

Description

The AH372 is a single-digital-output Hall-Effect latch sensor with internal pullup 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 pullup resistor. An internal bandgap 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 operation point (B_{OP}), output is switched on (OUT pin is pulled low). The output state is held on until a magnetic flux density reversal falls below B_{RP} . When B is less than B_{RP} , the output is switched off.

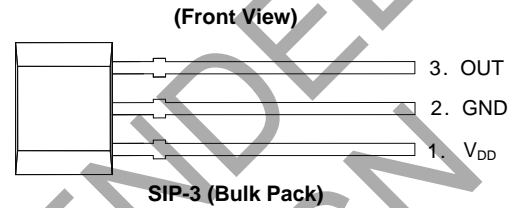
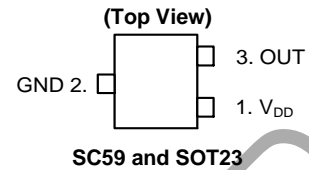
The AH372 is available in SIP-3 (Ammo Pack), SIP-3 (Bulk Pack), SC59 and SOT23 packages.

Features

- Bipolar Hall-Effect Latch Operation
- 2.2V to 20V Operating Range
- Single Output with Built-in Pullup Resistor
- 25mA output Sink Capability
- -40°C to +125°C Operating Temperature
- Industry Standard SIP-3 (Ammo Pack), SIP-3 (Bulk 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.

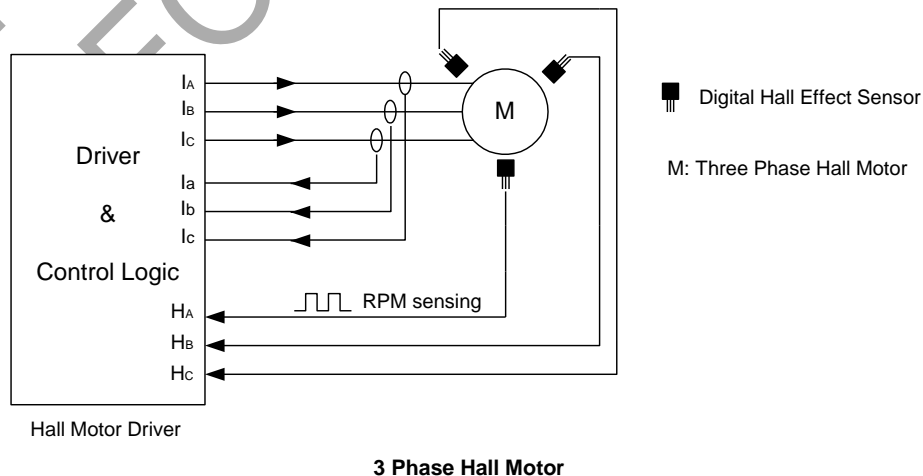
Pin Assignments



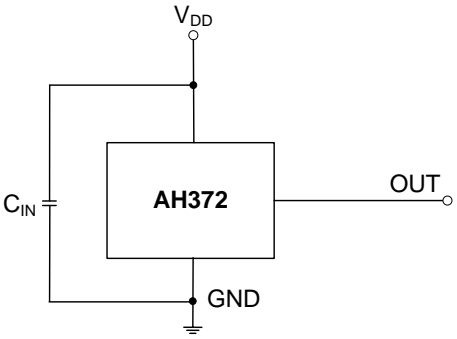
Applications

- Rotor position sensing for motor commutations
- Encoders
- Speed measurements – RPM monitors
- Contact-less current switches

Typical Application Circuits



Typical Application Circuits (continued)



