



**INTERNAL PULLUP HALL EFFECT LATCH
FOR HIGH TEMPERATURE**

Description

AH173 is a single-digital-output Hall effect latch sensor with pullup 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 pullup resistor (Rpu). 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**) 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.

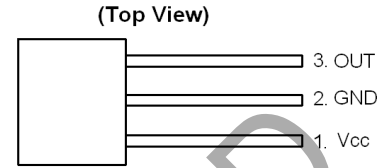
The AH173 is available in SIP-3 (Ammo Pack), SIP-3 (Bulk Pack), and SC59 packages.

Features

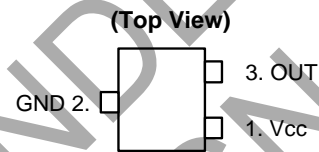
- Bipolar Hall Effect Latch Sensor
- 3V to 20V DC Operating Voltage
- Built-in Pullup Resistor
- 25mA Output Sink Current
- Operating Temperature: -40°C to +125°C
- SIP-3 (Ammo Pack), SIP-3 (Bulk Pack), and SC59 Packages (SC59 is Commonly Known as SOT23 in Asia)
- **Totally Lead-Free & Fully RoHS Compliant (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



SIP-3 (Bulk Pack)

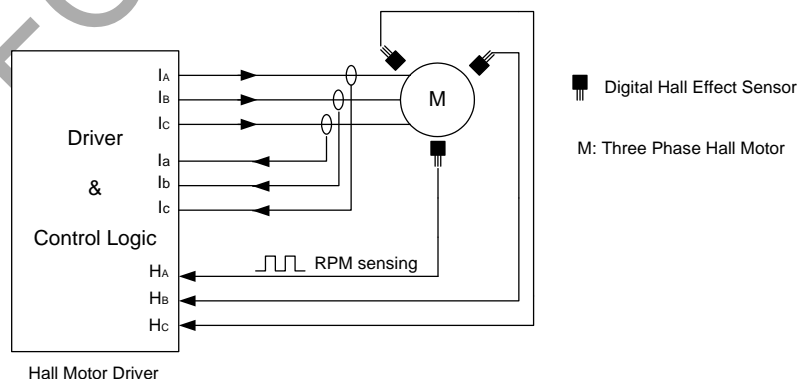


SC59

Applications

- Rotor position sensing
- Current switches
- Encoders
- RPM detections

Typical Applications Circuit



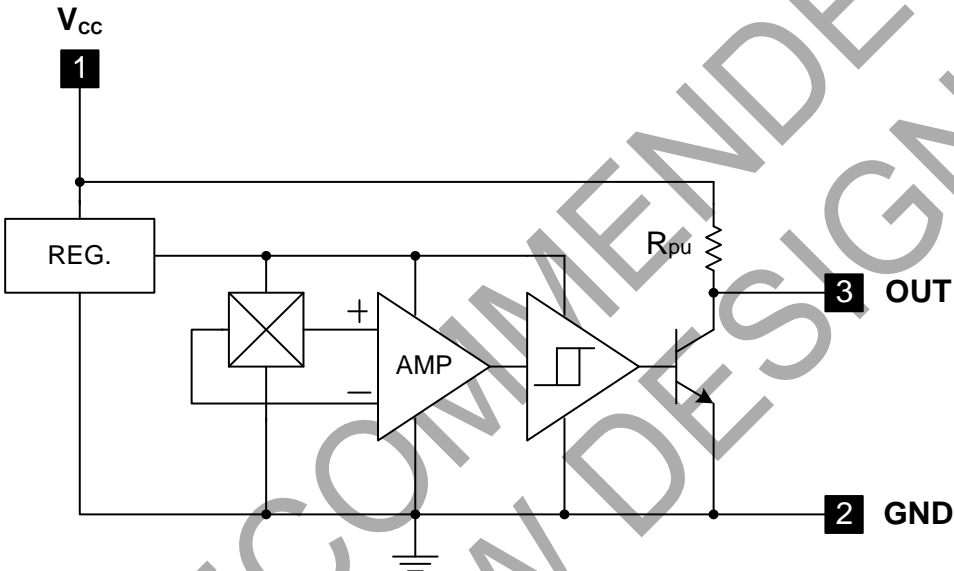
Hall Motor Driver

3 Phase Hall Motor

Pin Descriptions

Pin Name	Pin #	Description
Vcc	1	Positive Power Supply
GND	2	Ground
OUT	3	Output Stage

Functional Block Diagram



Absolute Maximum Ratings (T_A = +25°C)

