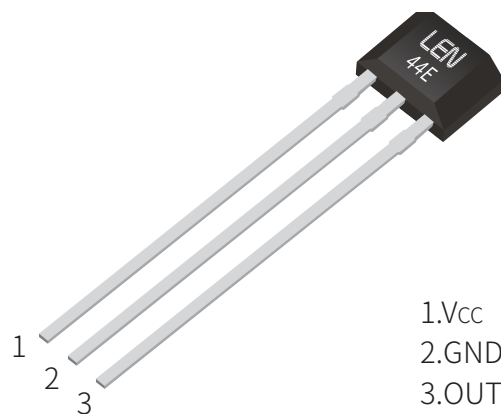


Descriptions

A3144EUA-T is integrated Hall-effect latched sensor designed for electronic commutation of brushless DC motor applications. The device includes a voltage regulator for operation with supply voltages of 3.5V to 28V, quadratic Hall-voltage generator, temperature compensation circuitry, small-signal amplifier, Schmitt trigger, and an open-collector output to sink up to 25mA.



TO-92S

Features

- ◇ On-chip Hall Sensor
- ◇ Maximum Output Sink Current: 25mA
- ◇ Operating Temperature: -40°C to 150°C
- ◇ ESD Rating: 4000V (HBM) and 400V (MM)
- ◇ Wide Operating Voltage Range: 3.5V to 28V
- ◇ Internal Bandgap Regulator for Temperature Compensation

Applications

- ◇ Flow-rate sensing
- ◇ Motor and fan control
- ◇ Auto-motive transmission position
- ◇ Speed and RPM (revolutions per minute) sensing

Ordering Information

Part Number	Package	Shipping Quantity
A3144EUA-T	TO-92S	500 pcs / Bag , 4000 pcs / Box

Absolute Maximum Ratings (T_A=25°C)

Parameter	Symbol	Ratings	Unit
Supply Voltage	V _{CC}	40	V
Reverse Supply Voltage	V _{RCC}	-20	V
Output off Voltage	V _{OUT}	55	V
Reverse Output Voltage	V _{ROUT}	-0.3	V
Output Sink Current (Continuous Current)	I _{OUT}	25	mA
Power Dissipation	P _D	400	mW
Operating Temperature Range	T _{OPR}	-40 ~ +150	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C
Human Body Mode (HBM) *1	V _{ESD(HBM)}	±4000	V
Machine Mode (MM) *1	V _{ESD(MM)}	±400	V
UA Package Thermal Resistance	R _{θJA}	166	°C/W

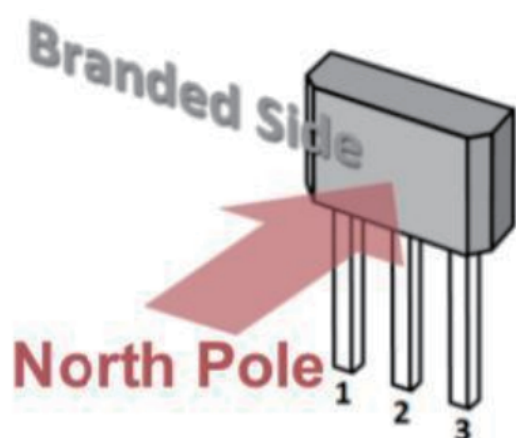
Notes: (*1) Human Body Model and Machine Model tests according to: standard AEC-Q100-002 and AEC-Q100-003 respectively.

(*2) Stresses above those listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

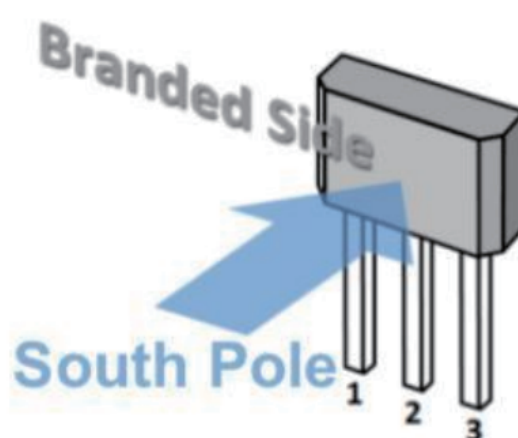
Characteristics ($T_A=25^{\circ}\text{C}$, $V_{DD} = 5\text{V}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating voltage	V_{CC}	$T_J < T_J(\text{Max})$	3.5		28	V
Supply Current	I_{CC}	$V_{CC}=3.5$ to 28V		3.5	8	mA
Off-State Leakage Current	I_{LEAK}	Output Hi-Z		<0.1	10	μA
Output Saturation Voltage	V_{SAT}	$I_{OUT}=20\text{mA}$		110	300	mV
Rise Time	T_R	$R_L=1\text{K}\Omega$ $C_S=20\text{pF}$		0.4	1.5	μs
Fall Time	T_F	$R_L=1\text{K}\Omega$ $C_S=20\text{pF}$		0.15	1.5	μs
Operate Point	B_{OP}	4.5V to 24V with 20mA load unles	200	260	330	Gs
Release Point	B_{RP}	4.5V to 24V with 20mA load unles	150	210	300	Gs
Hysteresis	B_{HYS}	4.5V to 24V with 20mA load unles	20	50	80	Gs

