

GaAs IC 4 Bit Digital Attenuator With Driver 1 dB LSB DC–2 GHz



AK802D4-24

Features

- Attenuation in 1 dB Steps to 15 dB
- Low Cost SOIC-14 Plastic Package
- Low DC Current < 16 mA Total
- Integral Driver +5 V, -5.6 V Supply Voltages

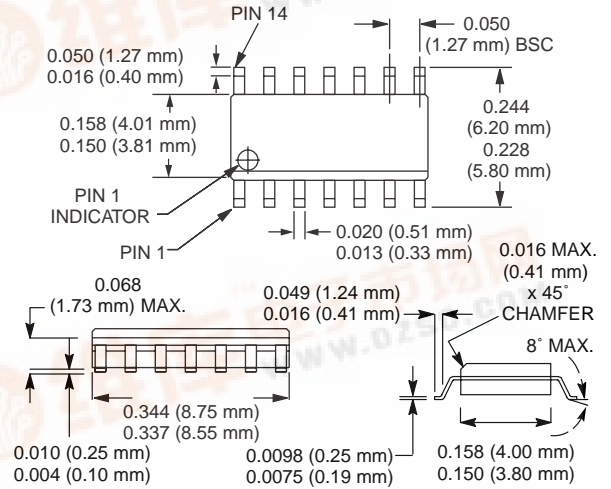
Description

The AK802D4-24 is an IC FET digital attenuator consisting of four monolithic attenuators with an LSB of 1 dB and a total attenuation of 15 dB with all attenuators connected.

The device has integral drivers for each bit requiring less than 4 mA per bit. DC supply voltages of +5 and -5.6 V are required.

The attenuator is packaged in a 14 lead plastic SOIC.

SOIC-14



Electrical Specifications at 25°C (+5 V, -5.6 V)

Parameter ¹	Frequency ²	Min.	Typ.	Max.	Unit
Insertion Loss ³	DC–0.5 GHz		1.7	2.0	dB
	DC–1.0 GHz		2.2	2.5	dB
	DC–2.0 GHz		3.1	3.5	dB
Attenuation Accuracy Per Bit ⁴	DC–1.0 GHz	(7% or 0.25 dB Whichever is Greater)			dB
	DC–2.0 GHz	(10% or 0.5 dB Whichever is Greater)			dB
VSWR (I/O)	DC–1.0 GHz		1.2:1	1.3:1	
	DC–2.0 GHz		1.4:1	1.5:1	

Operating Characteristics at 25°C (+5 V, -5.6 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics ⁵	Rise, Fall (10/90% or 90/10% RF)			15		ns
	On, Off (50% CTL to 90/10% RF)			30		ns
	Video Feedthru			30		mV
Input Power for 1 dB Compression		0.5–1.0 GHz		+24		dBm
		0.05 GHz		+16		dBm
Control Voltages	V _{Low}		0.0		0.2	V
	V _{High}		4.5		5.0	V
Supply Voltages ^{6,7}	+5.0 V ± 0.20 V @ 4 mA Typ.		4.8		5.2	V
	-5.6 V ± 0.20 V @ 12 mA Typ.		-5.4		-5.8	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.

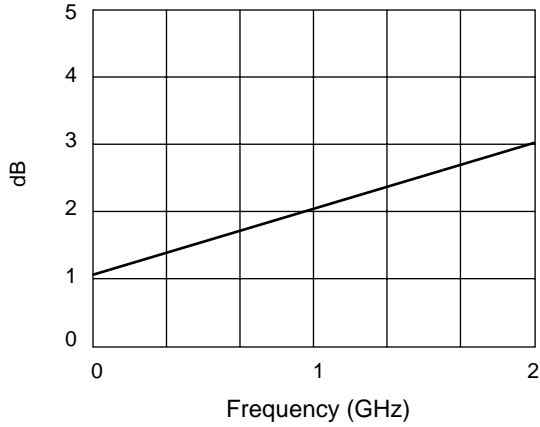
4. Attenuation referenced to insertion loss.

