Low-Power Hall Switch

Halogen Free

General Description

FD2H003B*-G1 is a low-power integrated Hall switch designed to sense the applied magnetic flux density and give a digital output, which indicates the present condition of the magnitude sensed. One example of the applications is the on/off switch in cellular flip-phones.

The micro power design is especially suitable for battery-operated systems such as cellular phones or laptop computers, in which power consumption is one major concern. The typical power consumption of FD2H003B*-G1 is below 10μW at 2.7V.

The magnetic switching points are precise and insensitive to process and temperature variations.

For FD2H003B*-G1, the output will be at the “high” level when no magnetic field is applied. When the applied magnetic flux density is stronger than the switching threshold, the output would be at the “low” level.

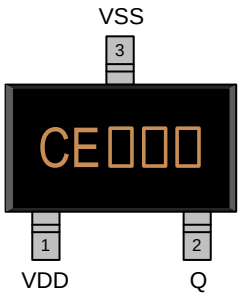
Features

- Micro power consumption
- 1.8V to 5.5V battery operation
- Chopper Amplifier based design:
  Insensitive to noise and offset caused by process variations, operating temperatures and mechanical stress Digital output
- CMOS process
- CMOS output stage : no external pull-up resistor needed

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Pin Descriptions

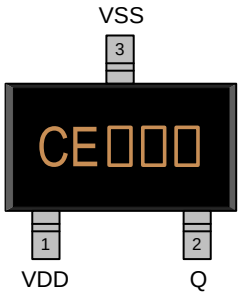
FD2H003BYR-G1



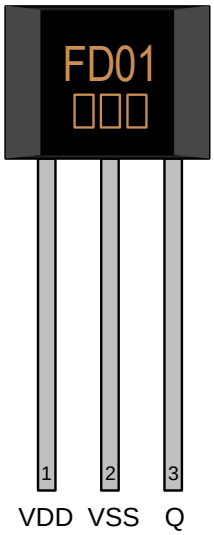
Name	I/O	Description
VDD	P	Positive supply
Q	O	Open Drain output
VSS	G	Ground

Legend: I=input, O=output, I/O=input/output, P=power supply, G=ground

FD2H003BaR-G1

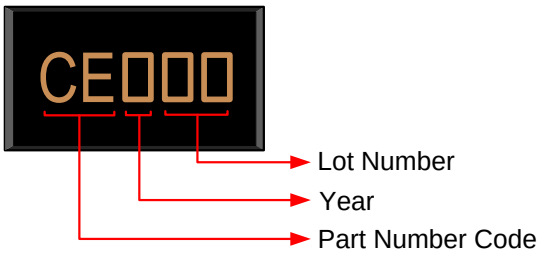


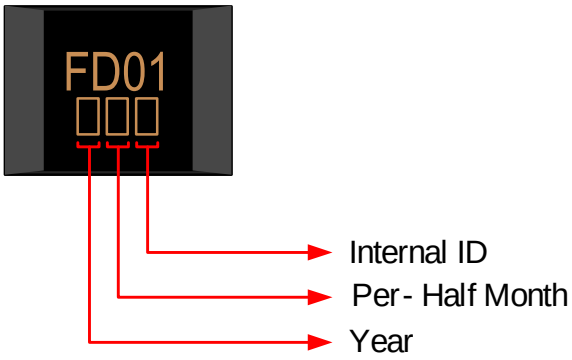
FD2H003BH-G1



This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Marking Information





Halogen Free: Halogen free product indicator

Lot Number: Wafer lot number's last two digits

For Example → Lot : 123456 → XXx-56L

Internal ID: Internal Identification Code

Per-Half Month: Production period indicator in half month time unit

For Example : A → First Half Month of January
B → Second Half Month of January
C → First Half Month of February
D → Second Half Month of February

Year: Production year's last digit

Part Number Code: Part number identification code for this product.

