

**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.

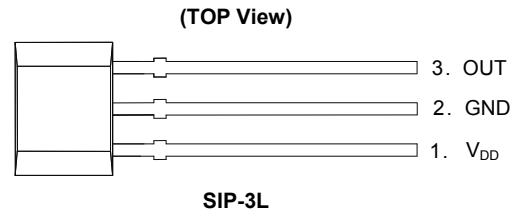
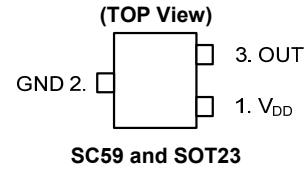
The AH373 is available in SIP-3L, SC59 and SOT23 packages.

**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)**

- 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](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.

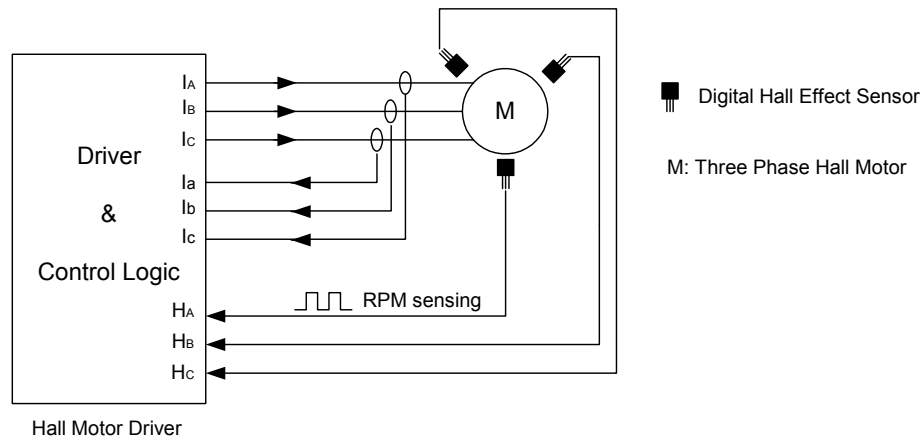
**Pin Assignments**



**Applications**

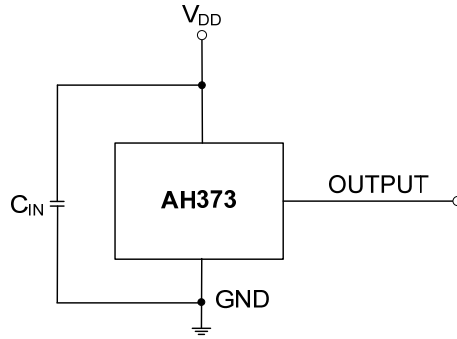
- Rotor Position Sensing for Motor Commutation
- Encoder
- Speed Measurement – RPM Monitor
- Contact-less Current Switch

**Typical Application Circuits**



**3 Phase Hall Motor**

**Typical Application Circuits** (cont.)



**Typical AH373 Circuit**

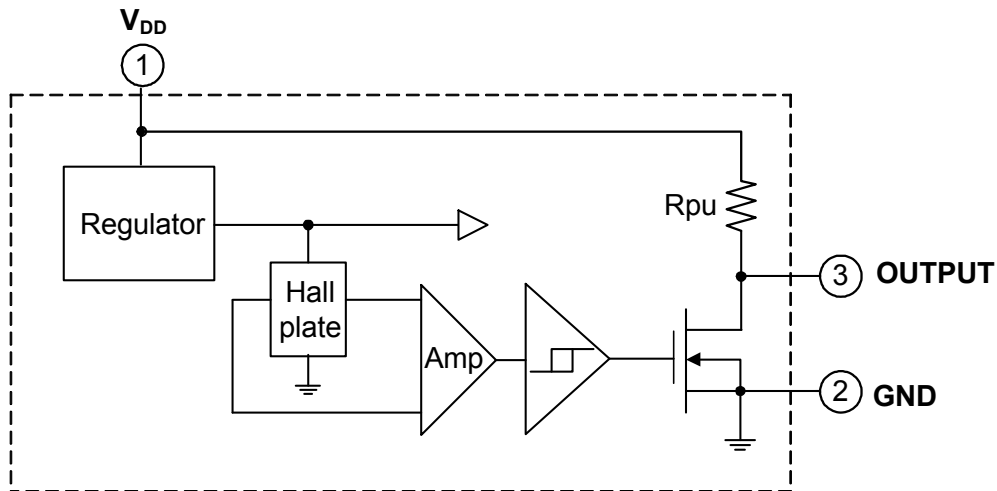
Note: 4. C<sub>IN</sub> is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 100nF typical

**Pin Descriptions**

Package: SC59, SOT23 and SIP-3L

Pin Number	Pin Name	Function
1	V <sub>DD</sub>	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	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	$^{\circ}\text{C}$	
$T_J$	Maximum Junction Temperature	+150	$^{\circ}\text{C}$	

- Notes:
- 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.
  - 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.)