Definition of Switching Function

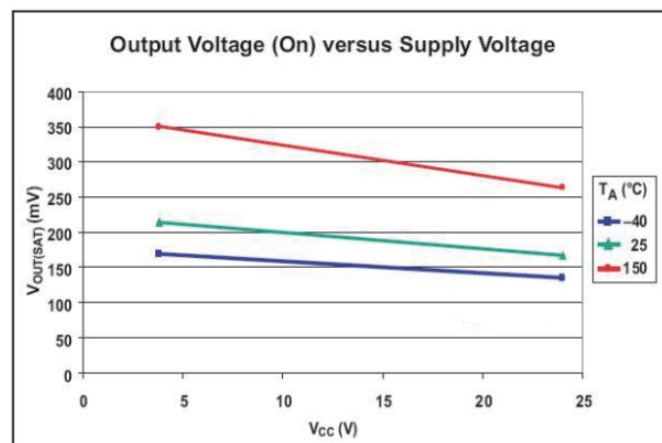
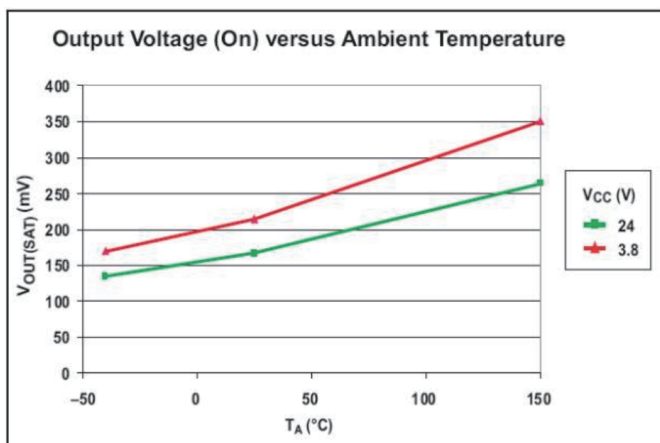
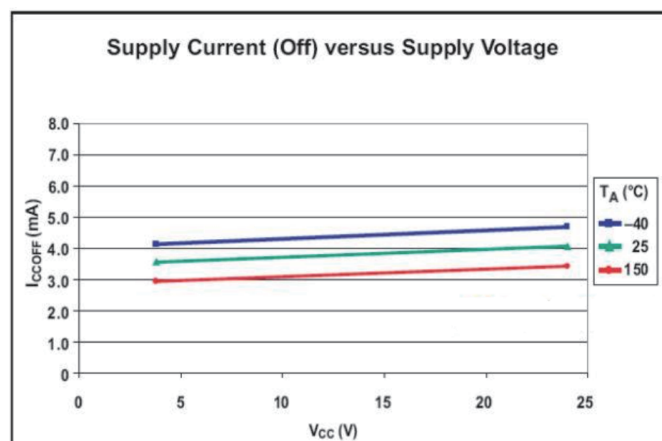
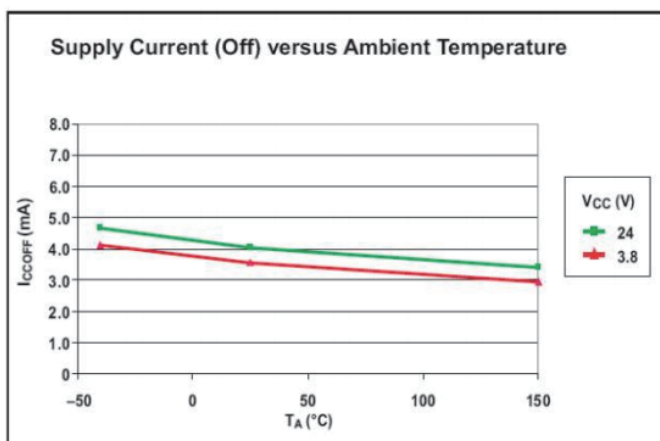
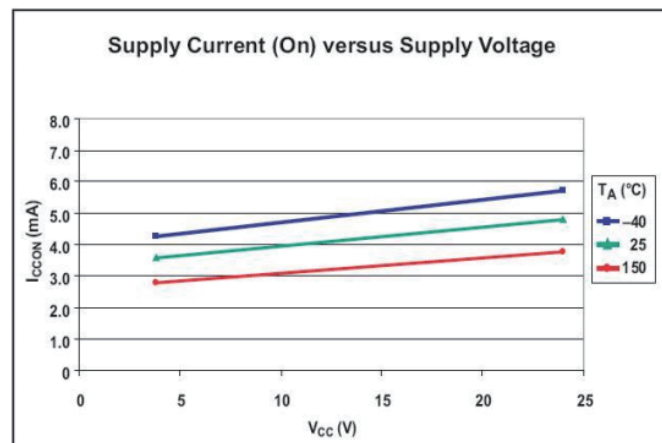
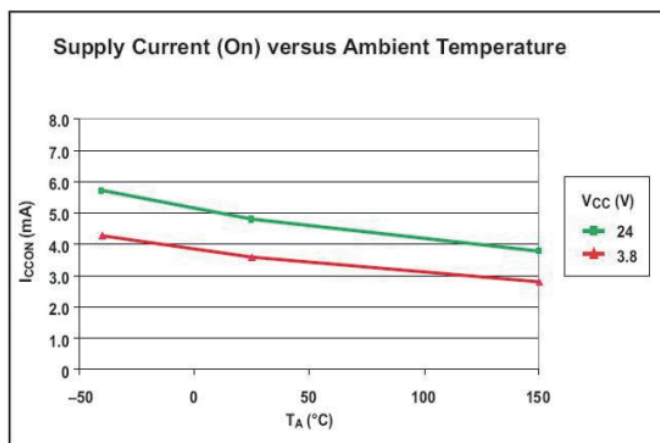


