



AR181 , Hall-Effect sensor, designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall Voltage, and a Schmitt trigger to provide switching hysteresis for noise rejection, and open collector output. An internal band gap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range. The device is identical except for magnetic switch points.

The device includes on a single silicon chip a voltage regulator, Hall-voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, open-collector output to sink up to 25mA. A south pole of sufficient strength will turn the output on. The North Pole is necessary to turn the output off. An on-board regulator permits operation with supply voltages of 3.5V to 20 V.

The package type is in a lead Halogen Free version was verified by third party organization.

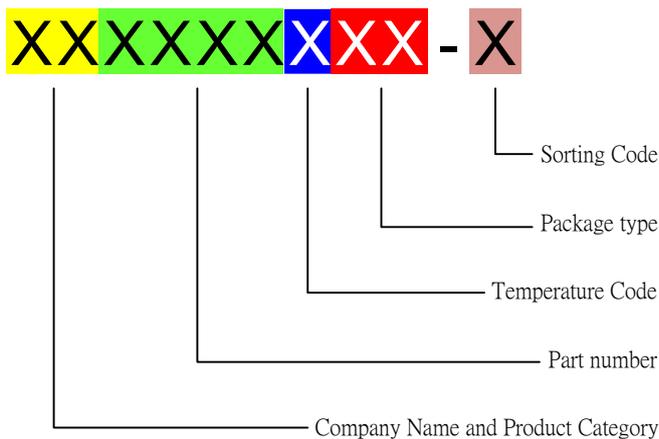
Features and Benefits

- Temperature compensation.
- Wide operating voltage range.
- Open-Collector pre-driver.
- Reverse bias protection on power supply pin.
- 100% at 125°C “Hot Test” in AR 181KUA

Applications

- High temperature Hall IC application
- Fan motor application
- BLDC motor application
- 3 phase BLDC motor in “K” Spec

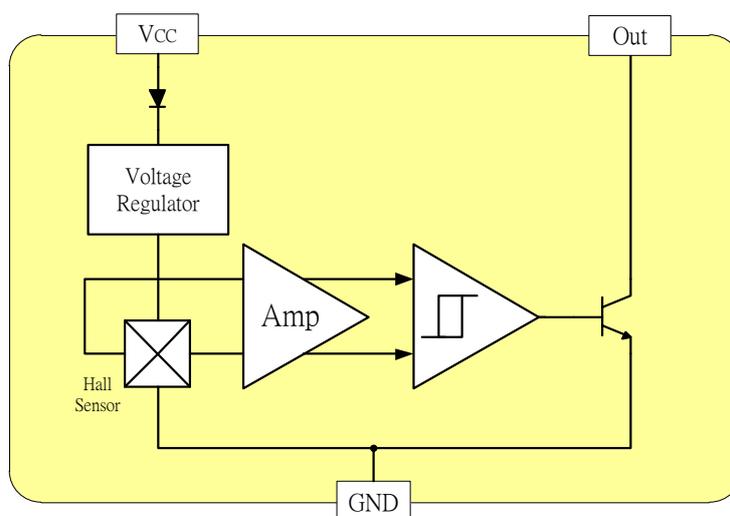
Ordering Information



Part No.	Temperature Suffix	Package Type
AR181KUA	K (-40°C to + 125°C)	UA (TO-92S)
AR181EUA	E (-40°C to + 85°C)	UA (TO-92S)
AR181ESO	E (-40°C to + 85°C)	SO (SOT-23)

AR181 KUA is developed as “125 degree C Temperature Version” by technology. Major application is industrial and automotive.

Functional Diagram



Absolute Maximum Ratings At ($T_a=25^\circ\text{C}$)

Characteristics		Values	Unit
Supply voltage, (V_{cc})		20	V
Output Voltage, (V_{out})		30	V
Reverse voltage, (V_{cc}) (V_{out})		-20	V
Magnetic flux density		Unlimited	Gauss
Output current, (I_{out})		25	mA
Operating Temperature Range, (T_a)	“E” version	-20 to +85	°C
	“K” version	-40 to +125	°C
Storage temperature range, (T_s)		-55 to +150	°C
Maximum Junction Temp, (T_j)		150	°C
Thermal Resistance	(θ_{ja}) UA	206	°C/W
	(θ_{jc}) UA	148	°C/W
Package Power Dissipation, (P_D)		606	mW

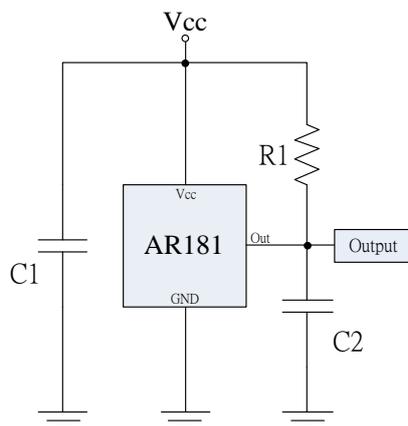
Note: Do not apply reverse voltage to V_{CC} and V_{OUT} Pin, It may be caused for Miss function or damaged device.