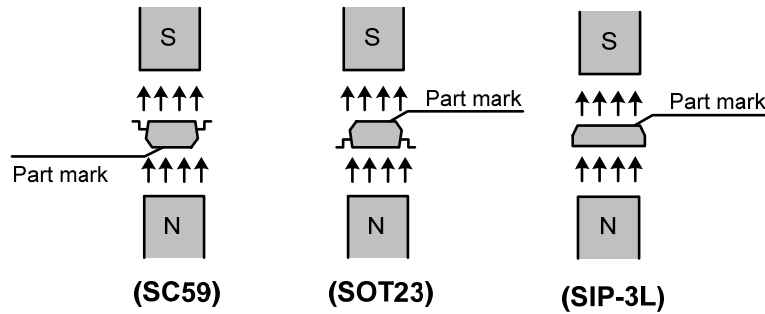
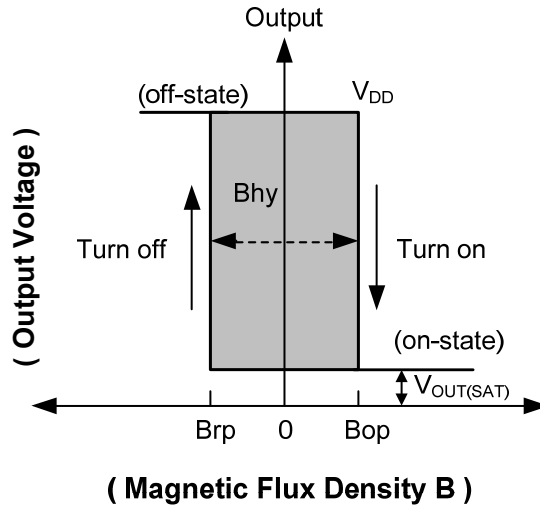
Symbol	Characteristic	Conditions	Min	Typ	Max	Unit
$V_{OUT}$	Output On Voltage	$I_{OUT} = 20\text{mA}$	—	300	400	mV
$I_{DD}$	Supply Current	$B < Brp$	—	2	4	mA
$I_{OFF}$	Output Leakage Current	Output off	—	< 0.1	10	$\mu\text{A}$
$R_{pu}$	Internal Pull-up Resistor	—	7	10	13	k $\Omega$

**Magnetic Characteristics** (Note 8) (@ $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 2.5\text{V}$  to  $20\text{V}$ , 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 ( $ B_{opx}  -  B_{rpx} $ )	Hysteresis	—	60	—	

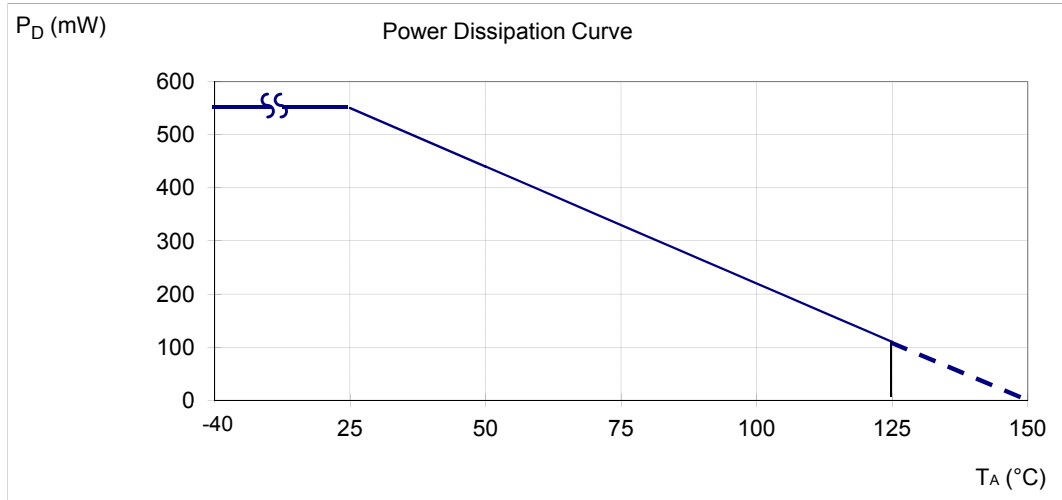
Note: 8. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