Typical AH372 Circuit

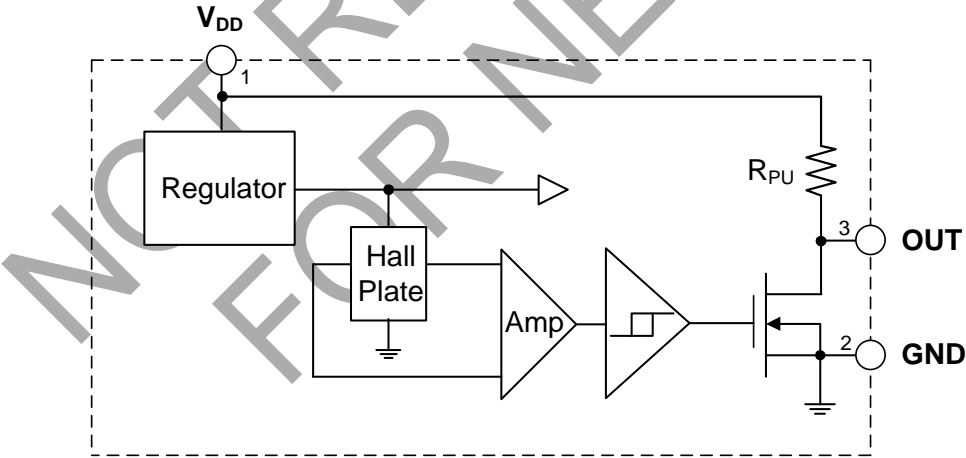
Note: 4. C_{IN} is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 100nF typical.

Pin Descriptions

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

Pin Number	Pin Name	Function
1	V _{DD}	Power Supply Input
2	GND	Ground
3	OUT	Output

Functional Block Diagram



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

Symbol	Characteristics	Values	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 (Ammo Pack) and SIP-3 (Bulk Pack)	550	mW
		SC59 and SOT23	230	mW
T_{STG}	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 Ratings* 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.)

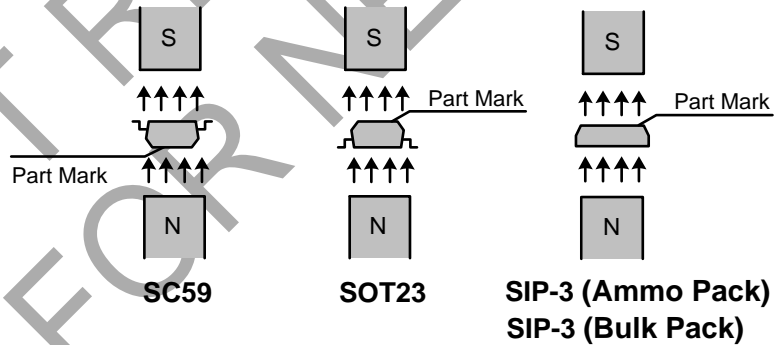
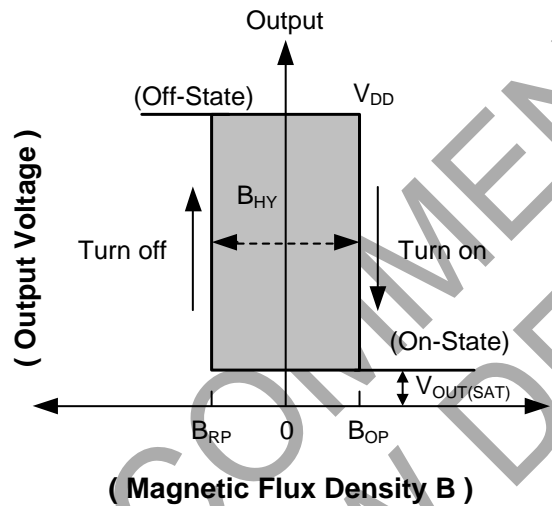
Symbol	Characteristic	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output On Voltage	$I_{OUT} = 20\text{mA}$	—	300	400	mV
I_{DD}	Supply Current	$B < B_{RP}$	—	2	4	mA
I_{OFF}	Output Leakage Current	Output off	—	< 0.1	10	μA
RPU	Internal Pull-up Resistor	—	7	10	13	k Ω

