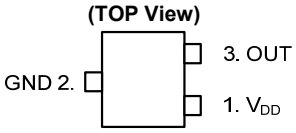
Description

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.

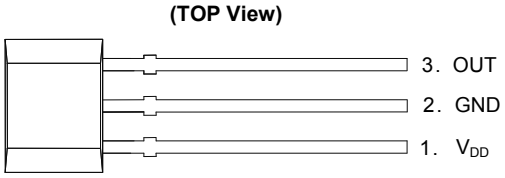
When the magnetic flux density (**B**) perpendicular to the package is larger than operate point (**Bop**), output is switched on (OUT pin is pulled low). The output state is held on until a magnetic flux density reversal falls below Brp. When **B** is less than Brp, the output is switched off.

The AH373 is available in SIP-3L, SC59 and SOT23 packages.

Pin Assignments



SC59 and SOT23



SIP-3L

Features

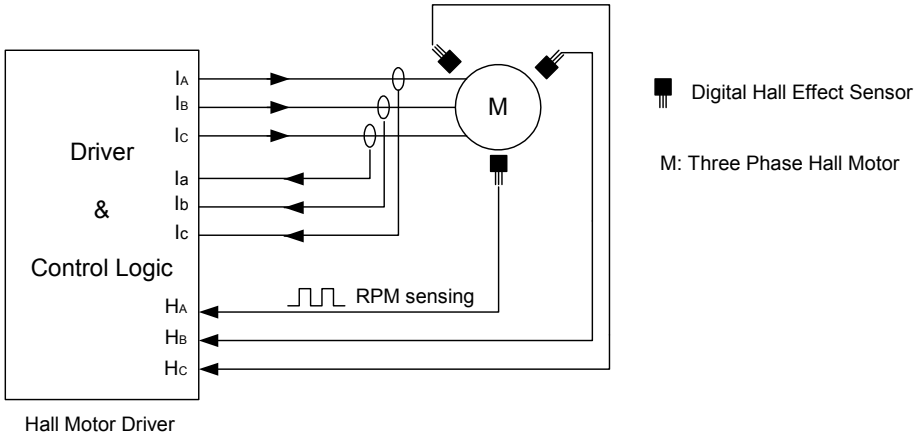
- Bipolar Hall Effect Latch Operation
- 2.2V to 20V Operating Range
- Single Output with Built-in Pull-up Resistor
- 25mA output Sink Capability
- -40°C to +125°C Operating Temperature
- Industry Standard SIP-3L, SC59 and SOT23 Packages
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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



3 Phase Hall Motor

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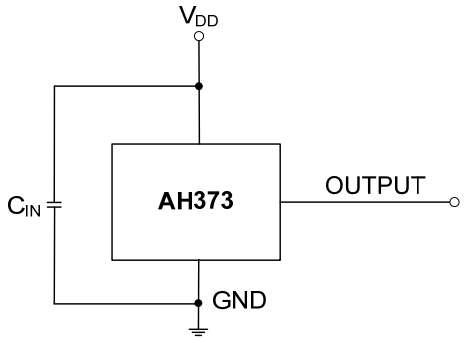
Typical Application Circuits (cont.)



Typical AH373 Circuit

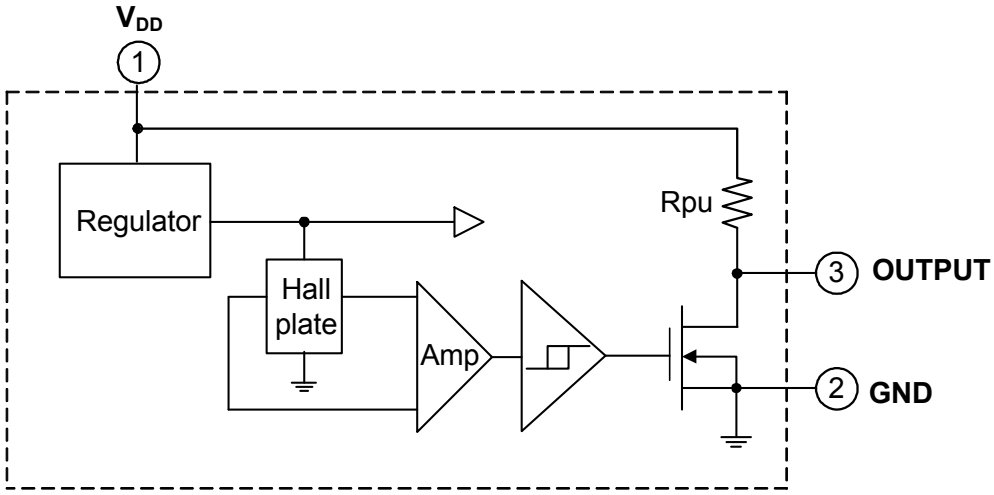
Note: 4. C_{IN} is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 100nF typical

