

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



AK802D4-11

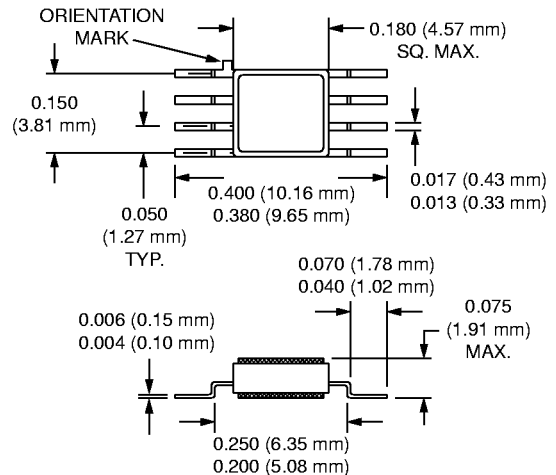
Features

- Integral Driver ± 5 V Supply Voltages
- Attenuation in 2 dB Steps to 30 dB
- 8 Lead Hermetic Surface Mount Package
- Capable of Meeting MIL-STD Requirements⁸

Description

The AK802D4-11 is an IC FET digital attenuator consisting of four monolithic attenuators with an LSB of 2 dB and a total attenuation of 30 dB with all attenuators connected. The device has integral drivers for each bit requiring less than 3 mA per bit. DC supply voltages of ± 5 V are required. The attenuator is designed for both commercial and high reliability applications.

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Electrical Specifications at 25 °C

Parameter ¹	Frequency ⁷	Min.	Typ.	Max.	Unit
Insertion Loss ²	DC–0.5 GHz		1.8	2.0	dB
	DC–1.0 GHz		2.0	2.5	dB
	DC–2.0 GHz		3.0	3.5	dB
Attenuation Accuracy per Bit ³	DC–2.0 GHz	+(0.3 dB + 3% of Attenuation Setting)			dB
VSWR (I/O)	DC–2.0 GHz		1.4:1	1.6:1	

Operating Characteristics at 25 °C

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru ⁴			10		ns
				20		ns
				30		mV
Input Power for 1 dB Compression		0.50–2 GHz		25		dBm
		0.05 GHz		16		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power 13 dBm	0.50–2 GHz		43		dBm
		0.05 GHz		30		dBm
Control Voltages	V_{Low}		0.0		0.5	V
	V_{High}		4.0		5.5	V
Supply Voltages ^{5,6}	+5 V @ 3 mA Typ.		+4.75		+5.25	V
	-5 V @ 10 mA Typ.		-4.75		-5.25	V

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

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

3. Attenuation referenced to insertion loss.

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

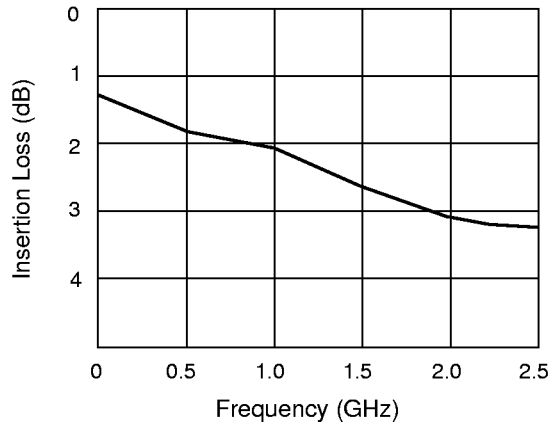
5. Supply voltage and ground must be connected before control voltage is applied. Use of toggle switches or other similar components may produce voltage spikes which can cause irreversible damage to the device.