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
B_{OP} (South Pole to Part Marking Side for SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SOT23; North Pole to Part Marking Side for SC59)	Operation Point	5	30	60	Gauss
B_{RP} (South Pole to Part Marking Side for SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SOT23; North Pole to Part Marking Side for SC59)	Release Point	-60	-30	-5	
B_{HY} ($ B_{OPX} - B_{RPX} $)	Hysteresis	—	60	—	

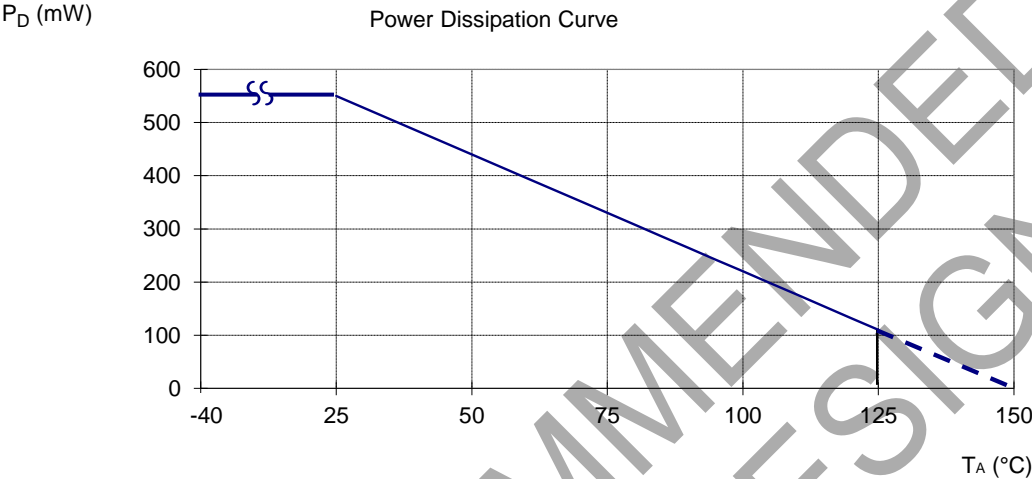
Note: 8. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



Thermal Performance Characteristics

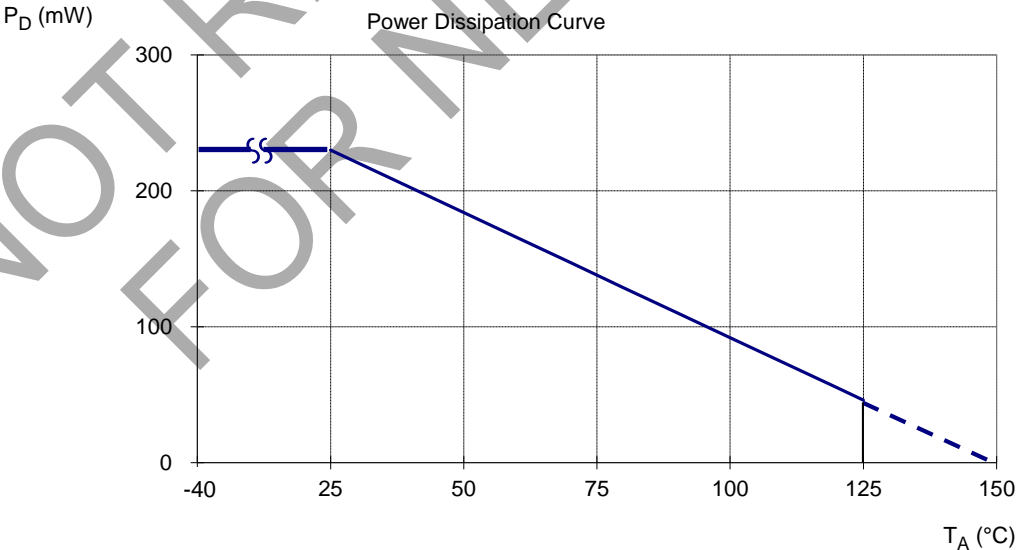
(1) Package Types: SIP-3 (Ammo Pack) and SIP-3 (Bulk Pack)