OUT=High

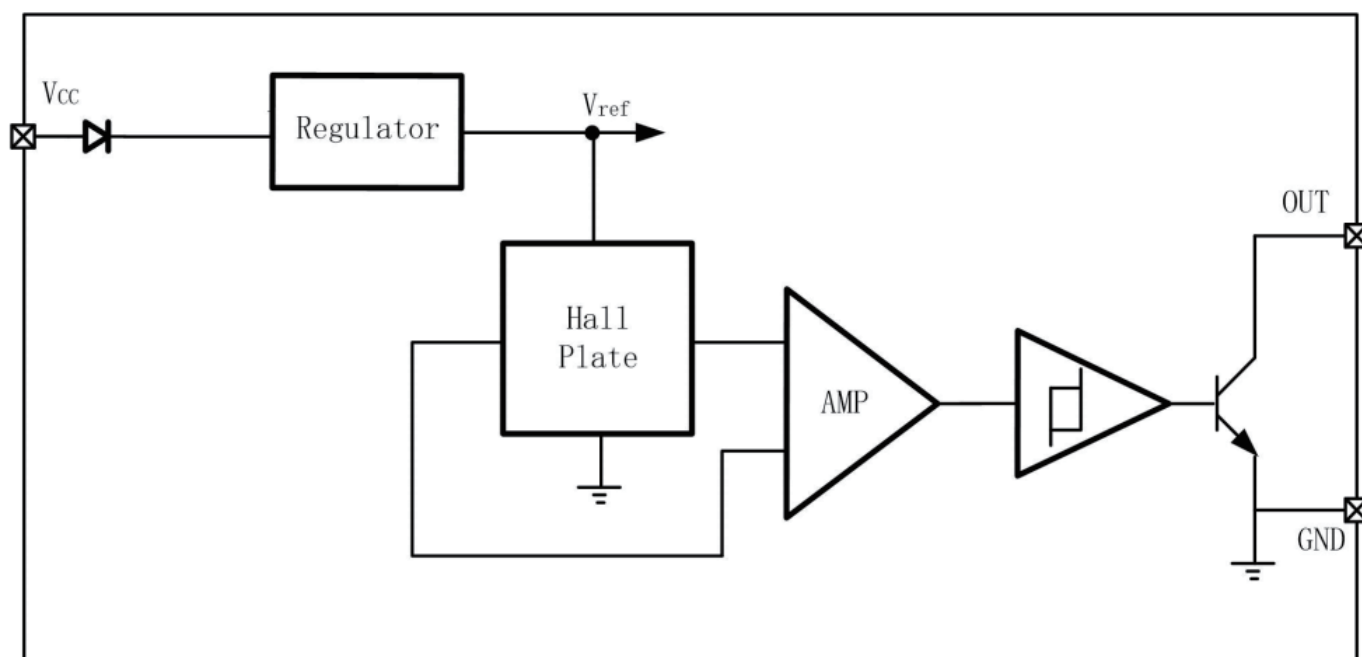


OUT= $V_{DS(on)}$

Basic Characteristics



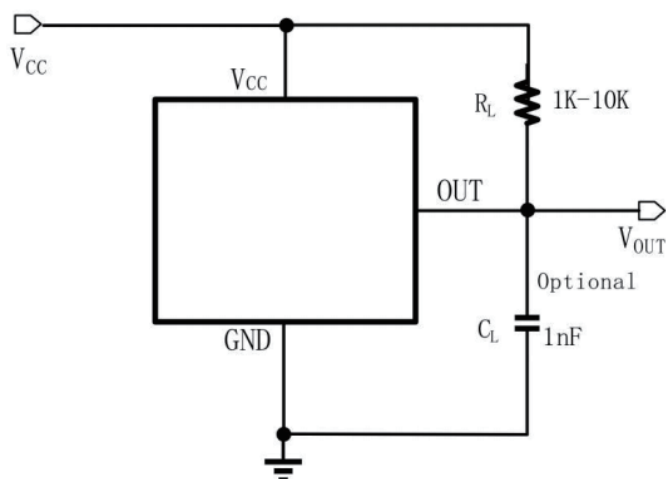
Function Block



The output of the **A3144EUA-T** switches low (turns on) when a magnetic field perpendicular to the Hall element exceeds the operate point threshold, B_{OP} . When the magnetic field is reduced below the release point, B_{RP} , the device output goes high (turns off). The difference between the magnetic operate point and release point is the hysteresis, B_{HYS} , of the device. This built-in hysteresis allows clean switching of the output, even in the presence of external mechanical vibration and electrical noise.

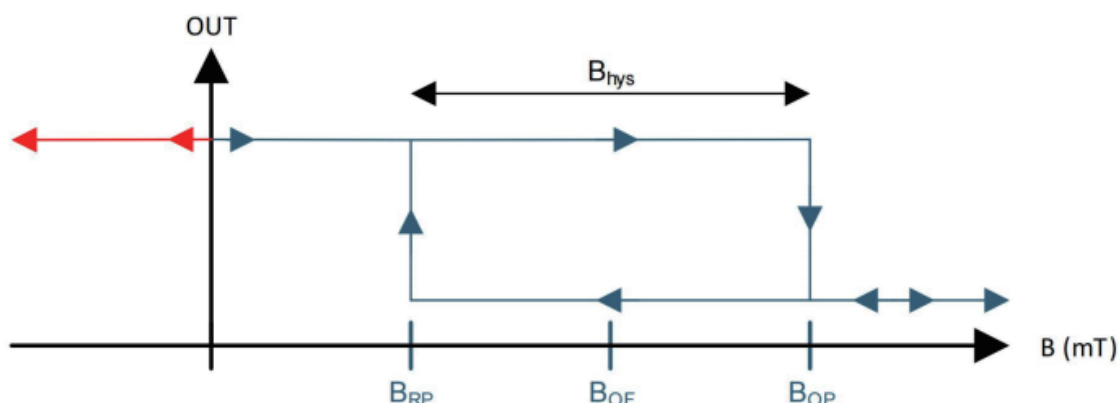
Powering-on the device in the hysteresis range, less than B_{OP} and higher than B_{RP} , allows an indeterminate output state. The correct state is attained after the first excursion beyond B_{OP} or B_{RP} .

Typical Application



The **A3144EUA-T** contains an on-chip voltage regulator and can operate over a wide supply voltage range. In applications that operate the device from an unregulated power supply, transient protection must be added externally. For applications using a regulated line, EMI/RFI protection may still be required. It is recommended to shunt C1 capacitors to the ground near the chip V_{CC} power supply, with a typical value of 0.1μF. At the same time in the external optional series resistor R1 their typical values for 100Ω. The output capacitor C_L is used as the output filter, typically 1nF.

