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Description

DIODES™ AH373 is a single-digital-output Hall-Effect latch sensor with internal pull-up resistor for high temperature operation. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, and a comparator to provide switching hysteresis for noise rejection, and an output driver with a pull-up resistor. An internal band-gap regulator provides a temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

When the magnetic flux density (**B**) perpendicular to the package is larger than operate point (**Bop**), output is switched on (OUT pin is pulled low). The output state is held on until a magnetic flux density reversal falls below Brp. When **B** is less than Brp, the output is switched off.

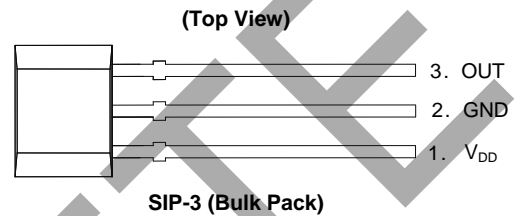
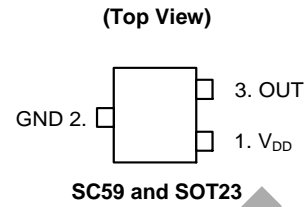
The AH373 is available in SIP-3 (Bulk Pack), SIP-3 (Ammo Pack), SC59 and SOT23 packages.

Features

- Bipolar Hall Effect Latch Operation
- 2.2V to 20V Operating Range
- Single Output with Built-in Pull-up Resistor
- 25mA Output Sink Capability
- -40°C to +125°C Operating Temperature
- Industry Standard SIP-3 (Bulk Pack), SIP-3 (Ammo Pack), SC59 and SOT23 Packages
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated’s definitions of Halogen- and Antimony-free, “Green” and Lead-free.
 3. Halogen- and Antimony-free “Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

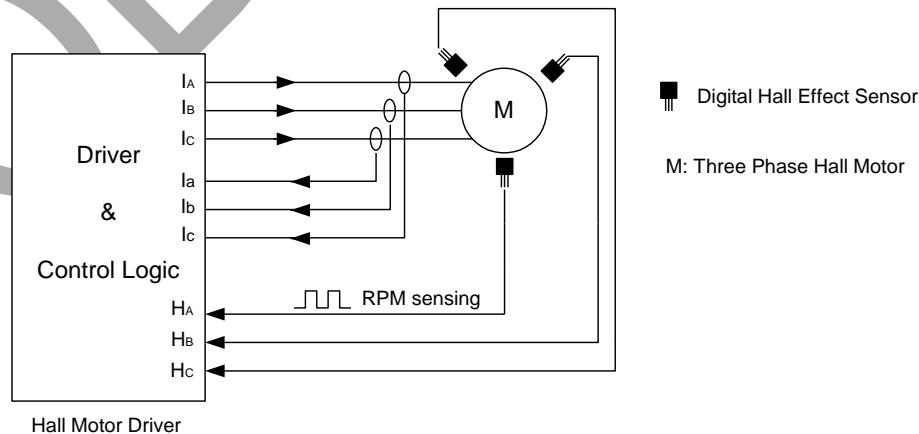
Pin Assignments



Applications

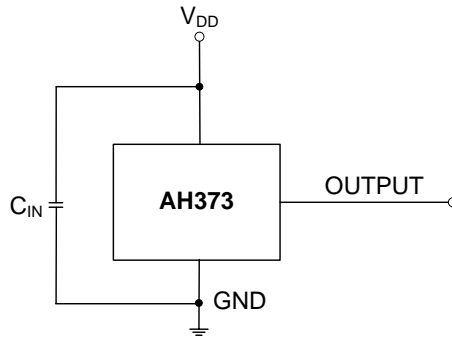
- Rotor position sensing for motor commutation
- Encoders
- Speed measurement – RPM monitors
- Contact-less current switches

Typical Application Circuits



3 Phase Hall Motor

Typical Application Circuits (continued)