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

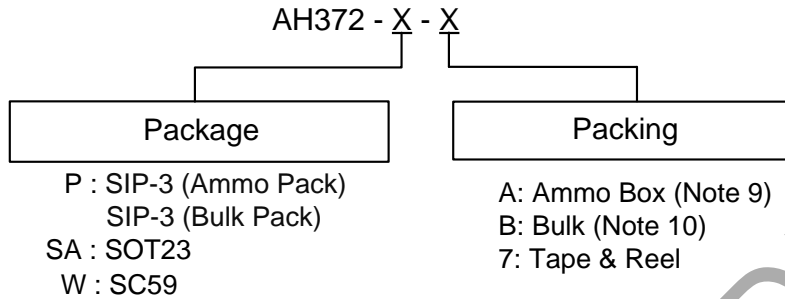


(2) Package Types: SC59 and SOT23

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



Ordering Information



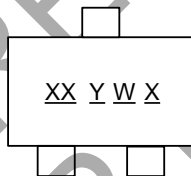
Orderable Part Number	Package Code	Package (Note 11)	Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH372-P-A	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH372-P-B	P	SIP-3 (Bulk Pack)	1000	-B	NA	NA	NA	NA
AH372-SA-7	SA	SOT23	NA	NA	3000/Tape & Reel	-7	NA	NA
AH372-W-7	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA

Notes: 9. Ammo Box is for SIP-3 (Ammo Pack) Spread Lead.
 10. Bulk is for SIP-3 (Bulk Pack) Straight Lead.
 11. Reverse taping as shown on Diodes Incorporated's Surface Mount (SMD) Packaging document AP02007, which can be found on our website <https://www.diodes.com/assets/Packaging-Support-Docs/AP02007.pdf>.

Marking Information

(1) Package Types: SC59 and SOT23

(Top View)

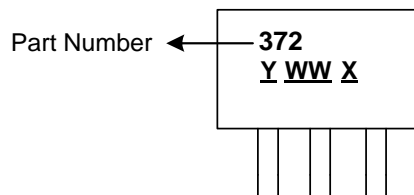


XX : Identification Code
 Y : Year 0 to 9
 W : Week : A to Z : 1 to 26 Week;
 a to z : 27 to 52 Week; z Represents
 52 and 53 Week
 X : Internal Code

Orderable Part Number	Package	Identification Code
AH372-W-7	SC59	XH
AH372-SA-7	SOT23	YH

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

(Front View)

