

Surface Mount Attenuator/Switch

50Ω Bi-Phase 10 to 1000 MHz

Maximum Ratings

Operating Temperature -55°C to 100°C

Storage Temperature -55°C to 100°C

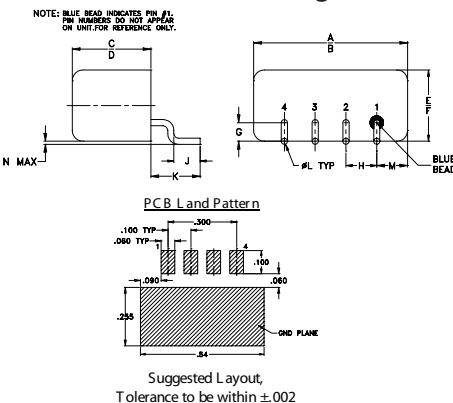
Control Current 30mA

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

Pin Connections

INPUT	1
OUTPUT	4
CONTROL	2
GROUND	3
CASE GROUND	3

Outline Drawing

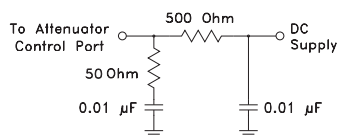


Outline Dimensions (inch/mm)

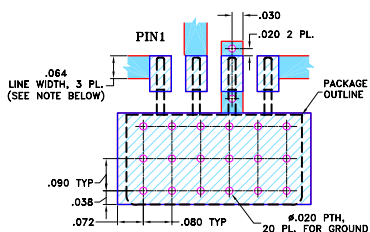
A	B	C	D	E	F	G
.50	.48	.255	.240	.23	.21	.06
12.70	12.19	6.48	6.10	5.84	5.33	1.52

H	J	K	L	M	N	wt
.100	.09	.16	.020	.09	.005	grams
2.54	2.29	4.06	0.51	2.29	0.13	1.9

suggested control port biasing configuration



Demo Board MCL P/N: TB-201 Suggested PCB Layout (PL-081)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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.
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Features

- wideband, 10 to 1000 MHz
- high in-out isolation

Applications

- bi-phase modulator

TFAS-2SM+
TFAS-2SM



CASE STYLE: NNN150
PRICE: \$2.20 ea. QTY. (1-9)

+ RoHS compliant in accordance
with EU Directive (2002/95/EC)

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

Attenuator/Switch Electrical Specifications

FREQUENCY (MHz)		INSERTION LOSS (dB) ±20 mA				MAX. INPUT PWR (dBm) ±20 mA		IN-OUT ISOLATION (dB) 0 mA			BI-PHASE X (±20 mA) Typ.			
IN	CON	Mid-Band m	Total Range	Typ.	Max.	1 dB compr.	no damage	L	M	U	Δ AMP (dB)	Phase (deg.) deviation from 180°	Total Range	Total Range
f _L -f _U	DC-0.5	Typ.	Max.	Typ.	Max.			Typ.	Min.	Typ.	Min.		m	
10-1000	DC-0.5	3.7	4.5	5.0	8.0	17*	25	50	30	42	20	31	20	0.1 0.2 2.0 3.0

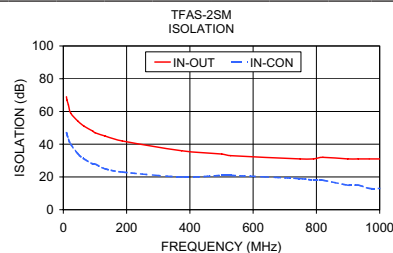
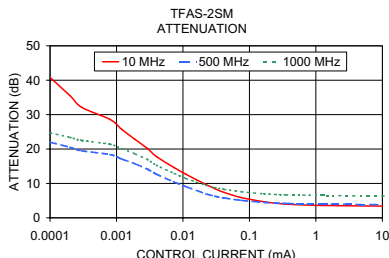
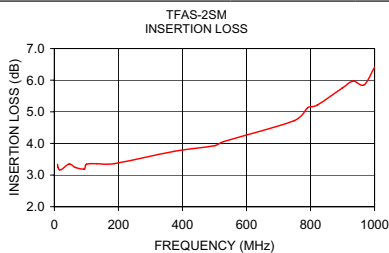
L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U = upper range [f_U/2 to f_U] m = [2 f_L to f_U/2]

* 13 dBm from 10-500 MHz.

