

### Description

AH173 is a single-digital-output Hall-Effect latch sensor with 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, a comparator to provide switching hysteresis for noise rejection, and an output driver with a pull-up resistor ( $R_{pu}$ ). 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**) 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.

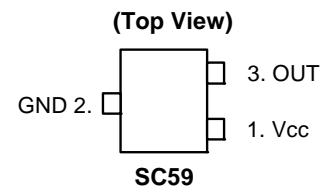
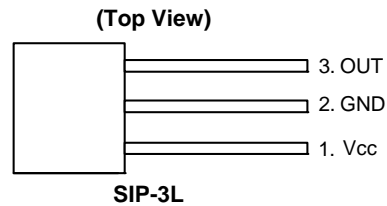
The AH173 is available in SIP-3L and SC59 packages.

### Features

- Bipolar Hall-Effect latch sensor
- 3V to 20V DC operating voltage
- Built-in pull-up resistor
- 25mA output sink current
- Operating temperature: -40°C to +125°C
- SIP-3L and SC59 packages (SC59 is commonly known as SOT23 in Asia)
- Green Molding Compound (No Br, Sb) (Note 1)

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).

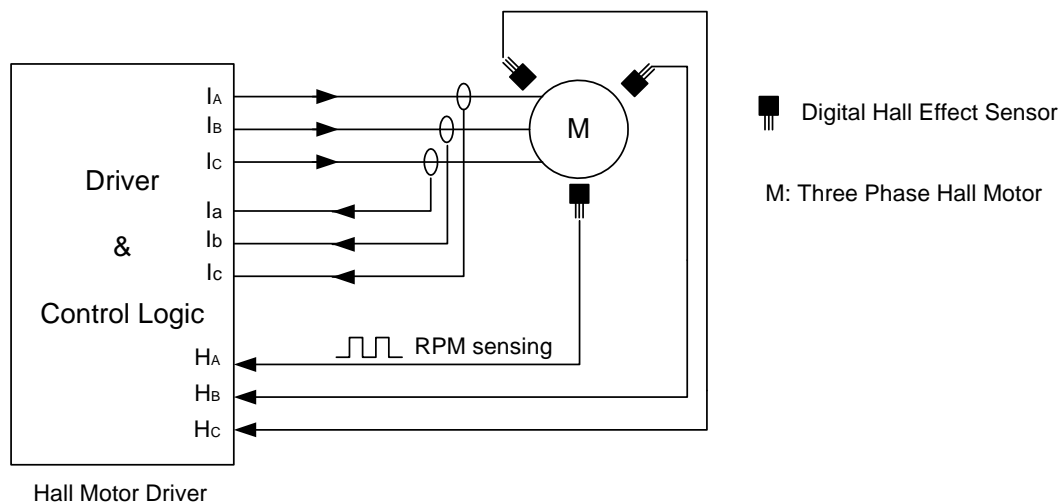
### Pin Assignments



### Applications

- Rotor Position Sensing
- Current Switch
- Encoder
- RPM Detection

### Typical Application Circuit

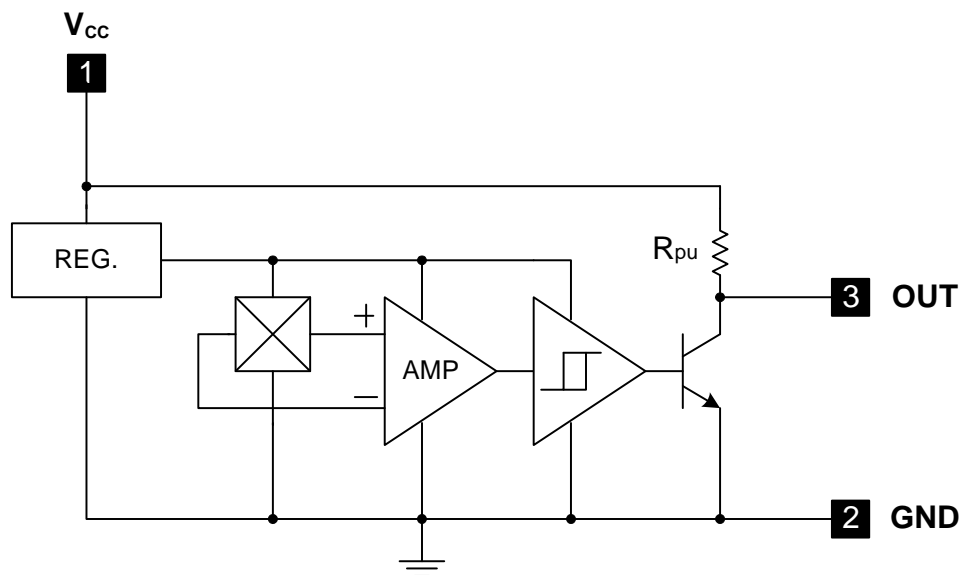


#### 3 Phase Hall Motor

### Pin Descriptions

Pin Name	Pin #	Description
V <sub>CC</sub>	1	Positive Power Supply
GND	2	Ground
OUT	3	Output Stage

