



## DESCRIPTION

The AH8113 is an integrated hall-effect sensor designed specifically to meet the requirements of low-power devices. e.g. as an On/Off switch in Cellular Flip-Phones, with battery operating voltages of 1.65V-5.5V.

Precise magnetic switching points and high temperature stability are achieved through the unique design of the internal circuit. An onboard clock scheme is used to reduce the average operating current of the IC. During the operate phase the IC compares the actual magnetic field detected with the internally compensated switching points. The output Voltage is switched at the end of each operating phase. During the Stand-by phase the output stage is latched and the current consumption of the device reduced to some  $\mu\text{A}$ .

The IC switching behavior is Omni polar; it can be switched on with either the North or South pole of a magnet.

The AH8113 is available in TSOT-23 and TO-92S Packages.

## ORDERING INFORMATION

Package Type	Part Number	
TSOT-23 SPQ: 3,000pcs/Reel	TE3	AH8113TE3R
		AH8113TE3VR
TO-92S SPQ: 2,000pcs/Box SPQ: 1,000pcs/Bag	ZS	AH8113ZSW
		AH8113ZSVW
Note	V: Halogen free Package R: Tape & Reel W: A : Ammo Packing B: Bulk Packing	
AiT provides all RoHS products		

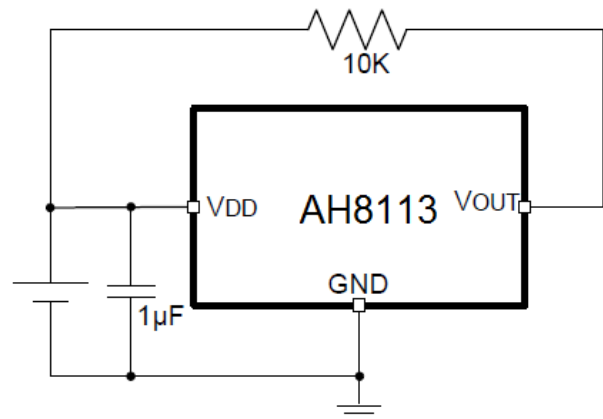
## FEATURES

- Micro power design
- 1.65 V to 5.5 V battery operation
- High sensitivity and high stability of the magnetic switching points
- High resistance to mechanical stress
- Digital output signal
- Switching for both poles of a magnet (omnipolar)
- Not suitable for automotive application
- Available in TSOT-23 and TO-92S Packages

## APPLICATION

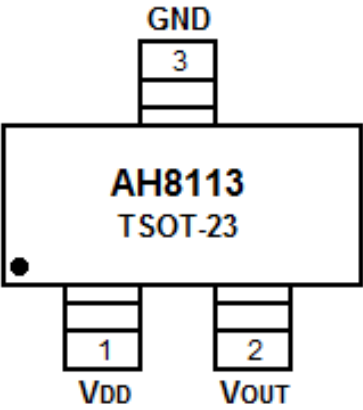
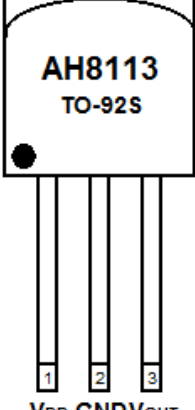
- Cover switch in clam-shell cellular phones
- Cover switch in Notebook PC/PDA
- Contact-less switch in consumer products

## TYPICAL APPLICATION





**PIN DESCRIPTION**

 <p style="text-align: center;">Top View</p>		 <p style="text-align: center;">Top View</p>	
Pin #		Symbol	Function
TSOT-23	TO-92S		
1	1	V <sub>DD</sub>	Supply Voltage
2	3	V <sub>OUT</sub>	Output Pin
3	2	GND	Ground



## ABSOLUTE MAXIMUM RATINGS

V <sub>DD</sub> , Supply Voltage	-0.3V ~ 6.0V
I <sub>DD</sub> , Operating Current	-1mA ~ 4.5mA
V <sub>OUT</sub> , Output Voltage	-0.3V ~ 6.0V
I <sub>OUT</sub> , Output Current	-1mA~2.0mA
T <sub>S</sub> , Storage Temperature Range	-40°C ~ +150°C
T <sub>J</sub> , Maximum Junction Temperature	150°C
ESD Protection	4000V

