

top hat®  
Surface Mount  
**Power Splitter/Combiner**

**SBTCJ-13-75+**

2 Way-180° 75Ω 5 to 1000 MHz

**Features**

- wide band frequency 5-1000 MHz
- low insertion, 1.1 dB typ.
- excellent amplitude unbalance, 0.3 dB typ.
- very good phase unbalance, 2.7 deg. typ.
- external resistor inductor & capacitor required
- aqueous washable
- leads for excellent solderability
- low cost

**Applications**

- CATV
- cellular
- UHV/VHV



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**

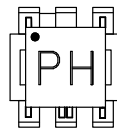
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		5		1000	MHz
Insertion Loss Above 3.0 dB	5 - 50	—	1.1	1.7	dB
	50 - 500	—	1.2	1.6	
	500 - 1000	—	1.5	2.1	
Isolation	5 - 50	20	29	—	dB
	50 - 500	20	28	—	
	500 - 1000	20	26	—	
Phase Unbalance	5 - 50	—	0.6	3	Degree
	50 - 500	—	2.7	7	
	500 - 1000	—	2.8	9	
Amplitude Unbalance	5 - 50	—	0.4	0.6	dB
	50 - 500	—	0.3	0.5	
	500 - 1000	—	0.8	1.2	
VSWR (Port-S)	5 - 50	—	1.27	1.5	:1
	50 - 500	—	1.15	1.3	
	500 - 1000	—	1.38	1.6	
VSWR (Port 1-2)	5 - 50	—	1.23	1.5	:1
	50 - 500	—	1.24	1.4	
	500 - 1000	—	1.58	1.8	

**Maximum Ratings**

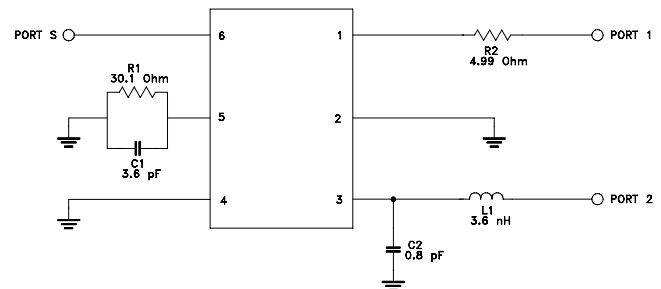
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1.0W max.

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

**Product Marking**



**Electrical Schematic**

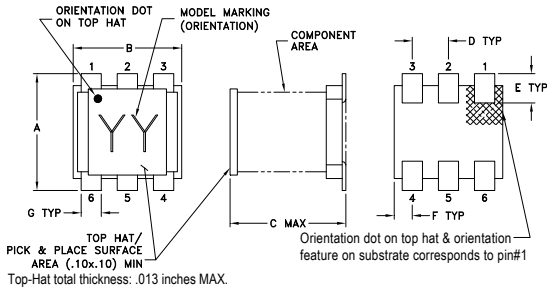


**Pin Connections**

Function	Pin Number
Sum port	6
port 1 (180°)	1
port 2 (0°)	3
ground	4
Ext. inductor series 3.6nh	3
Ext. capacitor 0.8pf	3 to Gnd
Ext. capacitor 3.6pf	5 to Gnd
Ext. resistor 30.1Ω	5 to Gnd
Ext. resistor series 4.99Ω	1
Ground or not used	2

SEQ.	Description	Suggested Supplier Part #
CAP C1	S-SER 3.6±.1 pF; 0603 Size	AVX. 0603 1U3R6 * AT2A
CAP C2	HIQ 0.8 ±.1 pF; 0603 Size	AVX. 0603 1U0R8 * AT2A
IND L1	3.6±.1 nH; 0402 Size	Murat LQP15MN3N6B00
RES R1	.1W 30.1Ω 1%; 0603 Size	KOA RK73HIJTDD30R1F
RES R2	.1W 4.99 Ω 1%; 0603 Size	KOA RK73HIJTDD4R99F

