

# Directional Couplers

DBTC-20-4+

DBTC-20-4L+

50Ω, 20dB coupling, 20 to 1000 MHz

## Maximum Ratings

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

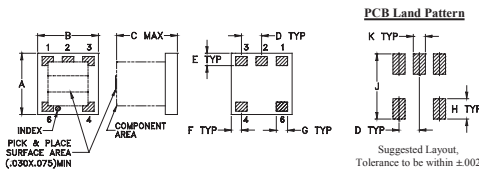
Permanent damage may occur if any of these limits are exceeded.

## Pin Connections

INPUT	3
OUTPUT	4
COUPLED	1
GROUND	2
ISOLATE (DO NOT USE)	6

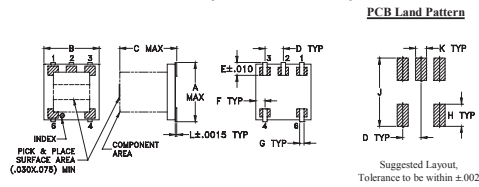
## Outline Drawing / Dimensions (inch/mm)

AT790-1 (DBTC-20-4+)



A	B	C	D	E	F	G	H	J	K	wt
.150	.150	.150	.050	.030	.025	.028	.050	.160	.030	grams
3.81	3.81	3.81	1.27	0.76	0.64	0.71	1.27	4.06	0.76	0.10

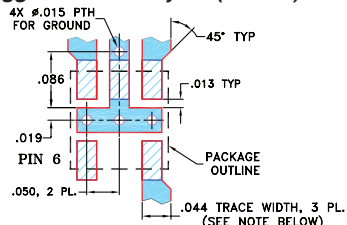
## AT1030 (DBTC-20-4L+)



A	B	C	D	E	F	G	H	J	K	L	wt
.166	.150	.155	.050	.037	.025	.012	.060	.184	.030	.004	grams
4.22	3.81	3.94	1.27	0.94	0.64	0.30	1.52	4.67	0.76	0.10	0.10

## Demo Board MCL P/N: TB-278

Suggested PCB Layout (PL-150)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### 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](http://www.minicircuits.com/MCLStore/terms.jsp)

## Features

- very flat coupling
- very broadband, multi octave
- temperature stable, LTCC base
- all welded construction
- leads attached for better solderability
- micro miniature coupler
- aqueous washable
- protected by US Patents 6,140,887 & 6,784,521

## Applications

- VHF/UHF receivers/transmitters
- cellular

## Electrical Specifications

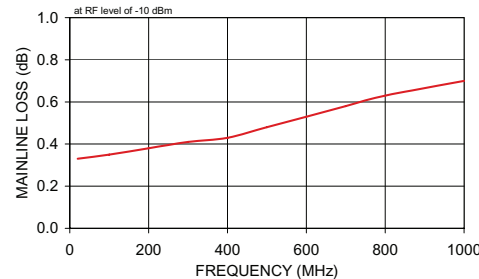
FREQ. RANGE (MHz)	COUPLING (dB)	MAINLINE LOSS* (dB)			DIRECTIVITY (dB)			VSWR** (:1)	POWER INPUT (W)							
		L	M	U	L	M	U		L	MU						
$f_l - f_u$	Nom. Flatness	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Max.	Max.						
20-1000	20.4±0.5 ±0.8	0.3	1.0	0.4	1.0	0.7	1.3	21	13	21	14	16	—	1.2	1.0	1.0

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  $f_u$ ]  
\* Includes theoretical coupled power loss of 0.04 dB at 20 dB coupling  
\*\* For coupled port VSWR above 500 MHz, 1.6:1 typ.

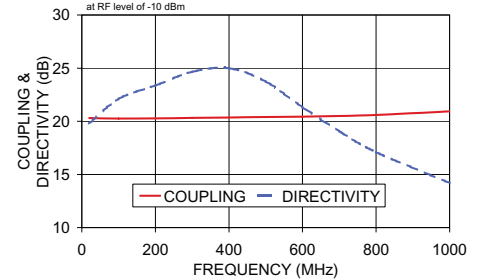
## Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		
				In	Out	Cpl
20.00	0.33	20.30	19.79	28.00	30.48	26.85
100.00	0.35	20.25	22.11	29.28	31.80	27.18
200.00	0.38	20.28	23.36	29.12	30.13	24.16
300.00	0.41	20.32	24.66	27.95	28.09	21.44
400.00	0.43	20.36	25.00	27.01	26.54	19.23
500.00	0.48	20.40	23.74	26.41	25.97	17.30
600.00	0.53	20.43	21.33	25.99	25.74	15.69
700.00	0.58	20.50	19.06	25.78	26.00	14.31
800.00	0.63	20.59	17.10	26.16	26.88	13.07
1000.00	0.70	20.94	14.20	28.41	29.64	11.03

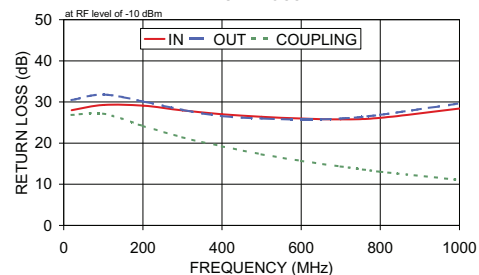
DBTC-20-4+ MAINLINE LOSS



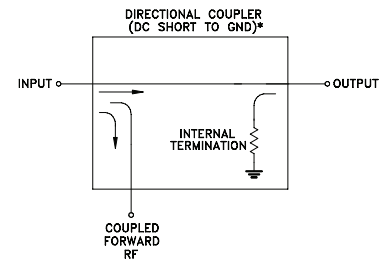
DBTC-20-4+ COUPLING & DIRECTIVITY



DBTC-20-4+ RETURN LOSS



## Electrical Schematic



\* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) THAT ROUTES DC FROM RF PORTS TO GROUND.