

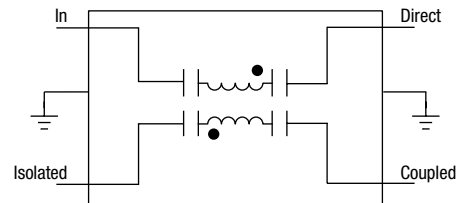
**DATA SHEET**

# HY19-12, HY19-12LF: 90-Degree Hybrid 1.85–1.99 GHz

**Features**

- Low cost
- Low profile
- Small SOIC-8 package
- Available on tape and reel
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020


**Block Diagram**



**Description**

The HY19-12 is a 90-degree hybrid tuned for the 1.85–1.99 GHz band. The monolithic circuitry is 100% passive and offers low loss, high isolation and exceptional phase/amplitude balance. It is available in the SOIC-8 surface mount package.

**NEW** Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.



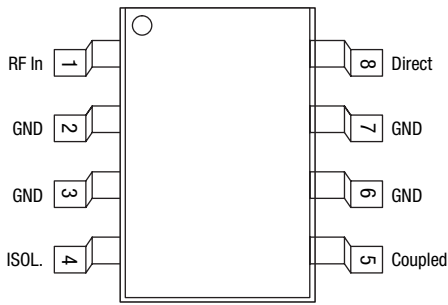
**Electrical Specifications at 25 °C**

**Z<sub>0</sub> = 50 Ω, unless otherwise noted**

Parameter	Frequency	Min.	Typ.	Max.	Unit
Frequency		1.85		1.99	GHz
Insertion loss <sup>(1)</sup>			0.5	0.6	dB
Isolation		17	20		dB
VSWR All ports			1.3:1	1.5:1	
Amplitude balance			±0.5	±1.1	dB
Phase balance			±1	±2	Deg.

1. Less 3 dB power split.

**Pin Out**

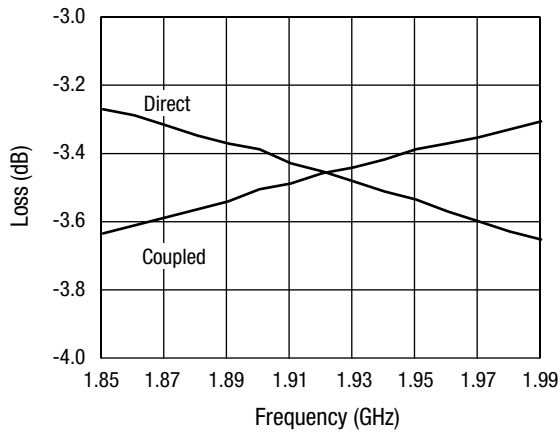


The Pin Out diagram shows the HY19-12 configured for a divider/coupler with Pin 1 as the input port and a 50 Ω termination to be placed at Pin 3. Since the HY19-12 is symmetric, any nonground pin may be used as the input port. The following table shows the possible pin connection combinations for the HY19-12 used as a divider/coupler:

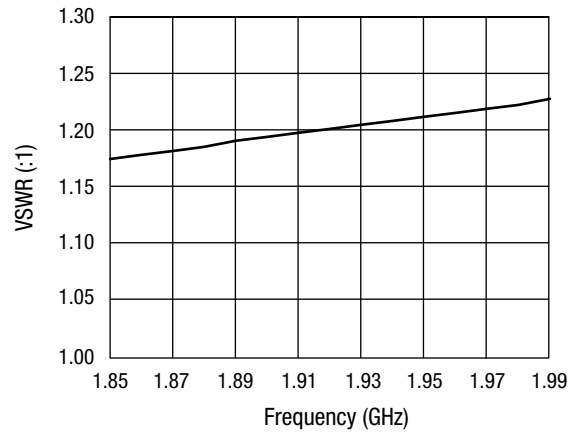
Input	Termination	Direct	Coupled
Pin 1	Pin 4	Pin 8	Pin 5
Pin 4	Pin 1	Pin 5	Pin 8
Pin 5	Pin 8	Pin 4	Pin 1
Pin 8	Pin 5	Pin 1	Pin 4

**Typical Performance Data**

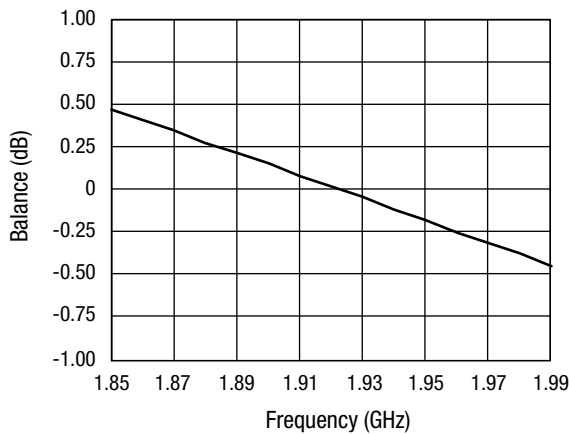
$Z_0 = 50 \Omega$ , unless otherwise noted



