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UGN-3120T/U
UGS-3120T/U
Sensor ICs

DATA SHEET

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

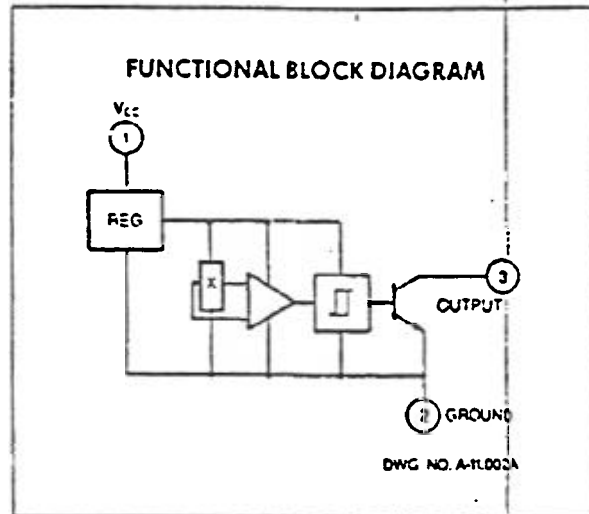
Type 3120 Hall Effect switches are highly temperature-stable and stress-resistant sensors best utilized in applications that provide steep magnetic slopes and require precise switch points. The magnetically activated integrated circuits are available with two operating temperature ranges and with several 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-3120T and UGN-3120U are rated for operation over the temperature range of -20°C to $+85^{\circ}\text{C}$. Types UGS-3120T and UGS-3120U have an operating range of -40°C to $+125^{\circ}\text{C}$.

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-mil (2.03 mm) thick specified by the suffix "T".

Type 3120 is also available in SOT 89 (TO-243AA) for surface-mount applications as UGN-3120L and UGS-



3120L, and in a hermetically sealed three-pin ceramic package. The high-temperature hermetic device (UGS-3120H) can be supplied with Sprague HYREL[®] screening as UGS-3120HH. For more information on surface-mount and hermetic switches, contact the factory.

ABSOLUTE MAXIMUM RATINGS

Power Supply, V _{cc}	25V
Magnetic Flux Density, B	Unlimited
Output OFF Voltage	25V
Output ON Current, I _{SMK}	25mA
Operating Temperature Range, T _A	
UGN-3120T	-20°C to $+85^{\circ}\text{C}$
UGN-3120U	-20°C to $+85^{\circ}\text{C}$
UGS-3120T	-40°C to $+125^{\circ}\text{C}$
UGS-3120U	-40°C to $+125^{\circ}\text{C}$
Storage Temperature Range, T _s	-65°C to $+150^{\circ}\text{C}$

*Devices can be stored at $+250^{\circ}\text{C}$ for short periods of time.

SPRAGUE DATA SHEET 27622Z

SENSOR DIVISION
SPRAGUE ELECTRIC COMPANY

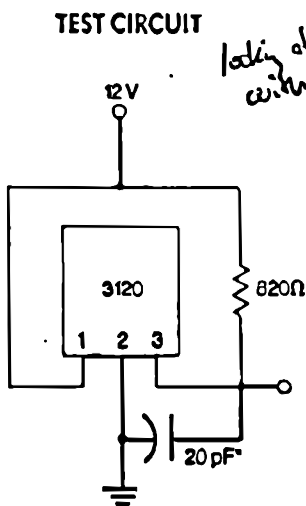
a Unit of The Penn Central Corporation
70 Pembroke Road, Concord, N.H. 03301

ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$, $V_{CC} = 4.5\text{ V to }24\text{ V}$ (unless otherwise noted)