## Thermal Performance Characteristics

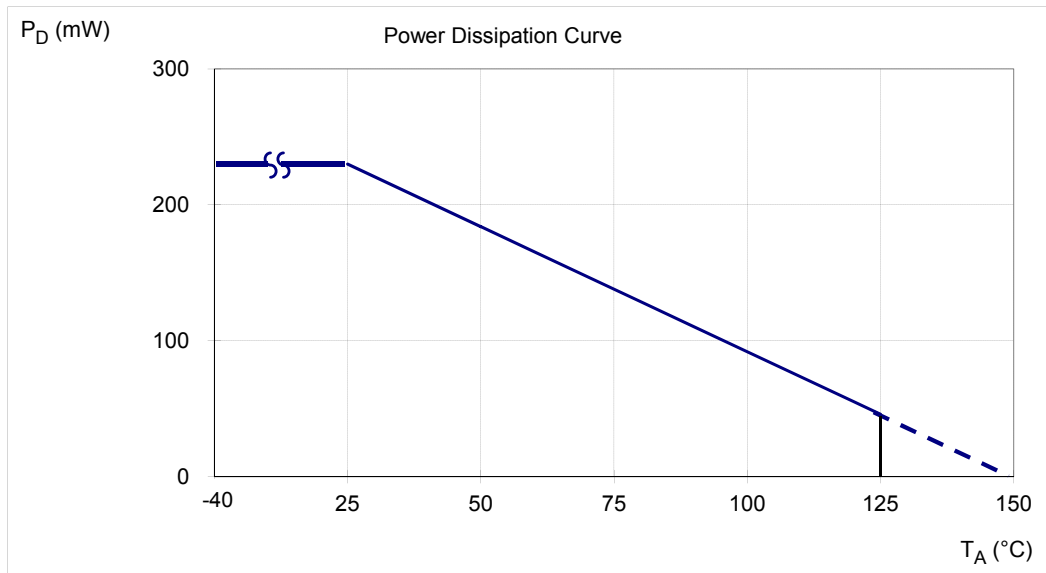
**(1) Package Type: SIP-3L**

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

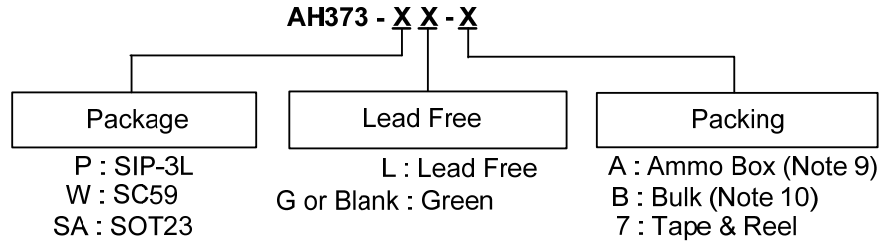


**(2) Package Type: SC59 and SOT23**

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



**Ordering Information**

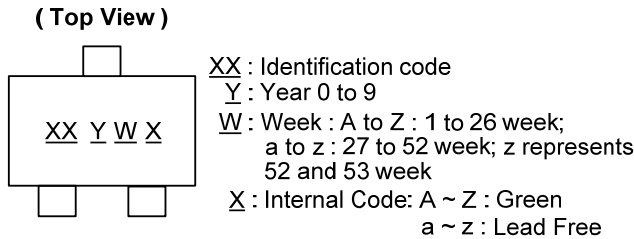


Part Number	Package Code	Packaging (Note 11)	Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH373-PL-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A
AH373-PL-B	P	SIP-3L	1000	-B	NA	NA	NA	NA
AH373-PG-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A
AH373-PG-B	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>.