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## ELECTRICAL CHARACTERISTICS

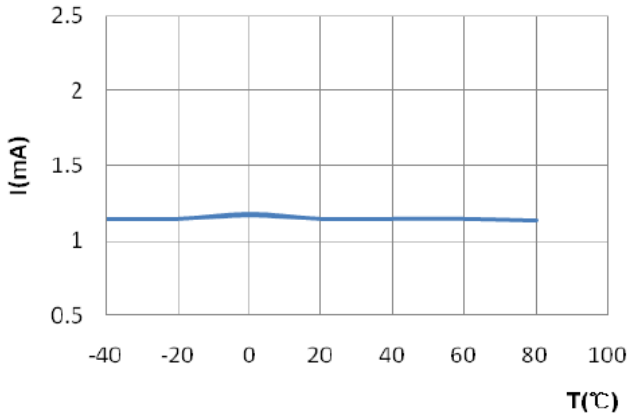
T<sub>A</sub> = +25°C, V<sub>DD</sub> = 3.0V, unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>AC/DC Characteristics</b>						
Supply Voltage	V <sub>DD</sub>		1.65	-	6.0	V
Averaged Supply Current	I <sub>SAVG</sub>		1	3	10	μA
Averaged Current During Operating Time	I <sub>SOPAVG</sub>		0.5	2.0	3.5	mA
Peak Current During Operating Time	I <sub>SOPT</sub>		-	-	4.5	mA
Supply Current During Standby Time	I <sub>SSTB</sub>		1	1.9	8	μA
Output Saturation Voltage	V <sub>OUTSAT</sub>	I <sub>OUT</sub> = 1mA	-	0.13	0.4	V
Output on Leakage Current	I <sub>OUTLEAK</sub>		-	0.01	1	μA
Output Rise Time	t <sub>r</sub>	R <sub>L</sub> =2.7kΩ, C <sub>L</sub> =10pF	-	0.5	1	us
Output Fall Time	t <sub>f</sub>	R <sub>L</sub> =2.7kΩ, C <sub>L</sub> =10pF	-	0.1	1	us
Operating Time	t <sub>OP</sub>		25	100	160	us
Standby Time	t <sub>STB</sub>		60	140	240	ms
Duty Cycle	t <sub>OP</sub> /t <sub>STB</sub>		-	0.071	-	%
Start-up Time of IC	t <sub>STU</sub>		-	12	20	us

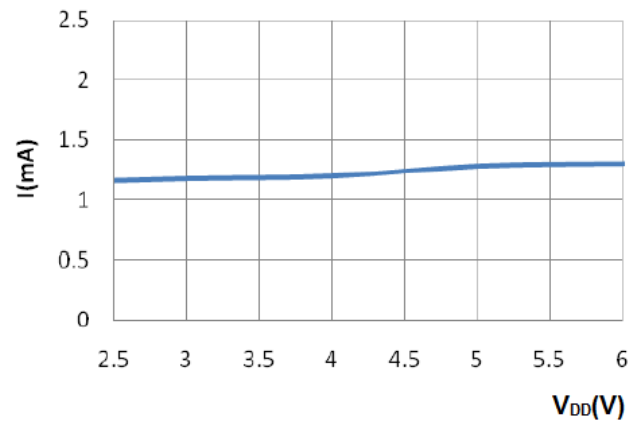


## TYPICAL PERFORMANCE CHARACTERISTICS

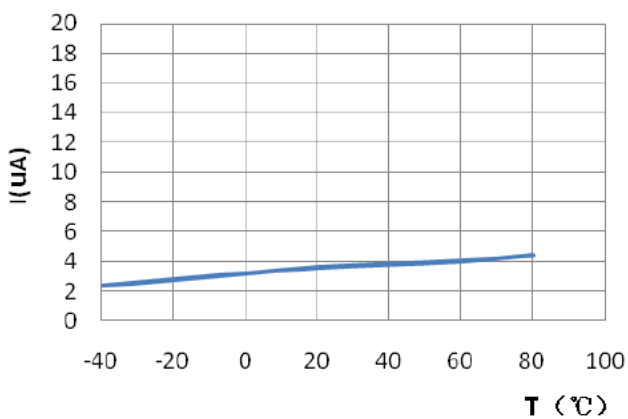
1.  $V_{DD} = 2.7V$ ,  $I_{SOPAVG} - T_A$