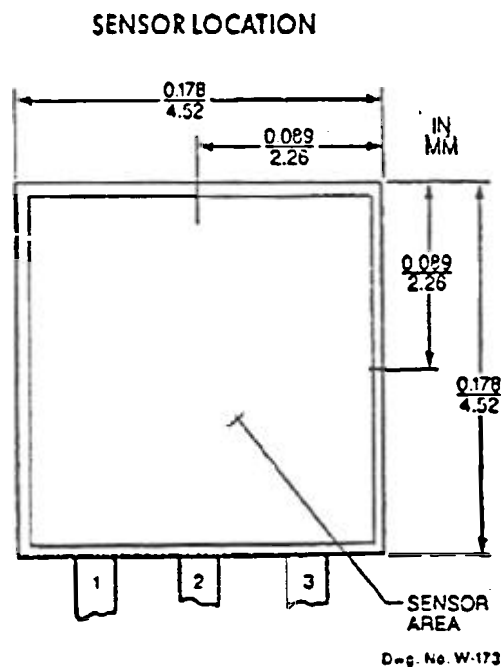
Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Supply Voltage	V_{CC}		4.5	—	24	V
Output Saturation Voltage	$V_{CE(sat)}$	$B \geq 200G, I_{SINK} = 20\text{mA}$	—	150	400	mV
Output Leakage Current	I_{OFF}	$B \leq 50G, V_{OUT} = 24V$	—	0.05	10	μA
Supply Current	I_{CC}	$B \leq 50G, V_{CC} = 4.5V,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

MAGNETIC CHARACTERISTICS

Characteristic	Symbol	$T_A = +25^\circ\text{C}$		$T_A = -20^\circ\text{C to }+85^\circ\text{C}$		$T_A = -40^\circ\text{C to }+125^\circ\text{C}$		Units
		Min.	Max.	Min.	Max.	Min.	Max.	
Operate Point	B_{OP}	70	350	70	425	35	450	G
Release Point	B_{RP}	50	330	50	405	25	430	G
	B_H	20	—	20	—	20	—	G

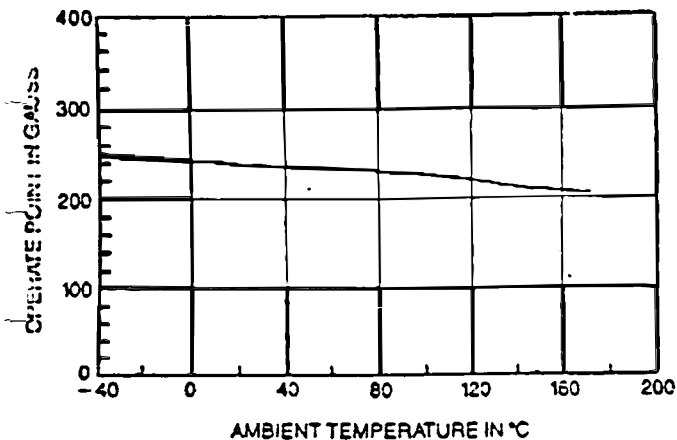


*Includes probe and test fixture capacitance.



