

**DATA SHEET**

# **SKY12406-360LF: GaAs IC 1-Bit Digital Attenuator**

## **12 dB LSB 50 MHz–600 MHz**

**Features**

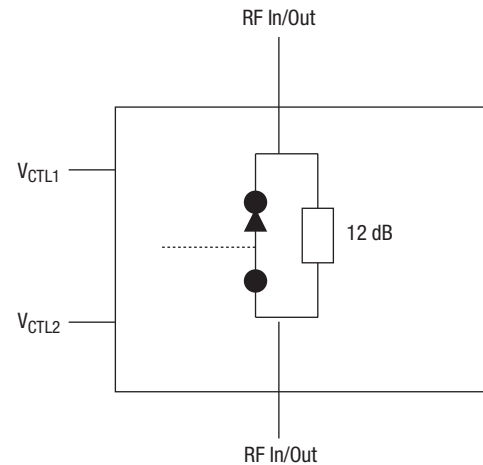
- Positive voltage control (0/+3 V)
- High bit accuracy
- Low loss
- Absorptive in 50  $\Omega$  systems
- Packaged lead (Pb)-free, RoHS-compliant and Green™

**Description**

The SKY12406-360LF is a pHEMT GaAs FET IC single bit attenuator packaged in an 2 x 2 mm 8-lead exposed pad plastic package for low-cost commercial applications. This attenuator has an LSB of 12 dB. The SKY12406-360LF is particularly suited where high attenuation accuracy, low insertion loss, and low intermodulation products are required. Typical applications include cellular radio, wireless data, and wireless local loop gain level control circuits.

**NEW**


Skyworks Green™ products are RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, are halogen free according to IEC-61249-2-21, and contain <1,000 ppm antimony trioxide in polymeric materials.

**Functional Diagram**

**Electrical Specifications**

**$V_{CTL} = 0 \text{ V/3 V}$ ,  $T = 25 \text{ }^{\circ}\text{C}$ ,  $P_{INPUT} = 0 \text{ dBm}$ ,  $Z_0 = 50 \text{ }\Omega$ , unless otherwise noted**

Parameter	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss	50 MHz–600 MHz		0.3	0.4	dB
Attenuation	50 MHz–600 MHz	11.6	12	12.4	dB
Return Loss	50 MHz–600 MHz	15	20		dB

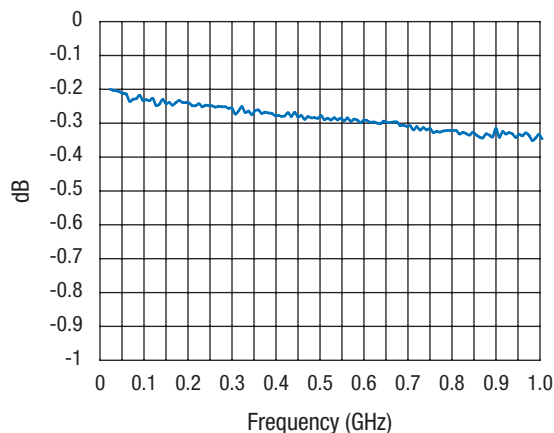
## Operating Characteristics

$V_{CTL} = 0$  V/3 V,  $T = 25$  °C,  $P_{INPUT} = 0$  dBm,  $Z_0 = 50$   $\Omega$ , unless otherwise noted

