NEW PRODUCT

Description

AH372 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 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.

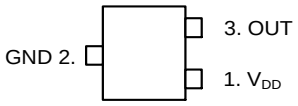
The AH372 is available in SIP-3 (Ammo Pack), SIP-3 (Bulk Pack), SC59 and SOT23 packages.

Features

- Bipolar Hall Effect Latch Operation
- 2.2V to 20V Operating Range
- Single Output with Built-in Pull-up 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)**

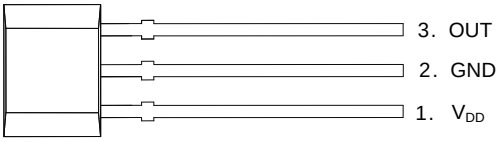
Pin Assignments

(Top View)



SC59 and SOT23

(Front View)



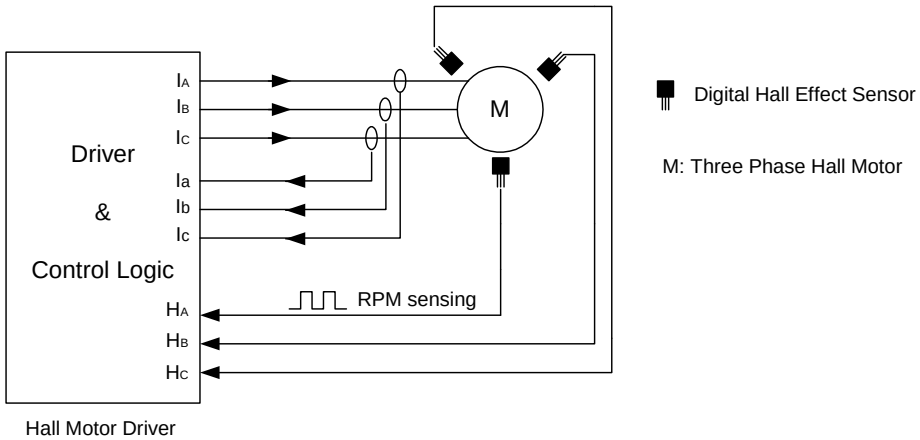
SIP-3 (Bulk Pack)

Applications

- Rotor Position Sensing for Motor Commutation
- Encoder
- Speed Measurement – RPM Monitor
- Contact-Less Current Switch

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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.

Typical Application Circuits



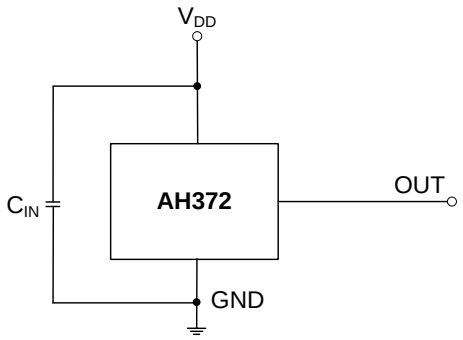
Hall Motor Driver

3 Phase Hall Motor

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Typical Application Circuits (cont.)



Typical AH372 Circuit

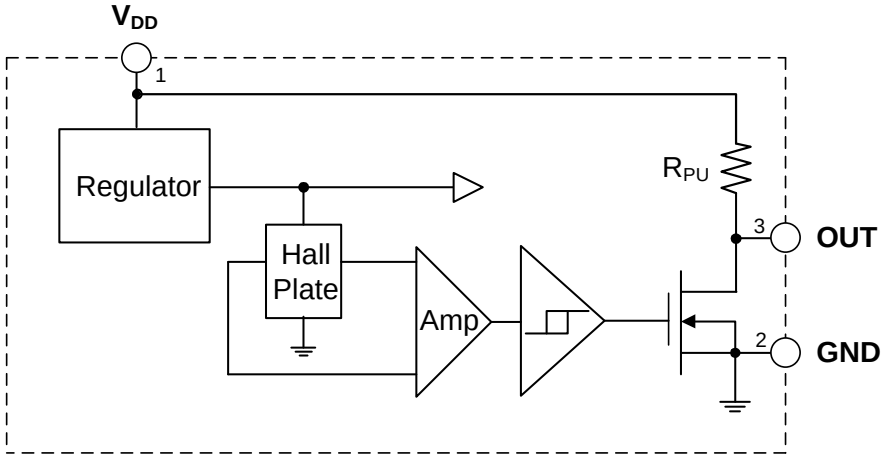
Note: 4. C_{IN} is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 100nF typical.

