PRELIMINARY DATA SHEET

SKY12325-350LF: 3-Bit Digital Attenuator 500 MHz–6 GHz, 1 dB LSB

Features

- Broadband: 500 MHz–6 GHz
- Attenuation range: 7 dB
- Positive control voltage
- Resolution: 1 dB
- Miniature QFN-16 3 x 3 mm package
- Available lead (Pb)-free and RoHS-compliant

Applications

- Cellular BTS
- General-purpose level control

Description

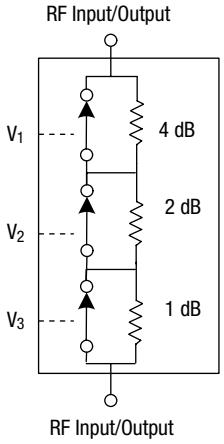
The SKY12325-350 is a 3-bit digital attenuator in a low cost QFN-16, 3 x 3 mm package. The attenuation bits are binary weighted, with the least significant bit (LSB) 1 dB. States are selected by 3 positive-voltage control inputs. DC blocking capacitors are required at each RF port. Both RF ports are absorptive.

The QFN-16 package is lead (Pb)-free and complies with current RoHS requirements.

The attenuator can operate over the temperature range of -40 °C to +85 °C.

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

Functional Block Diagram



Electrical Specifications at 25°C

V_{CTL} = 0 V/5V, T = 25 °C, P_{INPUT} = 0 dBm, Z_0 = 50 Ω, unless otherwise noted

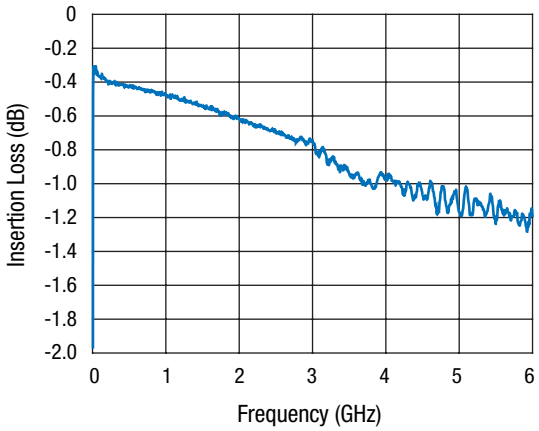
Parameter	Frequency	Min.	Typ.	Max.	Unit
Insertion loss	0.5–3.0 GHz		0.7	0.9	dB
	3.0–4.5 GHz		0.9	1.1	dB
	4.5–6.0 GHz		1.3	1.5	dB
Attenuation range			7		dB
Attenuation accuracy	0.5–4.0 GHz	± (0.2 + 3% of attenuation setting in dB)			dB
	4.0–6.0 GHz	± (0.3 + 3% of attenuation setting in dB)			dB
Return loss	0.5–3.5 GHz		15		dB
	3.5–6.0 GHz		15		dB

Operating Characteristics at 25°C

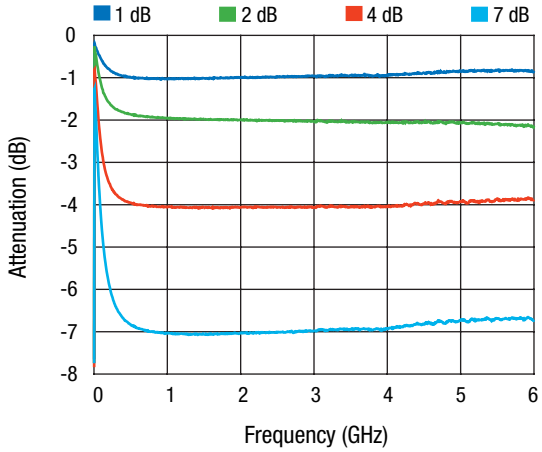
T = 25 °C, Z_0 = 50 Ω, unless otherwise noted

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Input power for 1 dB compression	V_{DD} = 3 V V_{DD} = 5 V	0.5–6.0 GHz		24 27		dBm dBm
Input third order intermodulation intercept	For two-tone input power 5 dBm, Δf = 1 MHz V_{LOW} = 0 V, V_{HIGH} = 3 V V_{LOW} = 0 V, V_{HIGH} = 5 V	0.5–6.0 GHz		 44 47		 dBm dBm
Control voltages	V_{LOW} = 0 V to 0.8 V @ 50 µA max. V_{HIGH} = 3 V to V_{DD} @ 50 µA max.					

