UGN-3119T/U AND UGS-3119T/U HALL EFFECT SWITCHES

FEATURES

- 4.5V to 24V Operation
- High Reliability—No Moving Parts
- Constant Output Amplitude
- Output Compatible with All Digital Logic Families
- Superior Temperature Stability
- Highly Resistant to Physical Stress

Type 3119 Hall Effect switches are highly temperature-stable and stress-resistant sensors best utilized in applications that provide steep magnetic slopes and low residual levels of magnetic flux density. The magnetically activated integrated circuits are available with two operating temperature ranges and with several package options.

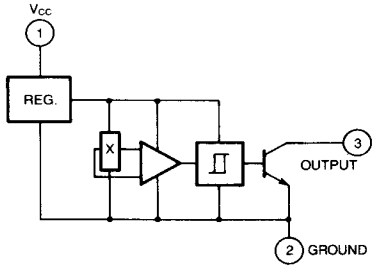
Each Hall Effect circuit includes a voltage regulator, quadratic Hall voltage generator, temperature stability circuit, signal amplifier, Schmitt trigger, and open-collector output on a single silicon chip. The on-board regulator permits operation with supply voltages of 4.5 to 24 V. The switches' output can sink up to 20 mA at a conservatively rated repetition rate of 100 kHz. They can be used directly with bipolar or MOS logic circuits. Selected devices, with outputs capable of sinking 50 mA, are available on special order.

Types UGN-3119T and UGN-3119U are rated for operation over the temperature range of −20°C to +85°C. Types UGS-3119T and UGS-3119U have an operating range of −40°C to +125°C.

The Hall Effect switches are offered in two three-pin plastic packages—a 60-mil (1.54 mm) magnetically optimized "U" package, and one 80 mils (2.03 mm) thick specified by the suffix "T."

Type 3119 is also available in SOT 89 (TO-243AA) for surface-mount applications as UGN-3119LT and UGN-3119LL and UGS-3119LT and UGS-3119LL, and in a hermetically sealed three-pin ceramic package. A high-temperature hermetic device supplied with Sprague HYREL® screening is available as UGS-3119HH. For more information on surface-mount and hermetic switches, contact the factory.

FUNCTIONAL BLOCK DIAGRAM



Dwg. No. A-11,002 A

ABSOLUTE MAXIMUM RATINGS

Power Supply, V_{CC}	25V
Magnetic Flux Density, B	Unlimited
Output OFF Voltage	25V
Output ON Current, I_{SINK}	25mA
Operating Temperature Range, T_A	
UGN-3119T	−20°C to + 85°C
UGN-3119U	−20°C to + 85°C
UGS-3119T	−40°C to +125°C
UGS-3119U	−40°C to +125°C
Storage Temperature Range, T_S	−65°C to +150°C *

*Devices can be stored at + 200°C for short periods of time.
**Selected devices available with T_A Range of −55°C to + 170°C.

These Hall Effect sensors are also supplied in a Low profile "U" package. The low profile "U" is specified by substituting a "UA" for the last character of the part number.

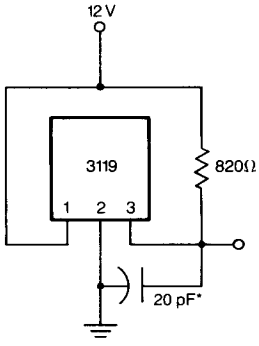
ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{CC} = 4.5 V to 24 V (unless otherwise noted)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Supply Voltage	V_{CC}		4.5	—	24	V
Output Saturation Voltage	$V_{CE(sat)}$	$B \geq 200G$, I_{SINK} = 20mA	—	150	400	mV
Output Leakage Current	I_{OFF}	$B \leq 50G$, V_{OUT} = 24V	—	0.05	10	μA
Supply Current	I_{CC}	$B \leq 50G$, V_{CC} = 4.5V, Output Open	—	4.7	8.0	mA
Output Rise Time	t_r	V_{CC} = 12V, R_L = 820Ω, C_L = 20pF	—	0.04	2.0	μs
Output Fall Time	t_f	V_{CC} = 12V, R_L = 820Ω, C_L = 20pF	—	0.18	2.0	μs

MAGNETIC CHARACTERISTICS

		T_A = + 25°C		T_A = − 20°C to + 85°C		T_A = − 40°C to + 125°C		
Characteristic	Symbol	Min.	Max.	Min.	Max.	Min.	Max.	Units
Operate Point	B_{OP}	175	500	100	545	45	575	G
Release Point	B_{RP}	125	450	50	495	25	555	G
Hysteresis	B_H	50	—	50	—	20	—	G

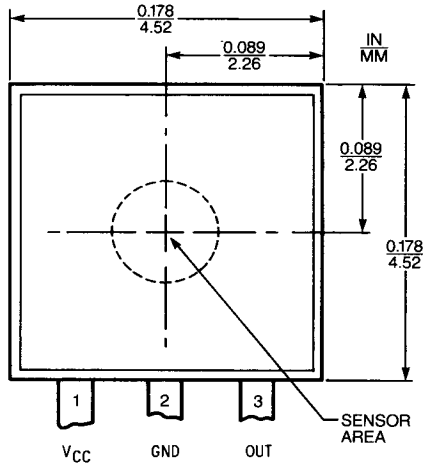
TEST CIRCUIT



Dwg. No. W-198

*Includes probe and test fixture capacitance.