Typical AH373 Circuit

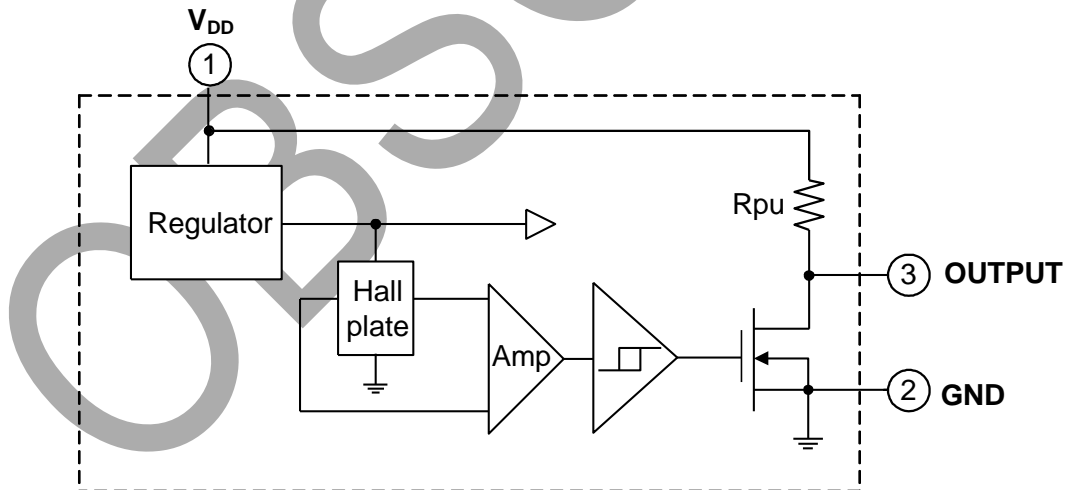
Note: 4. C_{IN} is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 100nF typical.

Pin Descriptions

Packages: SC59, SOT23, SIP-3 (Bulk Pack) and SIP-3 (Ammo Pack)

Pin Number	Pin Name	Function
1	V_{DD}	Power Supply Input
2	GND	Ground
3	OUTPUT	Output

Functional Block Diagram



Absolute Maximum Ratings (Note 5) (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Symbol	Characteristics	Value	Unit	
V_{DD}	Supply Voltage (Note 6)	28	V	
V_{OUT} (Off)	Output "Off" Voltage	28	V	
I_o (Sink)	Output "On" Current (Sink)	25	mA	
B	Magnetic Flux Density	Unlimited		
P_D	Package Power Dissipation	SIP-3 (Bulk Pack) and SIP-3 (Ammo Pack)	550	mW
		SC59 and SOT23	230	mW
T_S	Storage Temperature Range	-65 to +150	$^\circ\text{C}$	
T_J	Maximum Junction Temperature	+150	$^\circ\text{C}$	

- Notes:
- Stresses greater than the 'Absolute Maximum Ratings' specified above can cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions exceeding those indicated in this specification is not implied. Device reliability can be affected by exposure to absolute maximum rating conditions for extended periods of time.
 - The absolute maximum V_{DD} of 28V is a transient stress rating and is not meant as a functional operating condition. It is not recommended to operate the device at the absolute maximum rated conditions for any period of time.

Recommended Operating Conditions (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Symbol	Characteristic	Conditions	Rating	Unit
V_{DD}	Supply Voltage (Note 7)	Operating	2.2 to 20	V
T_A	Operating Temperature Range	Operating	-40 to +125	$^\circ\text{C}$

- Note: 7. The output of IC will be switched after the supply voltage is over 2.2V, but the magnetic characteristics will not be normal until the supply is over 2.5V.

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, $V_{DD} = 12\text{V}$, unless otherwise specified.)

Symbol	Characteristic	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output On Voltage	$I_{OUT} = 20\text{mA}$	—	300	400	mV
I_{DD}	Supply Current	$B < B_{rp}$	—	2	4	mA
I_{OFF}	Output Leakage Current	Output off	—	< 0.1	10	μA
Rpu	Internal Pull-up Resistor	—	7	10	13	k Ω