Pin Descriptions

Package: SC59, SOT23 and SIP-3L

Pin Number	Pin Name	Function
1	V_{DD}	Power Supply Input
2	GND	Ground
3	OUTPUT	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-3L	550	mW
		SC59 and SOT23	230	mW
T_S	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 < Brp	—	2	4	mA
I_{OFF}	Output Leakage Current	Output off	—	< 0.1	10	μA
Rpu	Internal Pull-up Resistor	—	7	10	13	kΩ

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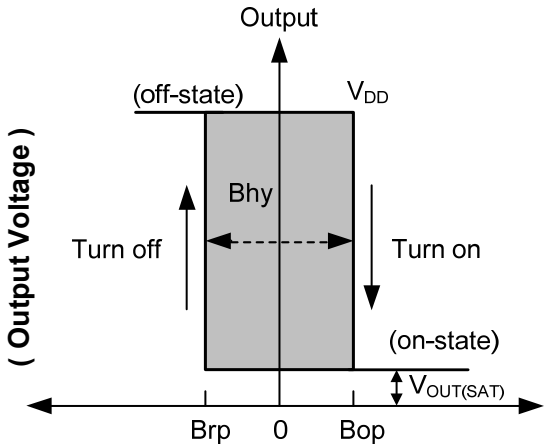
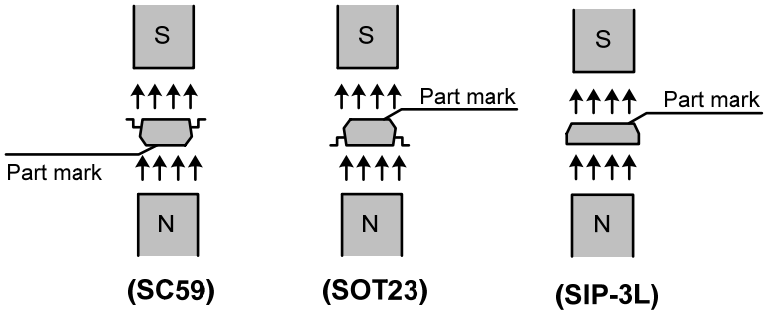
Magnetic Characteristics (Note 8) (@T_A = +25°C, V_{DD} = 2.5V to 20V, unless otherwise specified.)

(1mT=10 Gauss)

Symbol	Characteristic	Min	Typ	Max	Unit
Bop (South pole to part marking side for SIP-3L 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-3L and SOT23; North pole to part marking side for SC59)	Release Point	-60	-30	-5	
Bhy (|Bopx|-|Brpx|)	Hysteresis	—	60	—	

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





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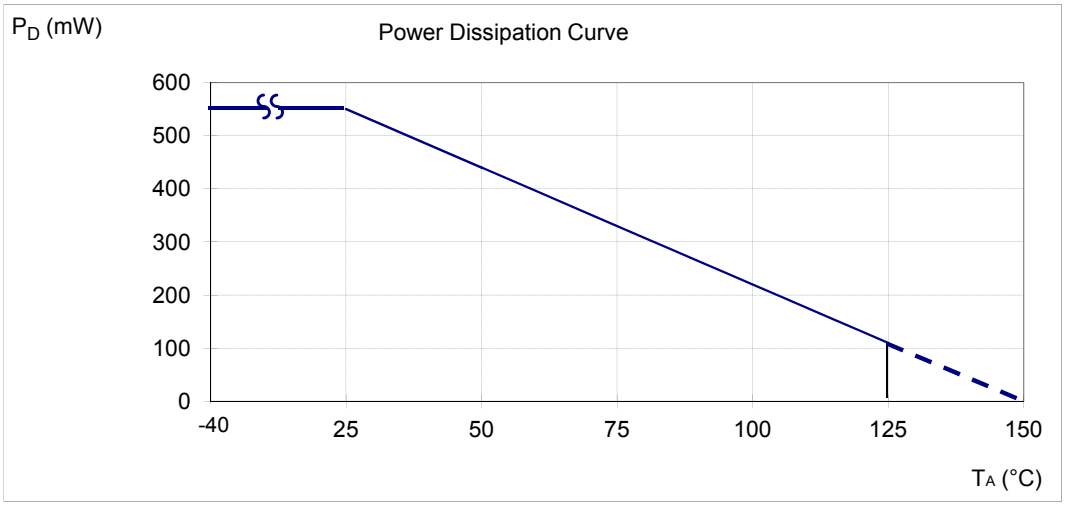
Thermal Performance Characteristics

