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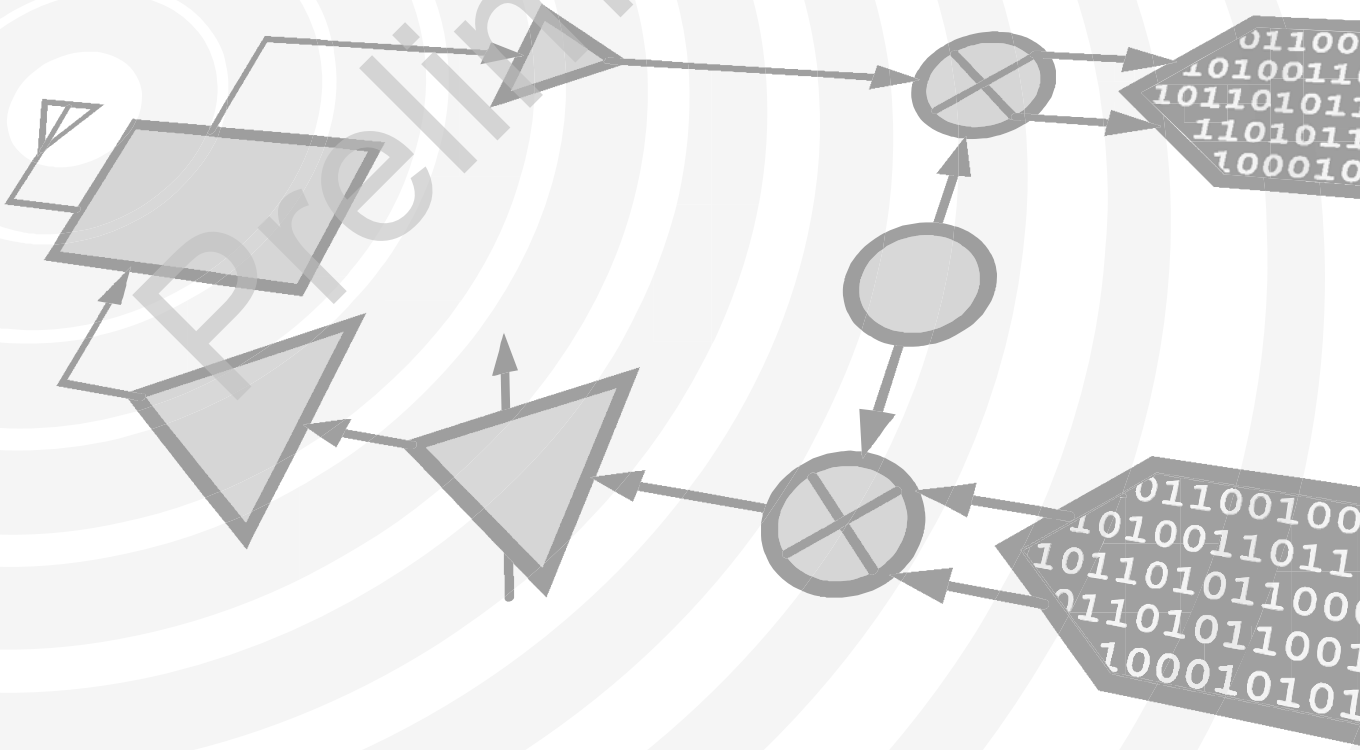

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HMC470ALP3 / 470ALP3E

v00.1115

1 dB LSB GaAs MMIC 5-BIT DIGITAL POSITIVE CONTROL ATTENUATOR, DC - 3 GHz

Designer's Kit Available

Typical Applications

The HMC470ALP3(E) is ideal for:

- Cellular; UMTS/3G Infrastructure
- ISM, MMDS, WLAN, WiMAX
- Microwave Radio & VSAT
- Test Equipment and Sensors

Features

1 dB LSB Steps to 31 dB

Single Control Line Per Bit

TTL/CMOS Compatible Control

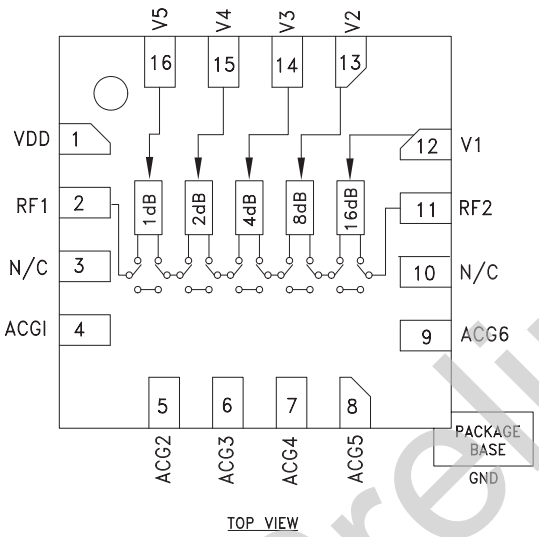
± 0.3 dB Typical Step Error

Single +5V Supply

16 Lead 3x3mm SMT Package: 9mm²

Included in the HMC-DK004 Designer's Kit

Functional Diagram



TOP VIEW

General Description

The HMC470ALP3(E) is a broadband 5-bit GaAs IC digital attenuators in low cost leadless surface mount packages. This single positive control line per bit digital attenuator incorporates off chip AC ground capacitors for near DC operation, making it suitable for a wide variety of RF and IF applications. Covering DC to 3 GHz, the insertion loss is less than 1.5 dB typical. The attenuator bit values are 1 (LSB), 2, 4, 8, and 16 dB for a total attenuation of 31 dB. Attenuation accuracy is excellent at ± 0.3 dB typical step error with an IIP3 of +45 dBm. Five TTL/CMOS control inputs are used to select each attenuation state. A single Vdd bias of +5V is required.

