

GaAs IC 2 Bit Digital Attenuator With Driver 16 dB LSB DC–2 GHz



AK002D2-24

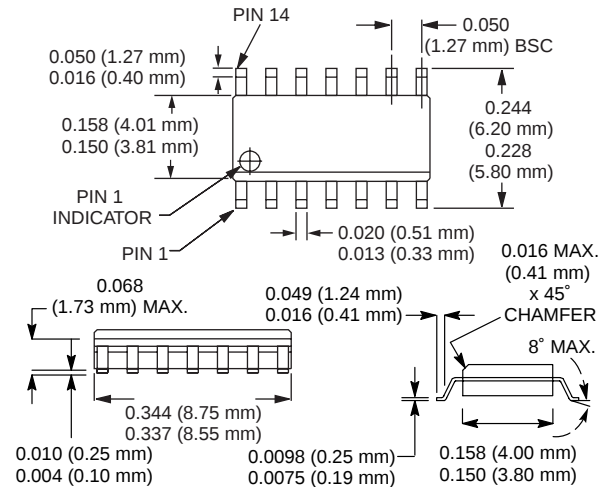
Features

- Attenuation in 16 dB Steps to 48 dB
- Integral Driver ± 5 V Supply Voltages
- Low Cost SOIC-14 Plastic Package

Description

The AK002D2-24 is an IC FET digital attenuator consisting of two monolithic attenuators with an LSB of 16 dB and a total attenuation of 48 dB with all attenuators connected. The device has integral drivers for each bit requiring < 3 mA per bit. DC supply voltages of ± 5 V are required.

SOIC-14



Electrical Specifications at 25°C (+5 V, -5 V)

Parameter ¹	Frequency ²	Min.	Typ.	Max.	Unit
Insertion Loss ³	DC–0.5 GHz		1.7	1.8	dB
	DC–1.0 GHz		1.9	2.1	dB
	DC–2.0 GHz		2.2	2.5	dB
Attenuation Accuracy ⁴	DC–1.0 GHz	16 ±6%	32 ±6%	48 ±8%	Bits Max.
	DC–2.0 GHz	±6%	±8%	±10%	Max. dB
VSWR (I/O)	DC–1.0 GHz		1.4:1	1.5:1	
	DC–2.0 GHz		1.6:1	1.7:1	

Operating Characteristics at 25°C (+5 V, -5 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics ⁵	Rise, Fall (10/90% or 90/10% RF)			10		ns
	On, Off (50% CTL to 90/10% RF)			20		ns
	Video Feedthru			30		mV
Input Power for 1 dB Compression		0.50–2.0 GHz		+20		dBm
		0.05 GHz		+12		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power +13 dBm	0.50–2.0 GHz		+37		dBm
		0.05 GHz		+26		dBm
Control Voltages	V _{Low}		0.0		0.2	V
	V _{High}		4.5		5.0	V
Supply Voltages ^{6,7}	+5 V $\pm$ 0.20 V @ 3 mA Typ.		4.8	5.0	5.2	V
	-5 V $\pm$ 0.20 V @ 8 mA Typ.		-4.8	-5.0	-5.2	V

1. All measurements made in a 50 Ω system, unless otherwise specified.

2. DC = 300 kHz.

3. Insertion loss changes by 0.003 dB/°C.

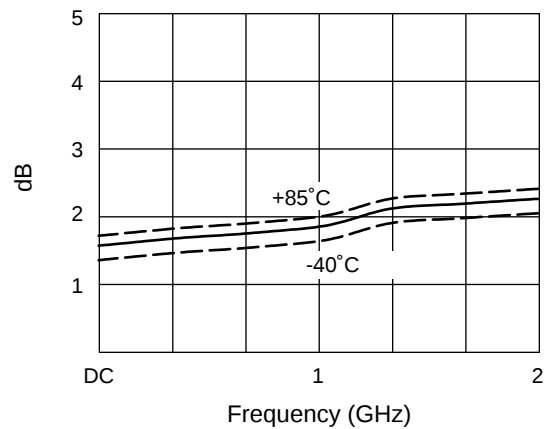
4. Attenuation referenced to insertion loss.

5. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

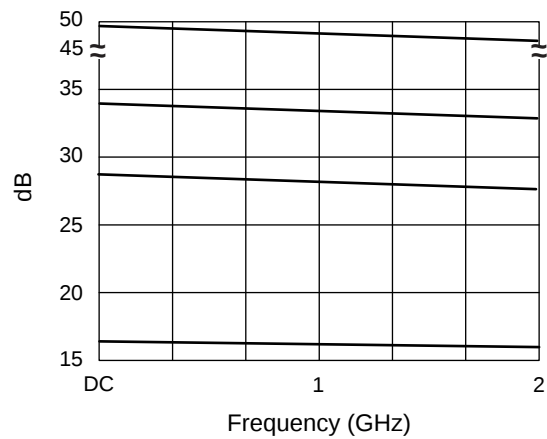
6. Supply voltages and ground must be connected before control voltage is applied. Use of toggle switches or other similar components may produce voltage spikes which can cause irreversible damage to the device.

7. Current drain @ 85°C = 5 mA Typ. @ +5 V, 11 mA Typ. @ -5 V.

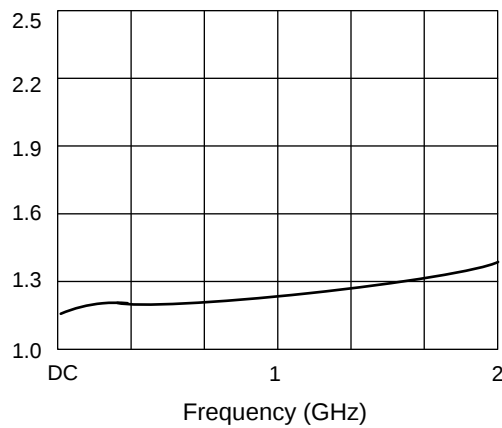
Typical Performance Data (+5 V, -5 V)



Insertion Loss vs. Frequency



16, 32 and 48 dB States vs. Frequency



VSWR vs. Frequency (All States)

Truth Table

C ₁	C ₂	Attenuation J ₁ –J ₂
16 dB	32 dB	Reference I.L.
0	0	Reference I.L.
1	0	16 dB
0	1	32 dB
1	1	48 dB

"0" = 0.0 to 0.2 V, "1" = 4.5 to 5.0 V.

Absolute Maximum Ratings

Characteristic	Value
RF Input Power	0.8 W > 500 MHz 0.2 W @ 50 MHz
Supply Voltage	+6 V, -6 V
Control Voltage	-0.2 V, +6 V
Operating Temperature	0°C to +70°C
Storage Temperature	-65°C to +150°C
Θ _{JC}	30°C/W

Pin Out

