SKYWORKS™

DATA SHEET

DD02-92, DD02-92LF: Directional Detector

Features

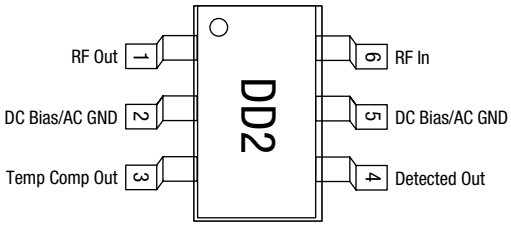
- Frequency coverage: 650 MHz to 3.0 GHz
- Typical insertion loss < 0.2 dB to 2.3 GHz
- Typical directivity > 23 dB
- Small outline SC-88 (6 Lead SC-70)
- Built-in temperature compensating diode
- Low cost for high-volume handset applications
- Available lead (Pb)-free MSL-2 @ 250 °C per JEDEC J-STD-020

Description

The DD02-92 directional detector is an alternative to the DD01-92 with improved insertion loss and directivity with slightly lower sensitivity. It is designed for handset power monitor applications from 800 MHz to 3 GHz. It is packaged in the small footprint, SC-88 (6 lead SC-70) package. The DD02-92 incorporates a directional coupler and two GaAs Schottky diodes on a monolithic GaAs chip. By applying forward DC bias to both Schottky diodes, the DD02-92 may be conveniently temperature compensated. The DD02-92 is characterized from 500 MHz to 3 GHz and generates a detected signal at 1.8 GHz of approximately 190 mV at 10 mW input power. Each Schottky diode is forward biased to approximately 5 µA.

NEW Skyworks offers lead (Pb)-free "environmentally friendly" packaging that is RoHS compliant (European Parliament for the Restriction of Hazardous Substances).

Pin Out



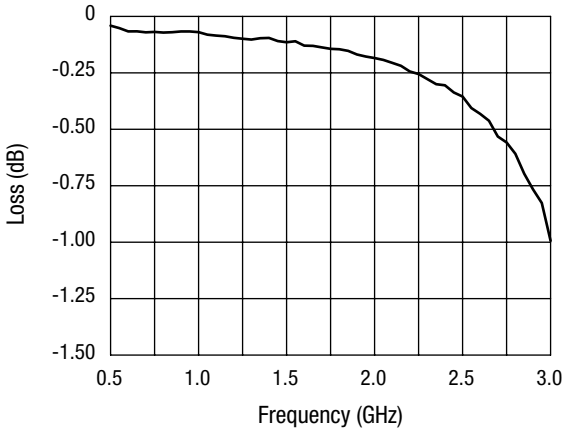
Electrical Specifications at 25 °C

Parameter	Frequency	Min.	Typ.	Max.	Unit
Detected output voltage @ 10 dBm	0.8–1.2 GHz 1.8–2.0 GHz	60 130	80 160	105 190	mV mV
Insertion loss	0.8–1.2 GHz 1.8–2.0 GHz		0.10 0.20	0.20 0.30	dB dB
Input return loss	0.8–1.2 GHz 1.8–2.0 GHz		30 25	22 20	dB dB
Output return loss	0.8–1.2 GHz 1.8–2.0 GHz		30 25	22 20	dB dB
Directivity	0.8–1.2 GHz 1.8–2.0 GHz	17 16	20 13		dB dB
Schottky noise voltage (1 MHz bandwidth)	RF power off		200		µV
Schottky diode DC voltage	RF power off		510		mV
DC offset voltage	RF power off	-5	0	+5	mV
Video resistance	RF power off		7500		Ω

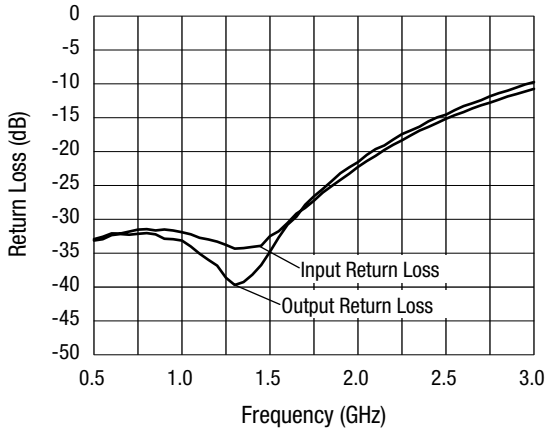
Conditions: 10 dBm input power, 1 V applied to Pin 2 and 5 (See test circuit).
All data was taken with R_{LOAD} = 100 kΩ.