Symbol	Characteristics	Values	Unit	
V _{CC}	Supply Voltage	20	V	
V _{OUT (Off)}	Output "Off" Voltage	20	V	
I _{O (Sink)}	Output "On" Current	25	mA	
T _S	Storage Temperature Range	-65 to +150	°C	
T _J	Maximum Junction Temperature	+150	°C	
P _D	Power Dissipation	SIP-3 (Ammo Pack)	550	mW
		SIP-3 (Bulk Pack)		
		SC59	230	mW

Recommended Operating Conditions

Symbol	Characteristic	Conditions	Min	Max	Unit
V _{CC}	Supply Voltage	Operating	3	20	V
T _A	Operating Ambient Temperature	Operating	-40	+125	°C

Electrical Characteristics ($T_A = +25^\circ\text{C}$)

Symbol	Characteristics	Conditions	Min	Typ	Max	Unit
$V_{OUT(SAT)}$	Output Saturation Voltage	$V_{CC} = 12\text{V}$, OUT "ON" $I_O = 10\text{mA}$	—	300	400	mV
I_{CC}	Supply Current	$V_{CC} = 12\text{V}$, OUT "OFF"	—	3.5	6	mA
R_{pu}	Internal Pullup Resistor	—	7	10	13	k Ω
V_d	Dropout Voltage	$V_d = V_{CC} - V_{CE}$	—	—	0.3	V

Magnetic Characteristics ($T_A = +25^\circ\text{C}$, $V_{CC} = 12\text{V}$, unless otherwise specified, Note 4)

(1mT = 10 Gauss)

A Grade

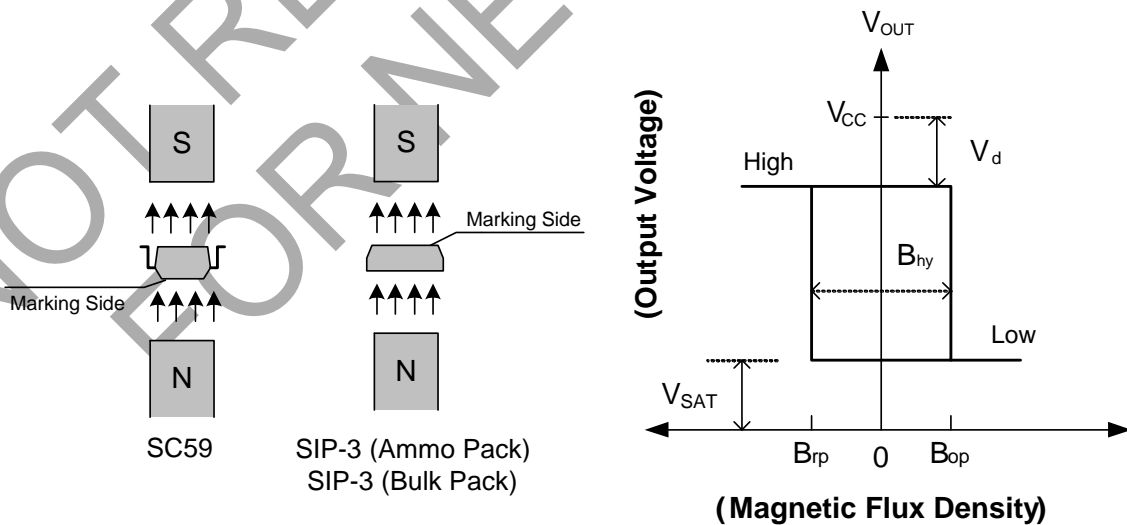
Symbol	Parameter	Min	Typ	Max	Unit
Bops (South Pole to Brand Side)	Operation Point	15	—	60	Gauss
Brps (South Pole to Brand Side)	Release Point	-60	—	-15	Gauss
$B_{hy}(B_{opx} - B_{rpx})$	Hysteresis	—	80	—	Gauss

B Grade

Symbol	Parameter	Min	Typ	Max	Unit
Bops (South Pole to Brand Side)	Operation Point	5	—	80	Gauss
Brps (South Pole to Brand Side)	Release Point	-80	—	-5	Gauss
$B_{hy}(B_{opx} - B_{rpx})$	Hysteresis	—	80	—	Gauss