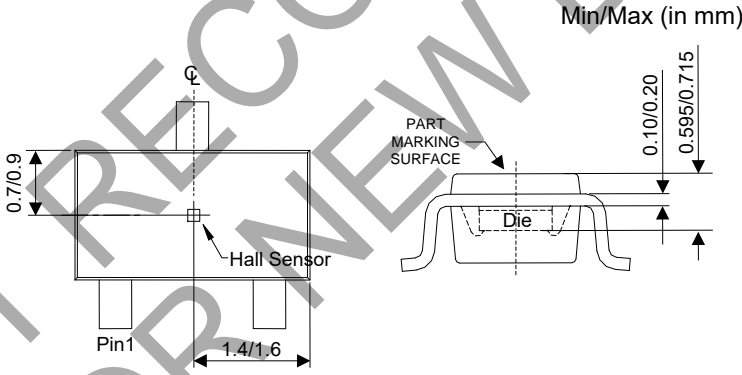
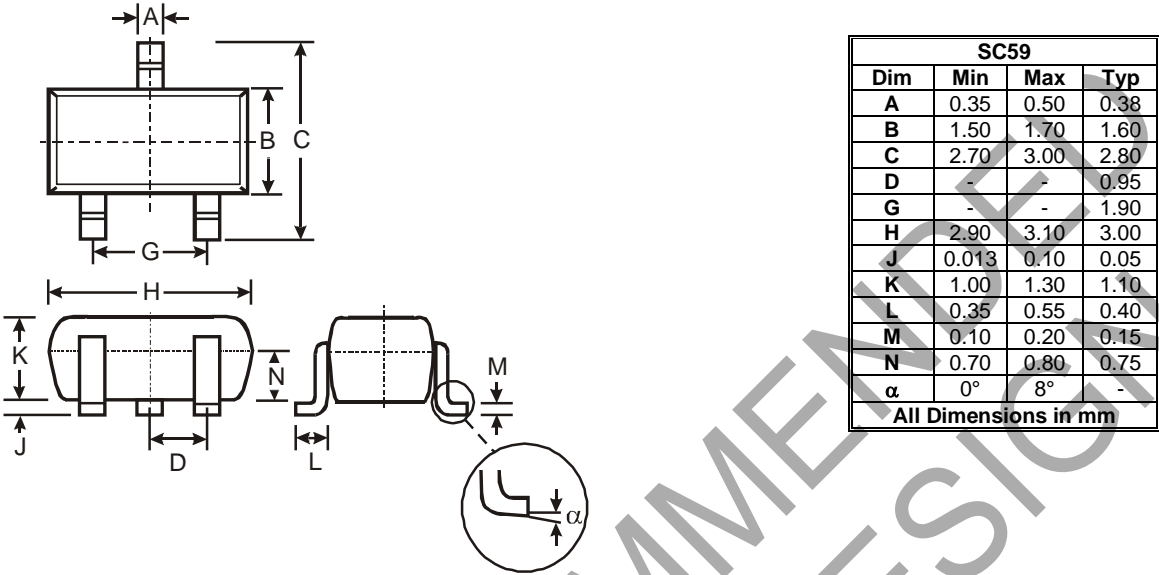


Y : Year : 0~9
 WW : Week : 01~52, "52" Represents
 52 and 53 Week
 X : Internal Code

Package Outline Dimensions

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

(1) Package Type: SC59

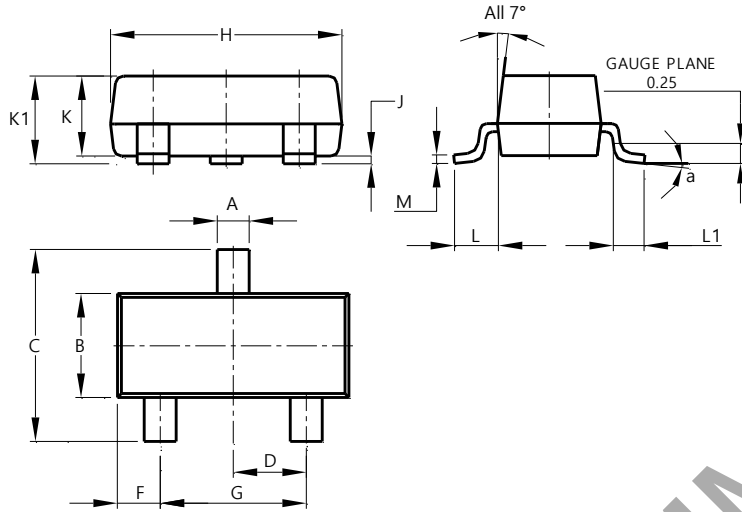


Sensor Location

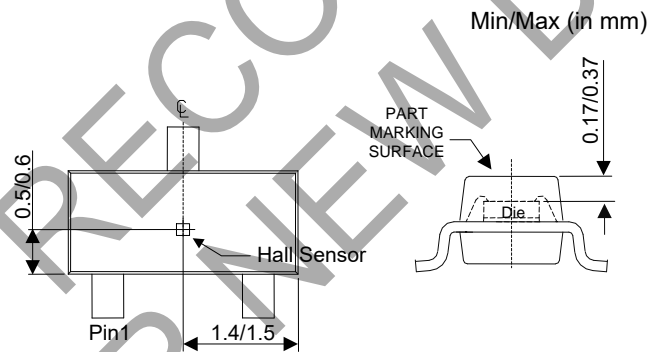
Package Outline Dimensions (continued)