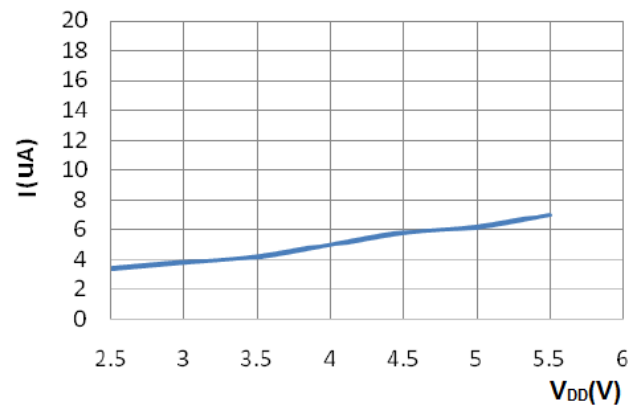
2.  $T_A = 20^\circ C$ ,  $I_{SOPAVG} - V_{DD}$



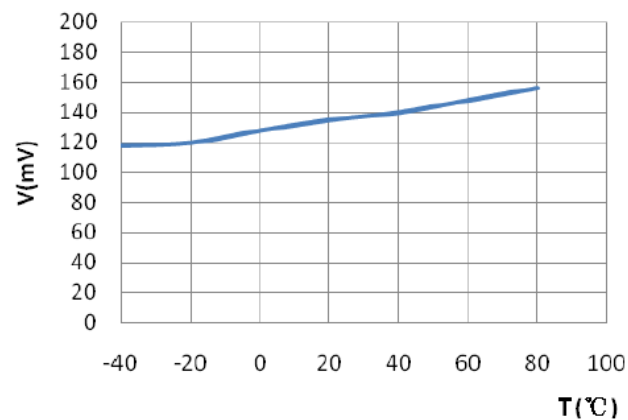
3.  $V_{DD} = 2.7V$ ,  $I_{SSTB} - T_A$



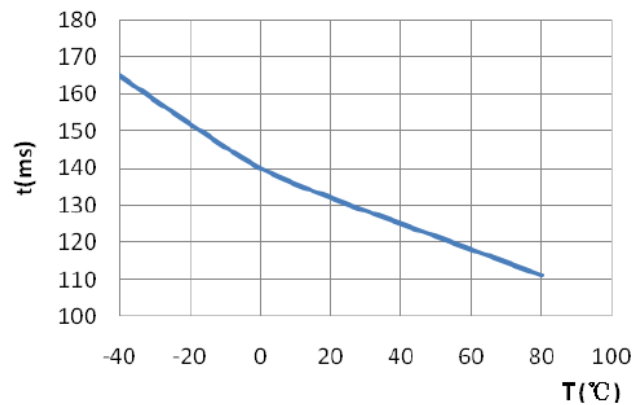
4.  $T_A = 20^\circ C$ ,  $I_{SSTB} - V_{DD}$