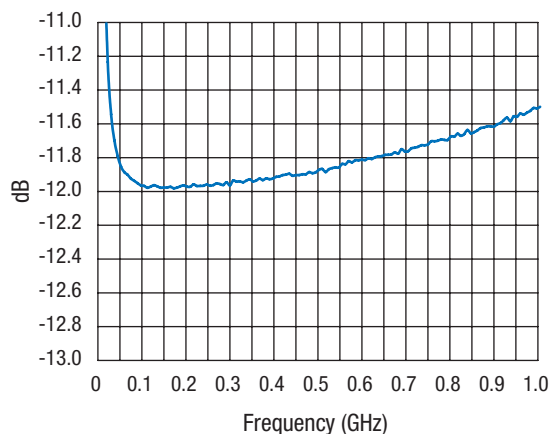
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise/fall time	10/90% or 90/10% RF			7	35	ns
On, off time	50% $V_{CTL}$ to 90/10% RF			8	35	ns
Input power for 1 dB compression	$V_{CTL} = 0$ V/3 V	50 MHz 600 MHz	18 20	22 25		dBm dBm
Input Intermodulation intercept point (IIP3)	For two tone input power 10 dBm/tone 1 MHz spacing $V_{CTL} = 0/3$ V	50 MHz 600 MHz	42 44	46 50		dBm dBm
Control voltages	$V_{CTL}$ LOW $V_{CTL}$ HIGH		0 2.7		0.2 3.3	V V
Control currents	$V_{CTL}$ LOW, $V_{CTL}$ HIGH			10	50	$\mu$ A

## Typical Performance Data

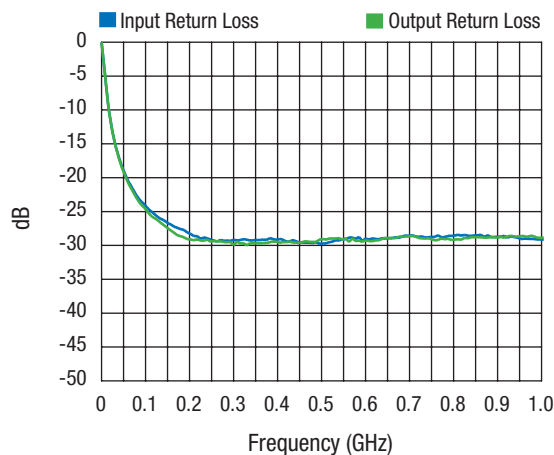
$V_{CTL} = 3$  V,  $T = 25$  °C,  $P_{INPUT} = 0$  dBm,  $Z_0 = 50$   $\Omega$ ,  $C_{BLK} = 560$  pF,  $C_{BP} = 560$  pF, unless otherwise noted



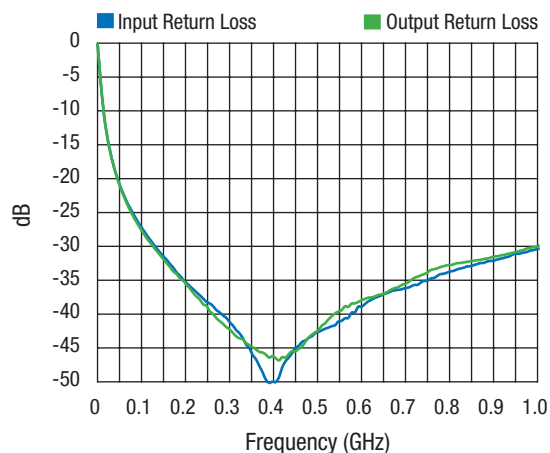
Typical Insertion Loss



Typical Attenuation

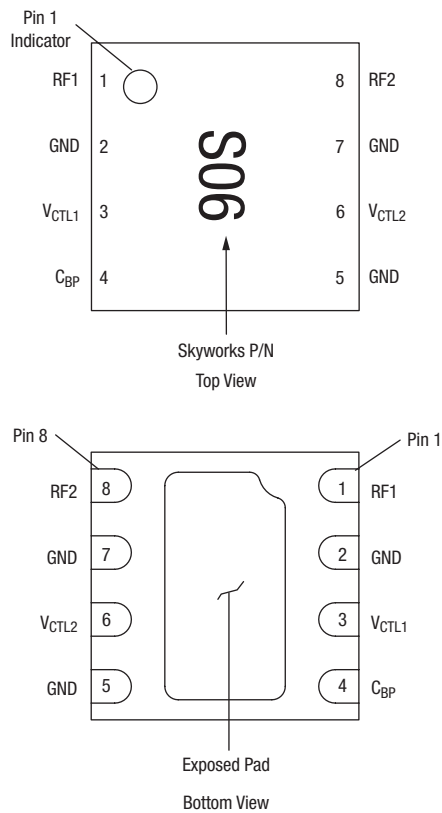


Typical Return Loss (Insertion Loss State)



Typical Return Loss (Attenuation State)

Pin Out



DC blocks are required on RF1 and RF2.  
C<sub>BLK</sub> = 560 pF for 50 MHz operation.  
C<sub>BP</sub> = 560 pF for 50 MHz operation.

