



**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 (R_{pu}). 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 (**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 Br_p. When **B** is less than Br_p, the output is switched off.

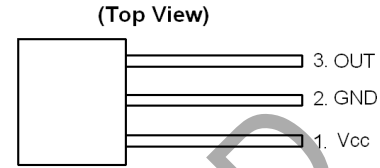
The AH173 is available in SIP-3 (Ammo Pack), SIP-3 (Bulk Pack), and SC59 packages.

Features

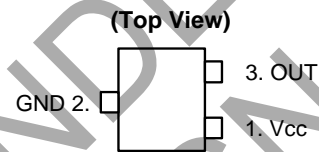
- Bipolar Hall Effect Latch Sensor
- 3V to 20V DC Operating Voltage
- Built-in Pullup Resistor
- 25mA Output Sink Current
- Operating Temperature: -40°C to +125°C
- SIP-3 (Ammo Pack), SIP-3 (Bulk Pack), and SC59 Packages (SC59 is Commonly Known as SOT23 in Asia)
- **Totally Lead-Free & Fully RoHS Compliant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

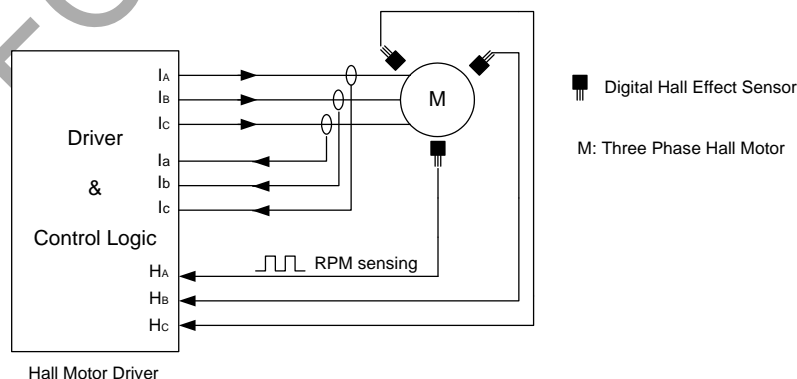


SC59

Applications

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

Typical Applications Circuit



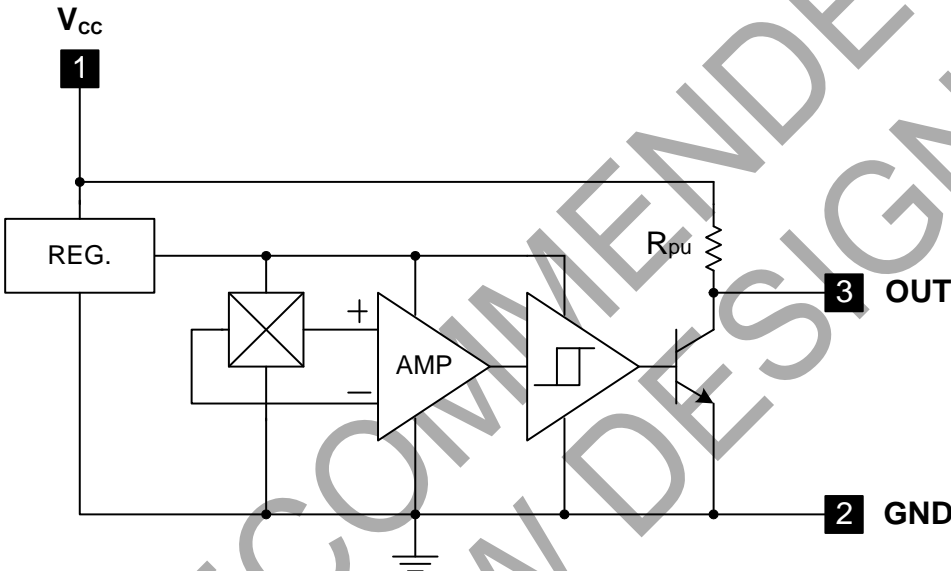
Hall Motor Driver

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

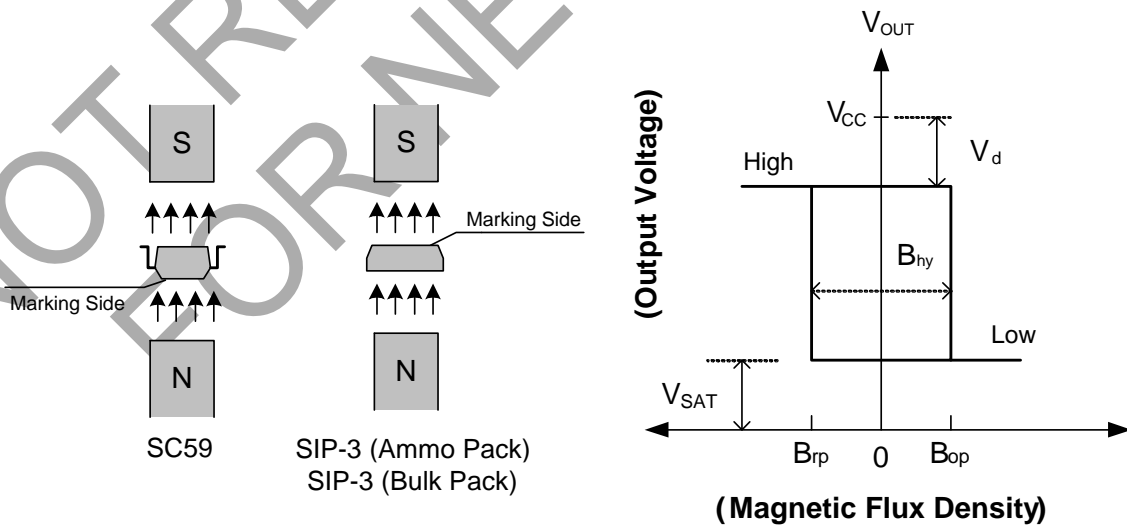
Symbol	Parameter	Min	Typ	Max	Unit
Bops (South Pole to Brand Side)	Operation Point	15	—	60	Gauss
Brps (South Pole to Brand Side)	Release Point	-60	—	-15	Gauss
$B_{hy}(B_{opx} - B_{rpx})$	Hysteresis	—	80	—	Gauss

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.