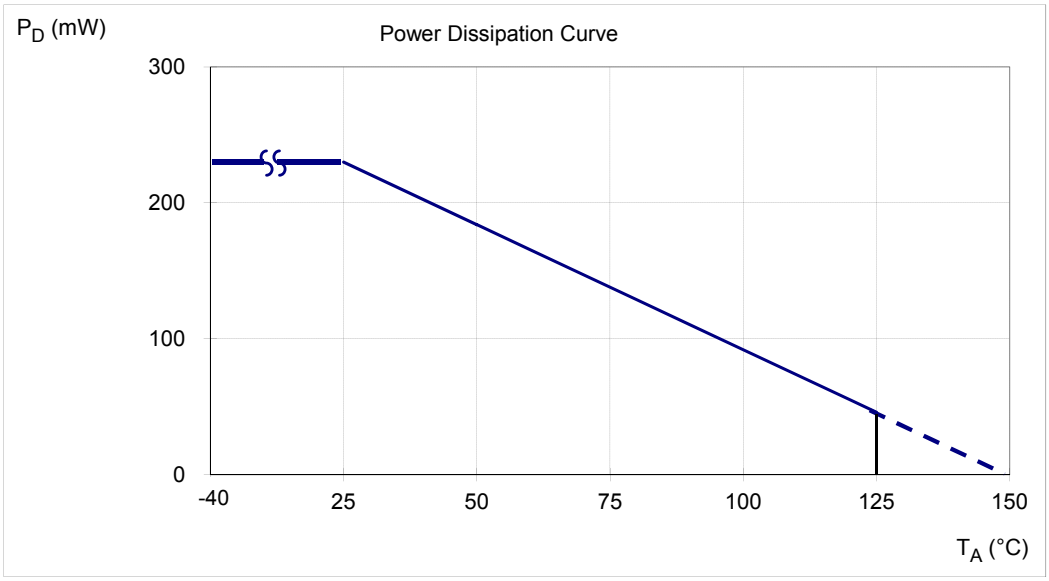
(1) Package Type: SIP-3L

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 Type: 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



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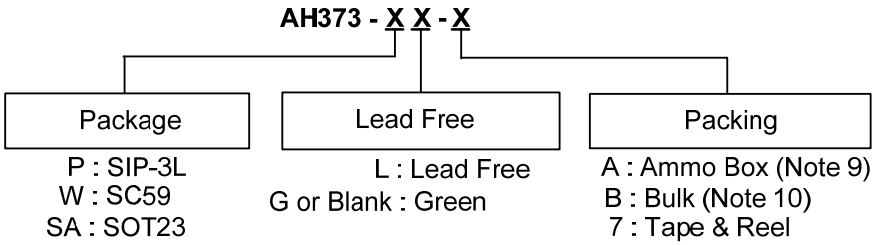
Ordering Information

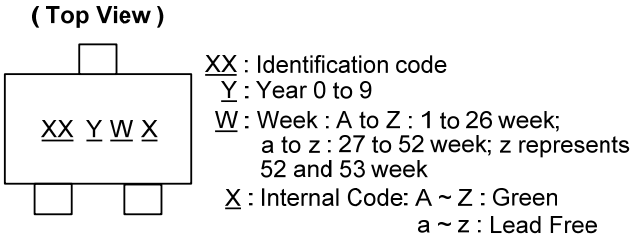


Part Number	Package Code	Packaging (Note 11)	Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH373-PL-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A
AH373-PL-B	P	SIP-3L	1000	-B	NA	NA	NA	NA
AH373-PG-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A
AH373-PG-B	P	SIP-3L	1000	-B	NA	NA	NA	NA
AH373-SA-7	SA	SOT23	NA	NA	3000/Tape & Reel	-7	NA	NA
AH373-WL-7	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA
AH373-WG-7	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA

Notes: 9. Ammo Box is for SIP-3L Spread Lead.
10. Bulk is for SIP-3L 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.