Detected output voltage is the difference between V_{REF} and V_{DET}. A digital voltmeter was used as a differential amplifier.

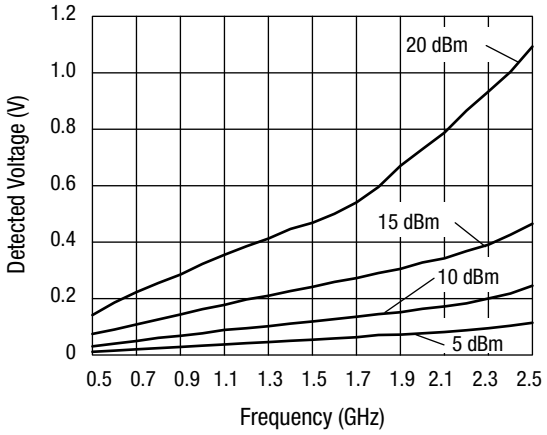
Typical Performance Data



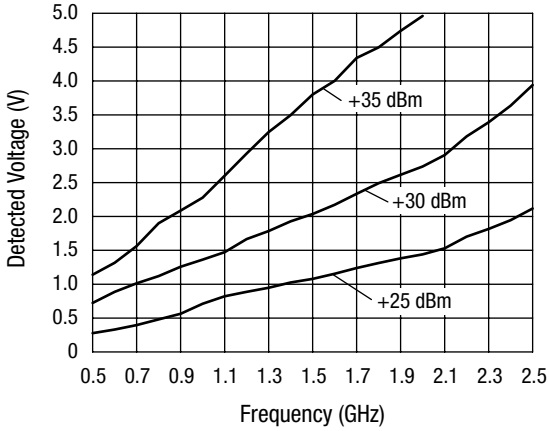
Insertion Loss vs. Frequency



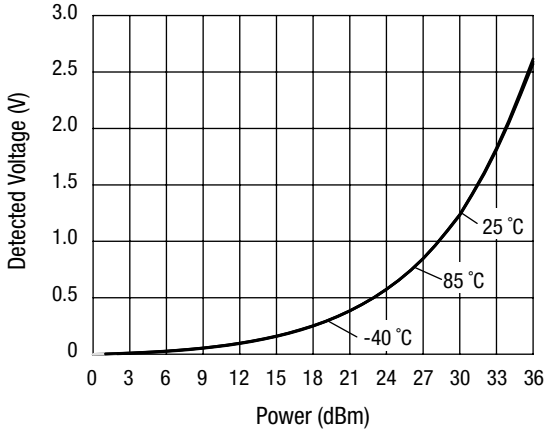
Return Loss vs. Frequency



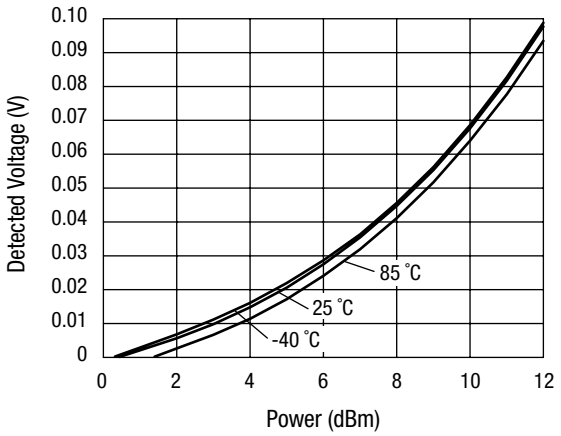
Differential Detected Voltage vs. Frequency and Power