5.  $I_{OUT} = 1mA$ ,  $V_{OUTSAT} - T_A$

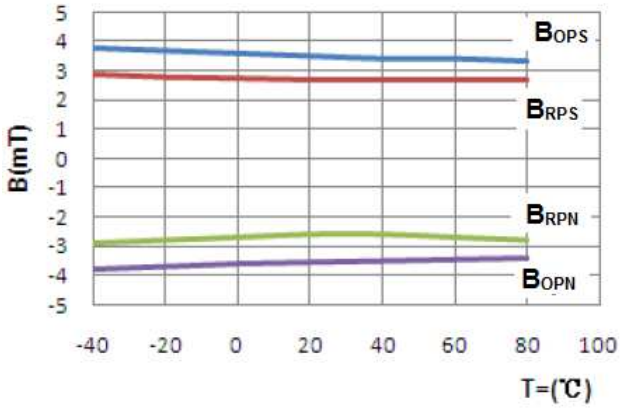


6.  $V_{DD} = 2.7V$ ,  $t_{STB} - T_A$

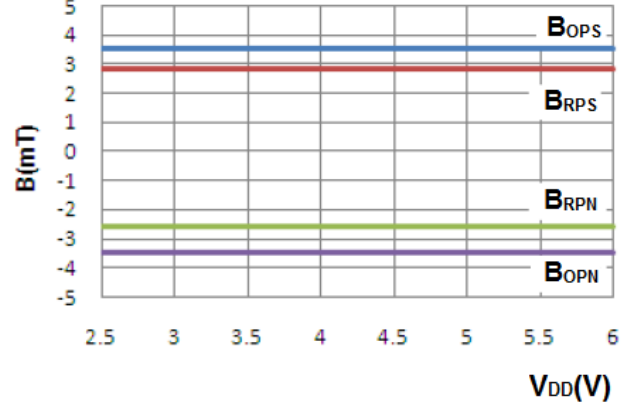




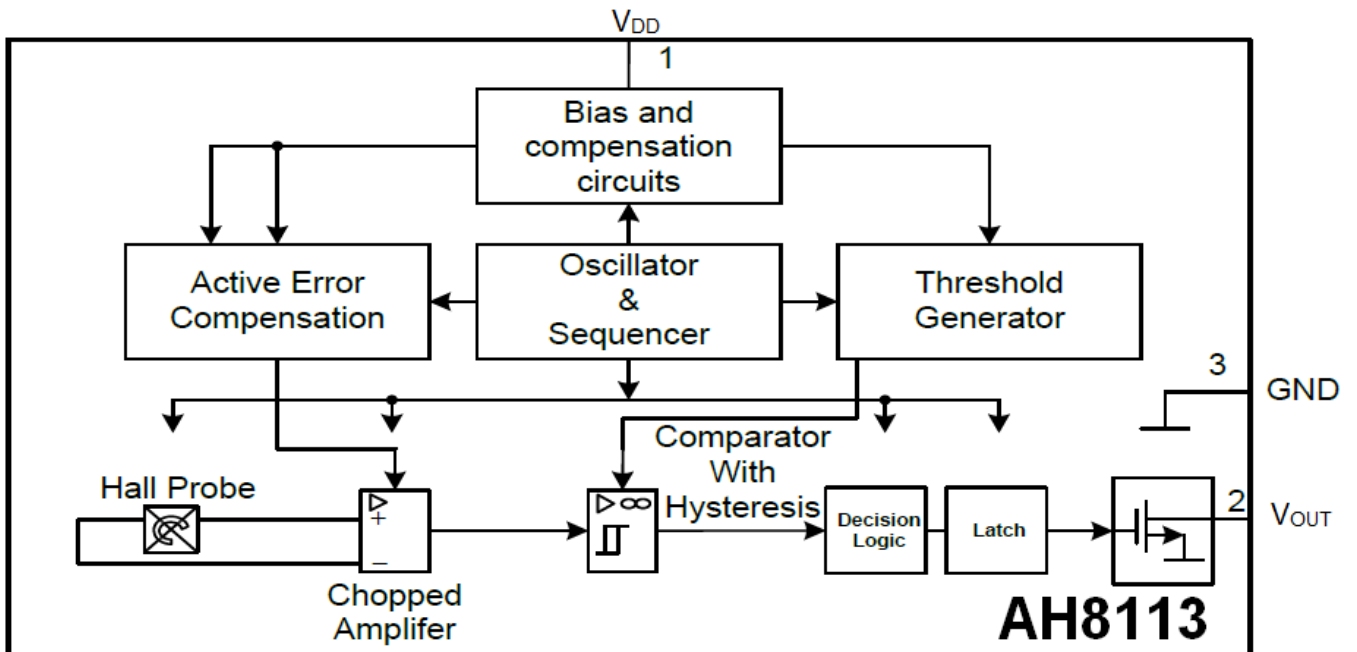