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



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Absolute Maximum Ratings (Note 5) @T_A = +25°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	°C
T_J	Maximum Junction Temperature		+150	°C

Notes: 5. Stresses greater than the 'Absolute Maximum Ratings' specified above may 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 may be affected by exposure to absolute maximum rating conditions for extended periods of time.

6. 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°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	°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°C, V_{DD} = 12V, unless otherwise specified.)

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

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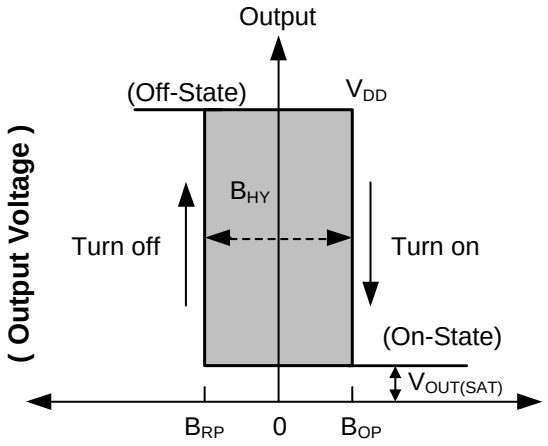
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Magnetic Characteristics (Note 8) (@T_A = +25°C, V_{DD} = 2.5V to 20V, unless otherwise specified.)

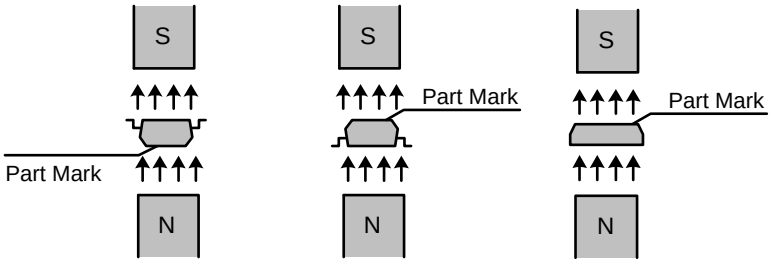
(1mT=10 Gauss)

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.



(Magnetic Flux Density B)



SC59 **SOT23** **SIP-3 (Ammo Pack)**
SIP-3 (Bulk Pack)

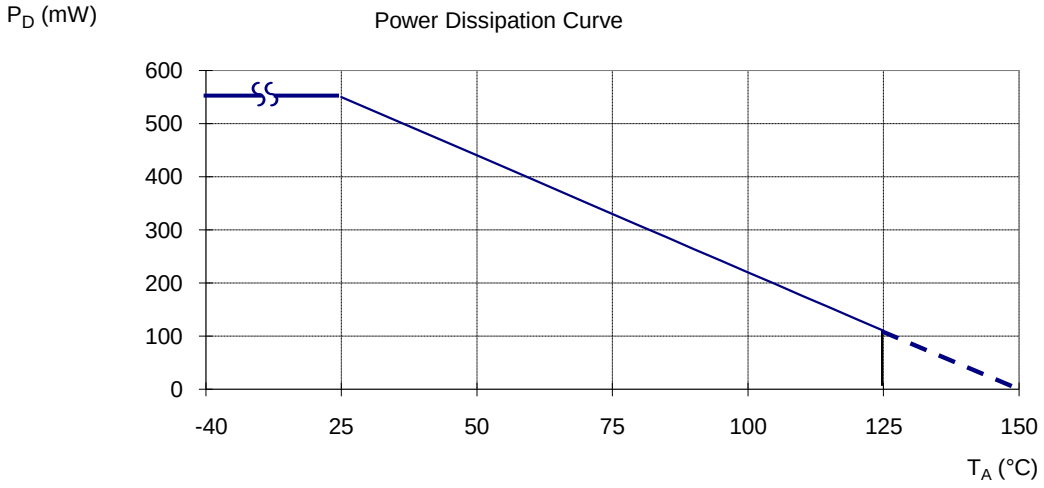
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Thermal Performance Characteristics