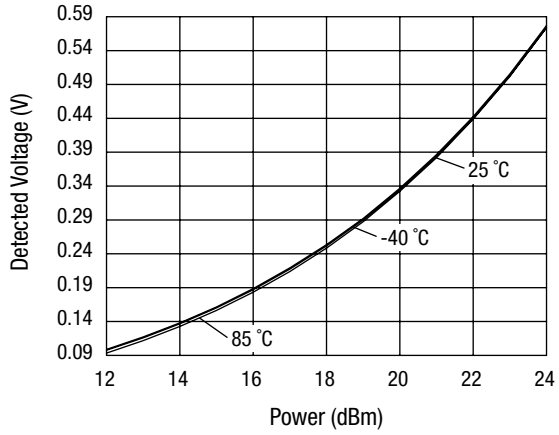
Differential Detected Voltage vs. Frequency & Power



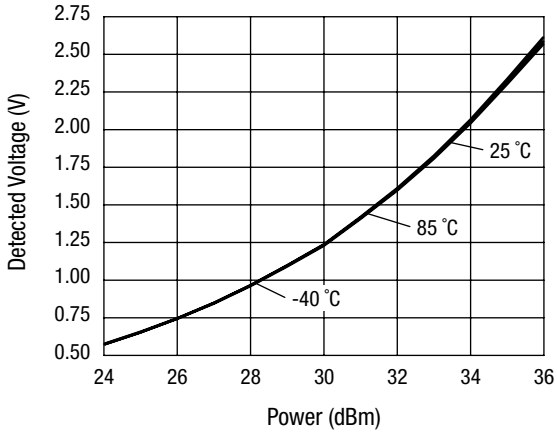
Differential Detected Voltage vs. Power and Temperature @ 900 MHz



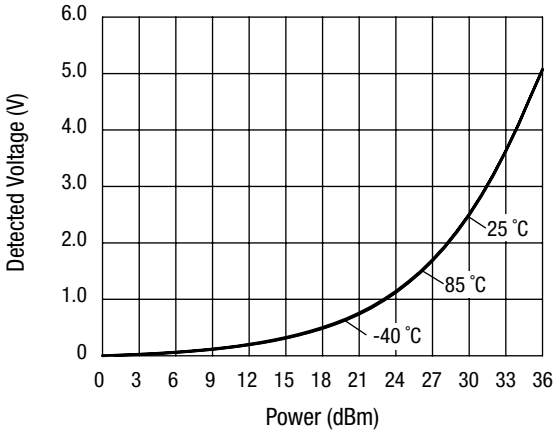
Differential Detected Voltage vs. Power and Temperature @ 900 MHz



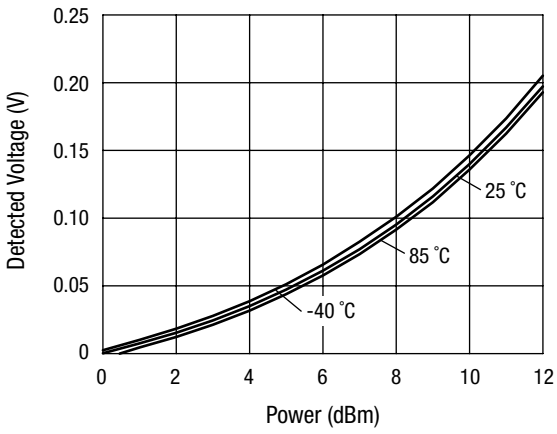
Differential Detected Voltage vs. Power and Temperature @ 900 MHz



