

MT1101

CMOS Unipolar, Hall-Effect Magnetic Position Sensors

FEATURES

- Resistant to Physical Stress
- Superior Temperature Stability
- Chopper stabilized amplifier
- Operation From Unregulated Supply
- High sensitivity
- Solid-State Reliability
- Open Drain output
- Small Size

ABSOLUTE MAXIMUM RATINGS

at $T_A = +25^\circ\text{C}$

Supply Voltage, V_{CC}	28 V
Magnetic Flux Density, B	Unlimited
Output Off Voltage, V_{OUT}	28 V
Continuous Output Current, I_{OUT}	50 mA*
Reverse Output Current, I_{OUT}	-50 mA
Junction Temperature, T_J	+150°C
Operating Temperature Range, T_A	-50°C to +125°C
Storage Temperature Range, T_S	-50°C to +150°C

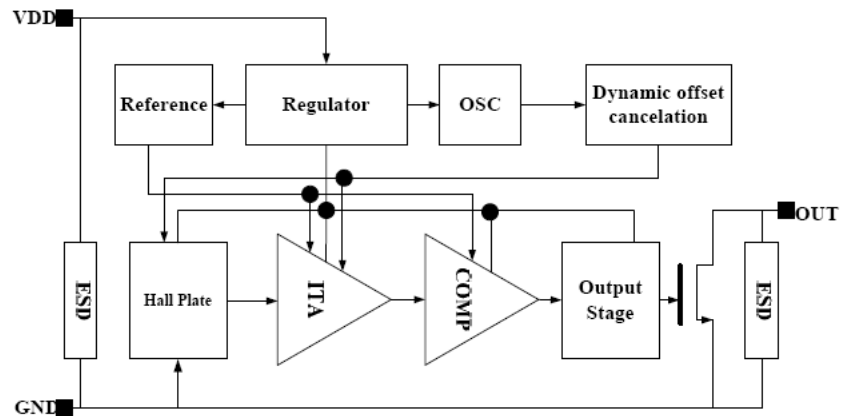
* Only when the $V_{CC}=4.5\text{V}$

These Hall-effect sensors are monolithic integrated circuits with tighter magnetic specifications, designed to operate continuously over extended temperatures to +125°C, and are more stable with both temperature and supply voltage changes.

Each device includes a voltage regulator for operation with supply voltages of 3.5 to 24 volts, hall plate with dynamic cancellation system, temperature compensation circuitry, chopper stabilized small-signal amplifier, Schmitt trigger, and an open drain output to sink up to 50 mA. With suitable output pull up, they can be used with bipolar or CMOS logic circuits.

This sensor family includes most widely used industry package type with same die inside:

MT11011A--- TO-92S
 MT1101AT --- SOT-23
 MT1101BT--- SOT-89B



Block Diagram

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ELECTRICAL CHARACTERISTICS over operating temperature range.

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Supply Voltage Range	V_{CC}	Operating, $T_J < 165^\circ\text{C}^1$	3.8	–	28	V
Output Leakage Current	I_{OFF}	$V_{OUT} = 28\text{ V}$, $B < B_{RP}$	–	–	10	μA
Output Saturation Voltage	$V_{OUT(SAT)}$	$I_{OUT} = 20\text{ mA}$, $B > B_{OP}$	–	150	450	mV
Output Current Limit	I_{OM}	$B > B_{OP}$	20	–	50	mA
Output Rise Time	t_r	$R_L = 900\ \Omega$, $C_L = 20\text{ pF}$	–	0.2	0.5	μs
Output Fall Time	t_f	$R_L = 900\ \Omega$, $C_L = 20\text{ pF}$	–	0.5	0.5	μs
Supply Current	I	$B < B_{RP}$, $V_{CC} = 12\text{ V}$	–	3.0	5.0	mA
		$B > B_{OP}$, $V_{CC} = 12\text{ V}$	–	3.0	5.0	mA
Electro-Static Discharge	ESD	HBM	4			kV
Maxim Switching Frequency	F_{SW}		10			kHz