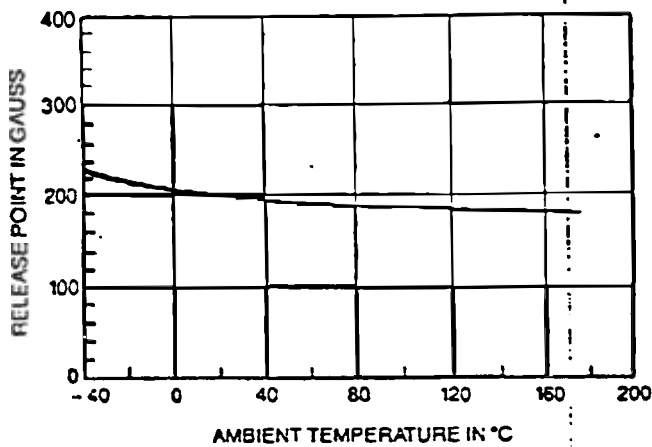
TYPICAL CHARACTERISTICS AS FUNCTIONS OF TEMPERATURE

OPERATE POINT



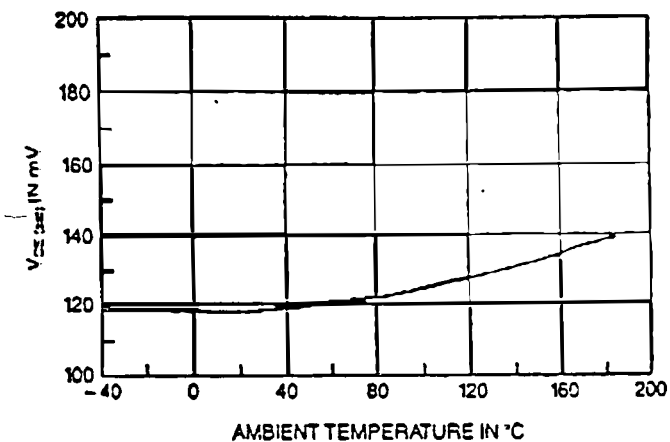
Dwg. No. W-178

RELEASE POINT



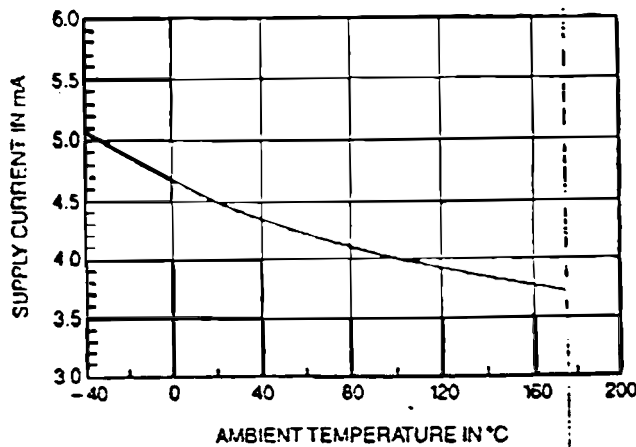
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OUTPUT SATURATION VOLTAGE



Dwg. No. W-178

SUPPLY CURRENT

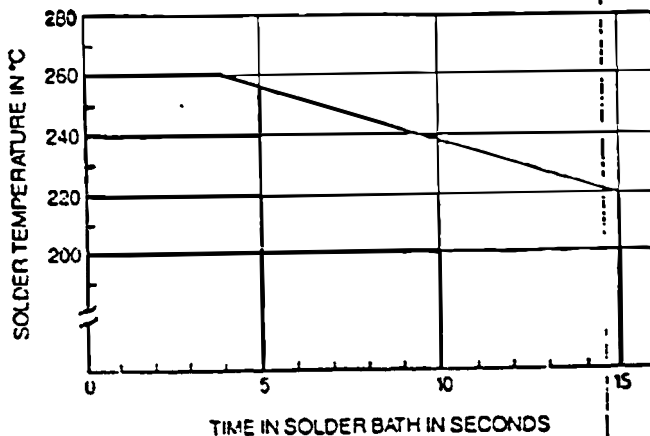


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GUIDE TO INSTALLATION

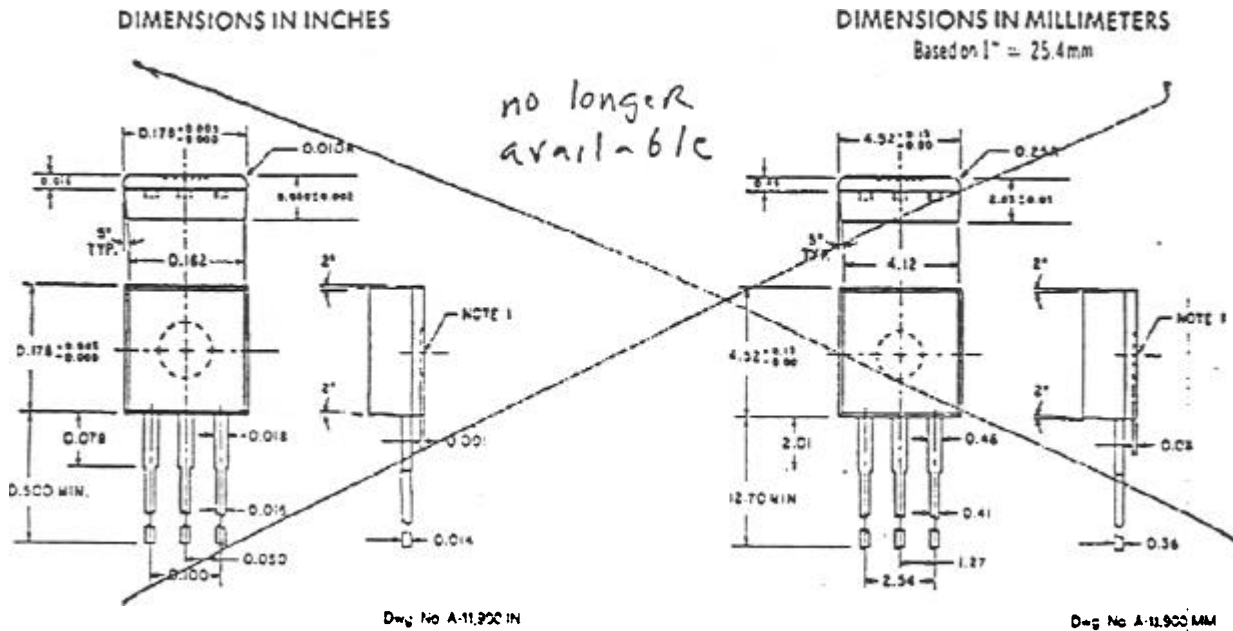
1. All Hall Effect integrated circuits are susceptible to mechanical stress effects. Caution should be exercised to minimize the application of stress to the leads or the epoxy package. Use of epoxy glue is recommended. Other types may deform the epoxy package.