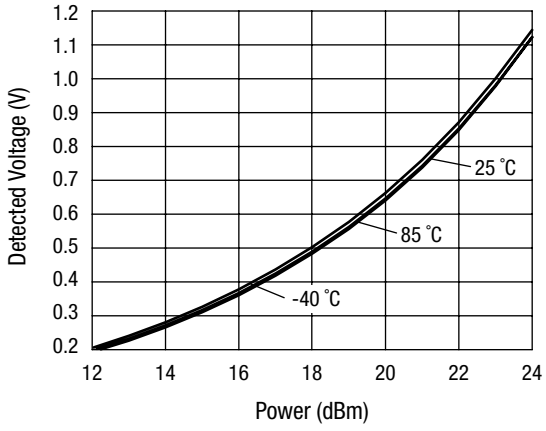
Differential Detected Voltage vs. Power and Temperature @ 900 MHz



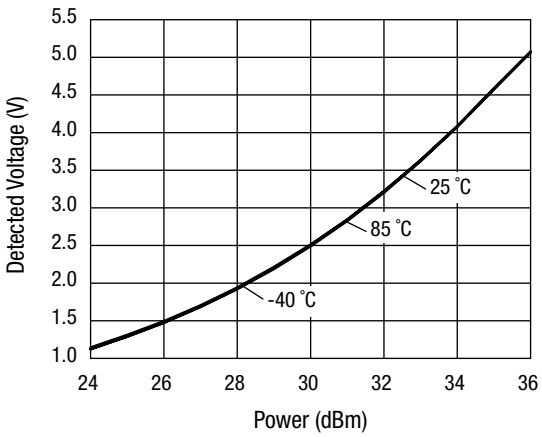
Differential Detected Voltage vs. Power and Temperature @ 1900 MHz



Differential Detected Voltage vs. Power and Temperature @ 1900 MHz

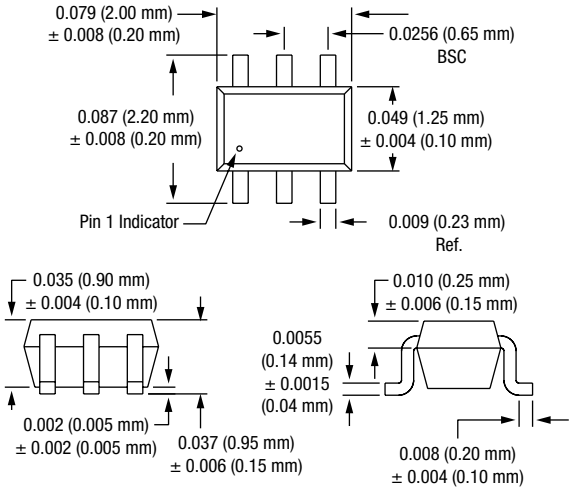


Differential Detected Voltage vs. Power and Temperature @ 1900 MHz

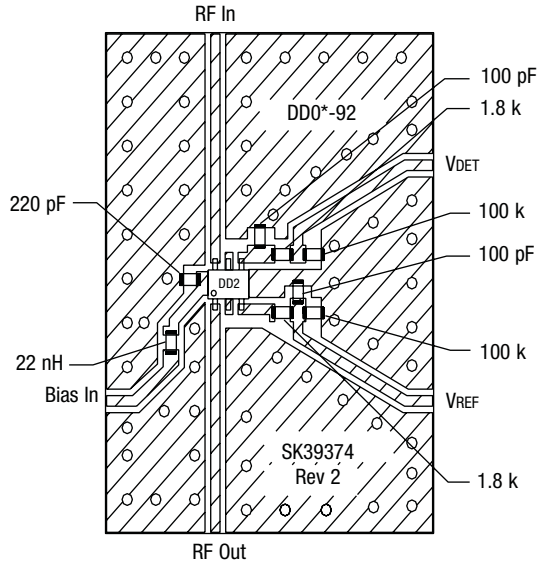


Differential Detected Voltage vs. Power and Temperature @ 1900 MHz

SC-88 (6 Lead SC-70)



Evaluation Board Layout



Absolute Maximum Ratings

Characteristic	Value
Incident power (CW) @ SWR = 2.0 max.	4 W @ < 1 GHz 2 W @ 1–2.5 GHz
DC bias current	10 mA
Operating temperature	-40 to +85 °C
Storage temperature	-65 to +150 °C

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, Electrostatic Discharge (ESD) 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.*

Test Circuit