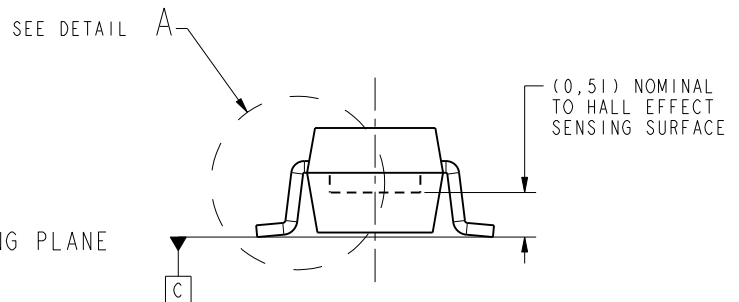
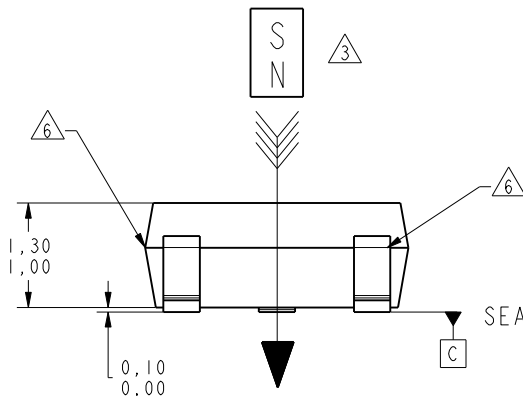
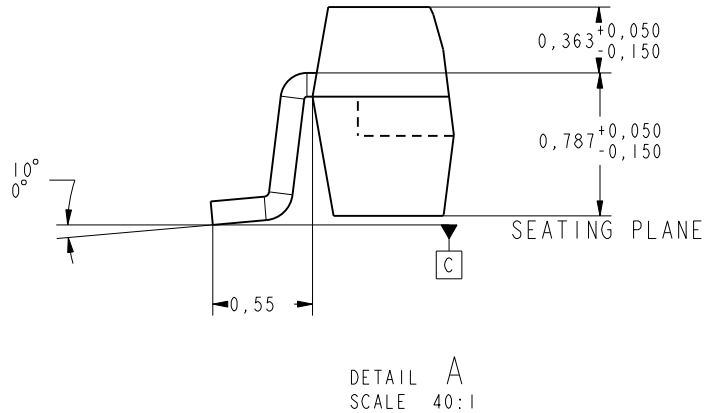
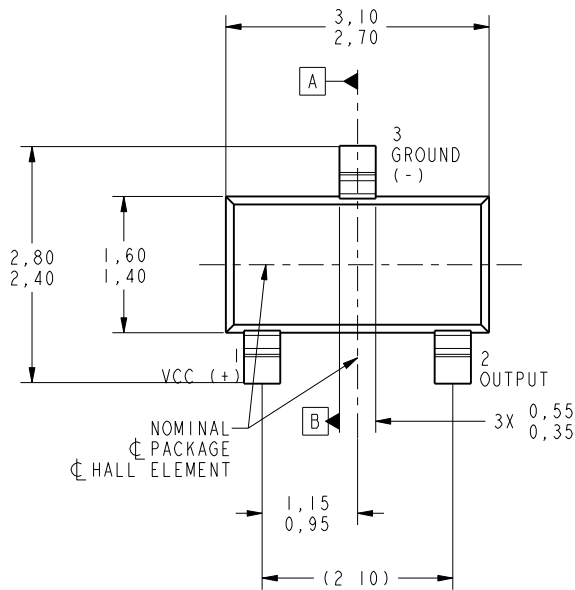
MAGNETIC CHARACTERISTICS over operating voltage range.

Characteristic	Test Conditions	Part Numbers ¹									Units
		MT1101A			MT1101AT			MT1101BT			
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Operate Point, B_{OP}	at $T_A = +25^\circ\text{C}$ and $T_A = \text{max.}$	50	75	100	50	75	100	50	75	100	G
Release Point, B_{RP}	at $T_A = +25^\circ\text{C}$ and $T_A = \text{max.}$	30	40	50	30	40	50	30	40	50	G
Hysteresis, B_{hys} ($B_{OP} - B_{RP}$)	at $T_A = +25^\circ\text{C}$ and $T_A = \text{max.}$	20	35	50	20	35	50	20	35	50	G

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PACKAGE DESIGNATOR (MT1101AT)