Pin Descriptions

Pin Number	Pin Name	Description
1	RF1	RF port
2	GND	Ground
3	V <sub>CTL1</sub>	DC control voltage
4	C <sub>BP</sub>	RF GND, must be AC coupled to ground
5	GND	Ground
6	V <sub>CTL2</sub>	DC control voltage
7	GND	Ground
8	RF2	RF port
Exposed Paddle	Paddle	Must be connected to RF ground

Absolute Maximum Ratings

Characteristic	Value
RF input power @ 3 V	24 dBm at 50 MHz 27 dBm at 600 MHz
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

V <sub>CTL1</sub>	V <sub>CTL2</sub>	RF1–RF2
1	0	Insertion loss
0	1	Attenuation

1 = 3 V.

0 = 0 V.

Any state other than described in the truth table will put the attenuator in an undefined state. If a non-described state occurs, no damage to the attenuator will occur.

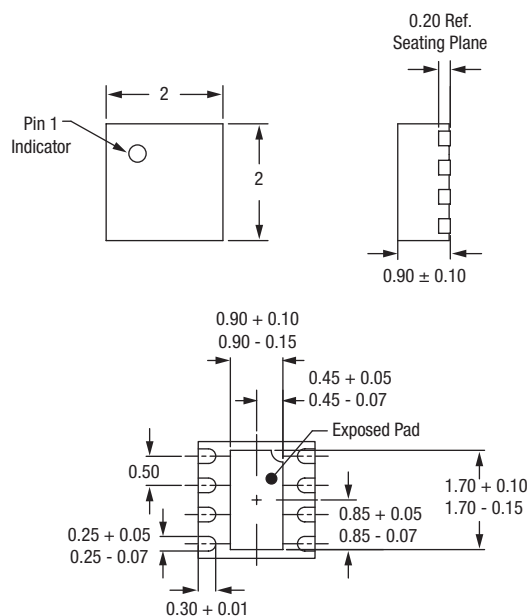
Recommended Solder Reflow Profiles

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

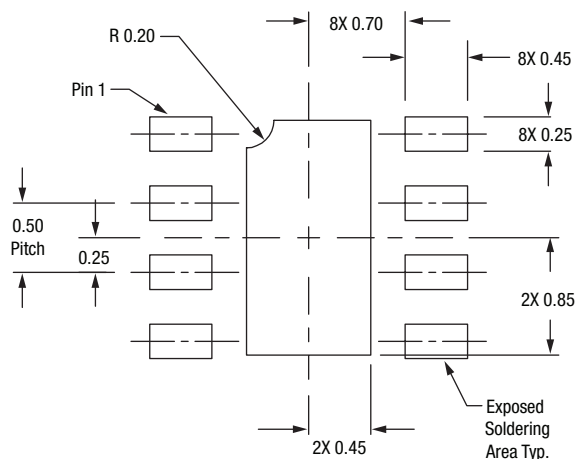
Tape and Reel Information

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

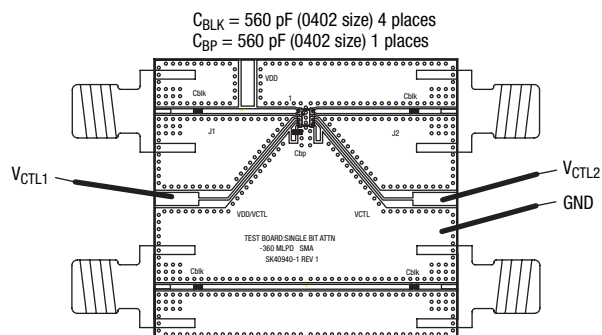
## QFN 8L 2 x 2 mm Package



## Suggested Land Pattern (Top View)



## Evaluation Board



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