UGN-3501M
SOLID-STATE LINEAR OUTPUT HALL EFFECT SENSOR

FEATURES

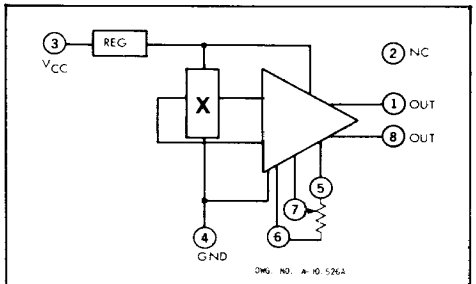
- Excellent Sensitivity
- Flat Response to 25 kHz (typ.)
- Internal Voltage Regulation
- Excellent Temperature Stability

UTILIZING THE HALL EFFECT for sensing a magnetic field, Type UGN-3501M ICs provide a linear differential output which is a function of magnetic field intensity.

These devices are intended for applications requiring accurate measurement and/or control of position, weight, thickness, velocity, etc.

The Type UGN-3501M Hall Effect IC includes a monolithic Hall cell, linear differential amplifier, differential emitter follower output, and a voltage regulator. Integrating the Hall cell and the amplifier into one monolithic device minimizes problems related to the handling of millivolt analog signals.

Provisions are included for output offset null. This sensor is supplied as a 8-pin dual in-line plastic package and is rated for continuous operation over the temperature range of 0°C to +70°C and a voltage range of 8 to 16 volts d-c.



FUNCTIONAL BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{CC} . . . . . +16 V
Output Current, I_{OUT} . . . . . 2 mA
Magnetic Flux Density, B . . . . . Unlimited
Operating Temperature Range, T_A . . . . . 0°C to +70°C
Storage Temperature Range, T_S . . . . . −65°C to +150°C

ELECTRICAL CHARACTERISTICS at V_{CC} = 12 VDC, T_A = +25°C (unless otherwise specified)

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Operating Voltage	V_{CC}		8.0	—	16	V
Supply Current	I_{CC}	V_{CC} = 16 V	—	10	18	mA
Output Offset Voltage	V_{OFF}	B = 0 Gauss, R-5-6-7 = 0 Ω, Note 1	—	100	400	mV
Output Common Mode Voltage	V_{CM}	B = 0 Gauss, Note 1	—	3.6	—	V
Sensitivity	ΔV_{OUT}	B = 1000 Gauss, R5-6-7 = 0 Ω, Notes 1,2	700	1400	—	mV
Sensitivity	ΔV_{OUT}	B = 1000 Gauss, R5-6 = 15 Ω, Notes 1, 2	650	1300	—	mV
Frequency Response	BW	R5-6-7 = 0 Ω, $f_H - f_L$ at −3 dB	—	25	—	kHz
Broadband Output Noise	e_n	f = 10 Hz to 10 kHz, R5-6-7 = 0 Ω	—	0.15	—	mV
Output Offset Voltage vs. Temperature	$\Delta V_{OFF}/\Delta T$	R5-6-7 = 0 Ω	—	0.20	—	mV/°C

NOTE 1. All output voltage measurements are made with a voltmeter having an input impedance of 10 kΩ or greater and a common-mode rejection ratio greater than 60 dB.
2. Magnetic flux density is measured at the most sensitive area of the device, which is on the top center, 0.037 ±0.001" (0.94 ±0.03mm) below the surface.

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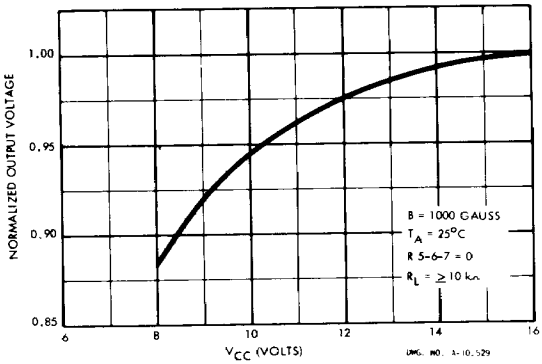
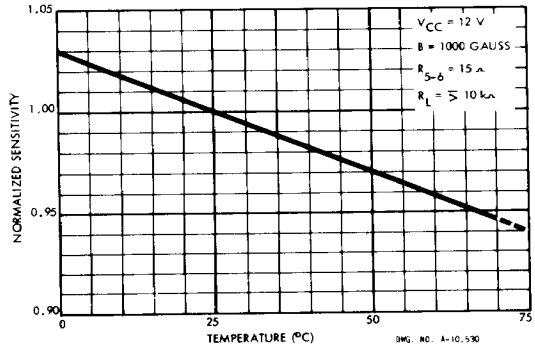
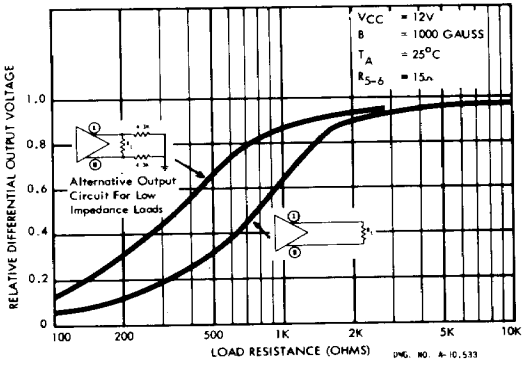
NORMALIZED SENSITIVITY AS A FUNCTION OF V_{CC}