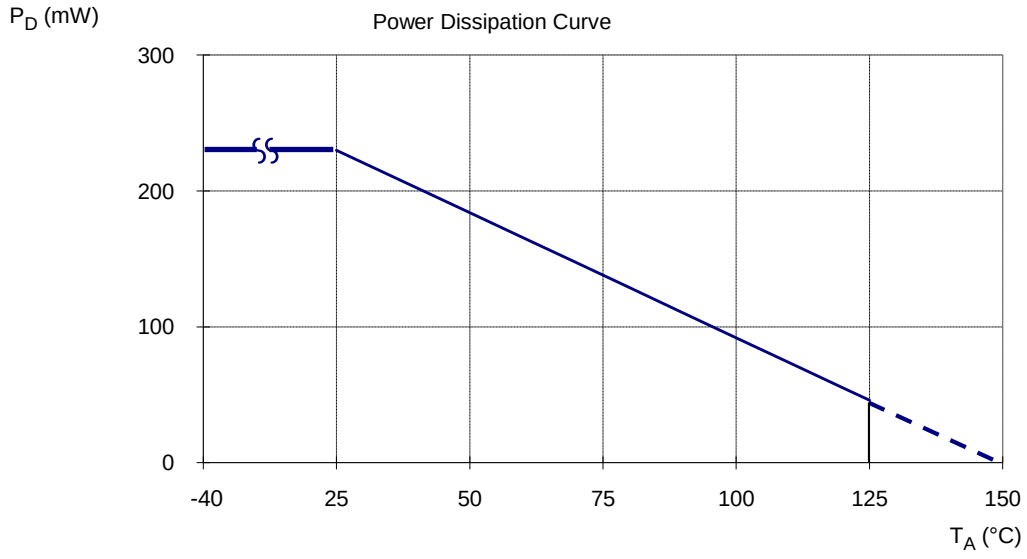
(1) Package Types: SIP-3 (Ammo Pack) and SIP-3 (Bulk Pack)

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



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Ordering Information

AH372 - X - X

Package

P : SIP-3 (Ammo Pack)
SIP-3 (Bulk Pack)
SA : SOT23
W : SC59

Packing

A: Ammo Box (Note 9)
B: Bulk (Note 10)
7: Tape & Reel

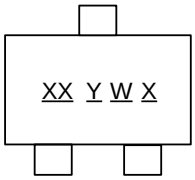
Part Number	Package Code	Packaging (Note 11)	Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH372-P-A	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH372-P-B	P	SIP-3 (Bulk Pack)	1000	-B	NA	NA	NA	NA
AH372-SA-7	SA	SOT23	NA	NA	3000/Tape & 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 Inc. Surface Mount (SMD) Packaging document AP02007, which can be found on our website http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information

(1) Package Types: SC59 and SOT23

(Top View)

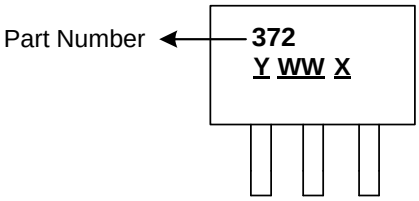


XX : Identification Code
Y : Year 0 to 9
W : Week : A to Z : 1 to 26 Week;
a to z : 27 to 52 Week; z Represents
52 and 53 Week
X : Internal Code

Part Number	Package	Identification Code
AH372	SC59	XH
AH372	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