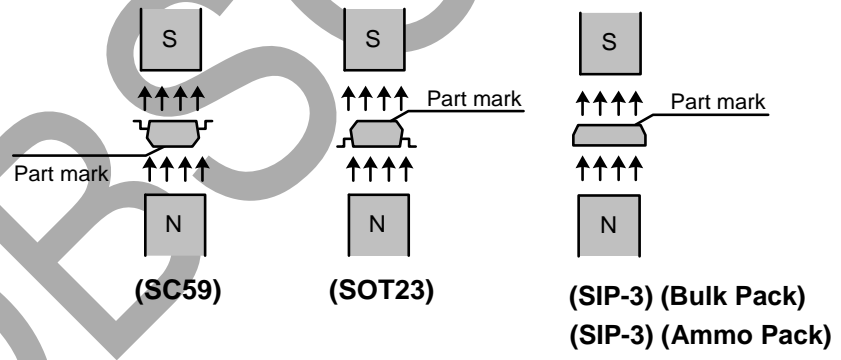
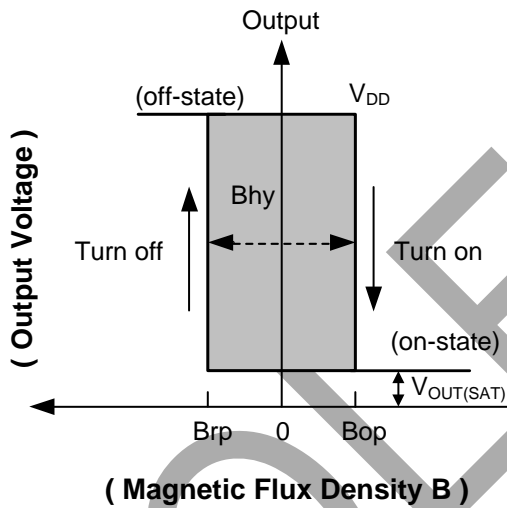
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Magnetic Characteristics (Note 8) (@ $T_A = +25^\circ\text{C}$, $V_{DD} = 2.5\text{V}$ to 20V , unless otherwise specified.)

(1mT=10 Gauss)

Symbol	Characteristic	Min	Typ	Max	Unit
Bop (South pole to part marking side for SIP-3 (Bulk Pack), SIP-3 (Ammo Pack) and SOT23; North pole to part marking side for SC59)	Operation Point	5	30	60	Gauss
Brp (South pole to part marking side for SIP-3 (Bulk Pack), SIP-3 (Ammo Pack) and SOT23; North pole to part marking side for SC59)	Release Point	-60	-30	-5	
Bhy ($ B_{opx} - B_{rpx} $)	Hysteresis	—	60	—	

Note: 8. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

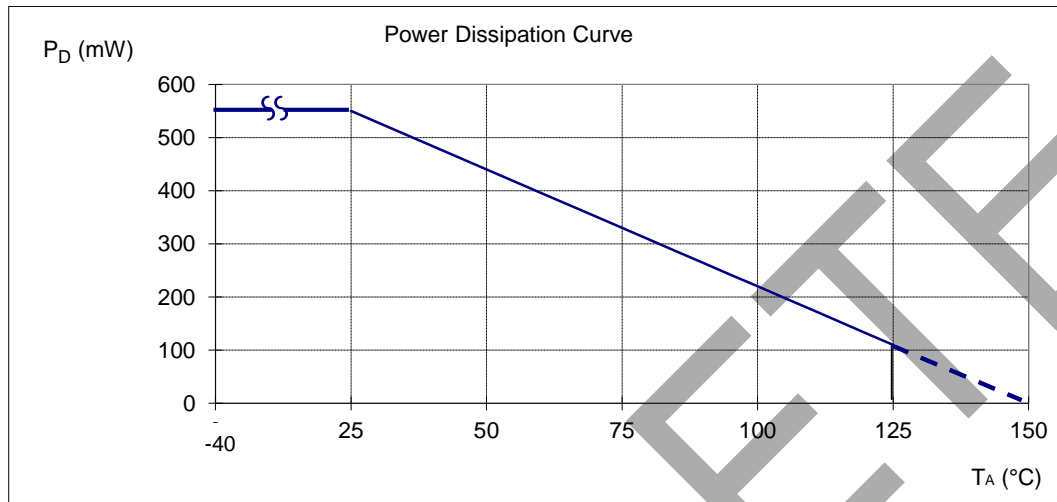


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Thermal Performance Characteristics