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Block Diagram

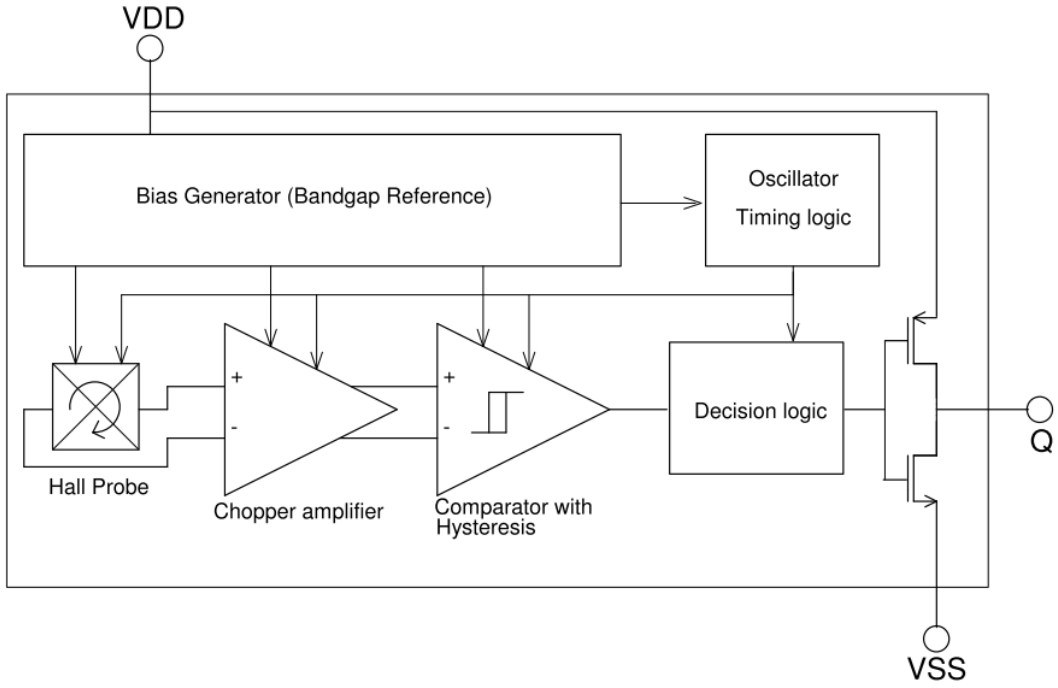


Figure.1

Functional Descriptions

Refer to the block diagram (Figure.1), FD2H003-LF is composed of the following building blocks:

- **Bias Generator**

The bias generator provides precise, temperature and process insensitive current sources for both the Hall plate and the chopper amplifier. These current sources in turn guarantee proper operation of the chip and precise switching thresholds under all kinds of environments specified in the specification.

- **Oscillator + Timing logic**

The built-in oscillator provides the clock signal, which is taken by the timing logic to determine the periods of the operating phase and the stand-by phase. Typically the operating time is about 60us and the stand-by time is 150ms. Using such a clocking scheme, the average power consumption is almost equal to that in the stand-by phase, which is under 10μW at 2.7V.

- **Chopper Amplifier**

To achieve a higher resolution the chopper amplifier structure is adopted in this design. Use of this structure dynamically removes both the offset and flicker noise at the same time.

- **Comparator with Hysteresis Control**

This block determines the switching threshold of the Hall switch in different situations.

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

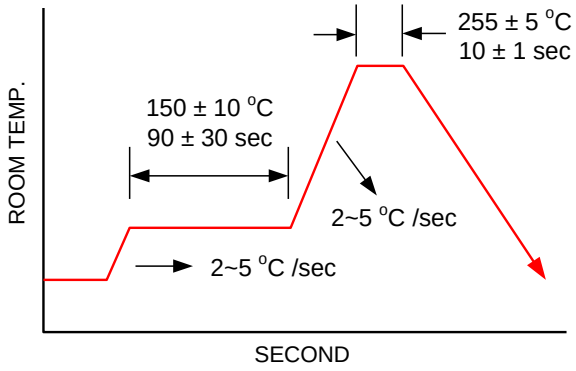
Ordering information

Part Number	Operating Temperature	Part Number Code	Package	Description	MOQ
FD2H003BYR-G1	-20 °C to +105 °C	CE	SOT23	±25G (B)	3000ea / Reel
FD2H003BaR-G1	-20 °C to +105 °C	CE	TSOT23	±25G (B)	3000ea / Reel
FD2H003BH-G1	-20 °C to +105 °C	-	SIP3	±25G (B)	1000ea / Bag