7.  $V_{DD} = 2.7V$ ,  $B - T_A$



8.  $T_A = 20^\circ C$ ,  $B - V_{DD}$



**BLOCK DIAGRAM**

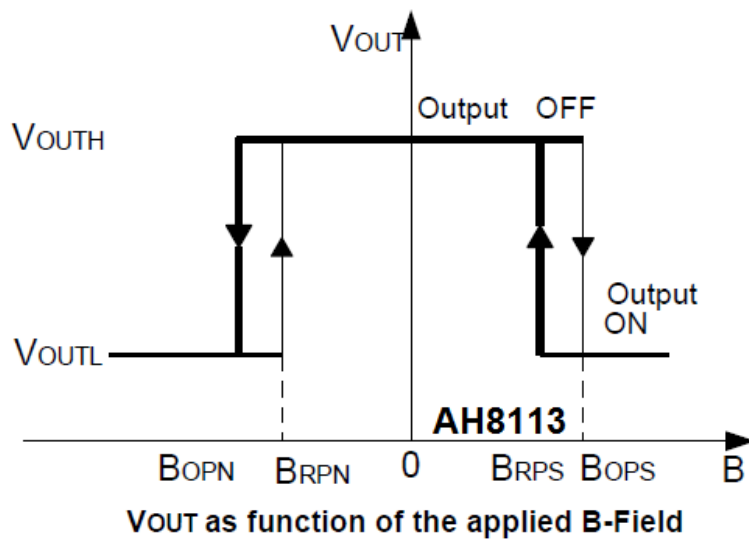
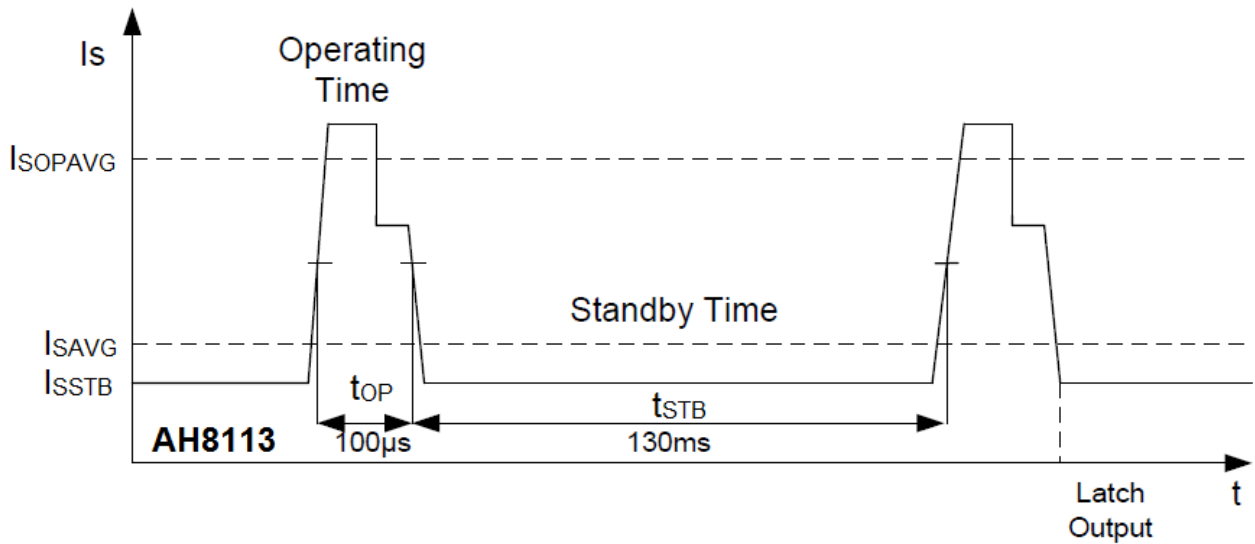