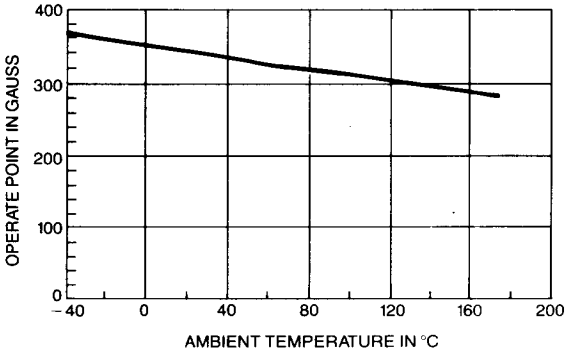
SENSOR LOCATION



Dwg. No. W-173A

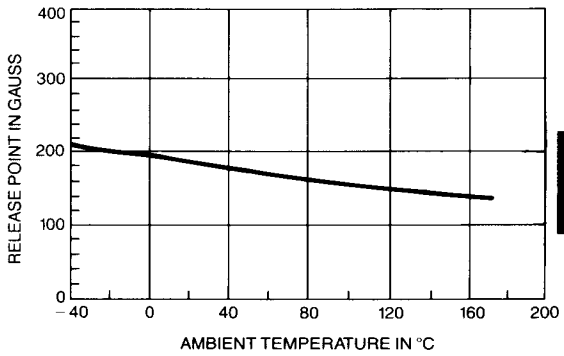
TYPICAL CHARACTERISTICS AS FUNCTIONS OF TEMPERATURE

OPERATE POINT



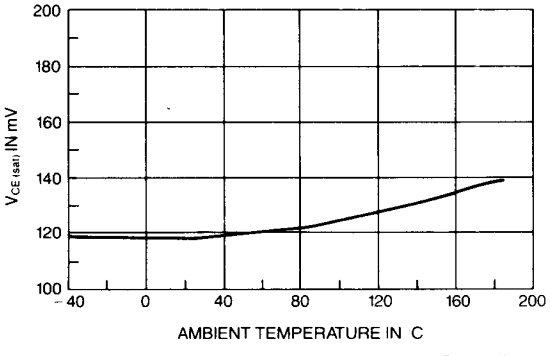
Dwg. No. W-199

RELEASE POINT



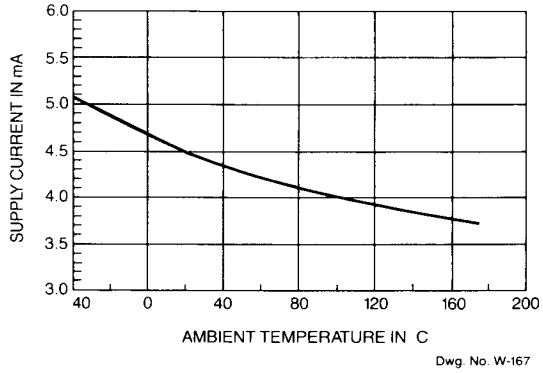
Dwg. No. W-200

OUTPUT SATURATION VOLTAGE



Dwg. No. W-176

SUPPLY CURRENT

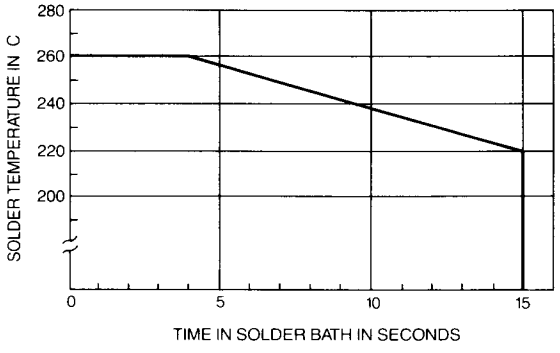


Dwg. No. W-167

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. Use of epoxy glue is recommended. Other types may deform the epoxy package.

2. To prevent permanent damage to the Hall cell, heat-sink the leads during hand-soldering. Recommended maximum conditions for wave soldering are shown in the graph at right.



Dwg. No. A-12,062