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. Solder flow should be no closer than 0.125" (3.18 mm) to the epoxy package.

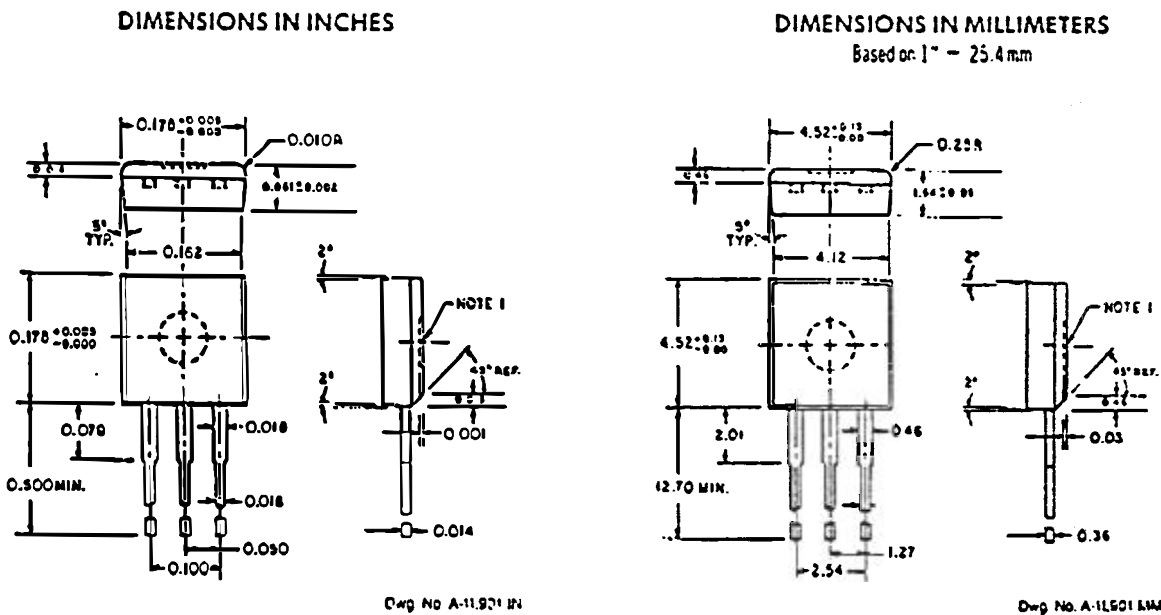


Dwg. No. 4-12.062

'T' PACKAGE



'U' PACKAGE



In the construction of the components described, full intent of this specification will be met. The Sprague Electric Company, however, reserves the right to make such departure from the detail specifications as may be required to permit improvements in its design of its products. Components made under military approvals will be accordance with the approval requirements. The information included herein is believed to be accurate and reliable. However, the Sprague Electric Company assumes no responsibility for its use, nor for any infringement of patents or other rights of third parties which may result herefrom.

NOTES:

1. Ejector pin indent is centrally located.
2. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
3. Tolerances, unless otherwise specified, are $\pm 0.005"$ (0.13mm) and $\pm 1/2^\circ$.