Absolute Maximum Ratings

Parameter	Conditions	Min.	Max.	Unit
Ambient Operating Temperature	-	-40	85	℃
Storage Temperature	-	-40	150	℃
DC Supply Voltage	-	1.8	5.5	V
Supply Current	-	-1	2.5	mA
Programming Pin Voltage (only available for FD2H003B*-G1)	With respect to VSS	-0.3	5.5	V
Magnetic Flux Density	-		unlimited	G
Lead Temperature	10sec	-	260	℃

IR Re-flow Soldering Curve



IR-Reflow Soldering Condition

Figure. 2

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Operating Conditions

Parameter	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	-	1.8	2.7	5.5	V
Output Voltage	-	-0.3	2.7	5.5	V
Ambient Temperature	-	-40	25	85	℃

Electrical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Average Supply Current	-	-	3[1]	20	μA
Average Supply Current (operating phase)	-	-	1.1[1]	-	mA
Average Supply Current (stand-by phase)	-	-	2.5[1]	-	μA
Output High Voltage(VOH)	Io=-0.5mA	VDD-0.4V	-		V
Output Low Voltage(VOL)	Io=+0.5mA	-	-	0.4V	V
Output Leakage Current	-	-	0.01	-	μA
Operating time	-	-	60	-	μs
Standby time	-	-	150	-	ms
Duty cycle	-	-	0.04	-	%

1. operating voltage 2.7V

Magnetic Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operate Points ($\|B_{OP}\|$)	-	15	25	35	G
Hysteresis	-	5	10	15	G