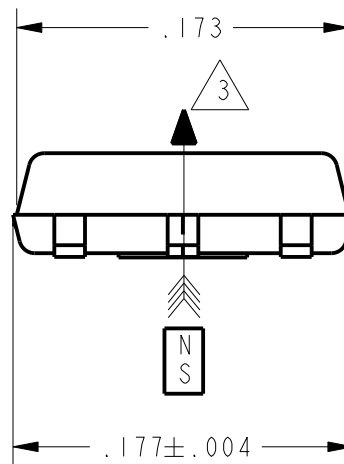
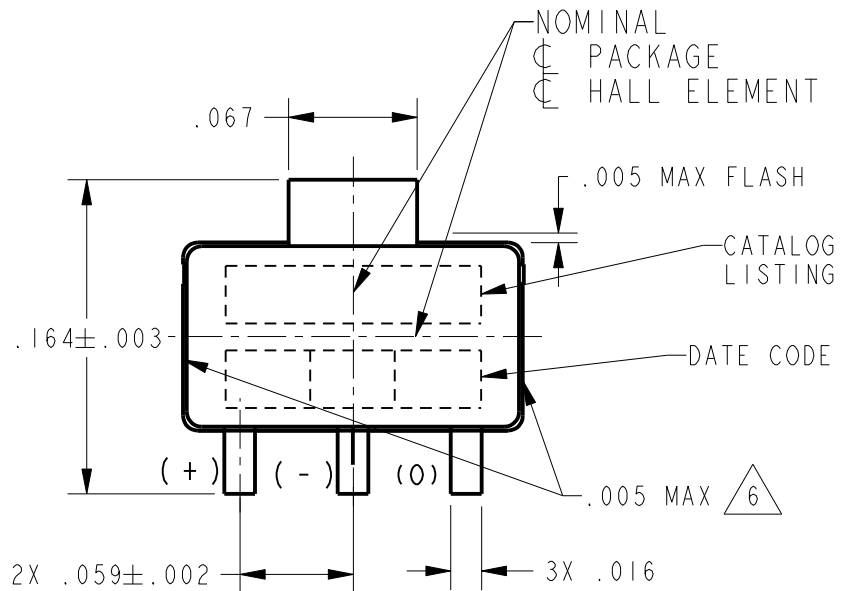
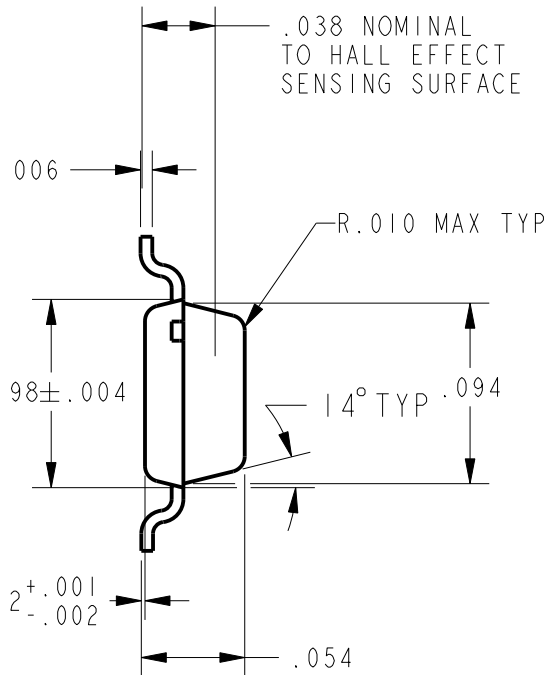
- NOTES:
1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
 2. Exact body and lead configuration at vendor's option within limits shown.
 3. Height does not include mold gate flash.
 4. Where no tolerance is specified, dimension is nominal.

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PACKAGE DESIGNATOR (MT1101BT)

Dimensions in Inches



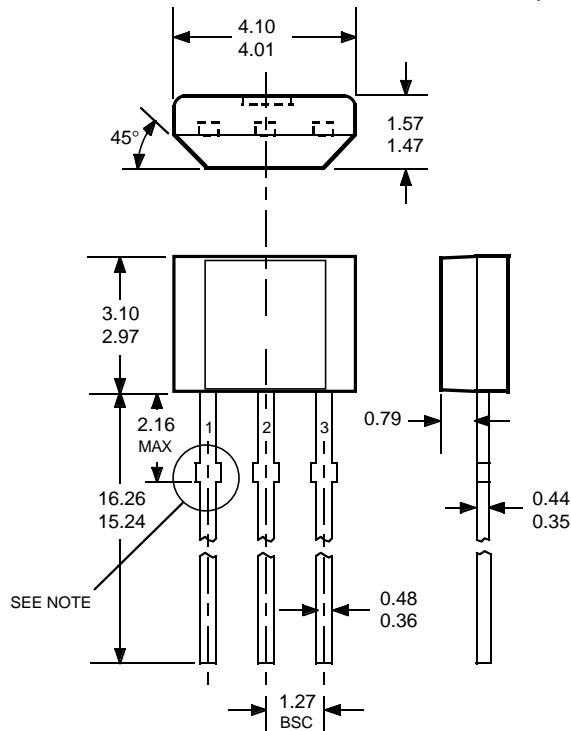
- NOTES:
1. Exact body and lead configuration at vendor's option within limits shown.
 2. Supplied in bulk pack (500 pieces per bag) or add "TR" to part number for tape and reel.
 3. Only low-temperature ($\leq 240^{\circ}\text{C}$) reflow-soldering techniques are recommended for SOT89 devices.

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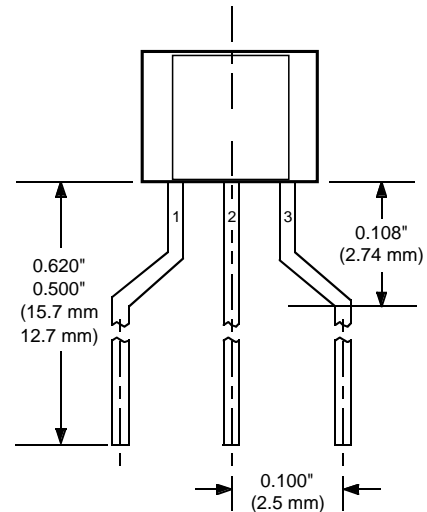
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PACKAGE DESIGNATOR

(MT1101A)



Radial Lead Form (order MT1101A-T)



- NOTES:
1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
 2. Exact body and lead configuration at vendor's option within limits shown.
 3. Height does not include mold gate flash.
 4. Recommended minimum PWB hole diameter to clear transition area is 0.035" (0.89 mm).
 5. Where no tolerance is specified, dimension is nominal.
 6. Supplied in bulk pack (500 pieces per bag).

NOTE: Lead-form dimensions are the nominals produced on the forming equipment. No dimensional tolerance is implied or guaranteed for bulk packaging (1000 pieces per bag).