### Functional Block Diagram



### Absolute Maximum Ratings (T<sub>A</sub> = 25°C)

Symbol	Characteristics	Values	Unit	
V <sub>CC</sub>	Supply Voltage	20	V	
V <sub>OUT</sub> (off)	Output "Off" Voltage	20	V	
I <sub>O</sub> (sink)	Output "On" Current	25	mA	
T <sub>S</sub>	Storage Temperature Range	-65~+150	°C	
T <sub>J</sub>	Maximum Junction Temperature	+150	°C	
P <sub>D</sub>	Power Dissipation	SIP-3L	550	mW
		SC59	230	mW

### Recommended Operating Conditions

Symbol	Characteristic	Conditions	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage	Operating	3	20	V
T <sub>A</sub>	Operating Ambient Temperature	Operating	-40	125	°C

### Electrical Characteristics (T<sub>A</sub> = 25°C)

Symbol	Characteristics	Conditions	Min	Typ.	Max	Unit
V <sub>OUT (SAT)</sub>	Output Saturation Voltage	V <sub>CC</sub> = 12V, OUT "ON" I <sub>O</sub> = 10mA	-	300	400	mV
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 12V, OUT "OFF"	-	3.5	6	mA
R <sub>pu</sub>	Internal Pull-up Resistor		7	10	13	KΩ
V <sub>d</sub>	Dropout Voltage	V <sub>d</sub> = V <sub>CC</sub> - V <sub>Ce</sub>	-	-	0.3	V

### Magnetic Characteristics (T<sub>A</sub> = 25°C, V<sub>CC</sub> = 12V, unless otherwise specified, Note 2)

(1mT = 10 Gauss)

#### A grade

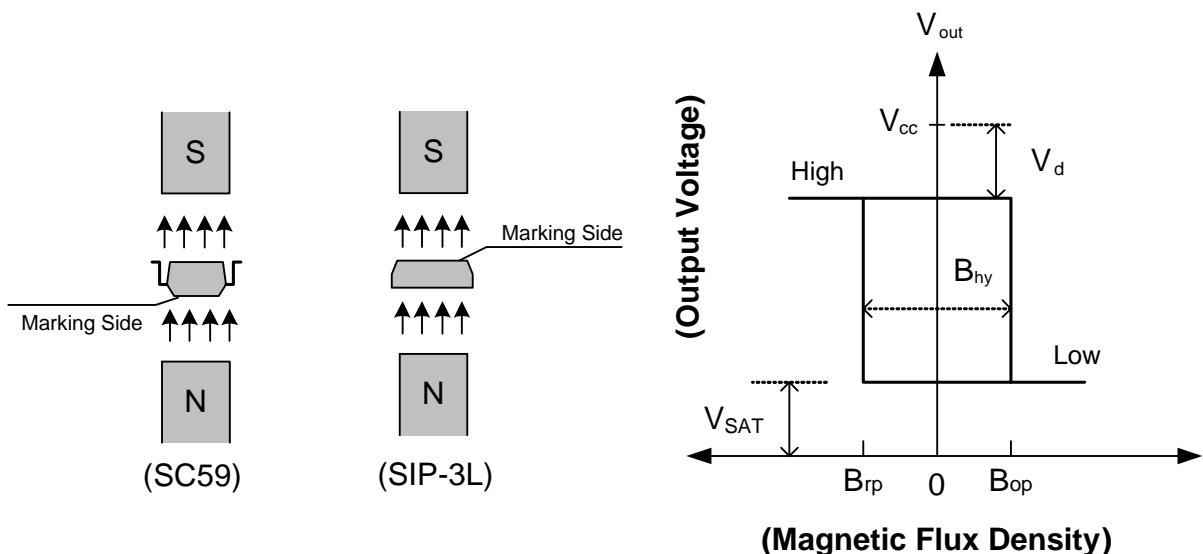
Symbol	Parameter	Min	Typ.	Max	Unit
B <sub>ops</sub> (south pole to brand side)	Operation Point	15	-	60	Gauss
B <sub>brps</sub> (south pole to brand side)	Release Point	-60	-	-15	Gauss
B <sub>hy</sub> ( B <sub>opx</sub>   -  B <sub>brpx</sub>  )	Hysteresis	-	80	-	Gauss

