DATA SHEET

AF002N2-32, AF002N2-32LF: GaAs IC 15 dB Voltage Variable Attenuator Single Control 300 kHz–2 GHz

Features

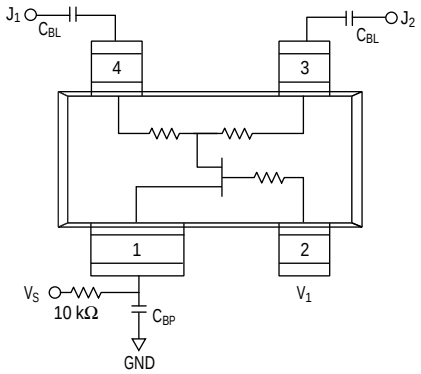
- Single voltage control, positive or negative voltage
- Low-cost SOT-143 package
- 15 dB dynamic range
- Nonreflective
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

The AF002N2-32 is a single control nonreflective 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 two DC blocking capacitors (C_{BL}) and one bypass capacitor (C_{BP}).

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.

Pin Out



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

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

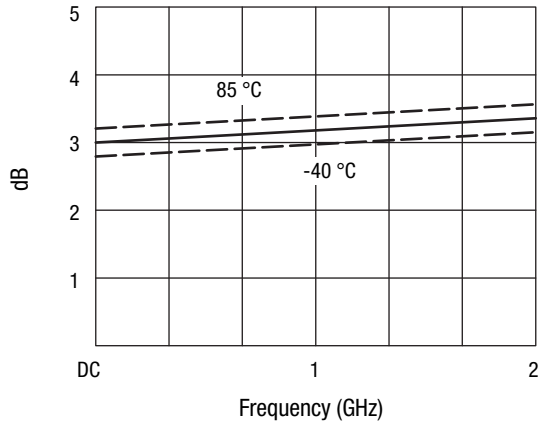
Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion loss (V_1 = -5 V)[2]	300 kHz–0.5 GHz		3.1	3.3	dB
	300 kHz–1.0 GHz		3.3	3.5	dB
	300 kHz–2.0 GHz		3.5	3.8	dB
Attenuation (V_1 = 0 V)	300 kHz–0.5 GHz	18	20		dB
	300 kHz–1.0 GHz	14	16		dB
	300 kHz–2.0 GHz	10	12		dB
VSWR (V_1 = 0 to -5 V)	300 kHz–2.0 GHz		2.0:1	2.2:1	

1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Insertion loss changes by 0.003 dB/°C.

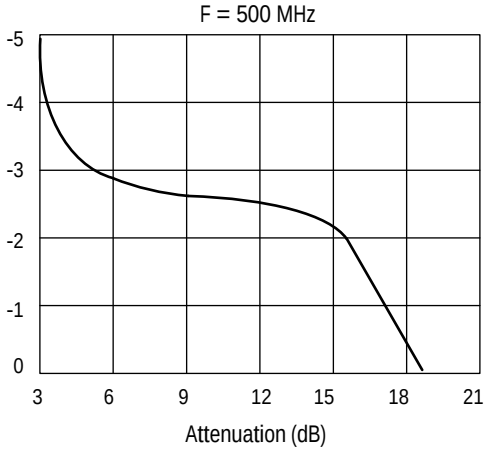
Operating Characteristics at 25 °C (0, -5 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			7		ns
On, off	50% CTL to 90/10% RF			10		ns
Video feedthru	T_{RISE} = 1 ns, BW = 500 MHz			20		mV
Input power for 1 dB compression	For all attenuation levels	0.05 GHz		-3		dBm
		0.90 GHz		0		dBm
Thermal resistance				25		°C/W
Control voltages	V_{LOW} = 0 to -0.2 V @ 20 µA max. V_{HIGH} = -5 V @ 50 µA max. to -8 V @ 200 µA max. $V_S = V_{HIGH} \pm 0.2$ V					

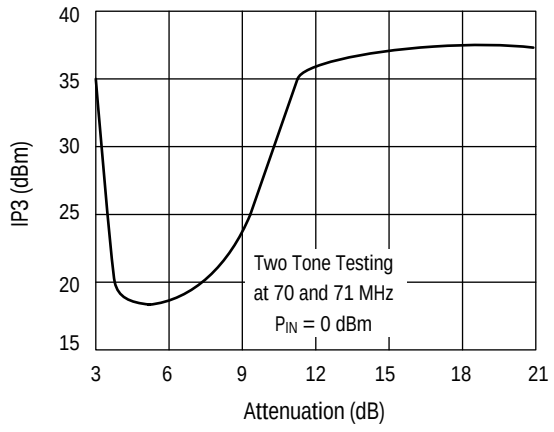
Typical Performance Data (0, -5 V)



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

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: *Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.*

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).

Recommended Solder Reflow Profiles

Refer to the *"Recommended Solder Reflow Profile"* Application Note.

Tape and Reel Information

Refer to the *"Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"* Application Note.

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

SOT-143