SURFACE MOUNT top hat

Power Splitter/Combiner TCP-2-182-75X+

75Ω 2 Way-0° 10 to 1800 MHz

FEATURES

- Wideband, 10 to 1800 MHz
- Usable down to 5 MHz frequency
- Low insertion, 0.8 dB typ.
- Optimized for the upper end of the downstream band
- Excellent amplitude unbalance, 0.15 dB typ.
- Very good phase unbalance, 2.0 deg. typ.
- External resistor & capacitor required
- Aqueous washable
- Low cost



Generic photo used for illustration purposes only

CASE STYLE: DB1627

+RoHS Compliant

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

APPLICATIONS

- DOCSIS® 3.1 Systems
- VHF/UHF
- CATV

PRODUCT OVERVIEW

Mini-Circuits' TCP-2-182-75X+ is a 75Ω 2-way 0˚ surface-mount power splitter/combiner covering the 50 to 1800 MHz frequency range, supporting bandwidth requirements for DOCSIS® 3.1 systems and equipment, as well as other broadband applications. This model can handle up to 0.5W RF input power as a splitter, and provides low insertion loss and low phase and amplitude unbalance. It features core and wire construction mounted on a 6-lead plastic base (0.16 x 0.15 x 0.16") with Mini-Circuits' TopHat® feature to improve speed and accuracy of pick and place assembly. This design requires external capacitors and resistors for impedance matching and cycling isolation between the output signals (refer to electrical schematic).

KEY FEATURES

Feature	Advantages
Wideband, 10 to 1800 MHz	Optimized for low insertion loss at the high end of the downstream band, this device is suitable for many broadband applications including DOCSIS® 3.1 systems and equipment, VHF/UHF, CATV, cellular, and more.
Low insertion loss, 0.8 dB	The combination of 0.5W power handling and low insertion loss makes it a suitable candidate for distributing signals while maintaining signal power.
Good isolation, 26 dB	Minimizes interference between ports
Low unbalance: • 0.15 dB amplitude unbalance • 2.0˚ phase unbalance	This model produces nearly equal output signals, making it ideal for use in parallel path /multichannel systems.
Top Hat® feature	Improves speed and accuracy of pick and place assembly and provides clear device marking for visual inspection.

ELECTRICAL SPECIFICATIONS AT 25°C

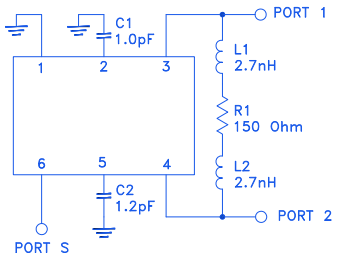
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		10		1800	MHz
Insertion Loss, above 3.0 dB	10-1800 50-1000 1000-1250 1250-1500	— — —	1.7 0.5 0.7 0.9	2.9 0.9 1.2 1.5	dB
Isolation	10-1800 50-1000 1000-1250 1250-1500	13 20 20 17	25 26 30 26	— — — —	dB
Phase Unbalance	10-1800 50-1000 1000-1250 1250-1500	— — — —	3.0 1.5 2.0 2.0	9.0 5.0 6.0 7.0	Degree
Amplitude Unbalance	10-1800 50-1000 1000-1250 1250-1500	— — — —	0.5 0.2 0.1 0.2	1.2 0.7 0.6 0.7	dB
VSWR (Port S)	10-1800 50-1000 1000-1250 1250-1500	— — — —	1.3 1.15 1.15 1.25	1.6 1.3 1.3 1.35	:1
VSWR (Port 1-2)	10-1800 50-1000 1000-1250 1250-1500	— — — —	1.5 1.20 1.2 1.25	2.0 1.4 1.3 1.40	:1
Power Input (as a splitter)	10-1800 50-1250	— —	— —	0.5 1.0	Watt

MAXIMUM RATINGS

Parameter	Ratings
Operating temperature	-40°C to 85°C
Storage temperature	-55°C to 100°C
RF Power Input (as splitter)	0.5 W max.

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

FUNCTIONAL SCHEMATIC



SURFACE MOUNT top hat

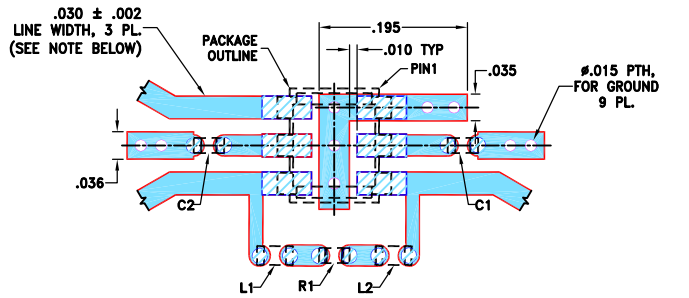
Power Splitter/Combiner TCP-2-182-75X+

PIN CONNECTIONS

SUM PORT	6
PORT 1	3
PORT 2	4
GROUND	1
EXT. CAPACITOR 0.7 pF	2 TO GND
EXT. CAPACITOR 0.7pF	5 TO GND
EXT. COMPONENTS (INDUCTOR 2.7 nH, RESISTOR 150Ω, INDUCTOR 2.7nH IN SERIES	3,4

PRODUCT MARKING: VA

DEMO BOARD MCL P/N: TB-908+
SUGGESTED PCB LAYOUT (PL-457)