Notes: 4. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

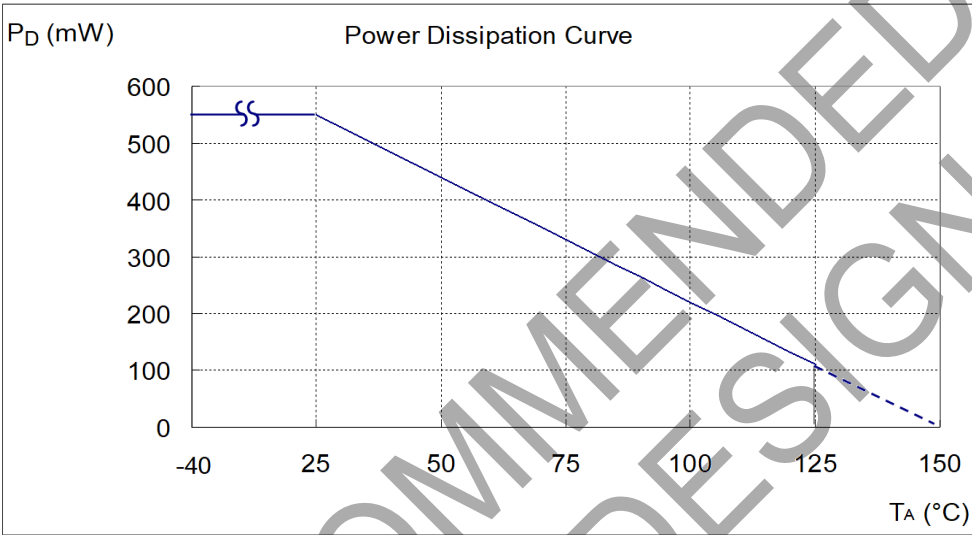
Operating Characteristics



Performance Characteristics

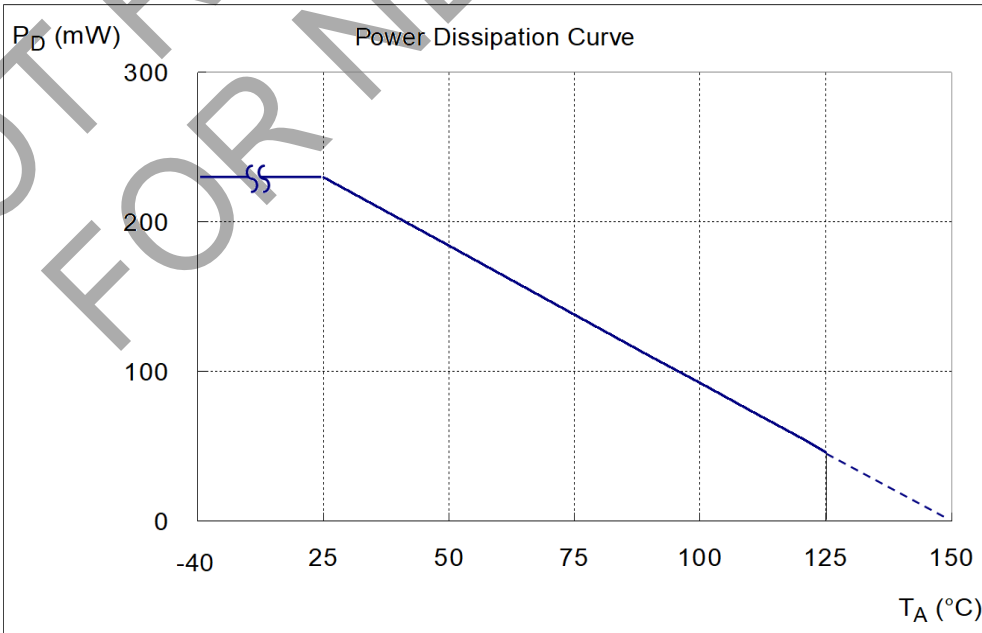
(1) SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

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

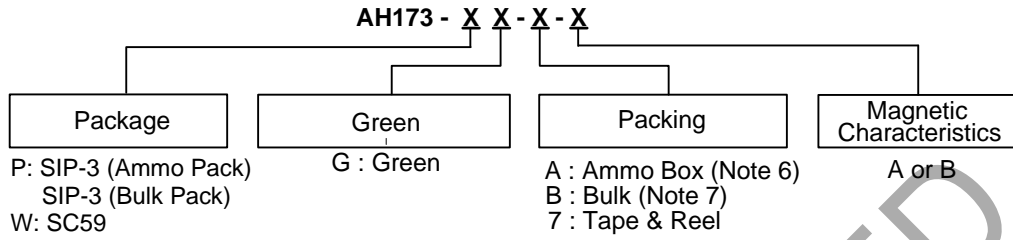


(2) SC59 (Commonly Known as SOT23 in Asia)

