

# GaAs IC 15 dB Voltage Variable Attenuator Single Control DC–2 GHz



AF002N2-32

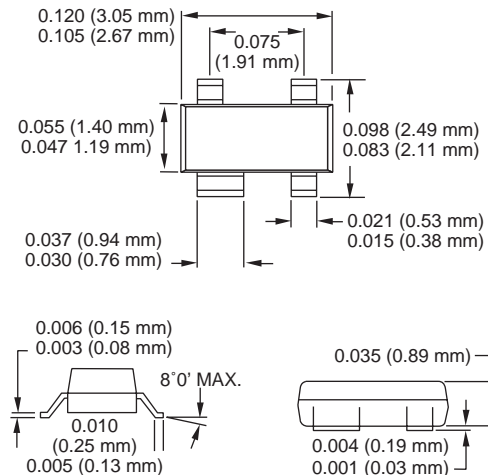
## Features

- Single Voltage Control, Positive or Negative Voltage
- Low Cost SOT-143 Package
- 15 dB Dynamic Range
- Non-Reflective

## Description

The AF002N2-32 is a single control non-reflective IC FET VVA ideal for AGC applications. Its low DC drain characteristic and size make it suitable for PCS and portable cellular markets. A positive control voltage may be used by adding 2 DC blocking capacitors ( $C_{BL}$ ) and 1 bypass capacitor ( $C_{BP}$ ).

## SOT-143



## Electrical Specifications at 25°C (0, -5 V)

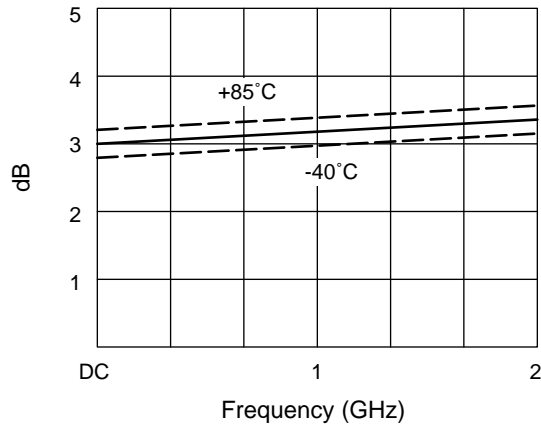
Parameter <sup>1</sup>	Frequency <sup>2</sup>	Min.	Typ.	Max.	Unit
Insertion Loss ( $V_1 = -5 V$ ) <sup>3</sup>	DC–0.5 GHz		3.1	3.3	dB
	DC–1.0 GHz		3.3	3.5	dB
	DC–2.0 GHz		3.5	3.8	dB
Attenuation ( $V_1 = 0 V$ )	DC–0.5 GHz	18	20		dB
	DC–1.0 GHz	14	16		dB
	DC–2.0 GHz	10	12		dB
VSWR ( $V_1 = 0$ to -5 V)	DC–2.0 GHz		2.0:1	2.2:1	

## Operating Characteristics at 25°C (0, -5 V)

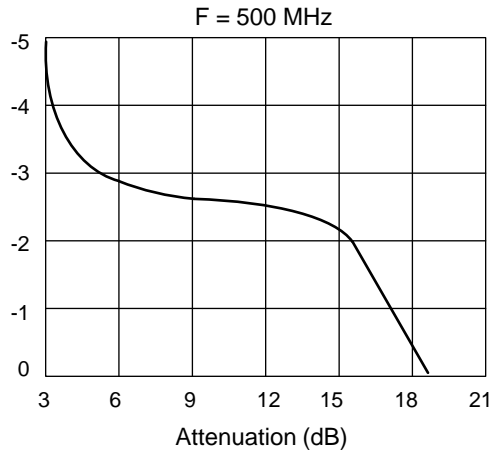
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics <sup>4</sup>	Rise, Fall (10/90% or 90/10% RF)			7		ns
	On, Off (50% CTL to 90/10% RF)			10		ns
	Video Feedthru			20		mV
Input Power for 1 dB Compression	For All Attenuation Levels	0.05 GHz		-3		dBm
		0.90 GHz		0		dBm
Control Voltages	$V_{Low} = 0$ to $-0.2 V$ @ 20 $\mu A$ Max. $V_{High} = -5 V$ @ 50 $\mu A$ Max. to $-8 V$ @ 200 $\mu A$ Max. $V_S = V_{High} \pm 0.2 V$					

1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.
2. DC = 300 kHz.
3. Insertion loss changes by 0.003 dB/°C.
4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

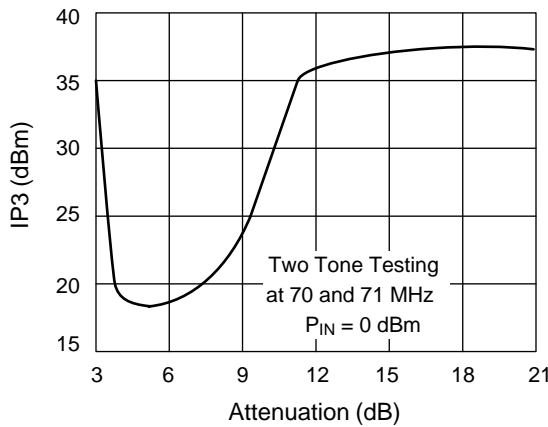
Typical Performance Data (0, -5 V)



Insertion Loss vs. Frequency



Attenuation vs. Control Voltage



Attenuation vs. IP3

Absolute Maximum Ratings

Characteristic	Value
RF Input Power	10 mW > 500 MHz 0/-8 V 4 mW @ 50 MHz 0/-8 V
Control Voltage	+0.2 V, -10 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
$\theta_{JC}$	25°C/W

Note: Operating this device above any of these parameters may cause irreversible damage.

Truth Table

Negative Voltage Operation

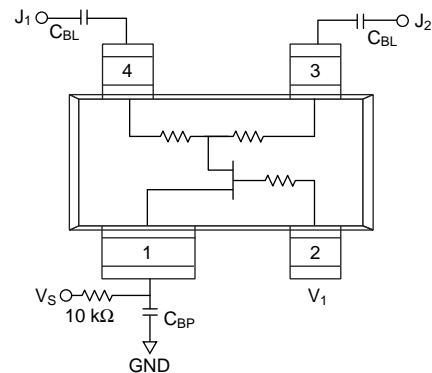
$V_1$	Attenuation $J_1-J_2$
-5	Insertion Loss
0	Full Attenuation

Positive Voltage Operation

$V_1$	Attenuation $J_1-J_2$
$V_{High}$	Full Attenuation
0	Insertion Loss

$V_{High} = +5 V$  to  $+8 V$  ( $V_S = V_{High} \pm 0.2 V$ ).

Pin Out



External components for positive voltage operation only.  
 $C_{BL} = 100 pF$ .

Optimum Tuning for Maximum Attenuation

F (MHz)	$C_{BP}$	Typical Maximum Attenuation
130	220 pF	21
730	15 pF	21
1925	1.6 pF	21