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Magnetic Flux

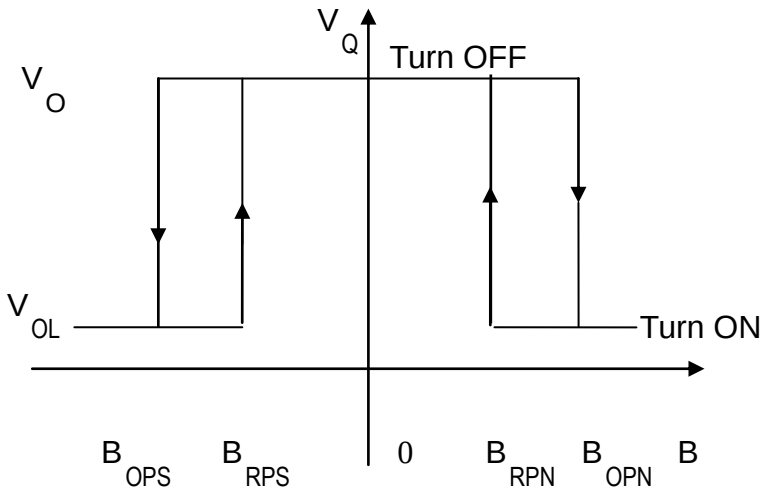


Figure 3 . FD2H003B*-G1

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Typical Characteristics

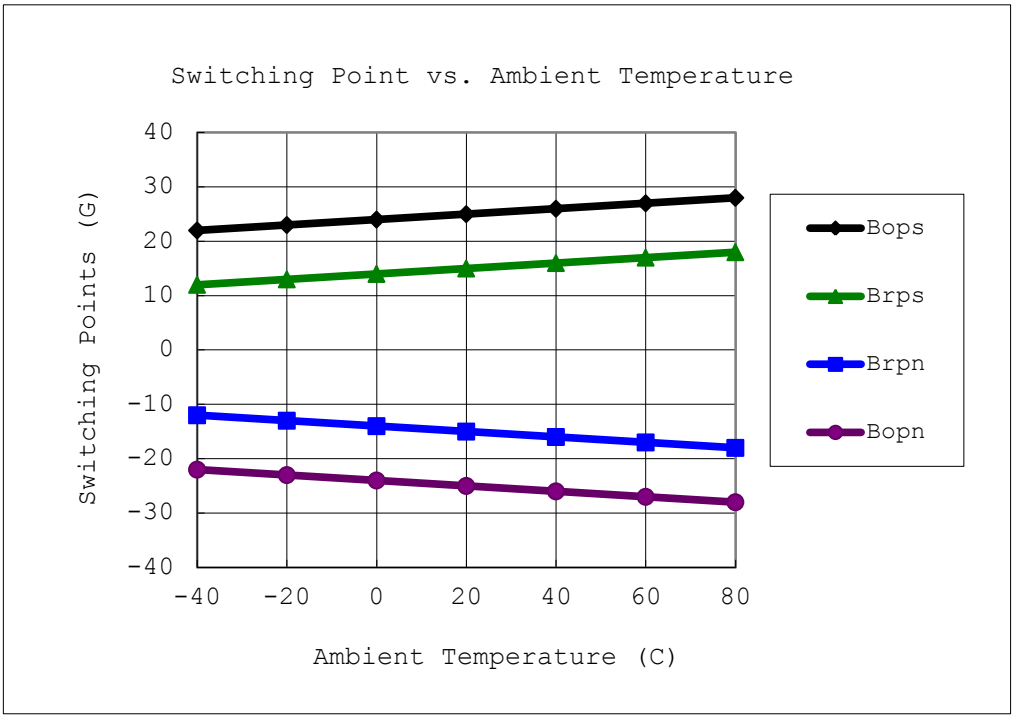


Figure.4 Magnetic Switch Points Versus Ambient Temperature (VDD=2.7V)

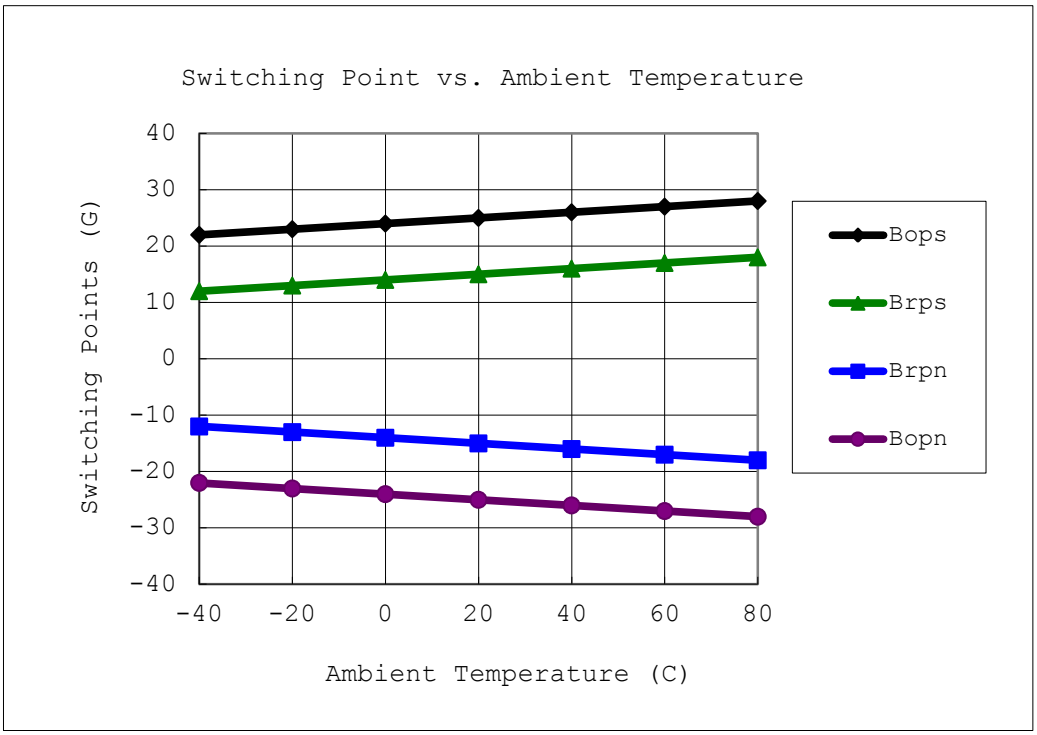


Figure.5 Magnetic Switch Points Versus Supply Voltage (Ta=25C degree)