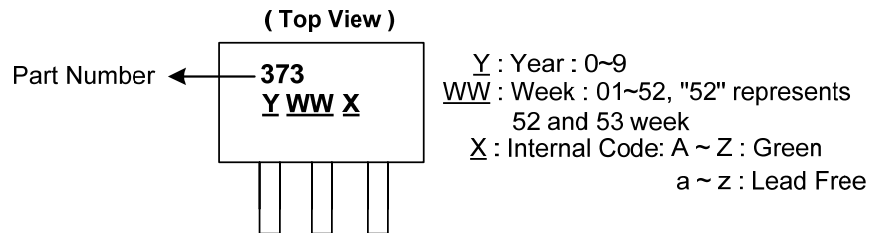
**Marking Information**

**(1) Package Type: SC59 and SOT23**



Part Number	Package	Identification Code
AH373	SC59	P2
AH373	SOT23	S2

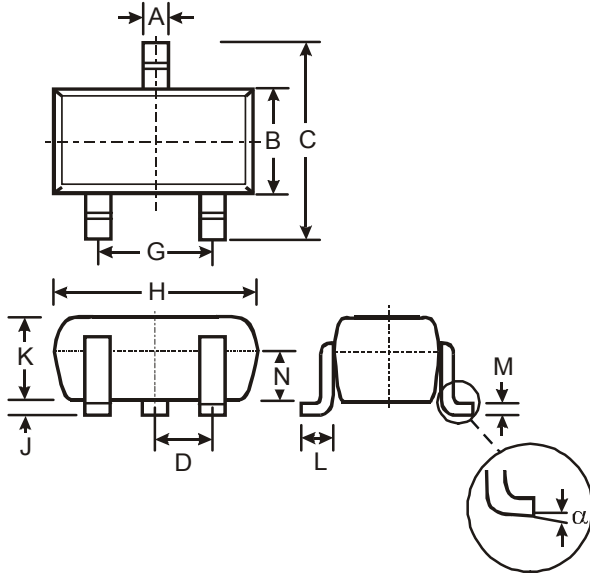
**(2) Package Type: SIP-3L**



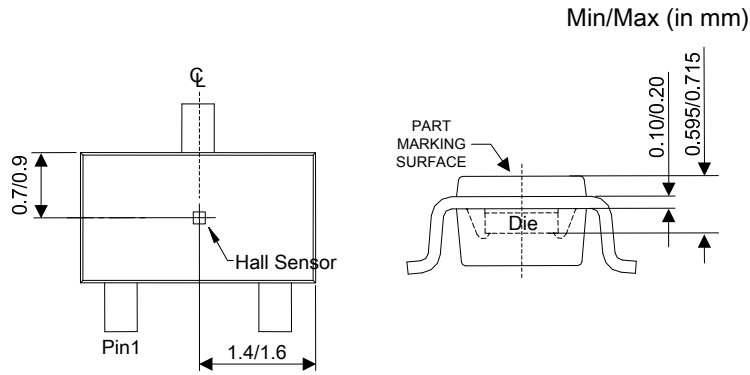
**Package Outline Dimensions** (All dimensions in mm.)

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			

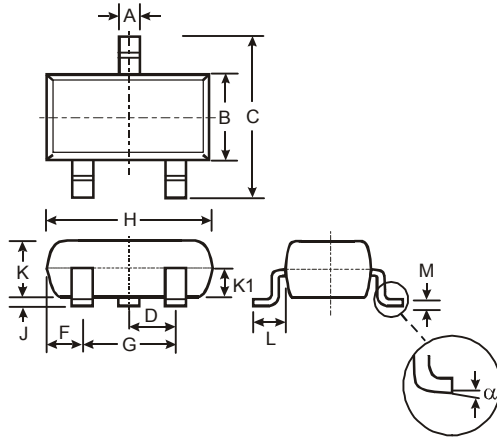


**Sensor location**

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

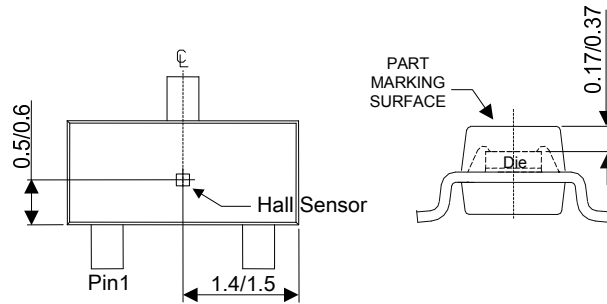
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

(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)