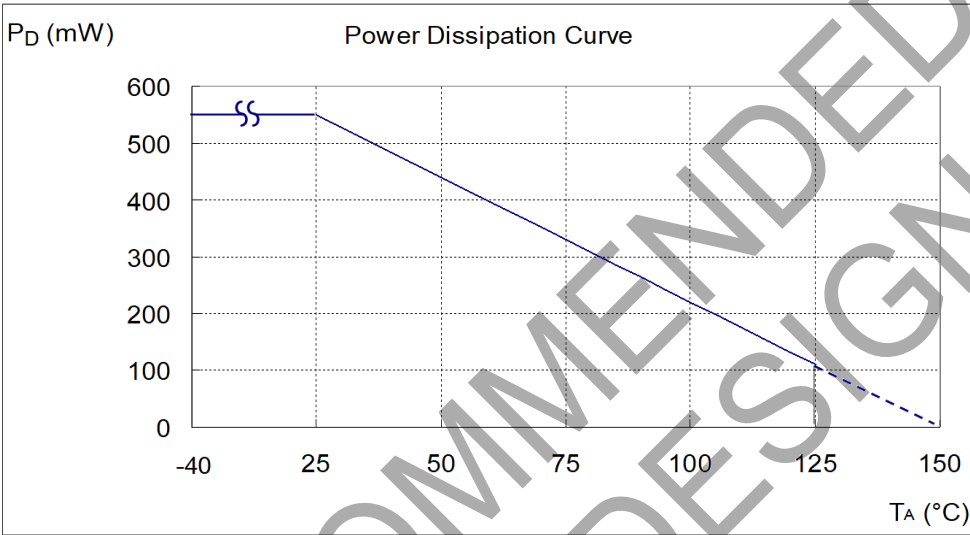
Operating Characteristics



Performance Characteristics

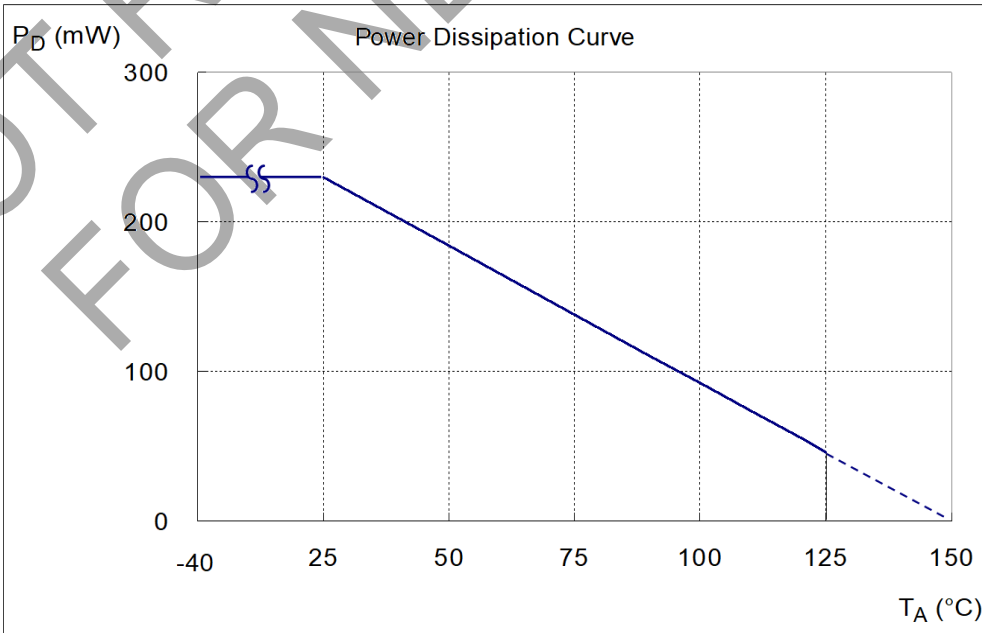
(1) SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

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

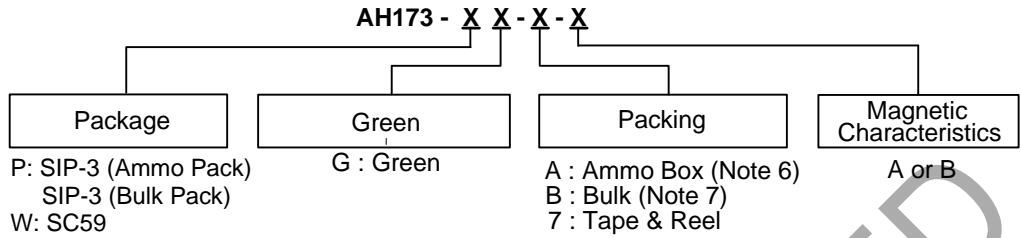


(2) SC59 (Commonly Known as SOT23 in Asia)

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



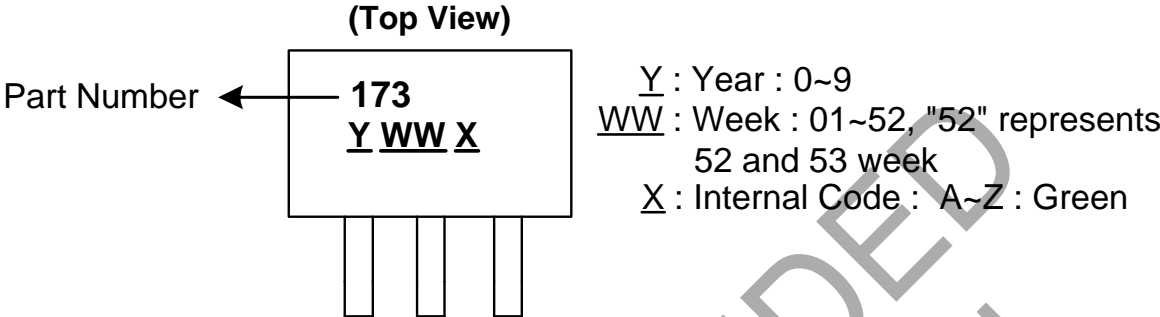
Orderable Part Number	Status (Note 8)	Package Code	Package (Note 5)	Bulk		7" Tape and Reel		Ammo Box	
				Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH173-PG-A-A	NRND	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH173-PG-A-B	NRND	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA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

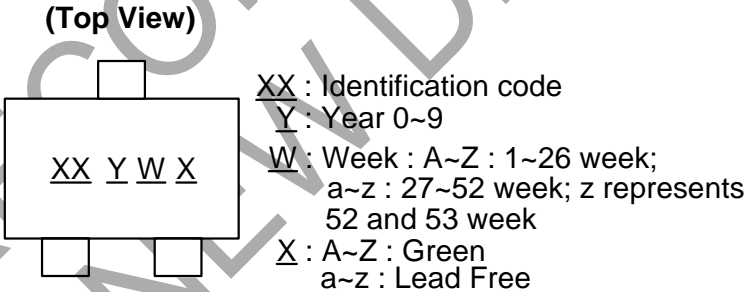
Marking Information

(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)