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

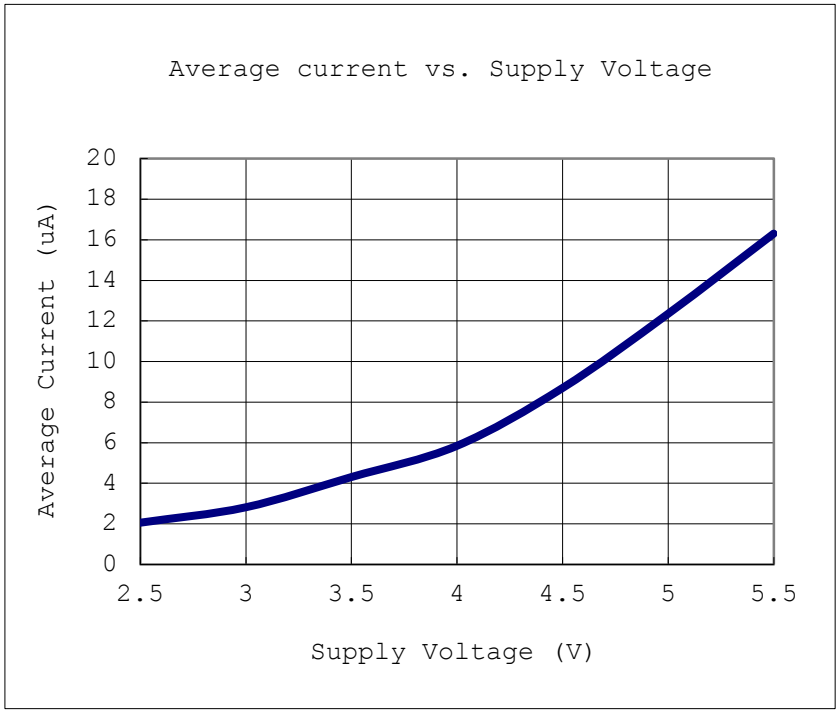


Figure.6 Average Current Versus Supply Voltage (Ta=25C degree)

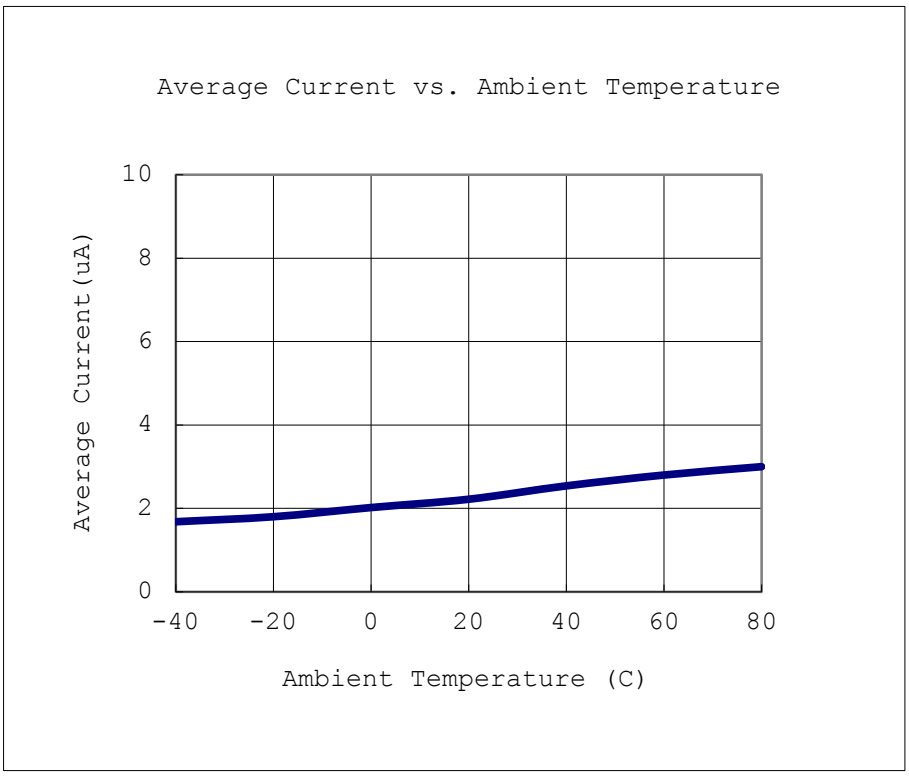


Figure.7 Average Current Versus Ambient Temperature (VDD=2.7V)

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Application Circuit Reference