Electrical Specifications

DC Operating Parameters : $T_a = +25^\circ\text{C}$, $V_{CC} = 12\text{V}$

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, (V_{CC})	Operating	3.5		20.0	V
Supply Current, (I_{CC})	$B < B_{OP}$		4.0	8.0	mA
Output Saturation Voltage, (V_{Sat})	$I_{OUT} = 10\text{ mA}$, $B > B_{OP}$			700.0	mV
Output Leakage Current, (I_{off})	$I_{OFF} B < B_{RP}$, $V_{OUT} = 12\text{V}$			10.0	μA
Output Rise Time, (T_R)	$R_L = 820\Omega$, $C_L = 20\text{pF}$			1.5	μs
Output Fall Time, (T_F)	$R_L = 820\Omega$; $C_L = 20\text{pF}$			1.5	μs
Operate Point, (B_{OP})	UA(SO)	5(-90)		90(-5)	Gauss
Release Point, (B_{RP})	UA(SO)	-90 (5)		-5 (90)	Gauss
Hysteresis, (B_{HYS})			100		Gauss

Typical application circuit



C1 : 1000PF

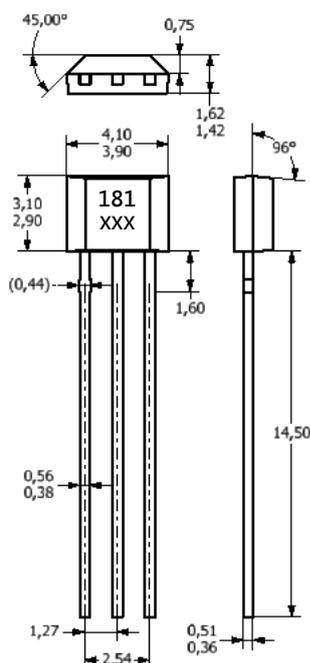
C2 : 15PF

R1 : 10K Ω

Sensor Location, Package Dimension and Marking

AR181 Package

UA Package



NOTES:

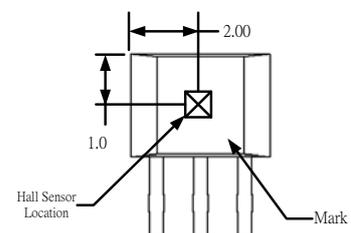
- 1).Controlling dimension: mm
- 2).Leads must be free of flash and plating voids
- 3).Do not bend leads within 1 mm of lead to package interface.
- 4).PINOUT:

Pin 1 VCC

Pin 2 GND

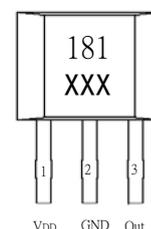
Pin 3 Output

Hall Chip location

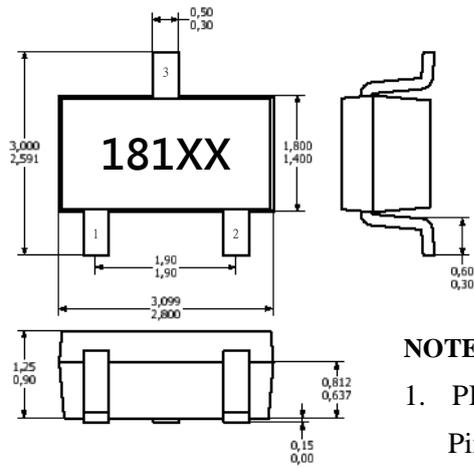


Output Pin Assignment

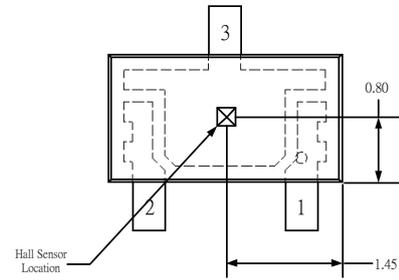
(Top view)



**SO Package
(Top View)**



**Hall Plate Chip Location
(Bottom view)**



NOTES:

1. PINOUT (See Top View at left :)
 Pin 1 V_{CC}
 Pin 2 Output
 Pin 3 GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum