

# SKY16406-381LF: 2.2-2.8 GHz Two-Way, 0 Degrees Power Divider

## Applications

- TD-LTE systems
- Satellite communications
- 2.4 GHz ISM band

## Features

- Low insertion loss: 0.3 dB @ 2.5 GHz
- High isolation: >25 dB @ 2.5 GHz
- Return loss: 25 dB typical @ 2.5 GHz
- Miniature DFN (6-pin, 1.5 x 2.0 mm) package (MSL1 @ 260 °C per JEDEC J-STD-020)

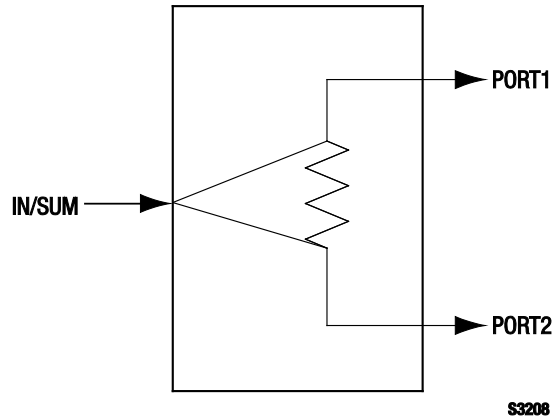


Figure 1. SKY16406-381LF Block Diagram



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## Description

The SKY16406-381LF is a two-way, in-phase Wilkinson-style pHEMT power splitter/combiner. The device is optimized for performance in the 2.2 to 2.8 GHz band. The monolithic circuitry offers low insertion loss, high isolation, and exceptional phase/amplitude balance between ports.

The SKY16406-381LF is manufactured in a miniature, 1.5 x 2.0 mm, 6-pin Dual Flat No-Lead (DFN) package. A functional block diagram is shown in Figure 1. The pin configuration and package are shown in Figure 2. Signal pin assignments and functional pin descriptions are provided in Table 1.

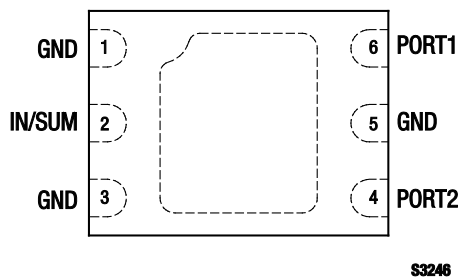


Figure 2. SKY16406-381LF Pinout – 6-Pin DFN (Top View)

**Table 1. SKY16406-381LF Signal Descriptions**

Pin #	Name	Description	Pin #	Name	Description
1	GND	Ground	4	PORT2	RF output, splitter mode, or RF input, combine mode. Not AC coupled.
2	IN/SUM	RF input, splitter mode, or RF output, combine mode. Not AC coupled.	5	GND	Ground
3	GND	Ground	6	PORT1	RF output, splitter mode, or RF input, combine mode. Not AC coupled.

**Table 2. SKY16406-381LF Absolute Maximum Ratings**

Parameter	Symbol	Minimum	Typical	Maximum	Units
RF input power, CW RF signal	P <sub>IN</sub>			2.5	W
Storage temperature	T <sub>STG</sub>	-65	+25	+150	°C
Operating temperature	T <sub>A</sub>	-55	+25	+105	°C

**Note:** Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.



**Attention: Observe Precautions for Handling Electrostatic Sensitive Devices**

**ESD Human Body Model (HBM) = 500 V (Class 1B)**

**ESD Machine Model (MM) = 200 V (Class B)**

**ESD Charged Device Model (CDM) = 1000 V (Class 4)**

*Electrostatic Discharge (ESD) can damage this device, which must be protected from ESD at all times. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.*

**Electrical and Mechanical Specifications**

The absolute maximum ratings of the SKY16406-381LF are provided in Table 2. Electrical specifications are provided in Tables 3.

Typical performance characteristics of the SKY16406-381LF are illustrated in Figures 3 through 9.

**Table 3. SKY16406-381LF Electrical Specifications (Note 1)**

( $T_A = +25\text{ }^\circ\text{C}$ ,  $P_{IN} = 0\text{ dBm}$ , Characteristic Impedance [ $Z_0$ ] =  $50\ \Omega$ , @ 2500 MHz, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Insertion loss (Note 2) (Note 3)	IL	PORT1 or PORT2, referenced to IN/SUM port		0.3	0.5	dB
Isolation	Iso	Referenced from PORT1 to PORT2	19	28		dB
Input return loss	S <sub>11</sub>	PORT1 and PORT2, terminated in $50\ \Omega$	18	25		dB
Output return loss	S <sub>22</sub>	PORT1 and PORT2, terminated in $50\ \Omega$	18	25		dB
Amplitude balance	Abal	Referenced from PORT1 to PORT2		$\pm 0.1$	$\pm 0.2$	dB
Phase balance	Pbal	Referenced from PORT1 to PORT2		$\pm 1.0$	$\pm 3.5$	deg

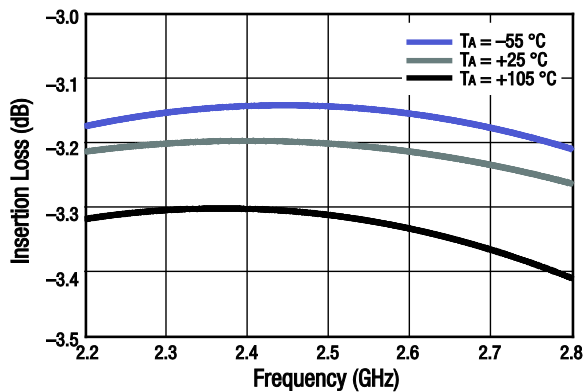
**Note 1:** Performance is guaranteed only under the conditions listed in this Table.

**Note 2:** Above the nominal 3 dB split for PORT1 and PORT2.

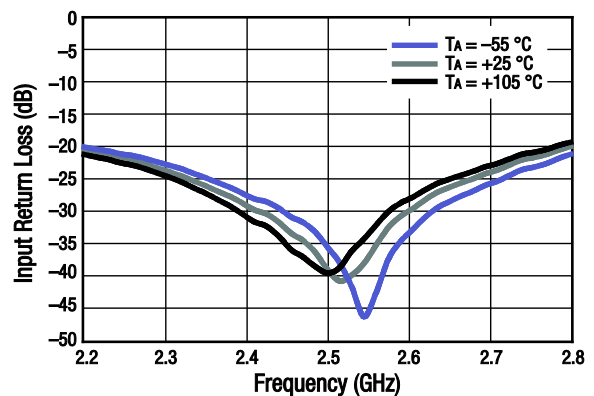
**Note 3:** 0.29 dB has been de-embedded from the measurement for circuit board and connector losses.

### Typical Performance Characteristics

( $T_A = +25\text{ }^\circ\text{C}$ ,  $P_{IN} = 0\text{ dBm}$ , Characteristic Impedance [ $Z_0$ ] =  $50\ \Omega$ , @ 2500 MHz, Unless Otherwise Noted)



**Figure 3. Insertion Loss vs Frequency Over Temperature, Narrow Band (EVB Loss Removed From Measurement)**



**Figure 4. Input Return Loss (IS11, IN/SUM Port) vs Frequency Over Temperature**

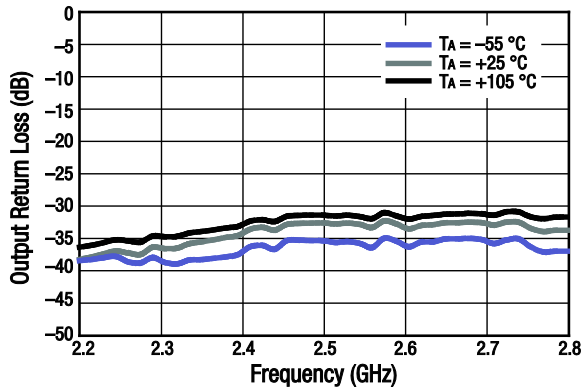


Figure 5. Output Return Loss (IS221, PORT1) vs Frequency Over Temperature

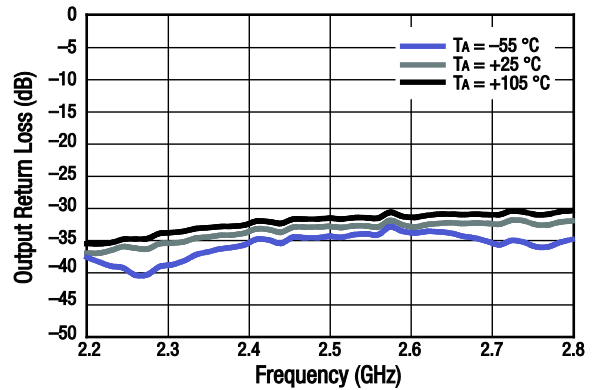


Figure 6. Output Return Loss (IS221, PORT2) vs Frequency Over Temperature

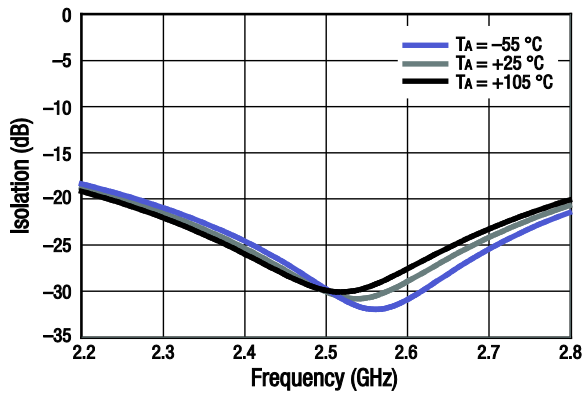


Figure 7. PORT1 to PORT2 Isolation (IN/SUM Port Terminated) vs Frequency Over Temperature

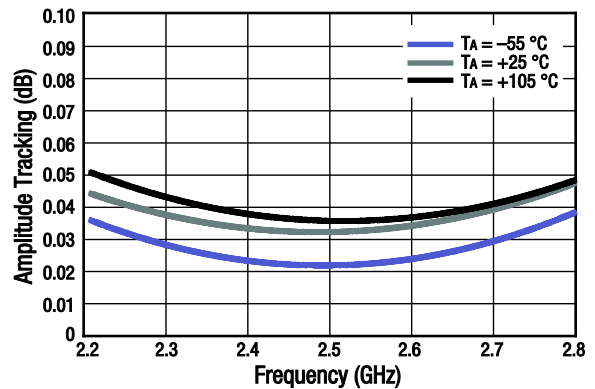


Figure 8. Amplitude Tracking (PORT1 to PORT2) vs Frequency Over Temperature

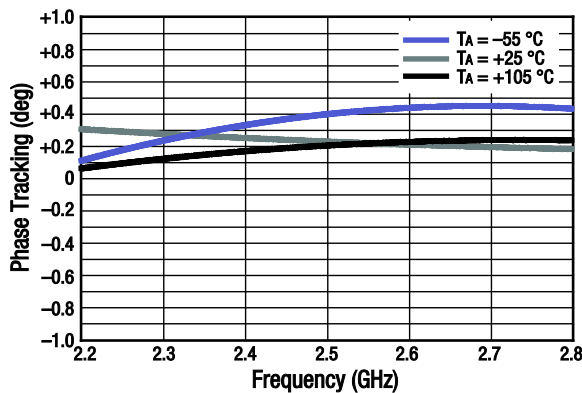


Figure 9. Phase Tracking (PORT1 to PORT2) vs Frequency Over Temperature

### Evaluation Board Description

The SKY16406-381LF Evaluation Board is used to test the performance of the SKY16406-381LF LNA. An assembly drawing for the Evaluation Board is shown in Figure 10. An Evaluation Board schematic diagram is provided in Figure 11.

### Package Dimensions

The PCB layout footprint for the SKY16406-381LF is provided in Figure 12. Typical case markings are shown in Figure 13. Package dimensions for the 6-pin DFN are shown in Figure 14, and tape and reel dimensions are provided in Figure 15.

### Package and Handling Information

Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

THE SKY16406-381LF is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. It can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, *Solder Reflow Information*, document number 200164.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.

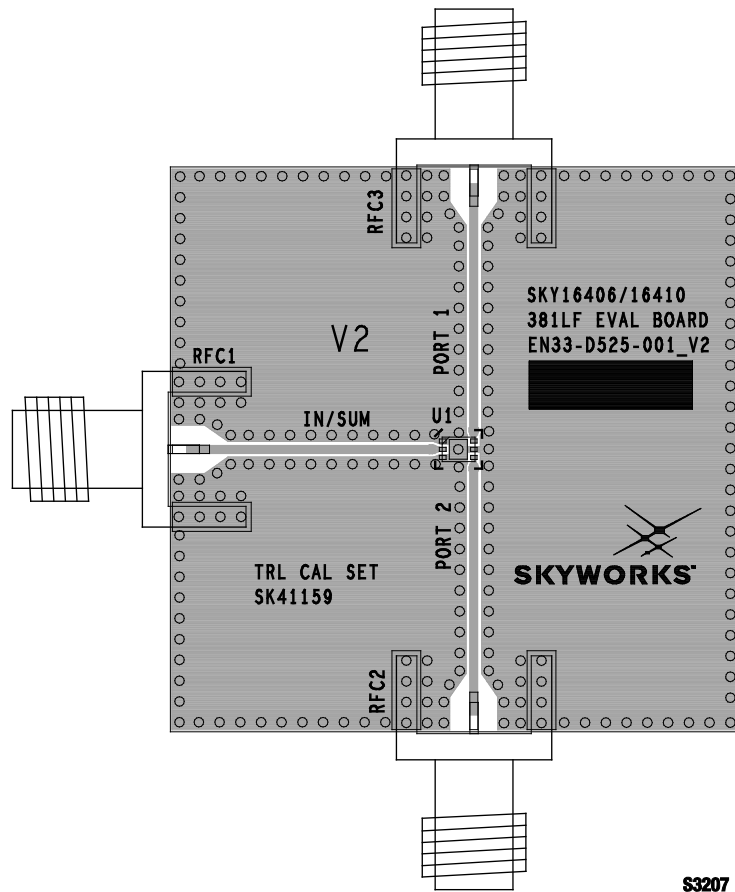
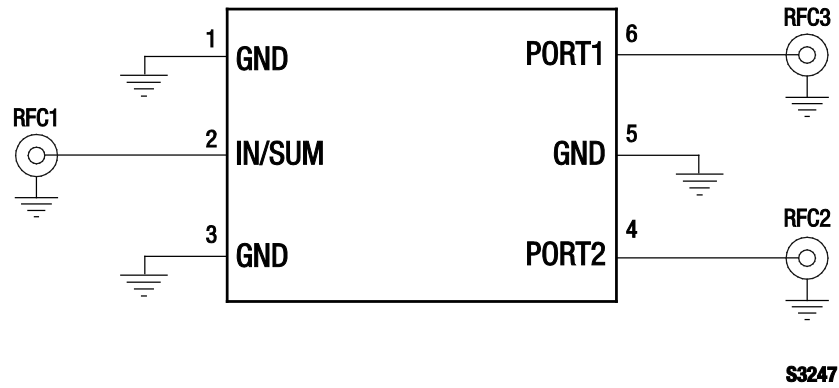
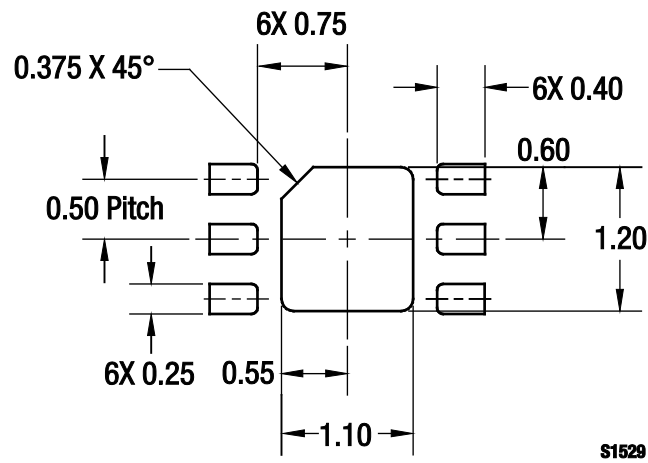