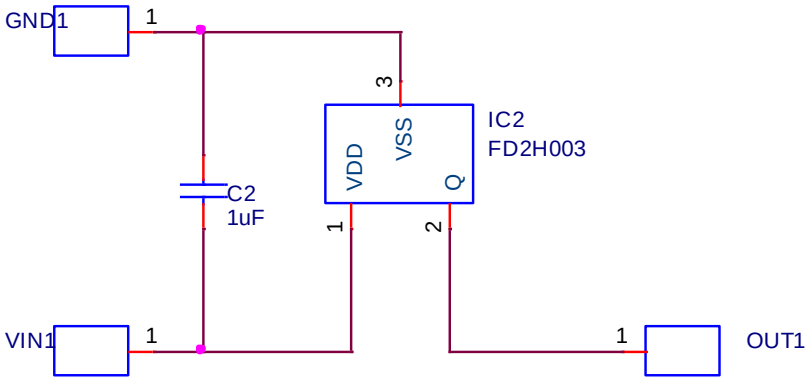


Figure.7

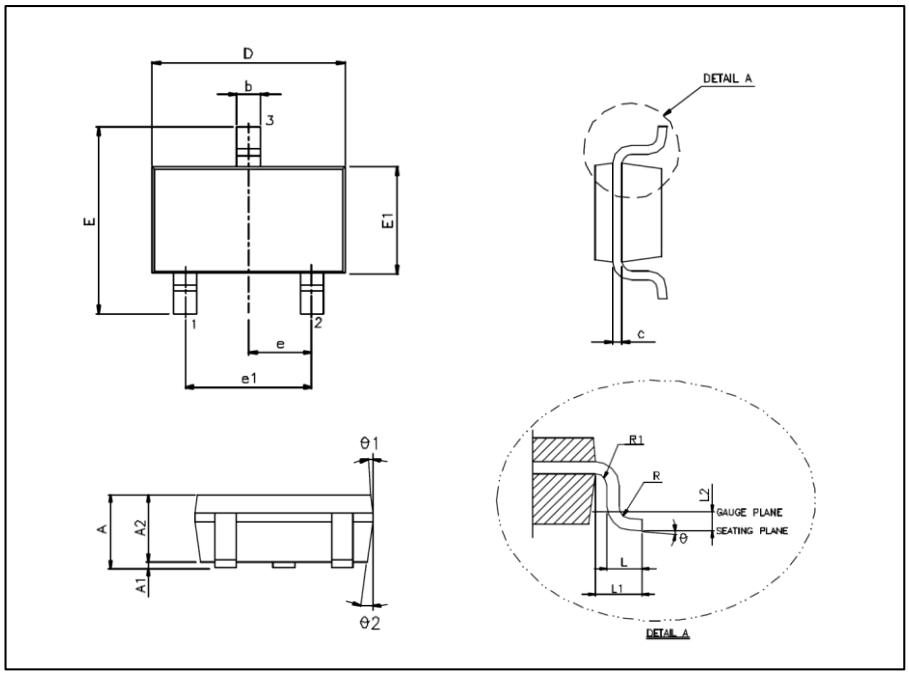
NOTE:

1. ***R1 is for power supply filtering function, and must be placed as close to IC1 as possible.***

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

Package Outline

SOT23(FD2H003BYR-G1)