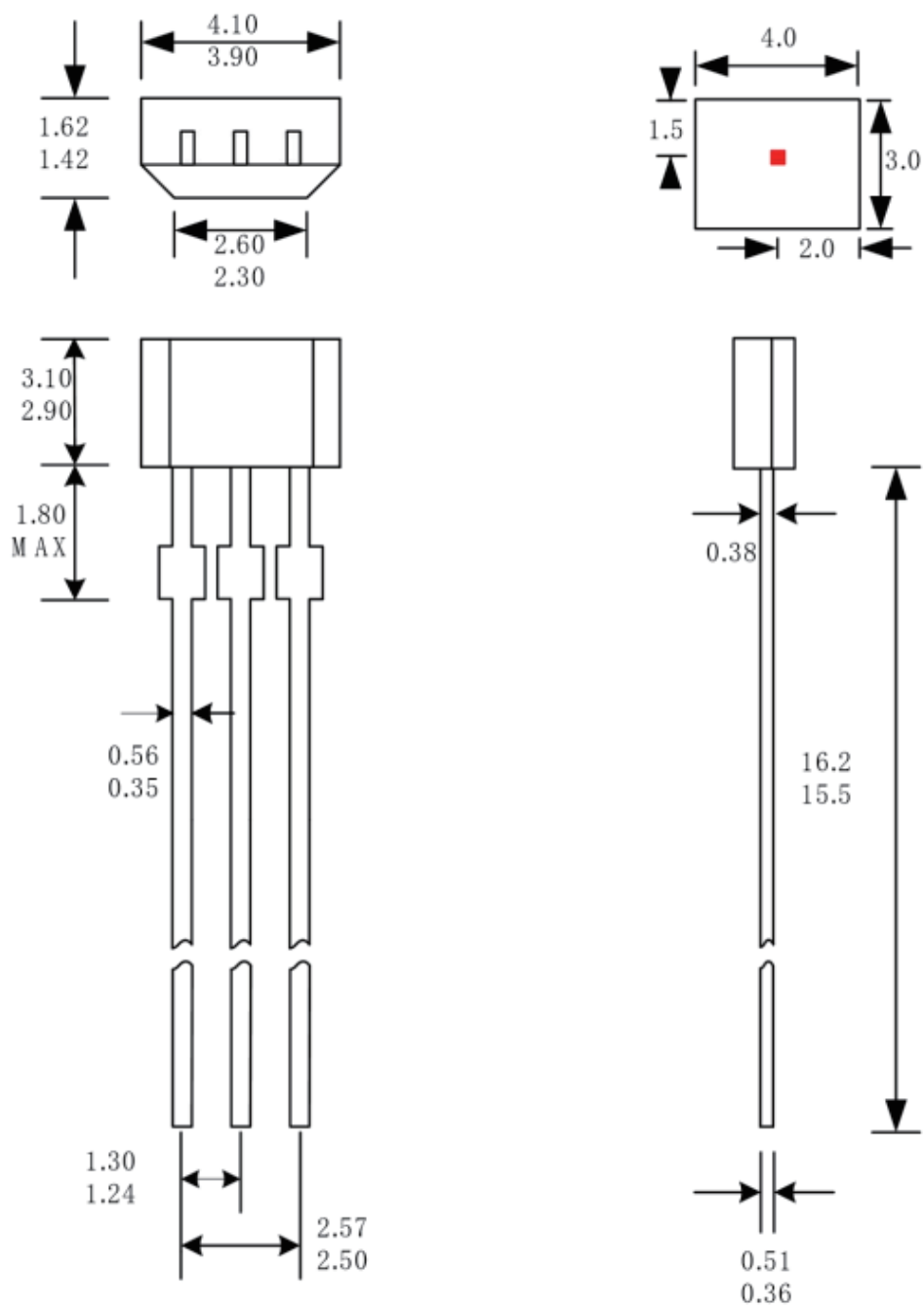
Transfer Function



Powering-on the device in the hysteresis region, less than B_{OP} and higher than B_{RP}, allows an indeterminate output state. The correct state is attained after the first excursion beyond B_{OP} or B_{RP}. If the field strength is greater than B_{OP}, then the output is pulled low. If the field strength is less than B_{RP}, the output is released.

Package Dimensions

TO-92S



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