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			

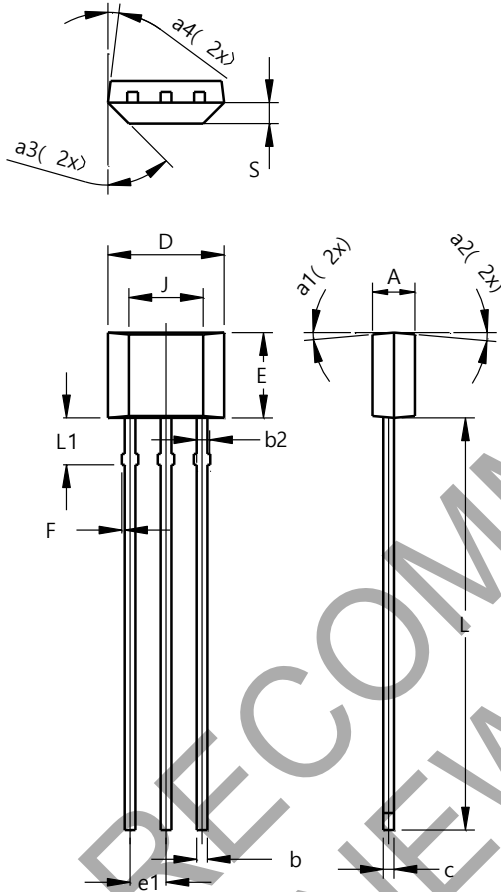


Sensor Location

Package Outline Dimensions (continued)

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

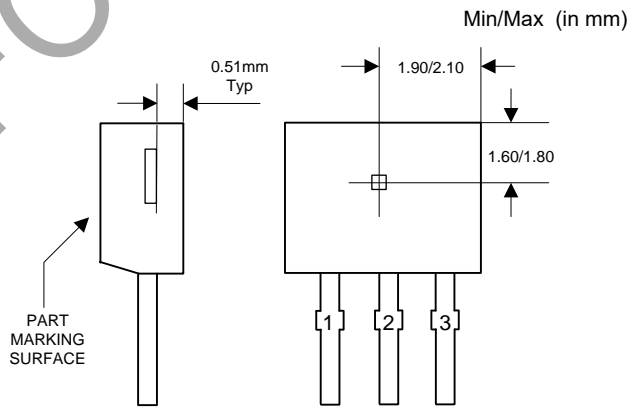
(3) Package Type: SIP-3 (Bulk Pack)



SIP-3 (Bulk Pack)			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
b	0.33	0.43	0.38
b2	0.40	0.508	0.46
c	0.35	0.41	0.38
D	3.90	4.30	4.10
E	2.80	3.20	3.00
e1	1.24	1.30	1.27
F	0.00	0.20	--
J	2.62 REF		
L	14.00	15.00	14.50
L1	1.55	1.75	1.65
S	0.63	0.84	0.74
a1	--	--	5°
a2	--	--	5°
a3	--	--	45°
a4	--	--	3°
All Dimensions in mm			