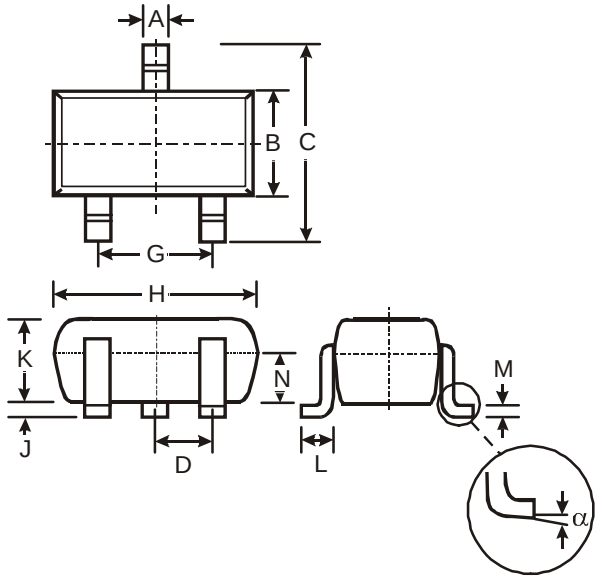
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Package Outline Dimensions

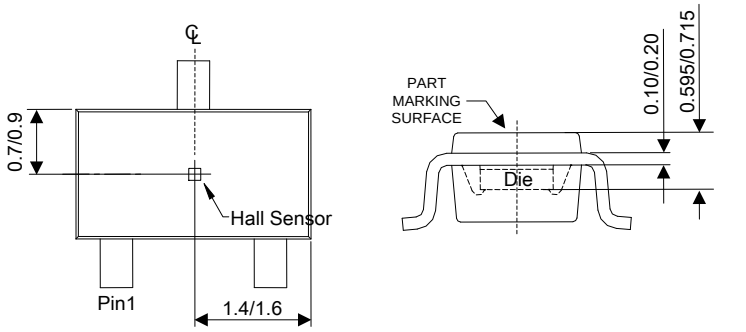
Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SC59



SC59			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	-
All Dimensions in mm			

Min/Max (in mm)



Sensor Location

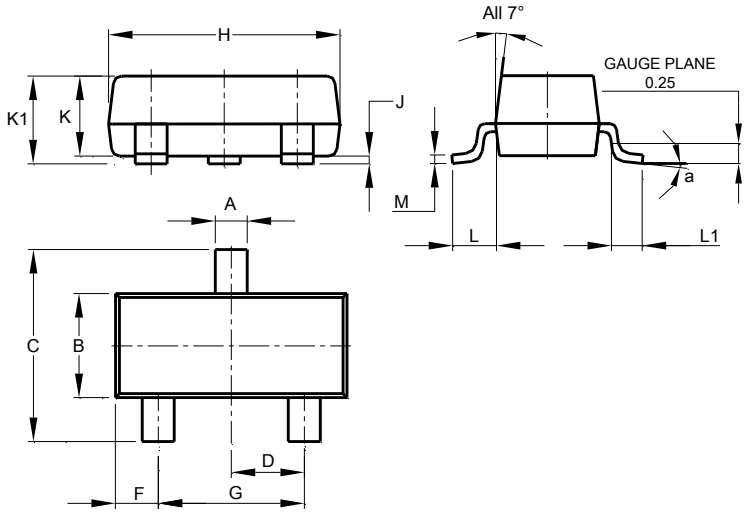
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Package Outline Dimensions (cont.)

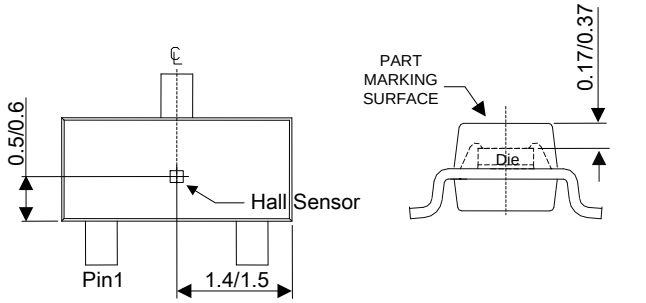
Please see http://www.diodes.com/package-outlines.html for the latest version.