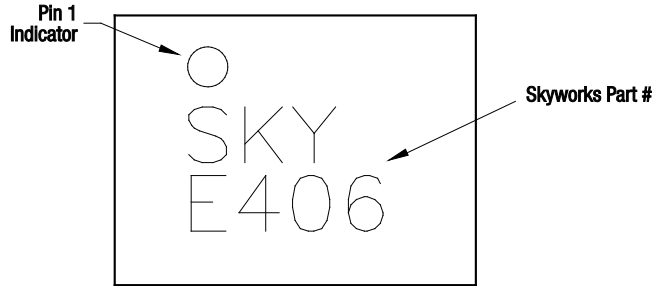
Figure 10. SKY16406-381LF Evaluation Board Assembly Diagram



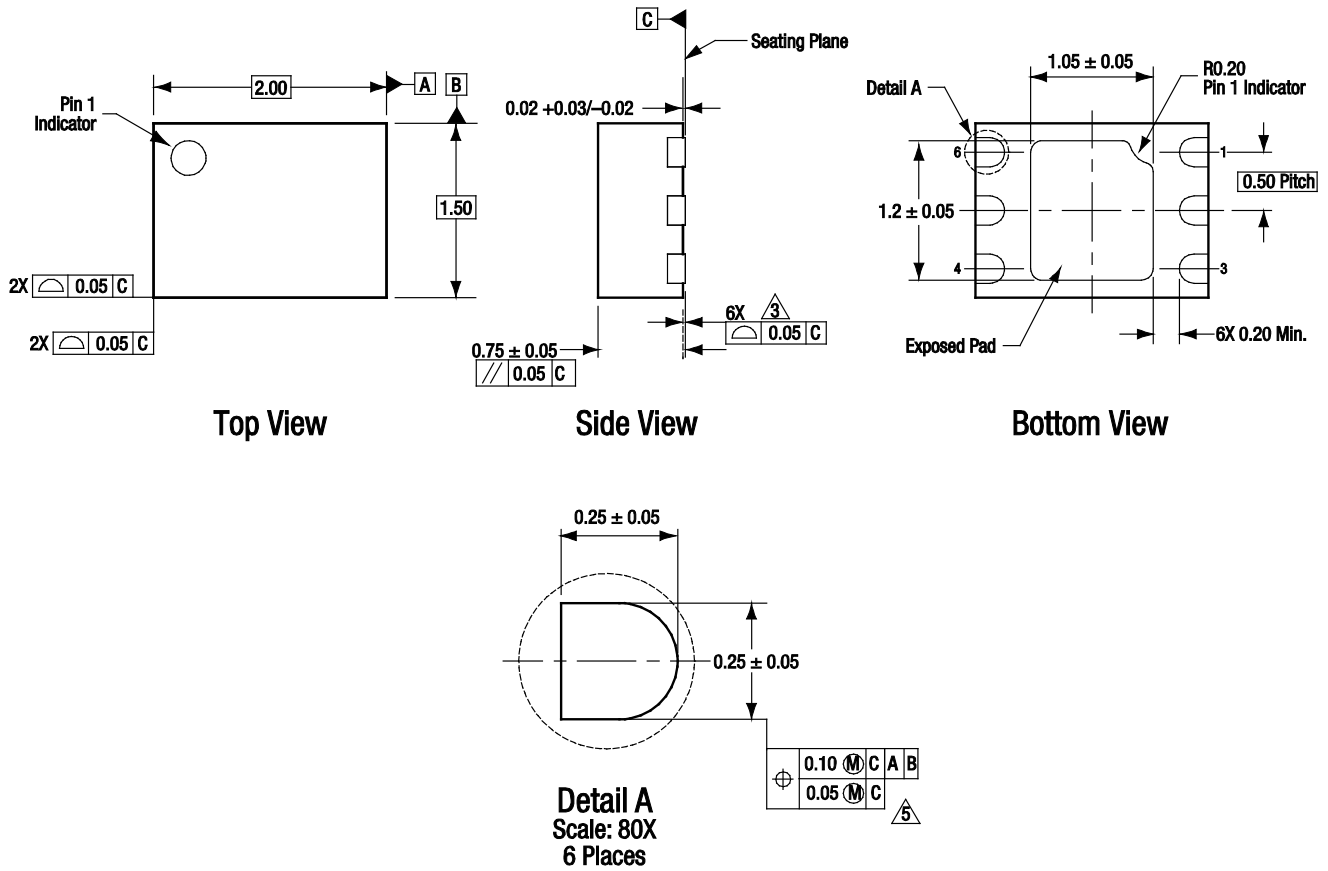
**Figure 11. SKY16406-381LF Evaluation Board Schematic**