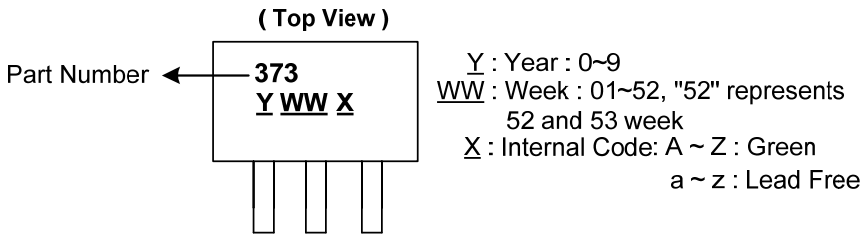
Marking Information

(1) Package Type: SC59 and SOT23



Part Number	Package	Identification Code
AH373	SC59	P2
AH373	SOT23	S2

(2) Package Type: SIP-3L



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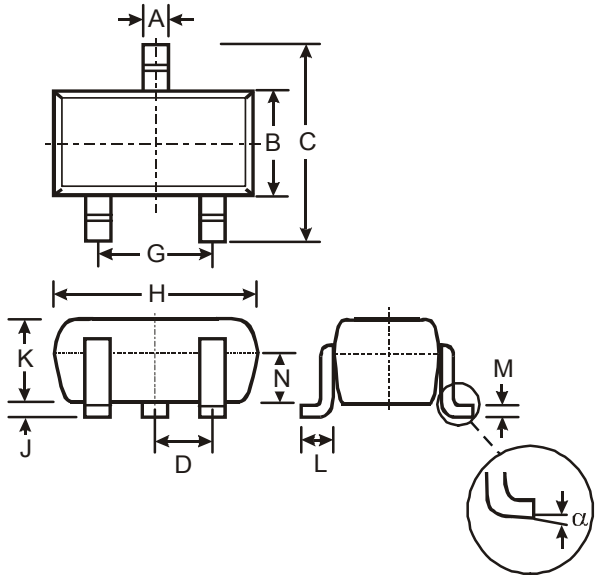
Package Outline Dimensions (All dimensions in mm.)

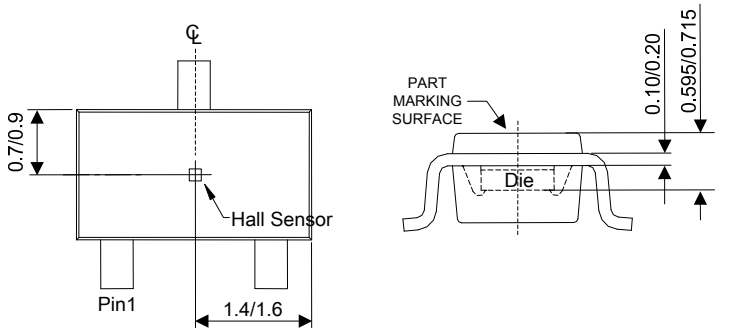
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(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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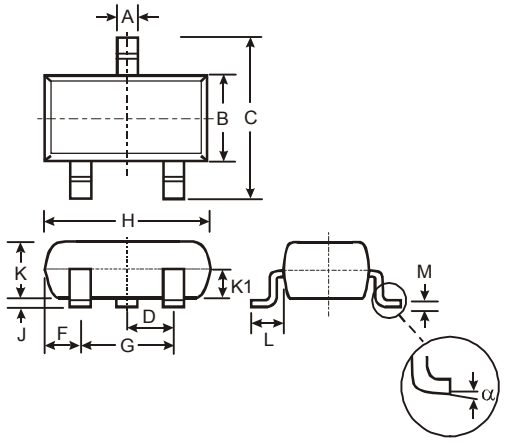
Package Outline Dimensions (cont.) (All dimensions in mm.)

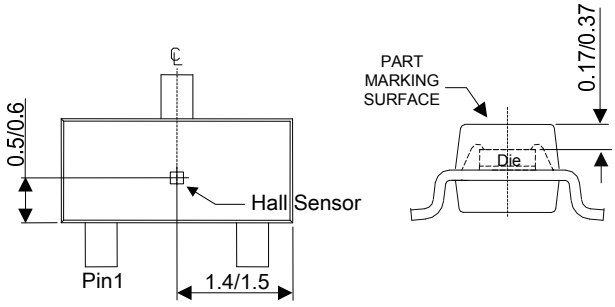
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Min/Max (in mm)