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



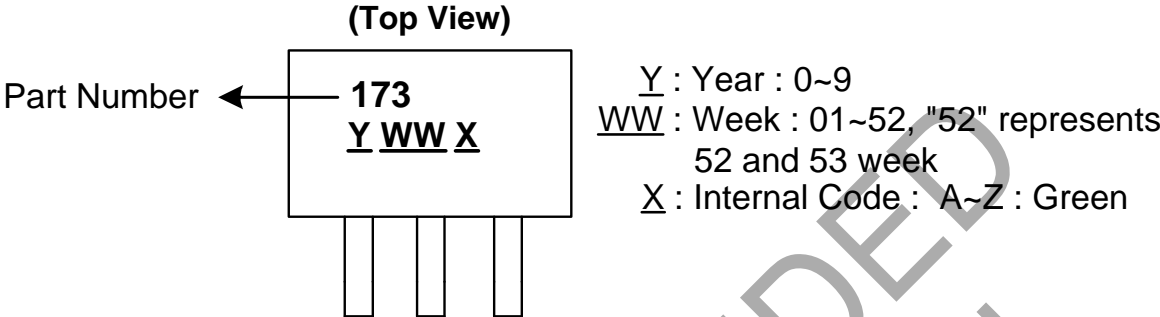
Orderable Part Number	Status (Note 8)	Package Code	Package (Note 5)	Bulk		7" Tape and Reel		Ammo Box	
				Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH173-PG-A-A	NRND	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH173-PG-A-B	NRND	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-B
AH173-PG-B-A	NRND	P	SIP-3 (Bulk Pack)	1000	-A	NA	NA	NA	NA
AH173-PG-B-B	NRND	P	SIP-3 (Bulk Pack)	1000	-B	NA	NA	NA	NA
AH173-WG-7-A	NRND	W	SC59	NA	NA	3000/Tape & Reel	-A	NA	NA
AH173-WG-7-B	NRND	W	SC59	NA	NA	3000/Tape & Reel	-B	NA	NA

- Notes:
- 5. Pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
 - 6. Ammo Box is for SIP-3 Spread Lead.
 - 7. Bulk is for SIP-3 Straight Lead.
 - 8. NRND = Not Recommended for New Design

NOT RECOMMENDED FOR NEW DESIGN

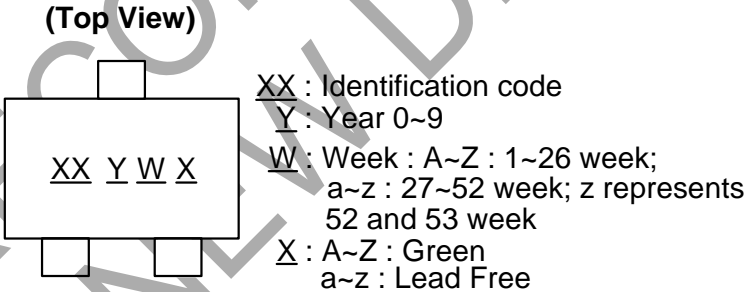
Marking Information

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



Orderable Part Number	Package	Identification Code
AH173	SIP-3 (Ammo Pack)	173
AH173	SIP-3 (Bulk Pack)	173

(2) Package Type: SC59 (Commonly Known as SOT23 in Asia)

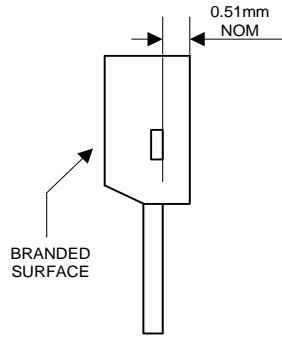


Orderable Part Number	Package	Identification Code
AH173	SC59	J3

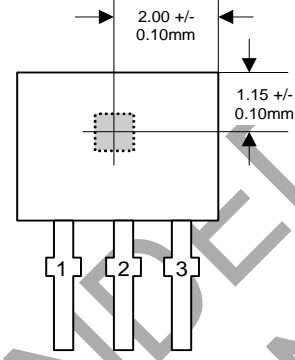
Package Outline Dimensions (All Dimensions in mm)