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

NOT RECOMMENDED FOR NEW DESIGN

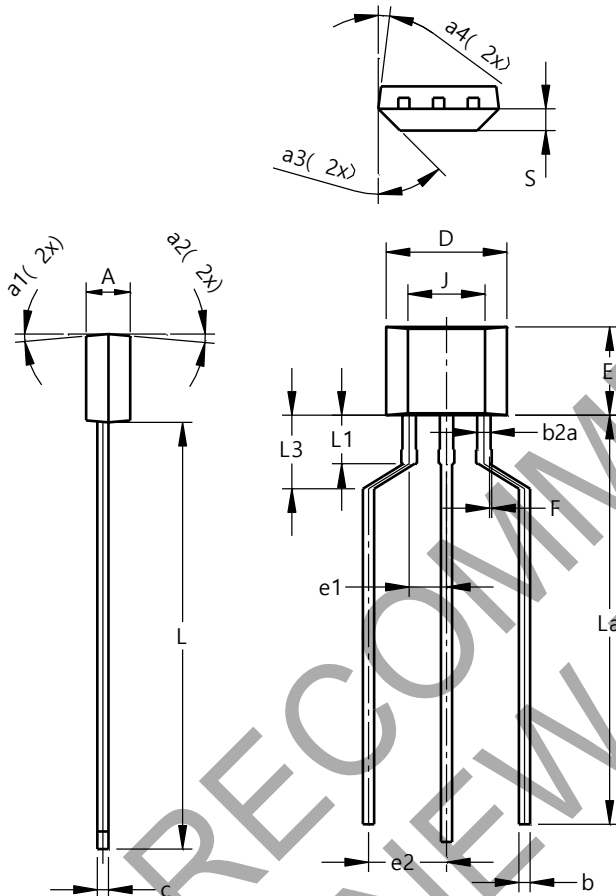


Sensor Location

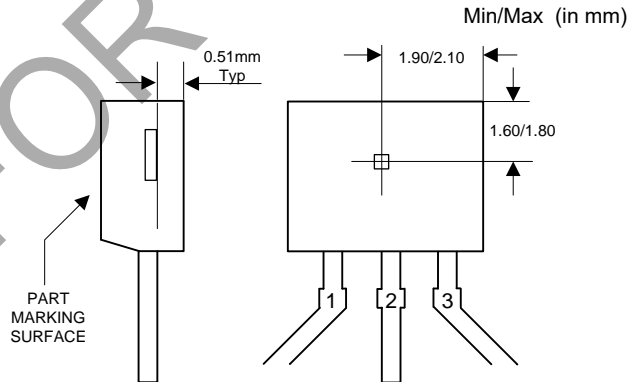
Package Outline Dimensions (continued)

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	Typ
A	1.40	1.60	1.50
b	0.33	0.43	0.38
b2a	0.40	0.52	0.46
c	0.35	0.41	0.38
D	3.90	4.30	4.10
E	2.80	3.20	3.00
e1	1.24	1.30	1.27
e2	2.40	2.90	2.65
F	0.00	0.20	--
J	2.62 REF		
L	14.00	15.00	14.50
La	12.90	14.90	13.90
L1	1.55	1.75	1.65
L3	2.00	3.00	2.50
S	0.63	0.84	0.74
a1	--	--	5°
a2	--	--	5°
a3	--	--	45°
a4	--	--	3°
All Dimensions in mm			

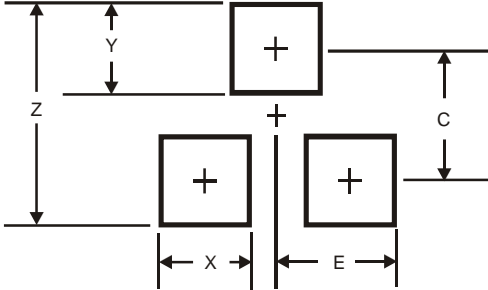


Sensor Location

Suggested Pad Layout

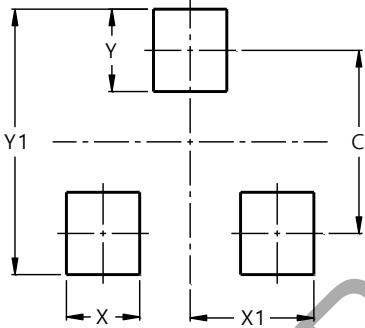
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(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

NOT RECOMMENDED FOR NEW DESIGN

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