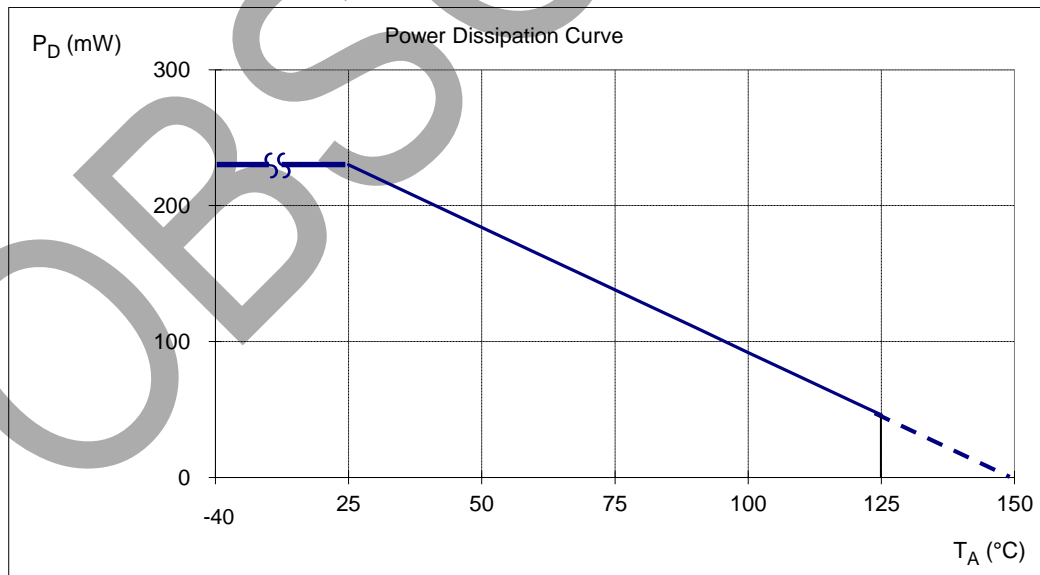
(1) Package Types: SIP-3 (Bulk Pack) and SIP-3 (Ammo Pack)

T _A (°C)	25	50	60	70	80	85	90	95	100	105	110	115	120	125	130	135	140	150
P _D (mW)	550	440	396	352	308	286	264	242	220	198	176	154	132	110	88	66	44	0

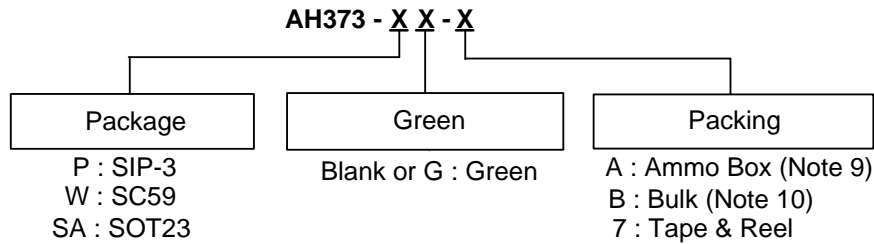


(2) Package Types: SC59 and SOT23

T _A (°C)	25	50	60	70	80	85	90	100	105	110	120	125	130	140	150
P _D (mW)	230	184	166	147	129	120	110	92	83	74	55	46	37	18	0



Ordering Information



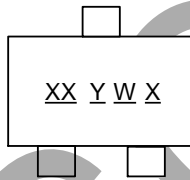
Part Number	Package Code	Package (Note 11)	Packing	
			Qty.	Carrier
AH373-PG-A	P	SIP-3 (Ammo Pack)	4,000	Ammo Box
AH373-PG-B	P	SIP-3 (Bulk Pack)	1,000	Bulk
AH373-WG-7	W	SC59	3,000	7" Tape & Reel
AH373-SA-7	SA	SOT23	3,000	7" Tape & Reel

Notes:
 9. Ammo Box is for SIP-3 (Ammo Pack) Spread Lead.
 10. Bulk is for SIP-3 (Bulk Pack) Straight Lead.
 11. Pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.

