

Surface Mount

# Power Splitter/Combiner

EP2C+

2 Way-0° 50Ω 1800 to 12500 MHz

## The Big Deal

- Ultra-Wide Bandwidth, 1800-12500 MHz
- Tiny Size, 4 x 4 x 1 mm
- High Power Handling, 1.85W as a Splitter



CASE STYLE: DG1847

## Product Overview

Mini-Circuits EP2C+ is a MMIC splitter/combiner designed for wideband operation from 1800 to 12500 MHz. This model provides excellent power ratings in a tiny device package (4x4x1 mm), with up to 1.85W power handling (as a splitter) and up to 0.4A DC current handling. Manufactured using GaAs IPD technology, it provides a high level of ESD protection and excellent reliability.

Feature	Advantages
Wideband, 1800 to 12500 MHz	One power splitter can be used in many applications, saving component count. Also ideal for wideband applications such as military and instrumentation.
Excellent power handling 1.85W as a splitter 0.85W internal dissipation as a combiner	In power combiner applications, half the power is dissipated internally. EP2C+ is designed to handle 0.85W internal dissipation as a combiner allowing reliable operation without excessive temperature rise. Similar splitters implemented as Wilkinson splitters on PCB require big resistors and additional heat sinking. As a splitter, EP2C+ can handle up to 1.85W in a very small package.
DC Passing up to 0.4A	DC current passing is helpful in applications where both RF & DC need to pass through the DUT, such as antenna mounted hardware.
Small size 4 x 4mm QFN package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

# Surface Mount Power Splitter/Combiner

## EP2C+

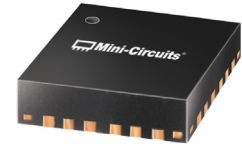
2 Way-0° 50Ω 1800 to 12500 MHz

### Features

- Wide bandwidth, 1800 to 12500 MHz
- Excellent amplitude unbalance, 0.2 dB typ.
- Good phase unbalance, 6 deg. typ.
- Small size, 4x4 mm
- High ESD level\*
- Aqueous washable
- DC passing

### Applications

- WIMAX
- ISM
- Instrumentation
- Radar
- WLAN
- Satellite communications
- LTE



CASE STYLE: DG1847

### +RoHS Compliant

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

### Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		1800		12500	MHz
Insertion Loss, above 3.0 dB	1800-3800	—	0.8	1.1	dB
	3800-8500	—	1.1	1.4	
	8500-12500	—	1.8	2.1	
Isolation	1800-3800	7.0	10.0	—	dB
	3800-8500	13.0	16.0	—	
	8500-12500	14.0	17.0	—	
Phase Unbalance	1800-3800	—	3.0	6.0	Degree
	3800-8500	—	6.0	10.0	
	8500-12500	—	11.0	—	
Amplitude Unbalance	1800-3800	—	0.1	0.2	dB
	3800-8500	—	0.2	0.4	
	8500-12500	—	0.7	0.9	
VSWR (Port S)	1800-3800	—	1.5	—	:1
	3800-8500	—	1.3	—	
	8500-12500	—	1.4	—	
VSWR (Port 1-2)	1800-3800	—	1.2	—	:1
	3800-8500	—	1.3	—	
	8500-12500	—	1.6	—	

### Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Power Input (as a splitter)	1.85 W max.
Internal Dissipation	0.85 W max.
DC Current	0.4 A max

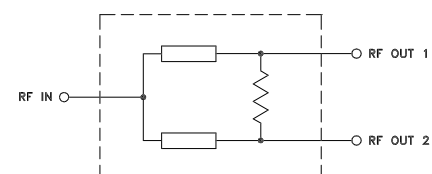
Permanent damage may occur if any of these limits are exceeded.

\* ESD rating  
Human body model (HBM): Class 2(1800 to <4000 V) in accordance with ANSI/ESD 5.1-2007  
Machine model (MM): Class M3 (200 to <400 V) in accordance with ANSI/ESD 5.2-2009

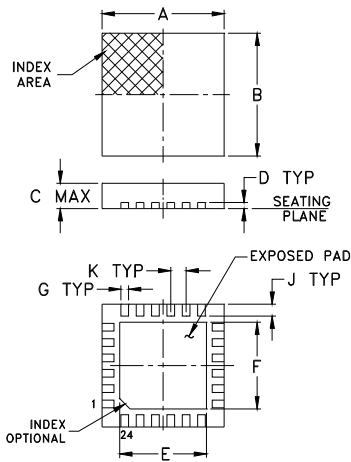
### Pad Connections

Function	Pad Number
SUM PORT	3
PORT 1	19
PORT 2	12
NOT USED, GROUND EXTERNALLY	1, 2, 4-11, 13-18, 20-24, Paddle