#### B grade

Symbol	Parameter	Min	Typ.	Max	Unit
B <sub>ops</sub> (south pole to brand side)	Operation Point	5	-	80	Gauss
B <sub>brps</sub> (south pole to brand side)	Release Point	-80	-	-5	Gauss
B <sub>hy</sub> ( B <sub>opx</sub>   -  B <sub>brpx</sub>  )	Hysteresis	-	80	-	Gauss

Notes: 2. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

### Operating Characteristics



**Performance Characteristics**

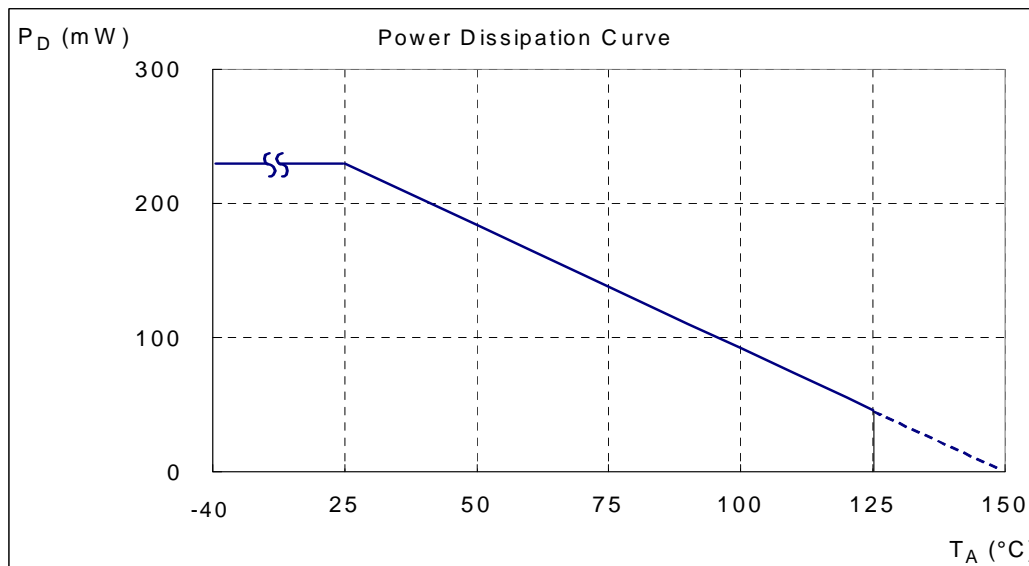
**(1) SIP-3L**

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

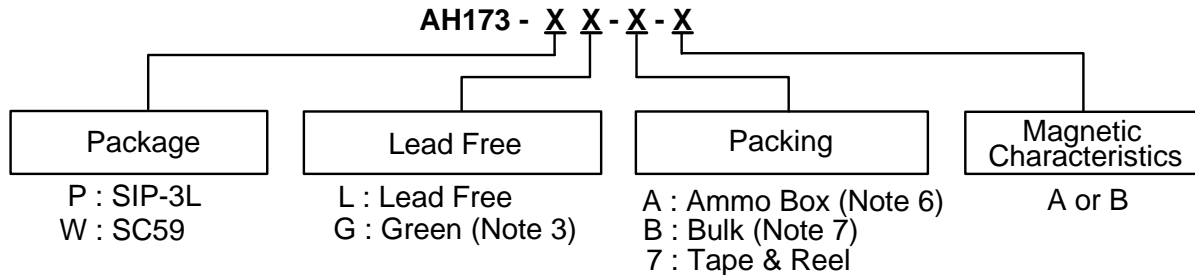














**(2) SC59 (commonly known as SOT23 in Asia)**

$T_A$ (°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

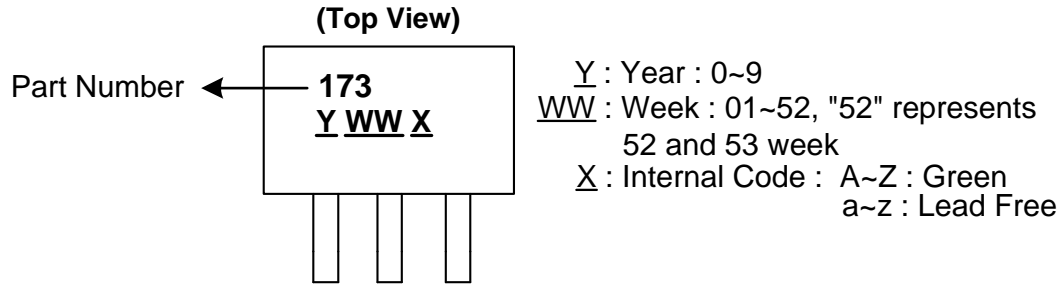


Device	Package Code	Packaging (Note 4, 5)	Tube/Bulk		7" Tape and Reel		Ammo Box		Magnetic Characteristics
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix	
 AH173-PL-A-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	A
 AH173-PL-A-B	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	B
 AH173-PG-A-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	A
 AH173-PG-A-B	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	B
 AH173-PL-B-A	P	SIP-3L	1000	-B	NA	NA	NA	NA	A
 AH173-PL-B-B	P	SIP-3L	1000	-B	NA	NA	NA	NA	B
 AH173-PG-B-A	P	SIP-3L	1000	-B	NA	NA	NA	NA	A
 AH173-PG-B-B	P	SIP-3L	1000	-B	NA	NA	NA	NA	B
 AH173-WL-7-A	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA	A
 AH173-WL-7-B	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA	B
 AH173-WG-7-A	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA	A
 AH173-WG-7-B	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA	B

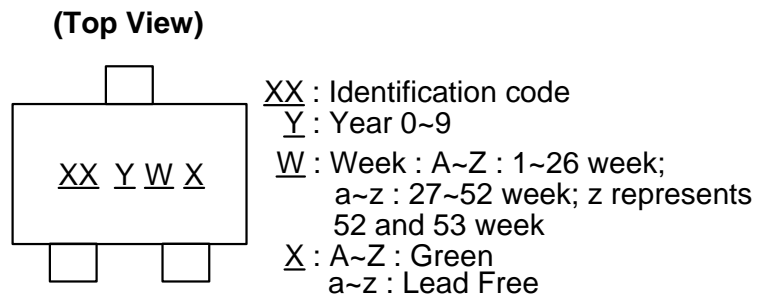
- Notes:
- EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).
  - Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  - 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>.
  - Ammo Box is for SIP-3L Spread Lead.
  - Bulk is for SIP-3L Straight Lead.