Marking Information

(1) Package Types: SC59 and SOT23

(Top View)

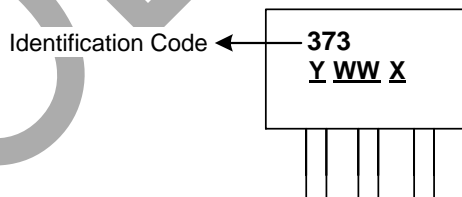


XX : Identification code
 Y : Year 0 to 9
 W : Week : A to Z : 1 to 26 week;
 a to z : 27 to 52 week; z represents
 52 and 53 week
 X : Internal Code: A ~ Z : Green
 a ~ z : Lead Free

Part Number	Package	Identification Code
AH373	SC59	P2
AH373	SOT23	S2

(2) Package Types: SIP-3 (Ammo Pack) and SIP-3 (Bulk Pack)

(Top View)



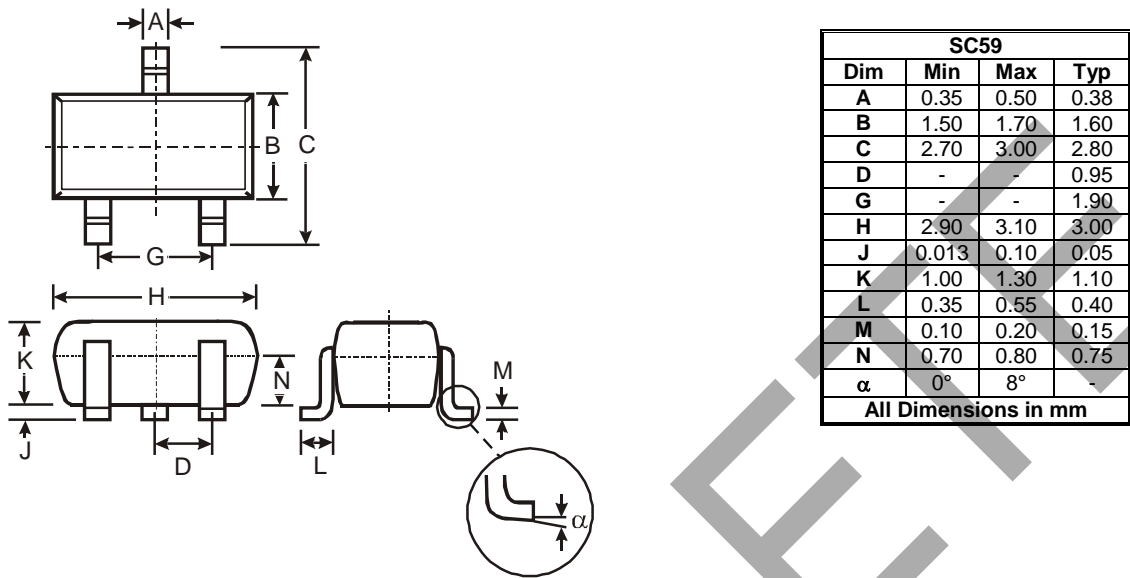
Y : Year : 0~9
 WW : Week : 01~52, "52" represents
 52 and 53 week
 X : Internal Code: A ~ Z : Green
 a ~ z : Lead Free

Part Number	Package	Identification Code
AH373	SIP-3 (Ammo Pack)	373
AH373	SIP-3 (Bulk Pack)	373

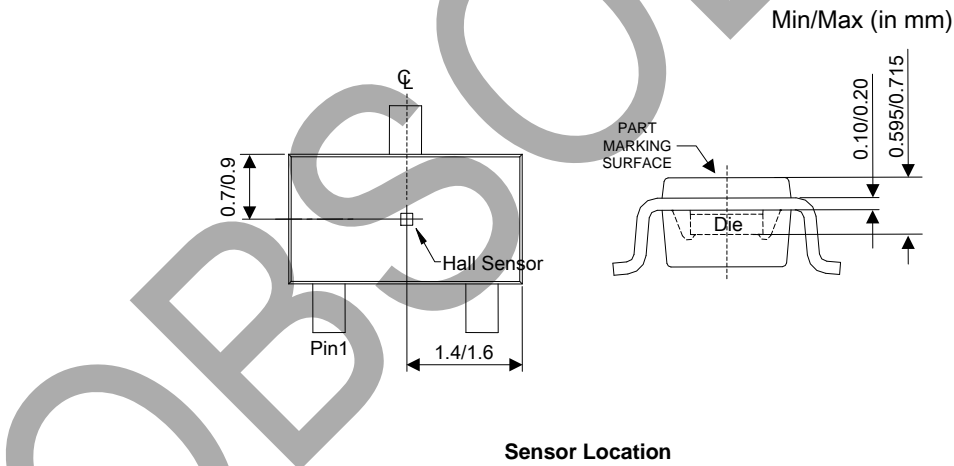
Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(1) Package Type: SC59