**Figure 12. SKY16406-381LF PCB Layout Footprint (Top View)**



**Figure 13. Typical Case Markings (Top View)**

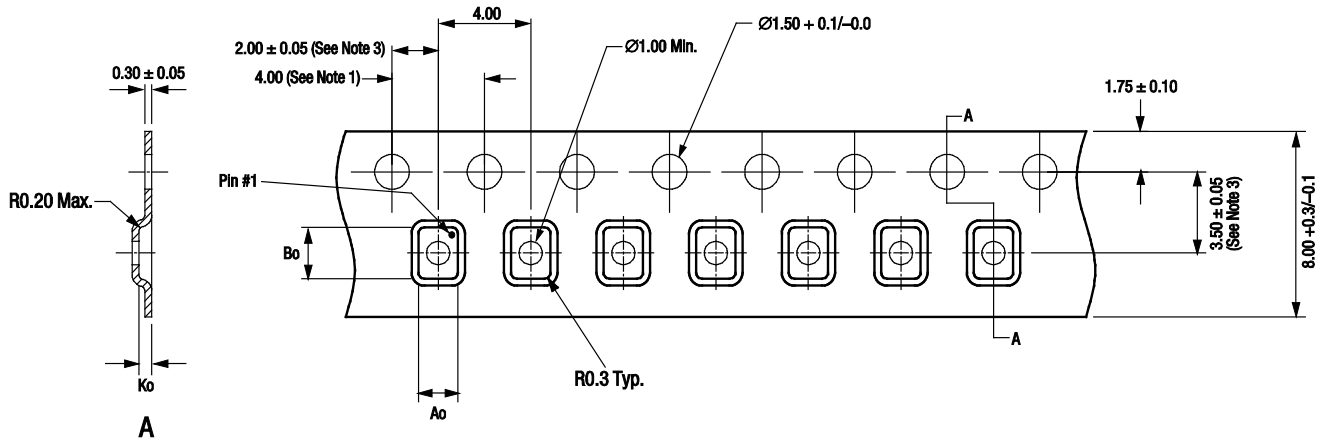


All measurements are in millimeters.  
 Dimensioning and tolerancing according to ASME Y14.5M-2009  
 Coplanarity applies to the terminals and all other bottom surface metalization.  
 Dimension applies to metalized terminal. If the terminal has a radius on its end,  
 the width dimension should not be measured in that radius area.

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**Figure 14. SKY16406-381LF 6-Pin DFN Package Dimensions**

DATA SHEET • SKY16406-381LF TWO-WAY POWER DIVIDER



Notes:

1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$ .
2. Chamfer in compliance with EIA 481.
3. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
4. Carrier tape: black conductive polycarbonate or polystyrene.
5. Cover tape material: transparent conductive PSA.
6. Cover tape size: 9.3mm width.
7. All measurements are in millimeters.

Ao = 1.70  
Bo = 2.20  
Ko = 0.55

S1723

Figure 15. SKY16406-381LF Tape and Reel Dimensions



**Ordering Information**

Model Name	Manufacturing Part Number	Evaluation Board Part Number
SKY16406-381LF Two-Way Power Divider	SKY16406-381LF	SKY16406-381LF-EVB

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