

4 Way-0° 50Ω DC to 18 GHz

The Big Deal

- Ultra-wide bandwidth, DC to 18 GHz
- High Isolation, 20 dB typ. at 9 GHz
- Small size, 5 x 5 x 1 mm



CASE STYLE: DG1677-2

Product Overview

Mini-Circuits' EP4RKU+ is a MMIC 4-way 0° splitter/combiner designed for wideband operation from DC to 18 GHz supporting many applications requiring high performance across a wide frequency range including all the LTE bands through WiMax and WiFi, as well as instrumentation and more. This model provides good isolation, and low phase and amplitude unbalance in a small 5 x 5mm QFN package. Manufactured using GaAs IPD technology, the EP4RKU+ not only provides a repeatable performance, but also a high level of ESD protection.

Key Features

Feature	Advantages
Wideband, DC to 18 GHz	One power splitter can be used in a HF thru, LTE bands, WiMax and WiFi, saving component count. Also ideal for wideband applications such as military and instrumentation.
Excellent Amplitude unbalance, 0.3 dB typ. at 9 GHz Excellent phase unbalance, 2° typ. at 9 GHz	Ideal for Applications such as MIMO & phased array radars
Small size, 5 x 5mm QFN package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

4 Way-0° 50Ω DC to 18 GHz

Features

- Wide bandwidth, DC to 18 GHz
- Excellent isolation, 20 dB typ. at 9 GHz
- Excellent amplitude unbalance, 0.3 dB typ. at 9 GHz
- Good phase unbalance, 2 deg. typ. at 9 GHz
- Small size, 5x5 mm
- Aqueous washable



Generic photo used for illustration purposes only

CASE STYLE: DG1677-2

Applications

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

+RoHS Compliant

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

Electrical Specifications¹ at 25°C

Parameter		Frequency (GHz)	Min.	Typ.	Max.	Unit
Frequency Range			DC		18	GHz
Insertion Loss above 6.0 dB		DC - 4	—	4.2	5.2	dB
		4 - 18	—	3.4	4.9	
Isolation		DC - 4	9	12.1		dB
		4 - 18	11	18.8		
Phase Unbalance		DC - 4	—	0.3	4	Degree
		4 - 18	—	1.9	19	
Amplitude Unbalance		DC - 4	—	0.1	0.6	dB
		4 - 18	—	0.2	1.2	
VSWR (Port S)		DC - 4		1.8		:1
		4 - 18		1.4		
VSWR (Port 1-4)		DC - 4		1.6		:1
		4 - 18		1.5		
Power Handling	As a splitter	DC - 18	—	—	0.6	W
	Per Port as a combiner	DC - 18	—	—	0.6	

1. Tested on Mini-Circuits Test Board TB-EP4RKUC+

Maximum Ratings

Parameter	Ratings
Operating Temperature	-55°C to 105°C
Storage Temperature	-65°C to 150°C

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

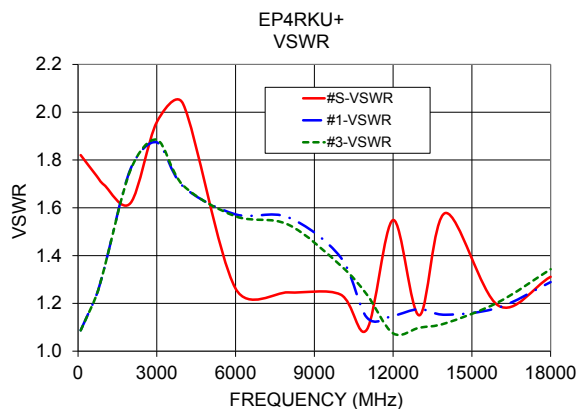
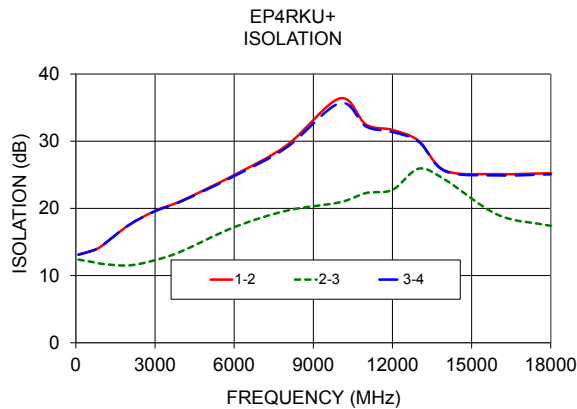
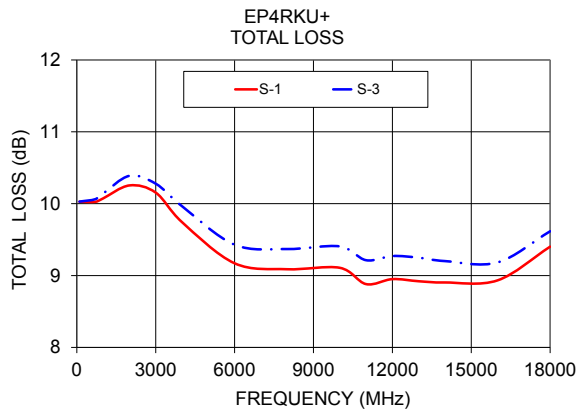
Pad Connections