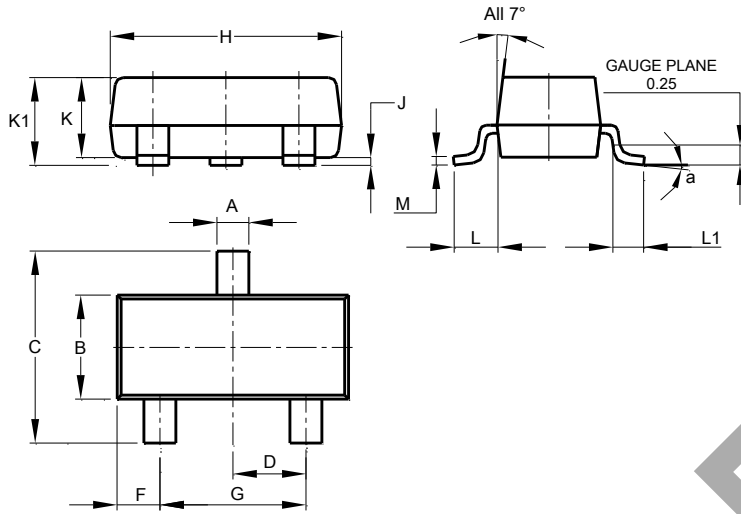
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Package Outline Dimensions (continued)

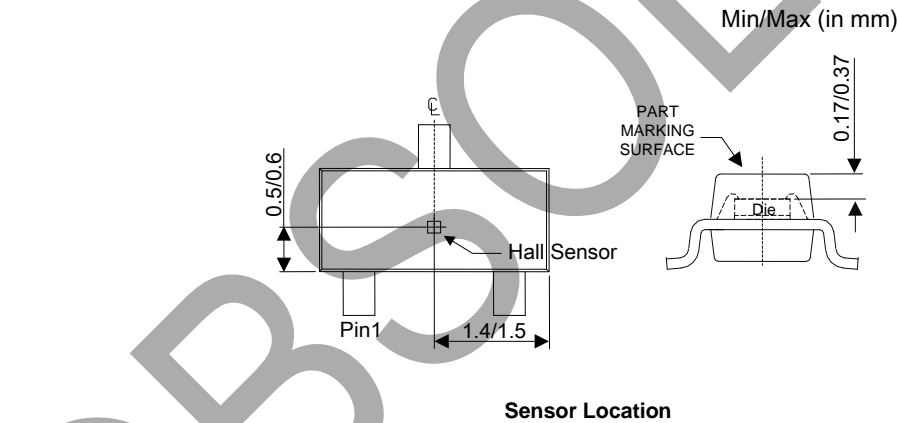
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(2) Package Type: SOT23



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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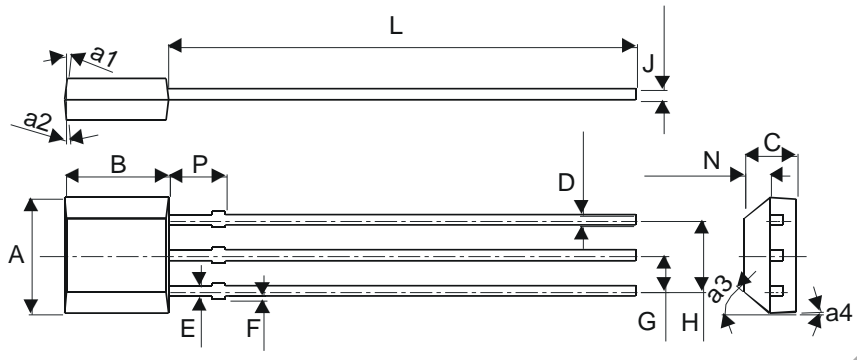


Sensor Location

Package Outline Dimensions (continued)

