

top hat<sup>®</sup>  
**Surface Mount**  
**Power Splitter/Combiner**

**TCP-2-33X+**

2 Way-0° 50Ω 1000 to 3000 MHz

**Features**

- low insertion, 0.8 dB typ.
- excellent amplitude unbalance, 0.3 dB typ.
- very good phase unbalance, 1.0 deg. typ.
- external resistor required
- aqueous washable
- leads for excellent solderability
- low cost

**Applications**

- cellular
- PCN
- GPS



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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500
13"	1000, 2000

**Electrical Specifications at 25°C**

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		1000		3000	MHz
Insertion Loss Above 3.0 dB	1000 - 3000	—	0.8	1.9	dB
Isolation	1000 - 3000	15	18	—	dB
Phase Unbalance	1000 - 3000	—	—	5	Degree
Amplitude Unbalance	1000 - 3000	—	—	0.9	dB

**Maximum Ratings**

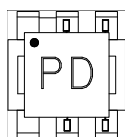
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	0.5W max.

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

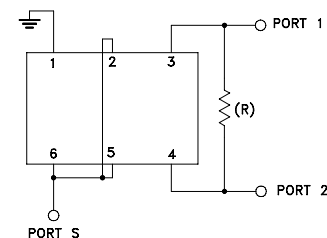
**Pin Connections**

Function	Pin Number
SUM PORT	2,5,6
PORT 1	3
PORT 2	4
GROUND	1
EXT. RESISTOR 200Ω	3,4

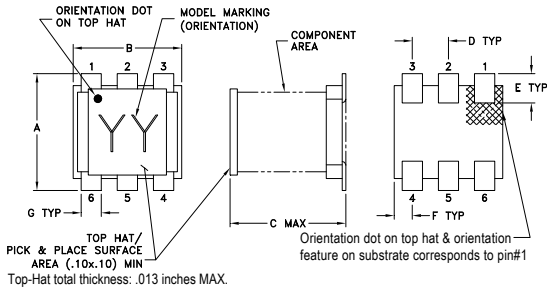
**Product Marking**



**Electrical Schematic**



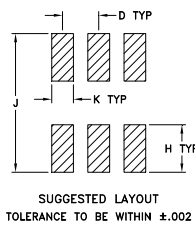
## Outline Drawing



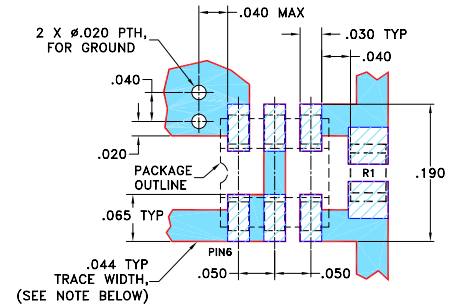
## Outline Dimensions (inch/mm)

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

## PCB Land Pattern



## Demo Board MCL P/N: TB-464+ Suggested PCB Layout (PL-357)

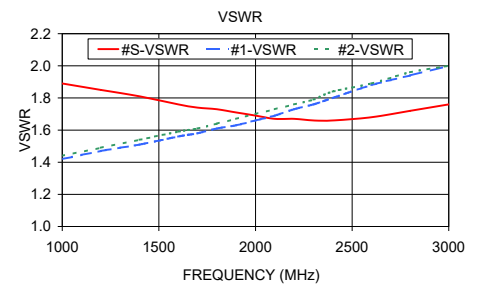
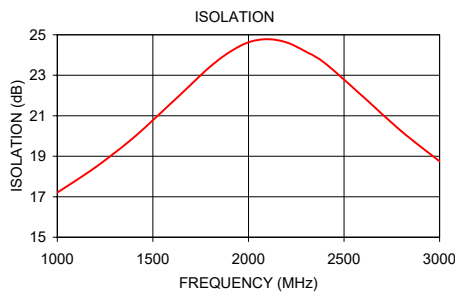
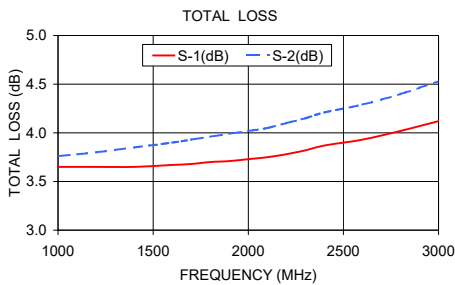


- RESISTOR R1: 200 ± 1% Ohm, 0805 SIZE
- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
  - DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Typical Performance Data

Frequency (MHz)	Total Loss <sup>1</sup> (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
1000.00	3.65	3.76	0.11	17.21	0.35	1.89	1.42	1.44
1200.00	3.65	3.80	0.15	18.46	0.37	1.85	1.47	1.49
1400.00	3.65	3.85	0.20	19.93	0.41	1.81	1.51	1.54
1600.00	3.67	3.90	0.23	21.66	0.50	1.76	1.56	1.59
1700.00	3.68	3.93	0.25	22.55	0.53	1.74	1.58	1.61
1800.00	3.70	3.96	0.26	23.43	0.59	1.73	1.61	1.64
1900.00	3.71	3.99	0.28	24.14	0.65	1.71	1.63	1.67
2000.00	3.73	4.02	0.29	24.63	0.74	1.69	1.66	1.70
2100.00	3.75	4.05	0.30	24.78	0.82	1.67	1.69	1.73
2200.00	3.78	4.10	0.31	24.62	0.91	1.67	1.73	1.76
2300.00	3.82	4.15	0.32	24.17	0.97	1.66	1.76	1.79
2400.00	3.87	4.21	0.34	23.60	1.16	1.66	1.80	1.84
2600.00	3.93	4.29	0.35	21.94	1.27	1.68	1.88	1.89
2800.00	4.02	4.40	0.38	20.24	1.45	1.72	1.94	1.96
3000.00	4.12	4.53	0.41	18.75	1.73	1.76	2.00	2.00

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



## Additional Notes

- 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.
- 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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