**MANGNETIC CHARACTERISTICS**

$T_A = +25^\circ\text{C}$ ,  $V_{DD} = 2.7\text{V}$ , unless otherwise specified

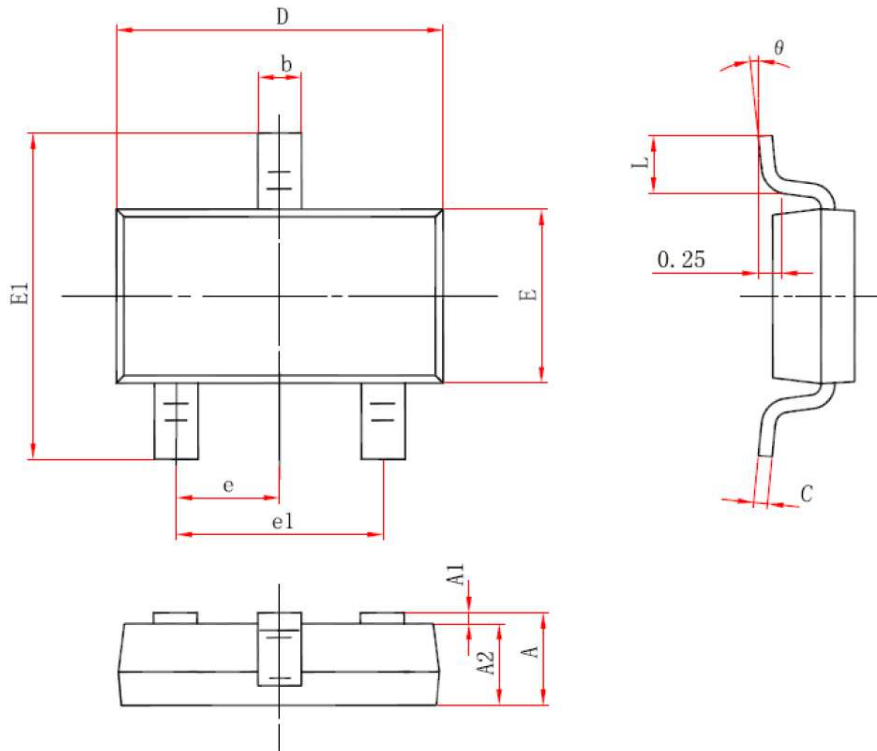
Symbol	Min	Typ	Max	Unit
B <sub>OPS</sub>	2	3.5	5	mT
B <sub>OPN</sub>	-5	-3.5	-2	mT
B <sub>RPS</sub>	1.2	2.7	4.2	mT
B <sub>RPN</sub>	-4.2	-2.6	-1.2	mT
B <sub>HYS</sub>	0.2	0.8	1.6	mT





**PACKAGE INFORMATION**

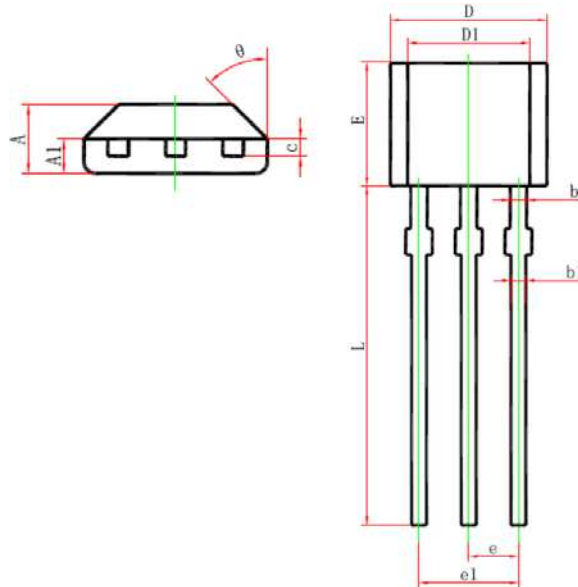
Dimension in TSOT-23 (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b	0.350	0.500	0.014	0.020
c	0.080	0.200	0.003	0.008
D	2.820	3.020	0.111	0.119
E	1.600	1.700	0.063	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 ( BSC )		0.037(BSC)	
e1	1.900 ( BSC )		0.075(BSC)	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



Dimension in TO-92S (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.420	1.620	0.056	0.064
A1	0.660	0.860	0.026	0.034
b	0.420	0.550	0.017	0.022
b1	0.360	0.480	0.014	0.019
c	0.360	0.510	0.014	0.020
D	3.900	4.100	0.154	0.161
D1	2.970	3.270	0.117	0.129
E	3.050	3.250	0.120	0.128
e	1.270TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	15.100	15.500	0.594	0.610
theta	45°TYP		45°TYP	





## IMPORTANT NOTICE

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