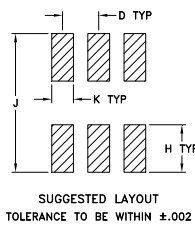
## Outline Drawing



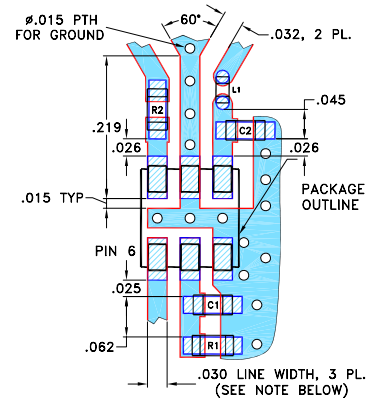
## Outline Dimensions (inch/mm)

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-580+ Suggested PCB Layout (PL-342)

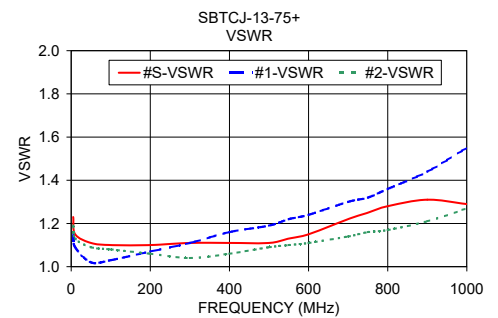
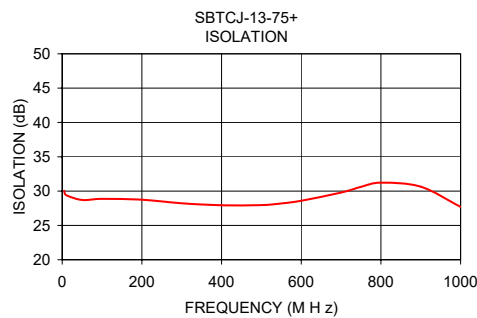
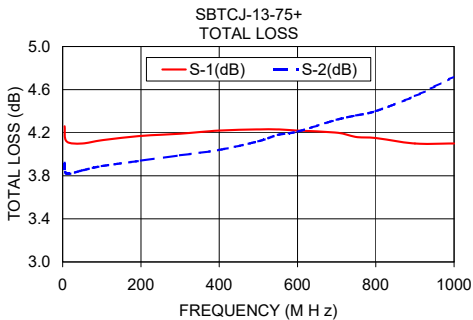


- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.  
■ DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
■ 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						
5.00	4.26	3.92	0.34	30.05	179.61	1.23	1.15	1.19
10.00	4.12	3.82	0.30	29.41	179.60	1.15	1.09	1.13
50.00	4.10	3.85	0.25	28.70	179.99	1.11	1.02	1.09
100.00	4.13	3.89	0.24	28.87	179.77	1.10	1.03	1.08
200.00	4.17	3.94	0.23	28.74	179.39	1.10	1.07	1.06
300.00	4.19	3.99	0.21	28.22	179.06	1.11	1.11	1.04
400.00	4.22	4.04	0.17	27.94	178.93	1.11	1.16	1.06
500.00	4.23	4.12	0.10	27.96	178.85	1.11	1.19	1.09
550.00	4.23	4.18	0.05	28.20	178.94	1.13	1.22	1.10
600.00	4.22	4.21	0.01	28.59	179.11	1.15	1.24	1.11
700.00	4.20	4.32	0.12	29.79	179.42	1.22	1.30	1.14
750.00	4.16	4.36	0.20	30.62	179.59	1.25	1.32	1.16
800.00	4.15	4.40	0.26	31.22	179.85	1.28	1.36	1.17
900.00	4.10	4.54	0.44	30.64	179.53	1.31	1.44	1.21
1000.00	4.10	4.72	0.61	27.70	178.60	1.29	1.55	1.27

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



## Additional 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.  
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)