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

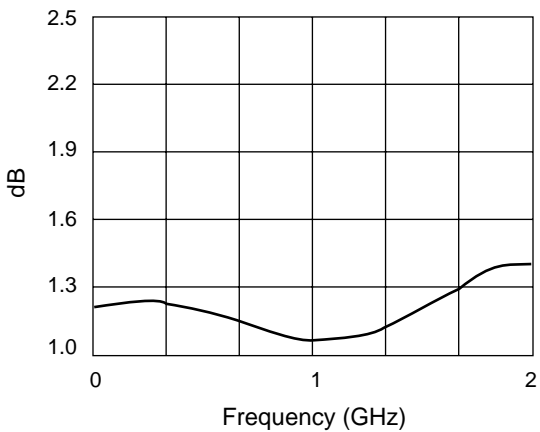
6. Protection circuit for driver included in package.

7. Current drain @ 85°C = 6 mA Typ. @ +5 V, 16 mA Typ. @ -5 V.

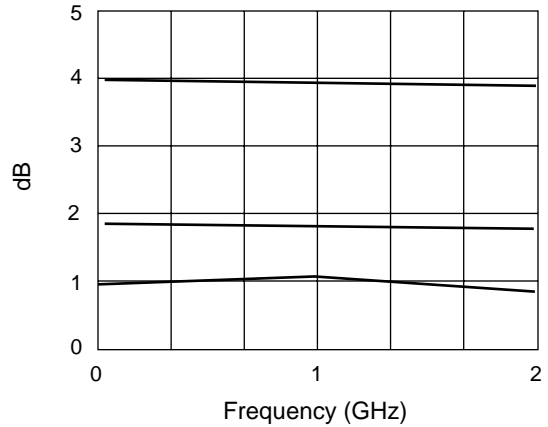
Typical Performance Data (+5 V, -5.6 V)



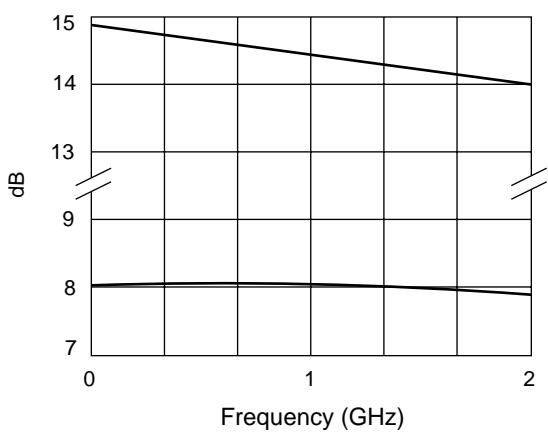
Insertion Loss vs. Frequency



VSWR vs. Frequency (All States)



1, 2, 4 dB Bits vs. Frequency

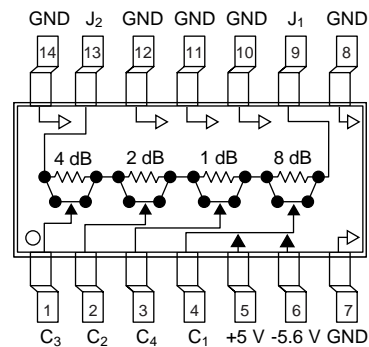


8, 15 dB Bits vs. Frequency

Absolute Maximum Ratings

Characteristic	Value
RF Input Power	0.5 W > 500 MHz 0.1 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



Truth Table

C ₁	C ₂	C ₃	C ₄	Attenuation J ₁ –J ₂
8 dB	2 dB	4 dB	1 dB	
0	0	0	0	Reference I.L.
0	0	0	1	1 dB
0	1	0	0	2 dB
0	0	1	0	4 dB
1	0	0	0	8 dB
1	1	1	1	15 dB

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