Sensor location

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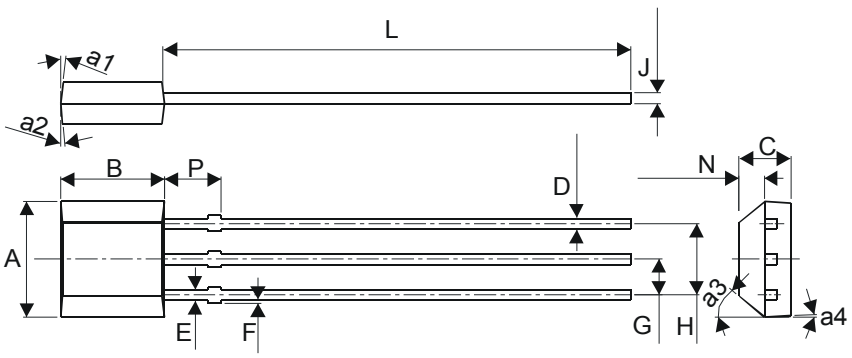
Package Outline Dimensions (cont.) (All dimensions in mm.)

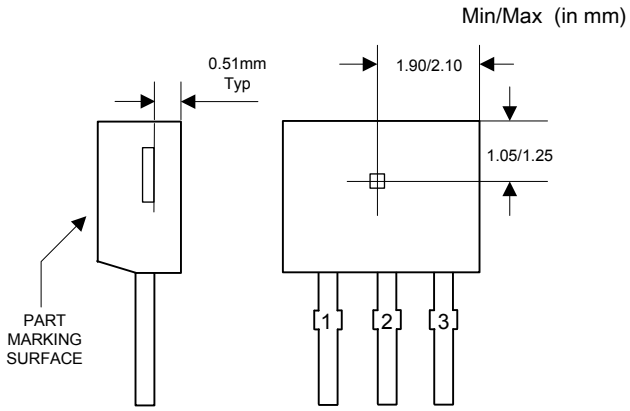
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(3) Package Type: SIP-3L for Bulk pack



SIP-3 for 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		

Notes: 13. SIP-3L Bulk pack - Thickness J includes Burrs



Sensor location

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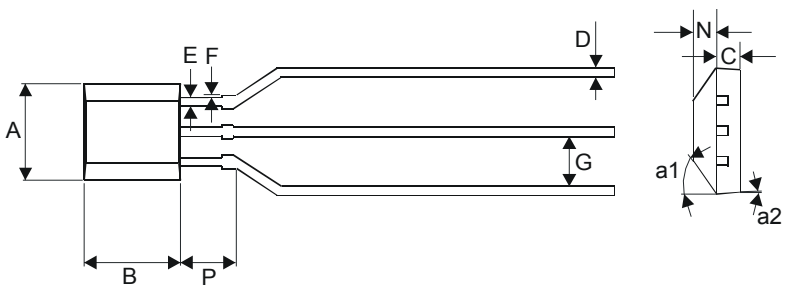
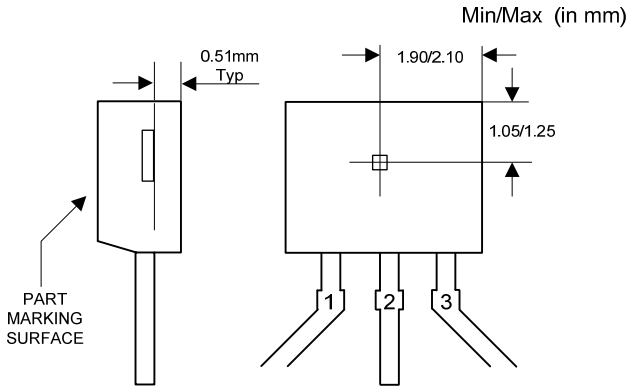
Package Outline Dimensions (cont.) (All dimensions in mm.)

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(4) Package Type: SIP-3L for Ammo pack



SIP-3 for 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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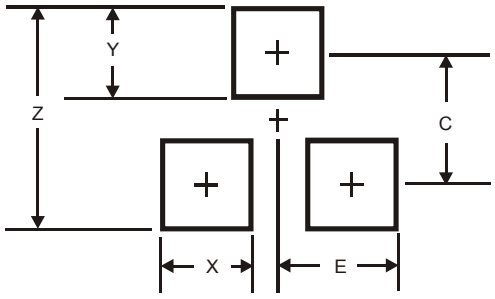
Suggested Pad Layout

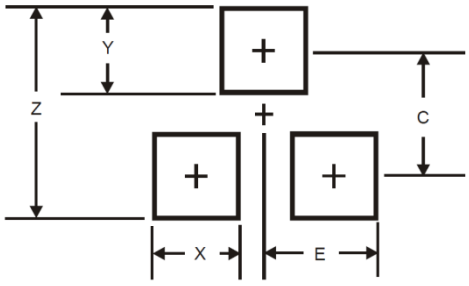
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

(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)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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