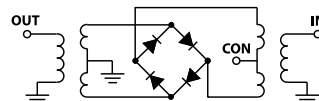
Performance specifications apply for input power up to 10 dB below stated 1 dB compression.

Typical Performance Data

Freq. (MHz)	I. Loss (dB) at 20mA		±Control ΔAMP (dB)	20mA ΔPhase (deg.)	Isolation (dB)		Input R. Loss (dB)	Control Current (mA)	Attenuation (dB)			Phase Δ ref at 15mA Ctrl			Input VSWR		
					(in-out)	(in-con)			10 MHz	500 MHz	1000 MHz	10 MHz	500 MHz	1000 MHz	10 MHz	500 MHz	1000 MHz
	$\overline{X}$	σ	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$	deg.	deg.	deg.							
10.0	3.34	0.009	0.00	180.0	69	47	11.4	0.0000	51.3	24.7	27.2	76.7	40.6	0.5	3.3	2.3	4.2
11.4	3.24	0.006	0.01	180.0	67	46	11.6	0.0001	40.8	22.0	24.7	67.8	31.3	-6.7	3.2	2.2	4.0
16.1	3.17	0.004	0.01	180.1	64	43	12.2	0.0002	35.5	20.5	23.4	61.3	25.4	-10.4	3.2	2.2	3.8
23.2	3.18	0.003	0.00	180.1	59	40	12.5	0.0003	32.1	19.5	22.5	59.5	21.4	-12.8	3.1	2.1	3.7
46.5	3.35	0.002	0.01	180.3	54	34	12.5	0.0008	28.6	18.4	21.4	55.8	17.3	-14.7	3.0	2.0	3.6
65.8	3.24	0.002	0.01	180.5	51	31	12.4	0.0012	25.7	17.1	20.1	53.7	14.1	-15.8	2.9	1.9	3.4
93.1	3.19	0.030	0.01	180.7	48	28	12.4	0.0019	22.8	15.7	18.6	51.0	10.9	-16.0	2.7	1.9	3.2
100.2	3.34	0.003	0.01	180.7	47	28	12.4	0.0029	20.2	14.2	17.0	47.8	8.6	-15.1	2.6	1.7	3.1
131.8	3.36	0.004	0.01	180.9	45	25	12.4	0.0040	17.8	12.7	15.3	45.1	6.8	-13.6	2.4	1.6	2.9
186.6	3.36	0.005	0.02	181.3	42	23	12.3	0.0074	14.6	10.4	12.9	40.1	4.7	-10.7	2.1	1.5	2.7
373.8	3.75	0.008	0.02	182.1	36	20	11.4	0.0110	12.7	9.1	11.5	36.8	3.7	-8.7	1.9	1.4	2.6
500.8	3.93	0.015	0.03	182.5	34	21	11.3	0.0159	11.1	8.0	10.4	33.2	2.8	-7.2	1.7	1.4	2.6
529.1	4.06	0.018	0.04	182.5	33	21	11.2	0.0221	9.7	7.0	9.5	29.5	2.2	-5.3	1.5	1.4	2.5
748.8	4.72	0.055	0.10	182.6	31	19	10.7	0.0301	8.5	6.3	8.8	25.9	1.7	-4.3	1.3	1.4	2.6
791.0	5.13	0.050	0.15	182.8	31	18	10.3	0.0416	7.4	5.8	8.3	22.4	1.0	-3.4	1.2	1.5	2.6
820.5	5.21	0.052	0.15	182.4	32	18	10.1	0.0753	5.9	5.1	7.6	16.2	0.7	-2.1	1.2	1.6	2.6
899.0	5.75	0.063	0.20	182.4	31	15	9.5	0.1640	4.7	4.5	7.0	9.2	0.2	-1.4	1.4	1.8	2.7
932.5	5.97	0.089	0.27	182.0	31	15	9.3	0.3543	4.0	4.2	6.7	5.0	0.0	-0.8	1.6	1.9	2.7
967.2	5.85	0.077	0.24	181.8	31	13	9.1	1.2309	3.6	4.0	6.5	1.7	-0.1	-0.5	1.8	2.0	2.7
1000.0	6.41	0.111	0.38	181.4	31	13	8.8	15.1064	3.4	3.8	6.3	0.0	0.0	-0.1	1.9	2.0	2.7



electrical schematic



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Notes: 1. Performance and quality attributes and conditions 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-Circuit'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/MCLStore/terms.jsp.

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