**Marking Information**

**(1) SIP-3L**



**(2) SC59 (Commonly known as SOT23 in Asia)**



Part Number	Package	Identification Code
AH173	SC59	J3

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

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

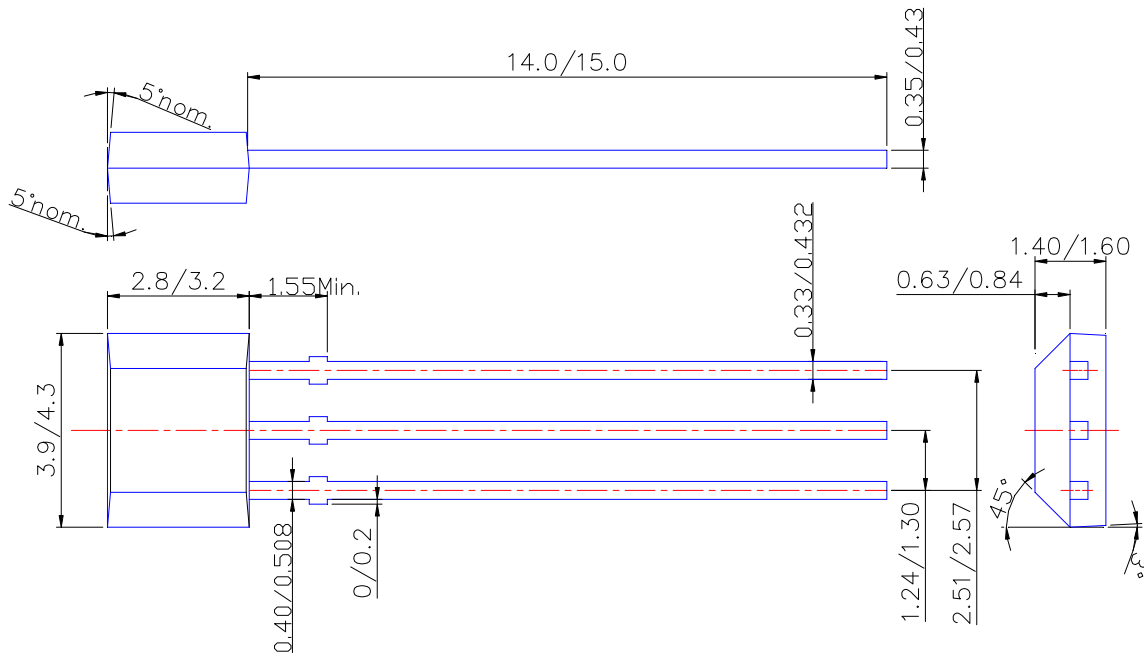


Active Area Depth