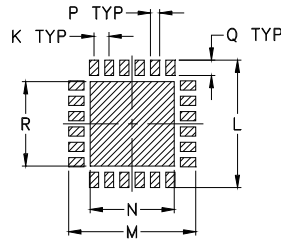
### Simplified Electrical Schematic



## Outline Drawing

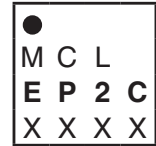


## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm 0.002$

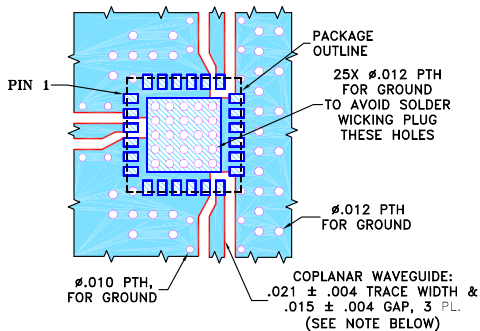
## Product Marking



## Outline Drawing Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J
.157	.157	.039	.008	.104	.104	.009	--	.016
4.0	4.0	1.0	0.20	2.64	2.64	0.23	--	0.41
K	L	M	N	P	Q	R	wt	
.020	.166	.166	.102	.012	.020	.102	grams	
0.50	4.22	4.22	2.59	0.30	0.51	2.59	0.04	

## Demo Board MCL P/N: TB-811+ Suggested PCB Layout (PL-442)

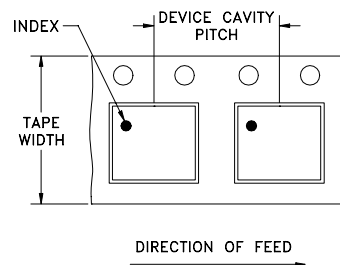


### NOTES:

1. COPLANAR WAVEGUIDE IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.010" \pm .001"$ . 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.

## Tape and Reel (F68)



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note
12	8	7	Small quantity standard
			20
			50
		13	Standard
			1000
			2000

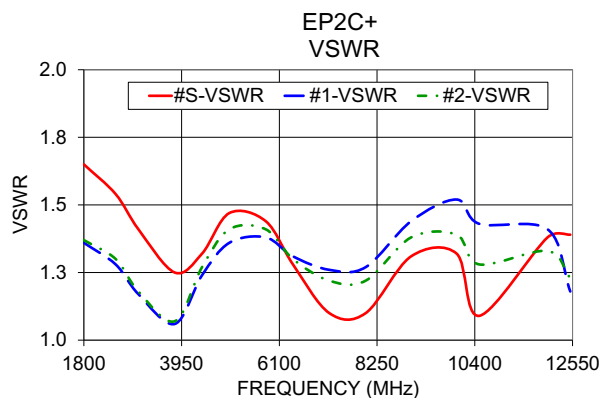
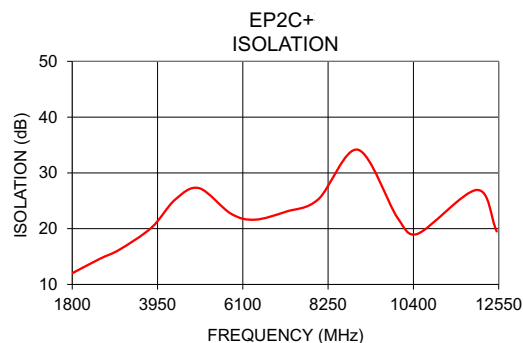
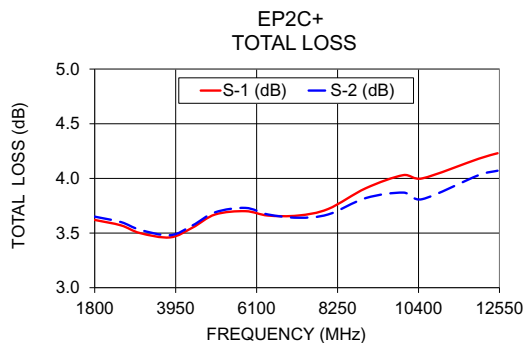
Note: Please Consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

## 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						
1800	3.62	3.65	0.03	12.01	0.94	1.65	1.36	1.37
2500	3.57	3.60	0.03	14.61	1.24	1.54	1.28	1.30
3000	3.50	3.53	0.03	16.28	1.45	1.41	1.17	1.18
3800	3.46	3.48	0.02	20.20	1.84	1.25	1.06	1.07
4400	3.55	3.57	0.02	25.25	2.13	1.32	1.24	1.27
5000	3.67	3.69	0.03	27.26	2.41	1.47	1.36	1.41
5800	3.70	3.73	0.02	22.69	2.70	1.44	1.38	1.41
6400	3.66	3.67	0.01	21.61	2.87	1.28	1.31	1.30
7200	3.66	3.64	0.02	23.07	3.17	1.10	1.26	1.22
8000	3.72	3.67	0.05	25.25	3.53	1.10	1.27	1.22
9000	3.91	3.82	0.09	34.16	3.88	1.31	1.44	1.38
10000	4.03	3.87	0.16	21.94	4.38	1.32	1.52	1.39
10500	4.00	3.81	0.19	19.06	4.86	1.09	1.43	1.28
12000	4.18	4.03	0.16	26.94	6.24	1.38	1.41	1.33
12500	4.23	4.07	0.16	19.52	6.47	1.39	1.18	1.23

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-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)