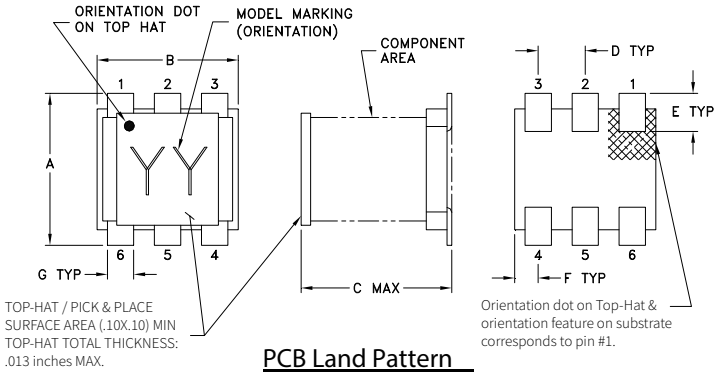
COMPONENT	SIZE
L1, L2	0402
C1,C2	0402
R1	0402

NOTES:
1. TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030"±.002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

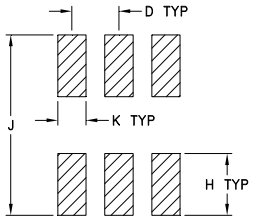
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

OUTLINE DRAWING



PCB Land Pattern



SUGGESTED LAYOUT
TOLERANCE TO BE WITHIN ±.002

OUTLINE DIMENSIONS (Inches / mm)

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

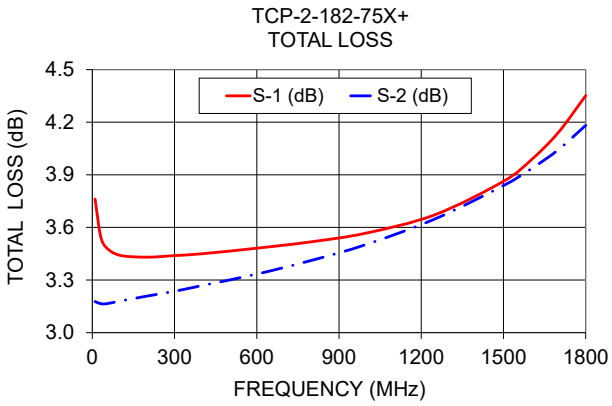
SURFACE MOUNT top hat

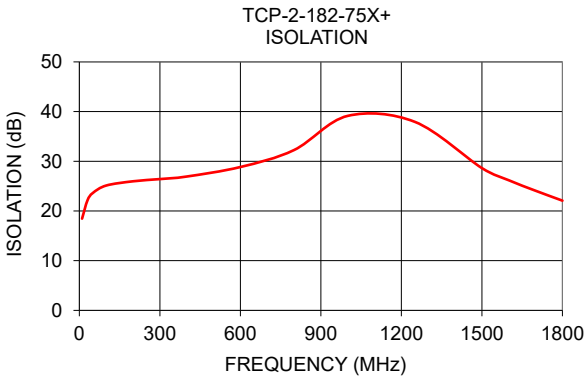
Power Splitter/Combiner TCP-2-182-75X+

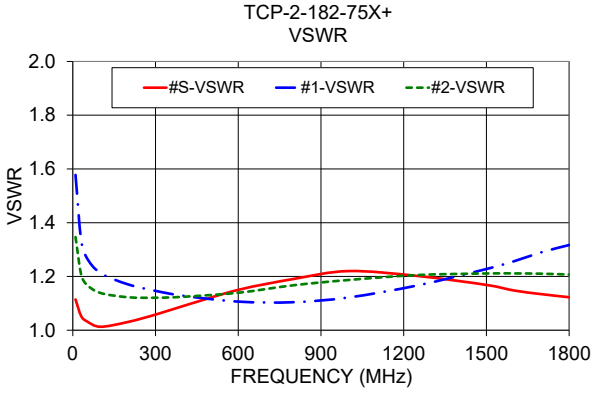
TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Total Loss[1] (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR (:1)		
	S-1	S-2				S	1	2
5	3.93	3.16	0.76	16.08	3.47	1.18	1.86	1.49
10	3.76	3.18	0.58	18.46	2.56	1.11	1.58	1.35
30	3.55	3.17	0.39	22.11	1.53	1.05	1.34	1.21
50	3.49	3.16	0.32	23.61	1.12	1.03	1.27	1.17
100	3.44	3.18	0.26	25.12	0.60	1.01	1.21	1.14
200	3.43	3.21	0.22	25.97	0.01	1.03	1.17	1.12
300	3.44	3.24	0.20	26.42	0.39	1.06	1.15	1.12
400	3.45	3.27	0.18	26.93	0.67	1.09	1.13	1.12
600	3.48	3.33	0.15	28.85	1.16	1.15	1.11	1.14
800	3.52	3.41	0.11	32.26	1.60	1.19	1.10	1.17
1000	3.57	3.50	0.06	39.14	1.94	1.22	1.12	1.19
1250	3.67	3.65	0.02	37.94	2.29	1.20	1.17	1.21
1500	3.86	3.84	0.02	28.63	2.59	1.17	1.23	1.21
1600	3.98	3.93	0.05	26.18	2.77	1.15	1.26	1.21
1700	4.14	4.04	0.10	24.07	2.99	1.13	1.29	1.21
1800	4.35	4.18	0.17	22.08	3.38	1.12	1.32	1.21

1. Total Loss = Insertion Loss + 3dB splitter loss.







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/terms/viewterm.html