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

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

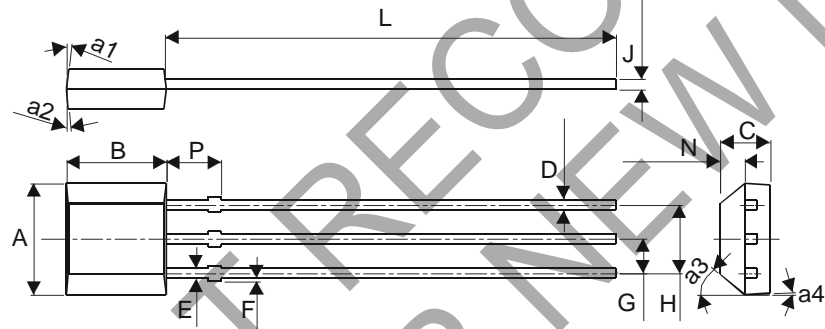


Active Area Depth



Sensor Location

Package Dimension

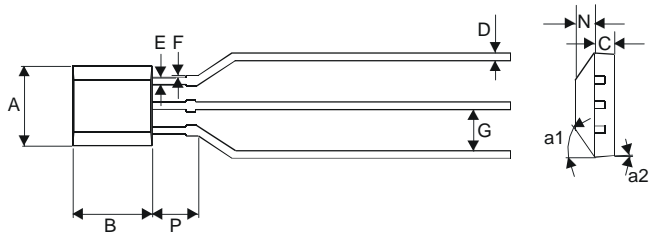


SIP-3 (Bulk Pack)		
Dim	Min	Max
A	3.9	4.3
a1	5° Typ	
a2	5° Typ	
a3	45° Typ	
a4	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

Package Outline Dimensions (Continued)

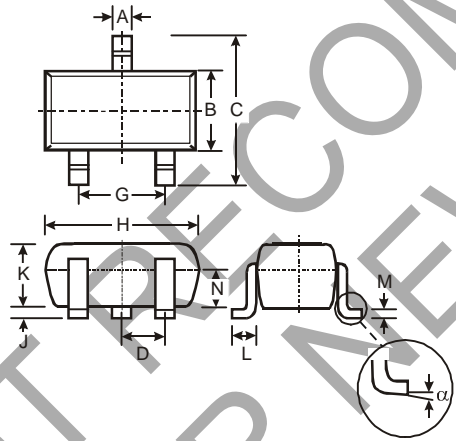
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(2) Package Type: SIP-3 (Ammo Pack)

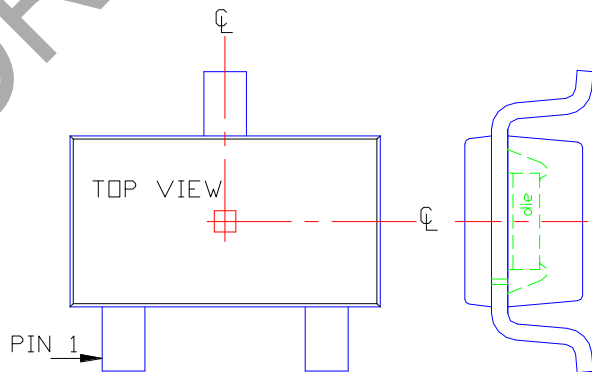


SIP-3 (Ammo Pack)		
Dim	Min	Max
A	3.9	4.3
a1	45° Typ	
a2	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

(3) SC59 (Commonly Known as SOT23 in Asia)



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			

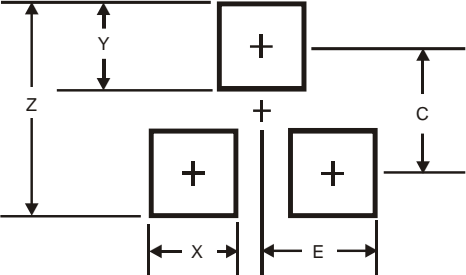


CL = Package Center Line

Suggested Pad Layout

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

(1) Package Type: SC59 (Commonly Known as SOT23 in Asia)



Dimensions	Value (in mm)
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35

NOT RECOMMENDED FOR NEW DESIGN

IMPORTANT NOTICE

1. DIODES INCORPORATED (Diodes) AND ITS SUBSIDIARIES MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).
2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes' products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes' products. Diodes' products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of Diodes' products for their intended applications, (c) ensuring their applications, which incorporate Diodes' products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.
3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.
4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.
5. Diodes' products are provided subject to Diodes' Standard Terms and Conditions of Sale (<https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/>) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
6. Diodes' products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes' products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.
7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.
8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.
9. This Notice may be periodically updated with the most recent version available at <https://www.diodes.com/about/company/terms-and-conditions/important-notice>

The Diodes logo is a registered trademark of Diodes Incorporated in the United States and other countries.
All other trademarks are the property of their respective owners.
© 2024 Diodes Incorporated. All Rights Reserved.

www.diodes.com

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Diodes Incorporated:](#)

[AH173-WG-7-A](#) [AH173-WG-7-B](#) [AH173-PG-A-A](#) [AH173-PG-A-B](#) [AH173-PG-B-A](#) [AH173-PG-B-B](#)