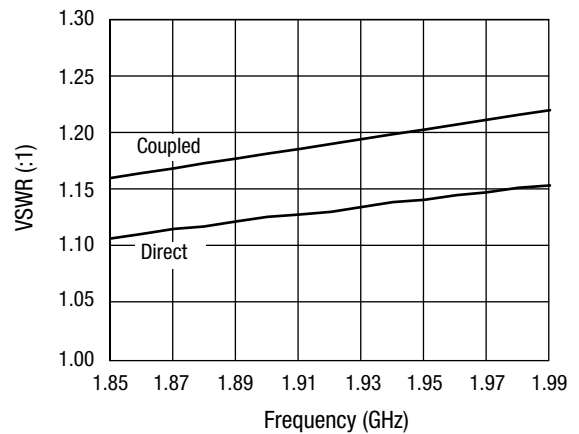
**Path Losses vs. Frequency**



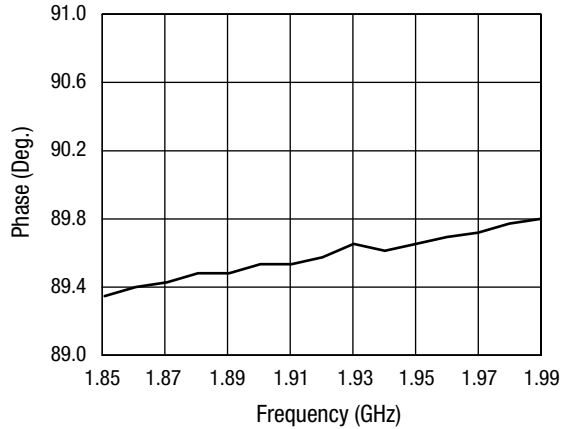
**Input VSWR vs. Frequency**



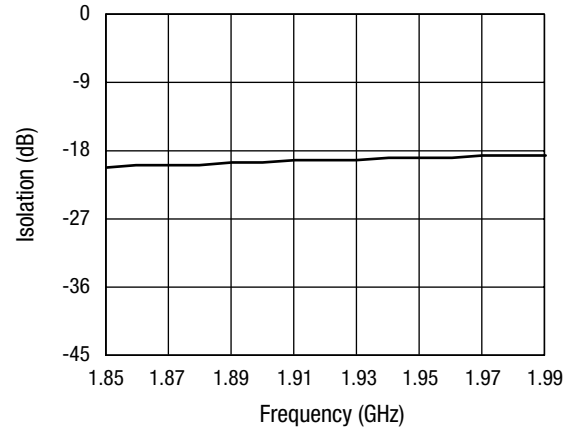
**Amplitude Balance vs. Frequency**



**Output VSWR vs. Frequency**



**Coupled - Direct Phase vs. Frequency**



**Isolation vs. Frequency**

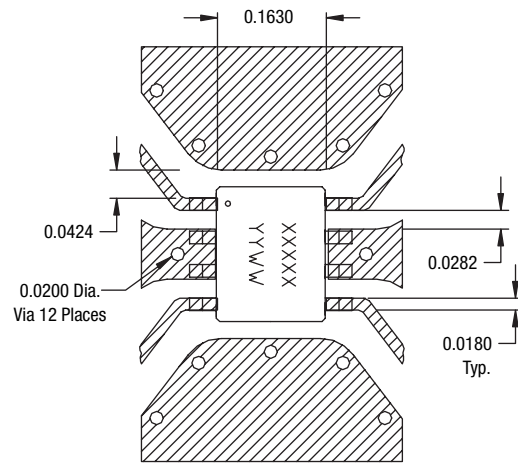
**Absolute Maximum Ratings**

Characteristic	Value
Input power <sup>(1)</sup>	4 W
Operating temperature	-40 °C to +85 °C
Storage temperature	-65 °C to +150 °C
Electrostatic discharge	125 V

1. Exceeding these parameters may cause irreversible damage. Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

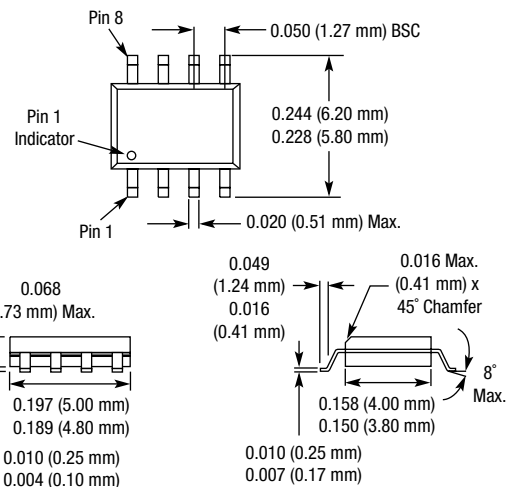
**CAUTION:** Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.

**Recommended Board Layout**



Materials 10 mil FR-4.  
Dimensions are in inches.

**SOIC-8**



**Recommended Solder Reflow Profiles**

Refer to the ["Recommended Solder Reflow Profile"](#) Application Note.

**Tape and Reel Information**

Refer to the ["Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"](#) Application Note.

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