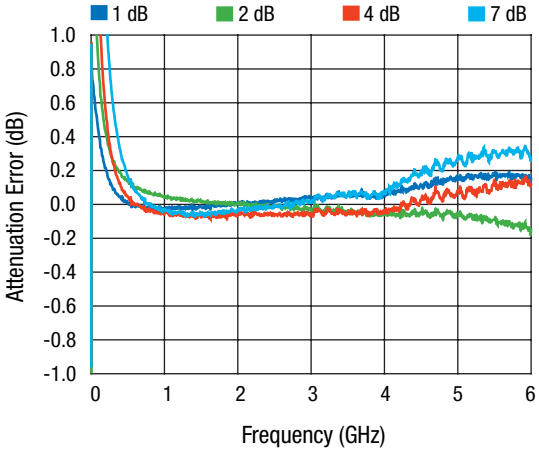
Typical Performance Data



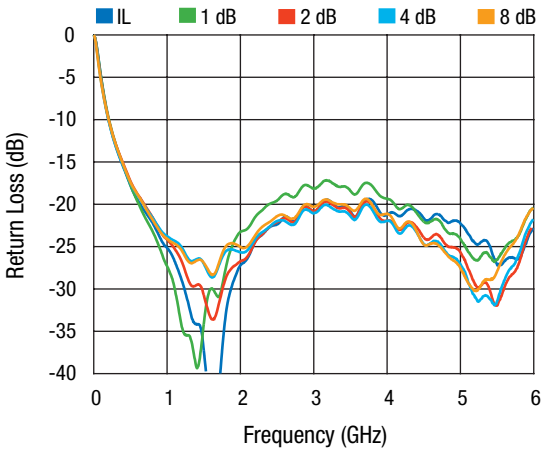
Insertion Loss vs. Frequency



Attenuation vs. Frequency, Normalized to Insertion Loss



Attenuation Error vs. Frequency



Return Loss vs. Frequency

Absolute Maximum Ratings

Characteristic	Value
RF input power	30 dBm
Supply voltage	6 V
Control voltage	$0\ V \le V_C \le 6\ V$
Operating temperature	-40 °C to +85 °C
Storage temperature	-65 °C 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.

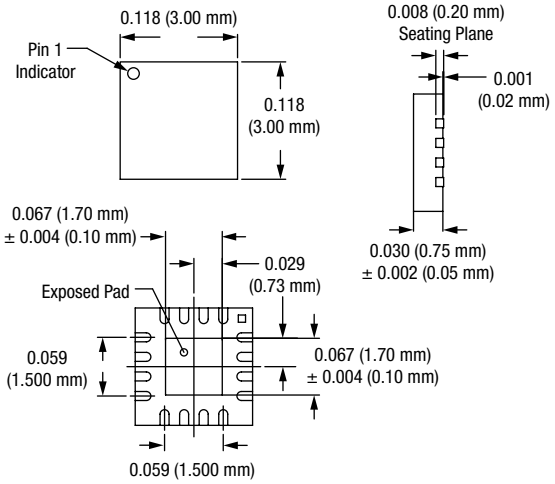
CAUTION: *Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without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

Truth Table

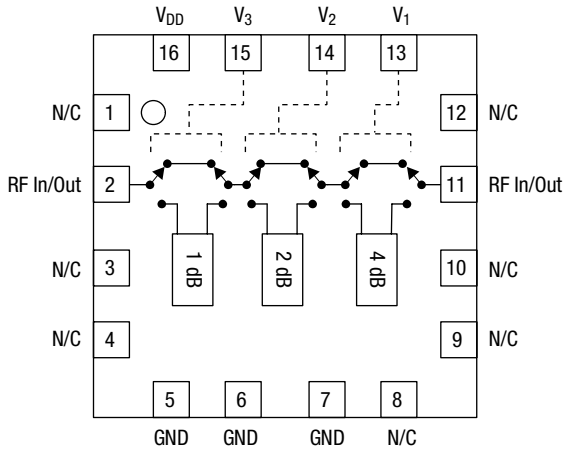
Control Voltage[1]			Attenuation (dB)[2]
V_1	V_2	V_3	
V_{LOW}	V_{LOW}	V_{LOW}	7
V_{LOW}	V_{LOW}	V_{HIGH}	6
V_{LOW}	V_{HIGH}	V_{LOW}	5
V_{LOW}	V_{HIGH}	V_{HIGH}	4
V_{HIGH}	V_{LOW}	V_{LOW}	3
V_{HIGH}	V_{LOW}	V_{HIGH}	2
V_{HIGH}	V_{HIGH}	V_{LOW}	1
V_{HIGH}	V_{HIGH}	V_{HIGH}	0

1. $+2.7\ V \le V_{HIGH} \le +5.5\ V$, $-0.2 \le V_{LOW} \le +0.2\ V$.
2. Attenuation normalized to insertion loss

-350 (QFN 3 x 3)



Pin Out



Pin Descriptions

Pin Number	Pin Name	Description
1, 3, 4, 8, 9, 10, 12	N/C	Not connected
2, 11	J_2	RF Input/Output - RF input or output port, supply voltage input. External DC block required
5, 6, 7	GND	Equipotential Point - Equipotential points for control voltages and RF circuits. Must be connected to pcb ground via lowest possible impedance
13	V_1	Control Voltage - High Impedance control voltage input for 4 dB weighted bit (MSB)
14	V_2	Control Voltage - High Impedance control voltage input for 2 dB weighted bit
15	V_3	Control Voltage - High Impedance control voltage input for 1 dB weighted bit (LSB)
16	V_{DD}	Supply Voltage - Supply voltage, $2.7\ V \le V_{DD} \le 5.5\ V$

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.