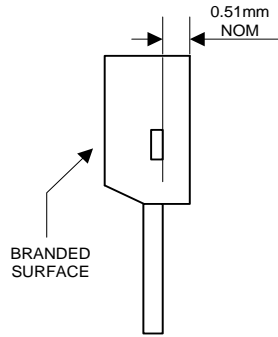


Orderable Part Number	Package	Identification Code
AH173	SC59	J3

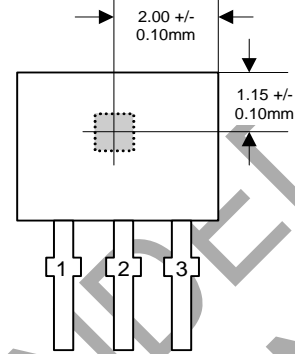
Package Outline Dimensions (All Dimensions in mm)

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

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

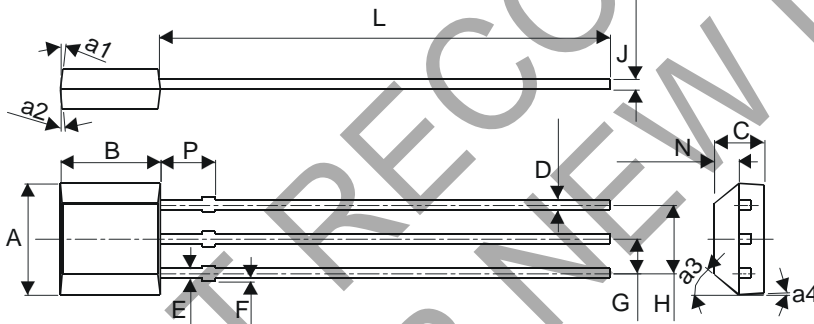


Active Area Depth



Sensor Location

Package Dimension

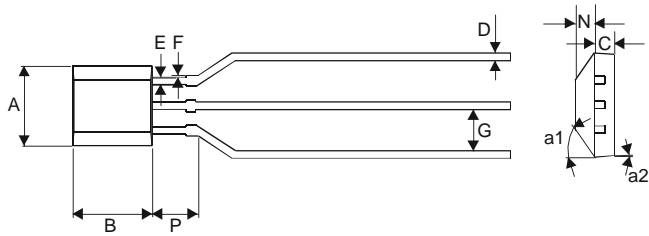


SIP-3 (Bulk Pack)		
Dim	Min	Max
A	3.9	4.3
a1	5° Typ	
a2	5° Typ	
a3	45° Typ	
a4	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

Package Outline Dimensions (Continued)

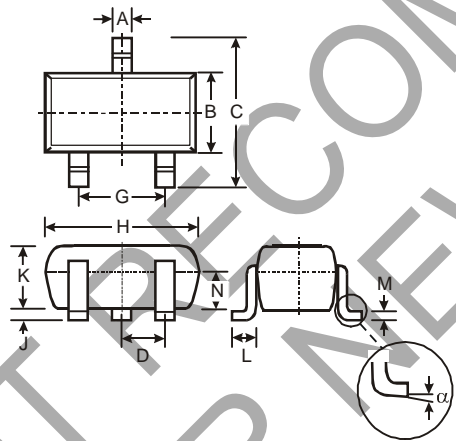
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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

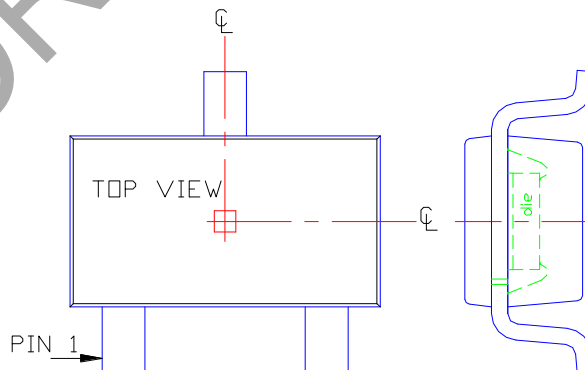


SIP-3 (Ammo Pack)		
Dim	Min	Max
A	3.9	4.3
a1	45° Typ	
a2	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

(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			

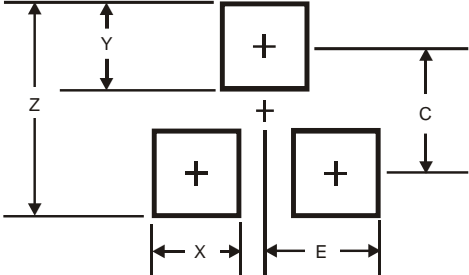


CL = Package Center Line

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

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