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

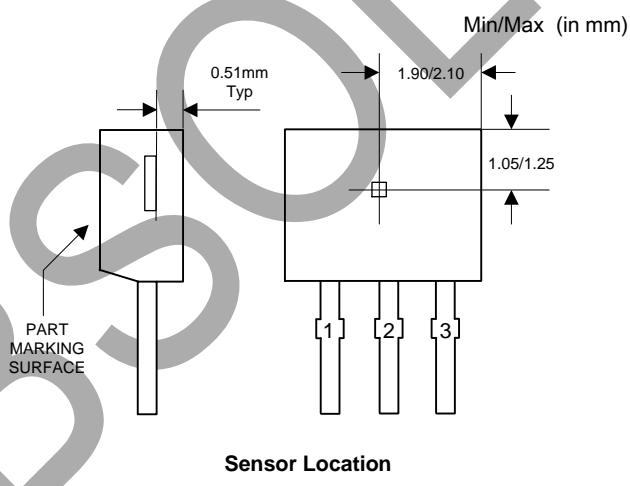
(3) Package Type: SIP-3 (Bulk Pack)



SIP-3 (Bulk Pack)		
Dim	Min	Max
A	3.9	4.3
a1	5° Typ	
a2	5° Typ	
a3	45° Typ	
a4	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

Note: 12. SIP-3 (Bulk Pack) - Thickness J includes Burrs

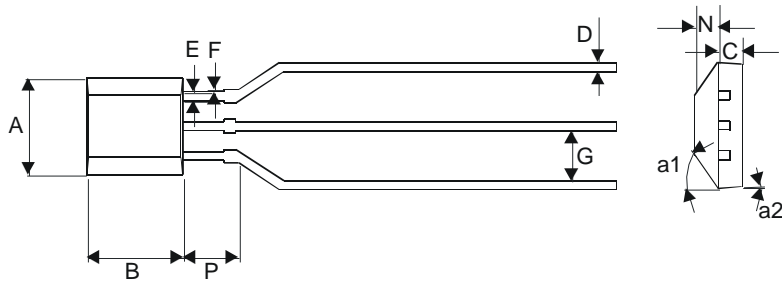
OBSOLETE - PART DISCONTINUED



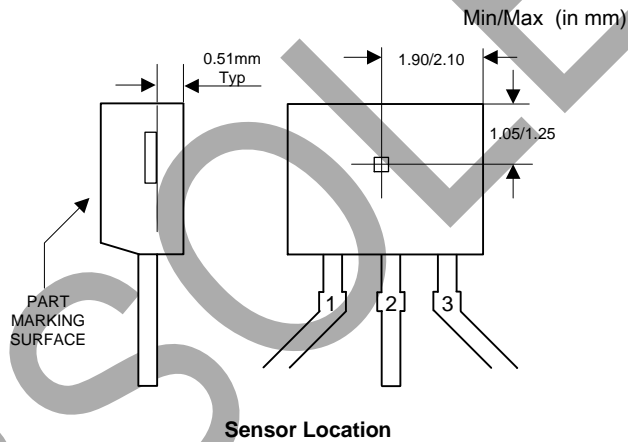
Package Outline Dimensions (continued)

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(4) Package Type: SIP-3 (Ammo Pack)



SIP-3 (Ammo Pack)		
Dim	Min	Max
A	3.9	4.3
a1	45° Typ	
a2	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		



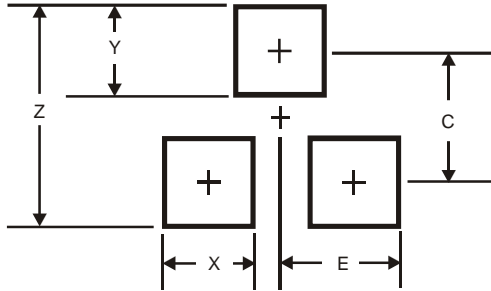
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Suggested Pad Layout

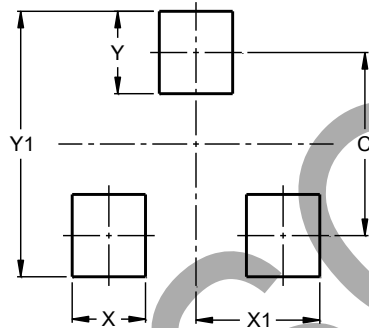
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(1) Package Type: SC59



Dimensions	Value (in mm)
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35

(2) Package Type: SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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