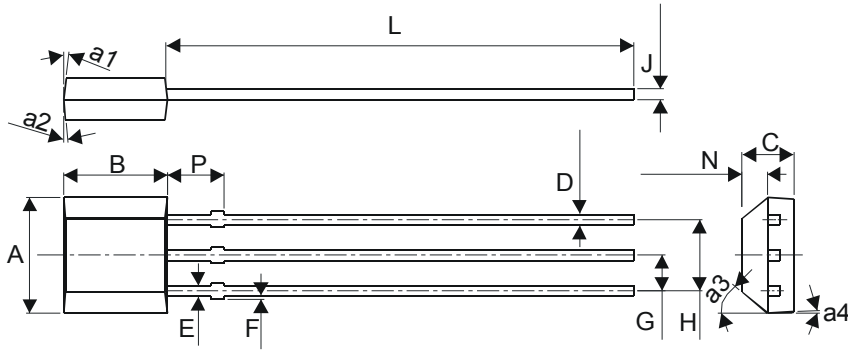
**Sensor location**



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

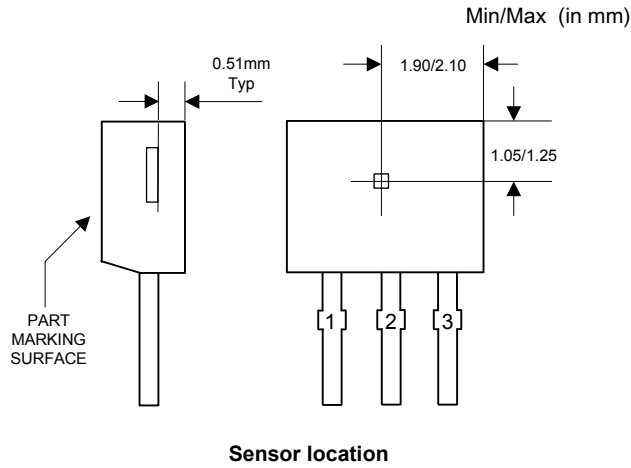
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

**(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	-
<b>All Dimensions in mm</b>		

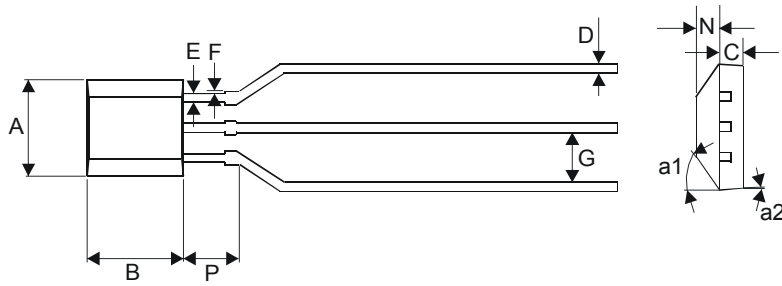
Notes: 13. SIP-3L Bulk pack - Thickness J includes Burrs



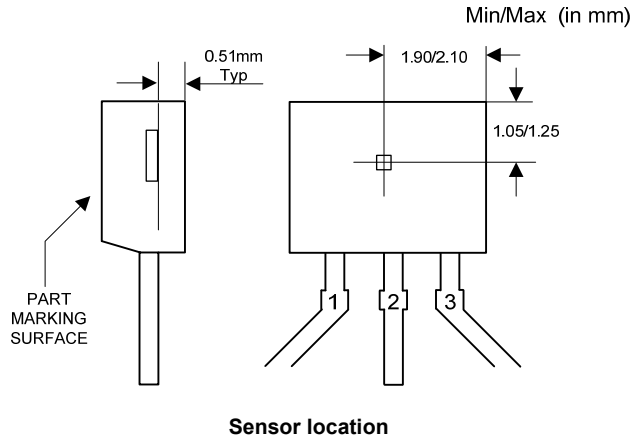
**Package Outline Dimensions** (cont.) (All dimensions in mm.)

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

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



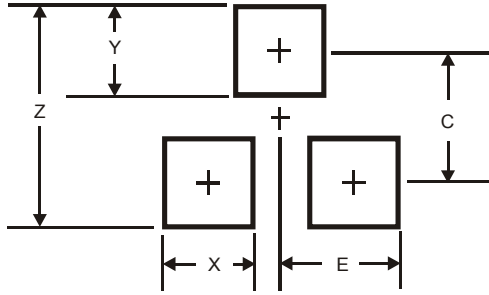
SIP-3 for Ammo Pack		
Dim	Min	Max
A	3.9	4.3
a1	45° Typ	
a2	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
<b>All Dimensions in mm</b>		



## Suggested Pad Layout

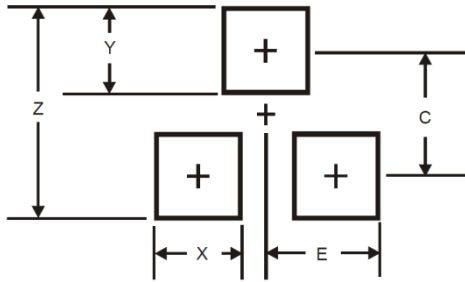
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

**(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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