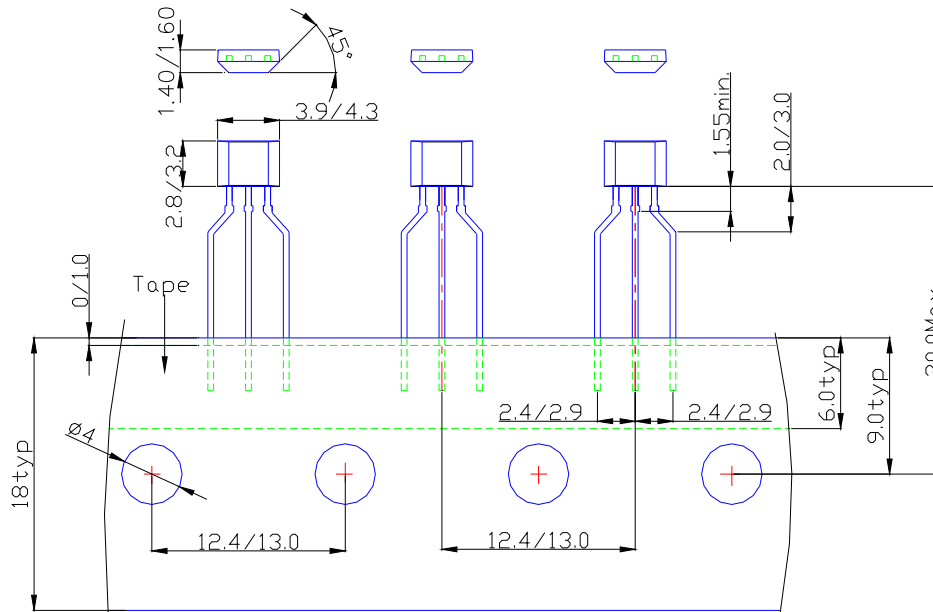
Sensor Location

**Package Dimension**

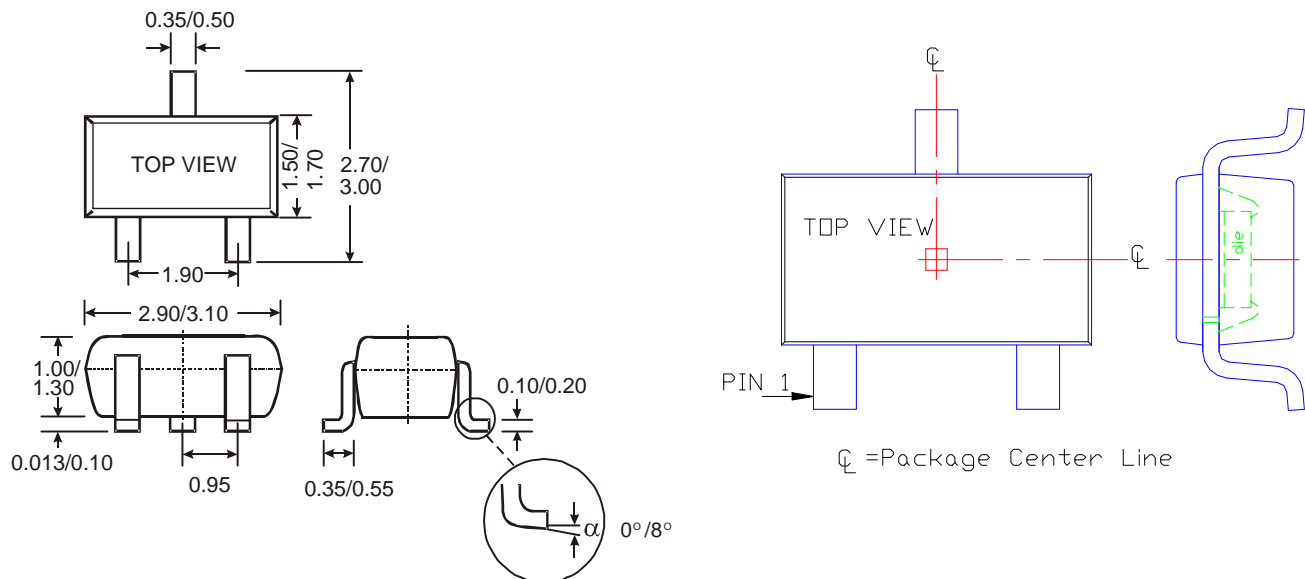


### Package Outline Dimensions (Continued)

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



#### (3) SC59 (Commonly known as SOT23 in Asia)





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