Function	Pad Number
SUM PORT	21
PORT 1	14
PORT 2	10
PORT 3	31
PORT 4	27
GROUND	9,11,13,15,20,22,26,28,30,32 and Paddle
NOT USED, GROUND EXTERNALLY	1-8, 12, 16-19, 23-25, 29

Simplified Electrical Schematic

Typical Performance Data

Freq. (MHz)	Total Loss (dB)				Amp. Unbal. (dB)	Isolation (dB)			Phase Unbal. (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3	VSWR 4
	S-1	S-2	S-3	S-4		1-2	2-3	3-4						
100	10.03	10.03	10.03	10.02	0.01	13.1	12.4	13.1	0.1	1.8	1.1	1.1	1.1	1.1
700	10.03	10.06	10.06	10.04	0.04	13.8	12.0	13.8	0.3	1.7	1.2	1.2	1.2	1.2
1000	10.07	10.13	10.14	10.11	0.07	14.5	11.7	14.5	0.4	1.7	1.3	1.4	1.3	1.4
2000	10.25	10.32	10.39	10.32	0.13	17.5	11.5	17.5	0.3	1.6	1.8	1.8	1.8	1.7
3000	10.15	10.18	10.28	10.25	0.12	19.6	12.3	19.6	0.1	2.0	1.9	1.9	1.9	1.8
4000	9.74	9.92	9.97	9.86	0.22	21.1	13.6	21.1	0.4	2.0	1.7	1.7	1.7	1.7
6000	9.17	9.42	9.43	9.35	0.26	25.0	17.2	24.8	1.2	1.3	1.6	1.6	1.6	1.5
8000	9.09	9.25	9.37	9.27	0.28	29.4	19.7	29.1	2.0	1.2	1.6	1.5	1.5	1.5
10000	9.11	9.34	9.41	9.33	0.30	36.4	20.9	35.7	2.3	1.2	1.4	1.4	1.4	1.4
11000	8.88	9.13	9.21	9.10	0.33	32.5	22.3	32.2	3.1	1.1	1.1	1.2	1.2	1.1
12000	8.95	9.12	9.27	9.18	0.32	31.7	22.8	31.4	3.2	1.5	1.1	1.1	1.1	1.2
13000	8.92	9.12	9.25	9.13	0.33	30.0	25.9	29.9	3.4	1.2	1.2	1.1	1.1	1.2
14000	8.90	9.11	9.20	9.09	0.30	25.6	24.3	25.5	3.8	1.6	1.2	1.1	1.1	1.2
16000	8.93	9.22	9.18	9.06	0.29	25.1	19.0	24.9	4.4	1.2	1.2	1.2	1.2	1.2
18000	9.40	9.58	9.62	9.50	0.21	25.2	17.4	25.1	5.3	1.3	1.3	1.3	1.3	1.3

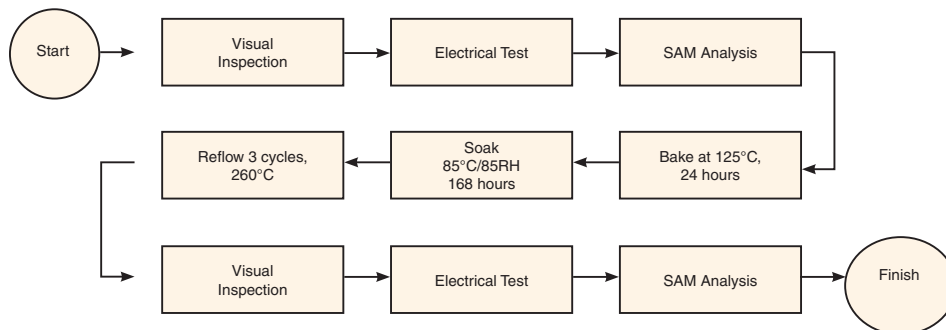


Additional Detailed Technical Information	
<i>additional information is available on our dash board. To access this information click here</i>	
Performance Data	Data Table
	Swept Graphs
	S-Parameter (S5P Files) Data Set (.zip file)
Case Style	DG1677-2 <i>Plastic package, exposed paddle</i> <i>lead finish: Matte Tin</i>
Tape & Reel Standard quantities available on reel	F68 <i>7" reels with 20, 50, 100, 200, 500 and 1000 devices</i>
Suggested Layout for PCB Design	PL-649
Evaluation Board	TB-EP4RKU+ (Without connectors) TB-EP4RKUC+ (With connectors)
Environmental Ratings	ENV08T1

ESD Rating

Human Body Model (HBM): Class 2 (Pass 2000V) in accordance with ANSI/ESD STM 5.1 - 2001

MSL Test Flow Chart



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.
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