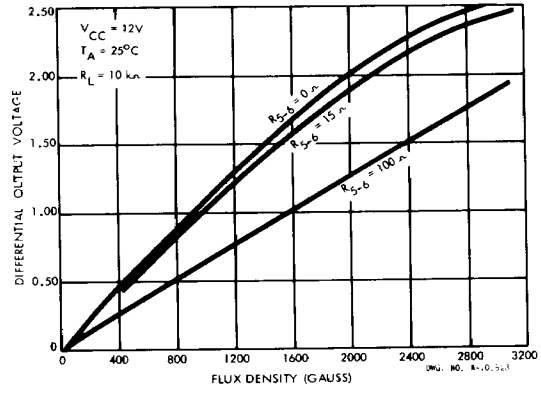
NORMALIZED SENSITIVITY AS A FUNCTION OF TEMPERATURE



RELATIVE OUTPUT VOLTAGE AS A FUNCTION OF LOAD RESISTANCE



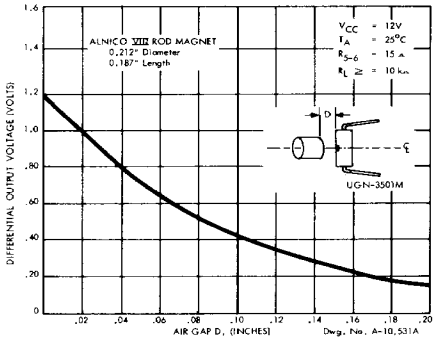
OUTPUT VOLTAGE AS A FUNCTION OF MAGNETIC FLUX DENSITY



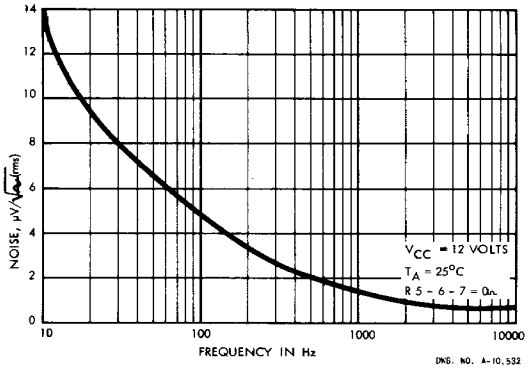
Additional information on all
Hall Effect devices is available from:

Sprague Electric Company
Hall Effect IC Marketing
70 Pembroke Road
Concord, New Hampshire 03301
(603) 224-1961

OUTPUT VOLTAGE AS A FUNCTION OF AIR GAP



NOISE SPECTRAL DENSITY

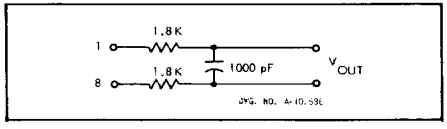


Guide to Installation

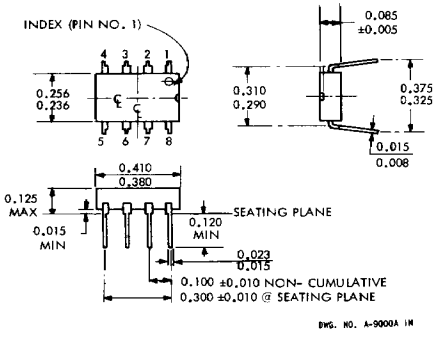
1. All Hall Effect integrated circuits are susceptible to mechanical stress effects. Caution should be exercised to minimize the application of stress to the leads or the epoxy package.

2. To prevent permanent damage to the Hall cell integrated circuit, heat-sink the leads during hand-soldering. For wave soldering, the part should not experience more than 260°C for more than five seconds. Solder flow should be no closer than 0.125" (3.18 mm) to the epoxy package.

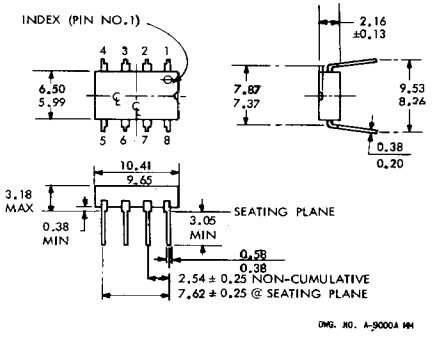
3. If a zeroing potentiometer is used, minimize lead lengths from it and isolate these leads from output leads if possible. In some cases, it may be more practical to limit the frequency response with an output RC network to prevent oscillation.



DIMENSIONS IN INCHES



DIMENSIONS IN MILLIMETRES
Based on 1 in. = 25.4 mm



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