6. Current drain @ 85°C = 5 mA Typ. @ +5 V, 14 mA Typ. @ -5 V.

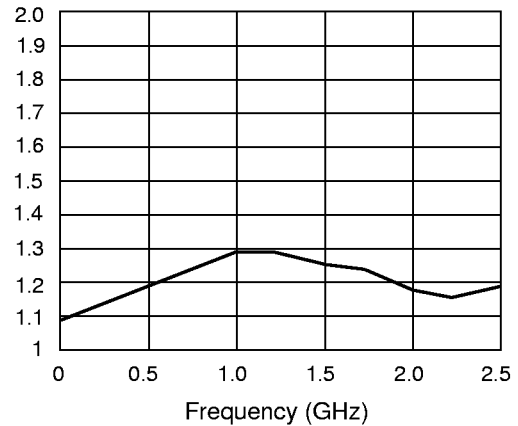
7. DC = 300 kHz.

8. See Quality/Reliability section.

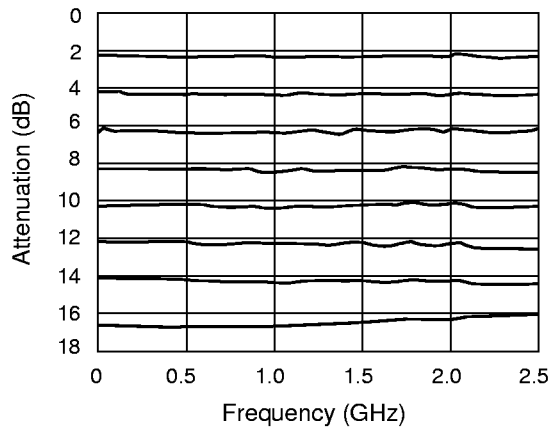
Typical Performance Data



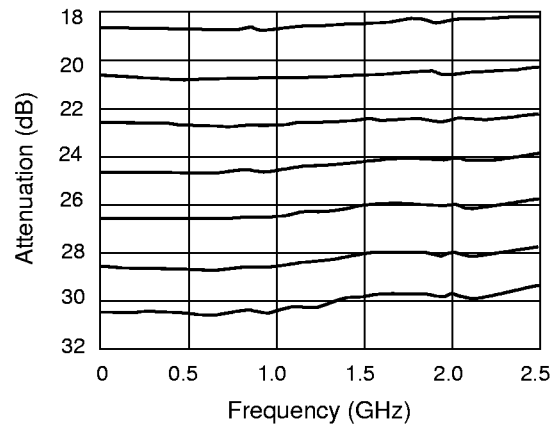
Insertion Loss vs. Frequency



Typical VSWR vs. Frequency (All States)



Attenuation 2 dB–16 dB



Attenuation 18 dB–30 dB

Absolute Maximum Ratings

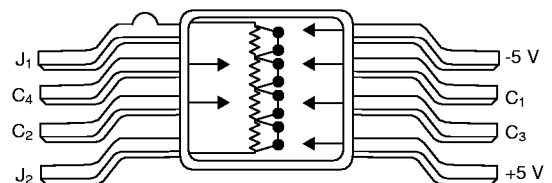
Characteristic	Value
RF Input Power (RF In)	0.5 W > 500 MHz 0.1 W @ 50 MHz
Supply Voltage (V _S)	+6 V, -6 V
Control Voltage (V _C)	-0.2 V, +6 V
Operating Temperature (T _{OP})	-40 °C to +90 °C
Storage Temperature (T _{ST})	-65 °C to +150 °C
Thermal Resistance (Θ _{JC})	30 °C/W

Truth Table

C ₁	C ₂	C ₃	C ₄	Attenuation J ₁ –J ₂
16 dB	8 dB	4 dB	2 dB	Reference I.L.
0	0	0	0	Reference I.L.
0	0	0	1	2 dB
0	0	1	0	4 dB
0	1	0	0	8 dB
1	0	0	0	16 dB
1	1	1	1	30 dB

"0" = 0.0 to 0.5 V, "1" = 4.0 to 5.0 V.

Pin Out



Note: Package base DC and RF ground.