeled H TYP. The total height of the structure is labeled J . The layers are represented by hatched rectangles.

OUTLINE DIMENSIONS (Inches)

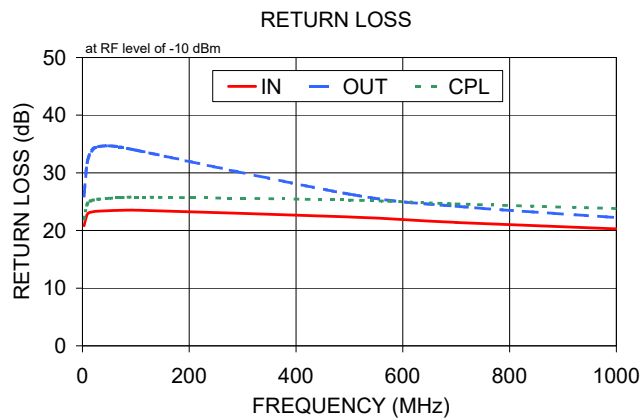
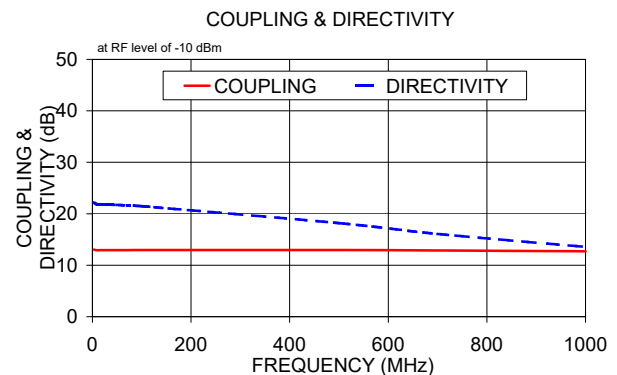
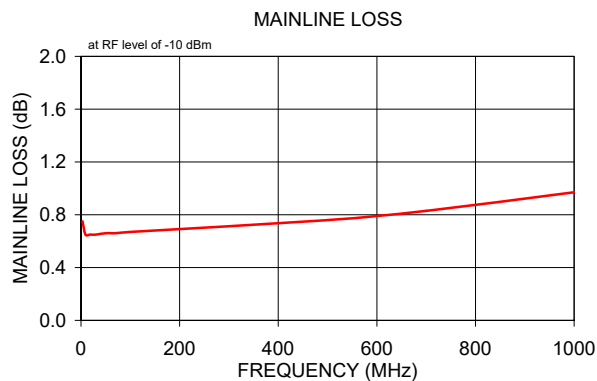
A	B	C	D	E	F
.160	.150	.160	.050	.040	.025
4.06	3.81	4.06	1.27	1.02	0.64
G	H	J	K		wt
.028	.065	.190	.030		grams
0.71	1.65	4.83	0.76		0.15

TAPE & REEL INFORMATION: F47



TYPICAL PERFORMANCE DATA

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)	Directivity (dB)	Return Loss (dB)		
	In-Out			In	Out	Cpl
5.00	0.96	13.23	22.93	18.39	22.11	20.63
100.00	0.80	13.07	21.46	21.56	29.75	23.23
200.00	0.82	13.07	19.90	22.09	29.67	22.99
300.00	0.84	13.06	18.25	22.15	27.88	22.67
400.00	0.86	13.03	16.68	21.58	24.86	22.04
500.00	0.86	12.96	15.34	20.44	22.11	21.08
600.00	0.87	12.88	14.27	19.08	19.99	20.15
700.00	0.91	12.82	13.42	17.97	18.61	19.42
800.00	0.93	12.73	12.75	17.33	17.64	18.67
1000.00	1.02	12.56	11.88	17.83	17.63	17.78



- 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-Circuits' applicable established test performance criteria and measurement instructions.
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