(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			

Min/Max (in mm)



Sensor Location

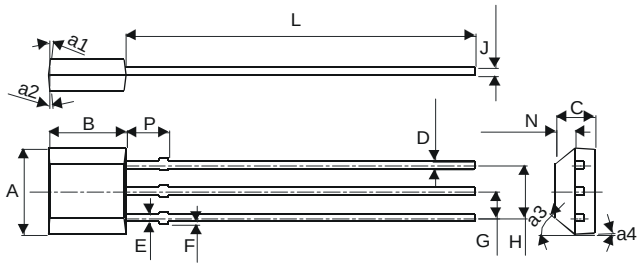
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Package Outline Dimensions (cont.)

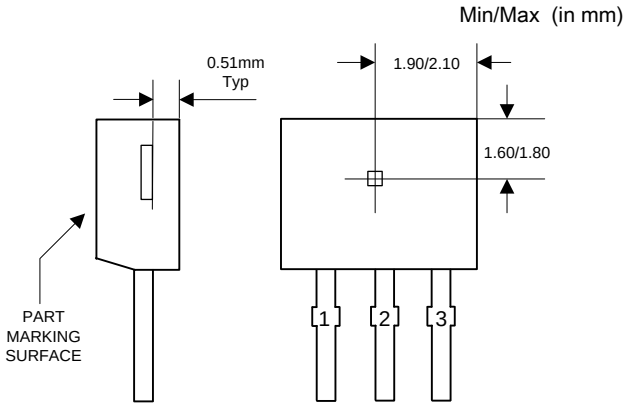
Please see http://www.diodes.com/package-outlines.html for the latest version.

(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



Sensor Location

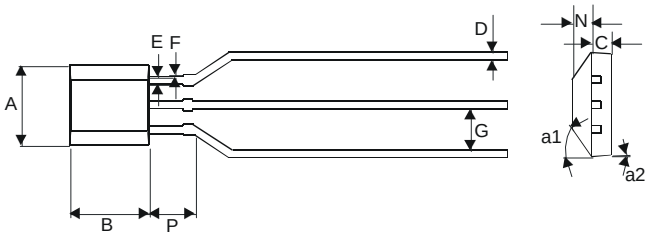
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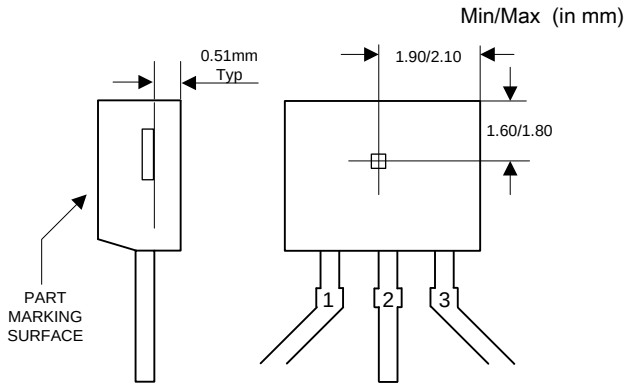
Package Outline Dimensions (cont.)

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		



Sensor Location

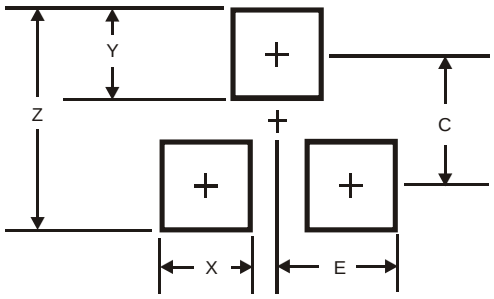
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Suggested Pad Layout

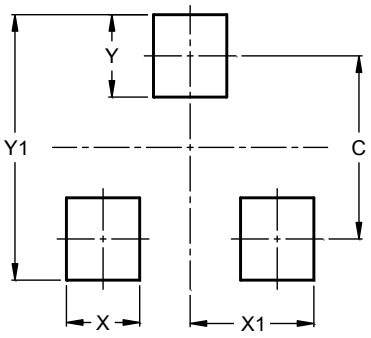
Please see http://www.diodes.com/package-outlines.html for the latest version.

(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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