Electrical Specifications, T_A = +25° C, With Vdd = +5V & Vctl = 0/+5V (Unless Otherwise Noted)

Parameter		Frequency (GHz)	Min.	Typ.	Max.	Units
Insertion Loss		DC - 1.5 GHz 1.5 - 2.3 GHz 2.3 - 3.0 GHz		1.3 1.4 1.7	1.6 1.7 2.0	dB dB dB
Attenuation Range		DC - 3 GHz		31		dB
Return Loss (RF1 & RF2, All Atten. States)		DC - 3 GHz		17		dB
Attenuation Accuracy: (Referenced to Insertion Loss) All Attenuation States 1.0 - 15.0 dB States 16.0 - 31.0 dB States		 DC - 2.3 GHz 2.3 - 3.0 GHz 2.3 - 3.0 GHz	 ± (0.3 + 2% of Atten. Setting) Max. ± (0.3 + 3% of Atten. Setting) Max. ± (0.3 + 6% of Atten. Setting) Max.			 dB dB dB
Input Power for 0.1 dB Compression		0.1 - 3.0 GHz		20		dBm
Input Third Order Intercept Point (Two-Tone Input Power= 0 dBm Each Tone)	REF - 15 dB States 16 - 31 dB States	0.1 - 3.0 GHz		45 35		dBm dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)		DC - 3 GHz		 160 180		 ns ns

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D

1 dB LSB GaAs MMIC 5-BIT DIGITAL POSITIVE CONTROL ATTENUATOR, DC - 3 GHz

Absolute Maximum Ratings

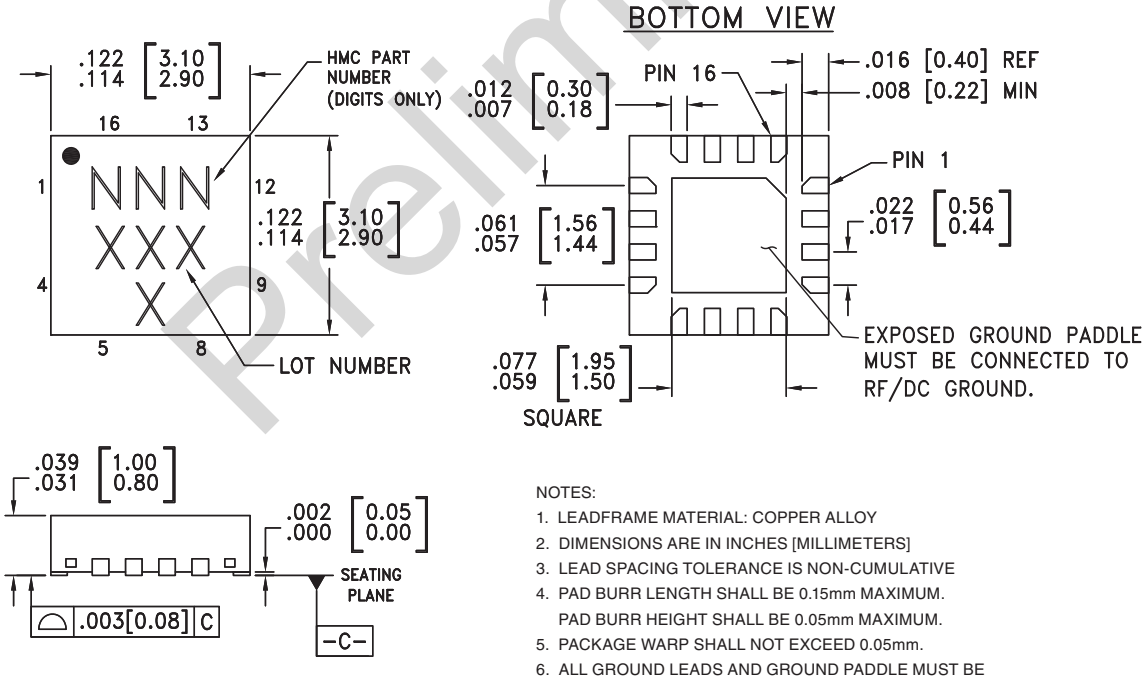
RF Input Power (DC - 3 GHz)	+27 dBm (T = +85 °C)
Control Voltage Range (V1 to V5)	-1V to Vdd +1V
Bias Voltage (Vdd)	+7V
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 7.7 mW/°C above 85 °C)	0.5 W
Thermal Resistance	130 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Truth Table

Control Voltage Input					Attenuation State RF1 - RF2
V1 16 dB	V2 8 dB	V3 4 dB	V4 2 dB	V5 1 dB	
High	High	High	High	High	Reference I.L.
High	High	High	High	Low	1 dB
High	High	High	Low	High	2 dB
High	High	Low	High	High	4 dB
High	Low	High	High	High	8 dB
Low	High	High	High	High	16 dB
Low	Low	Low	Low	Low	31 dB
Any combination of the above states will provide an attenuation approximately equal to the sum of the bits selected.					

Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE
4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
7. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED LAND PATTERN.