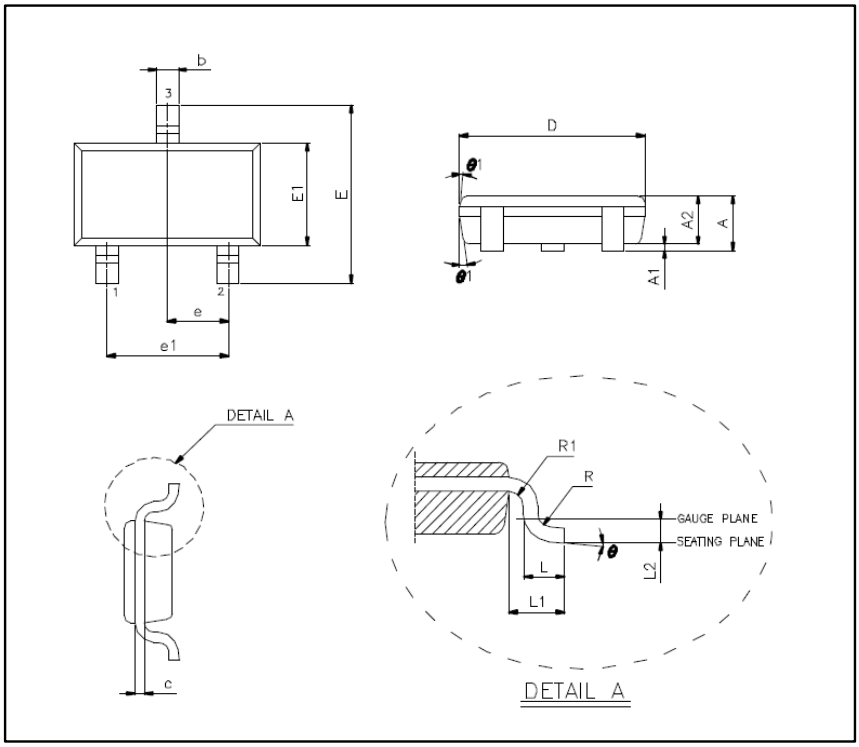


Unit: mm

Symbols	Min. (mm)	Nom. (mm)	Max. (mm)
A	-	-	1.45
A1	-	-	0.15
A2	0.90	1.15	1.30
b	0.30	-	0.50
c	0.08	-	0.22
D	2.90 BSC.		
E	2.80 BSC		
E1	1.60 BSC		
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.45	0.60
L1	0.60 REF.		
L2	0.25 BSC		
R	0.10	-	-
R1	0.10	-	0.25
θ°	0°	4°	8°
θ1°	5°	10°	15°

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

TSOT-23L(FD2H003BaR-G1)

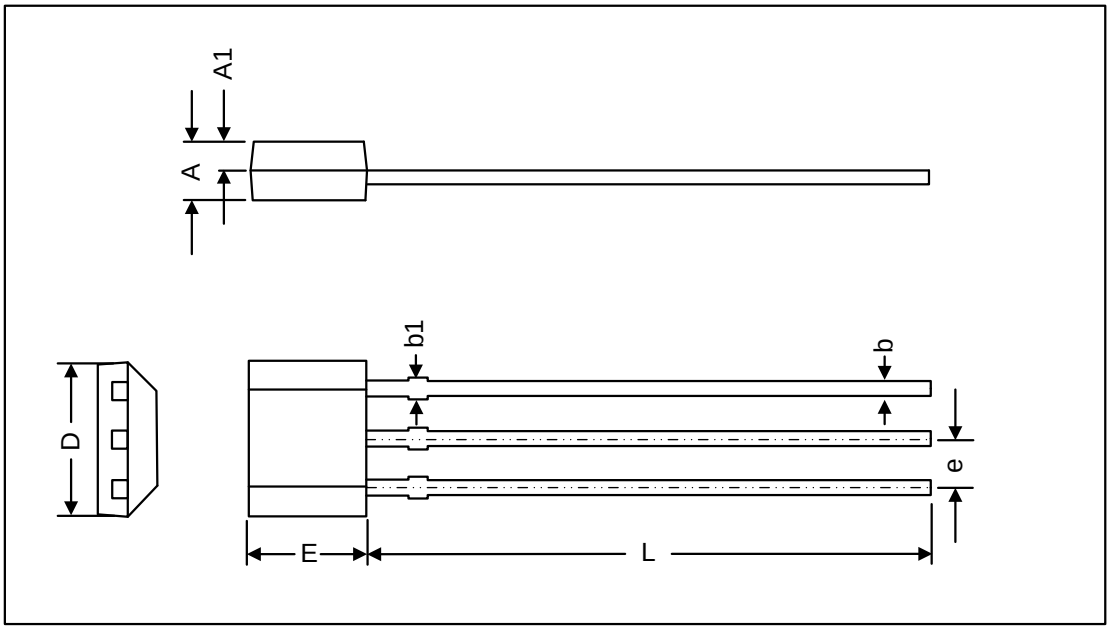


Unit: mm

Symbols	Dimension In Millimeters		
	Min	Nom	Max
A	0.750	-	0.800
A1	0.025	-	0.050
A2	0.700	0.750	0.775
b	0.350	-	0.500
c	0.100	-	0.200
D	2.800	2.900	3.000
E	2.600	2.800	3.000
E1	1.500	1.600	1.700
e	0.950 BSC		
e1	1.900 BSC		
L	0.370	0.450	0.600
L1	0.600 REF		
L2	0.250 BSC		
R	0.100	-	-
R1	0..100	-	0.250
Θ	0°	4°	8°
Θ1	4°	10°	12°

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

SIP-3L (FD2H003BH-G1)



Unit: mm

Symbols	Min. (mm)	Nom. (mm)	Max. (mm)
A	1.245	-	1.753
A1	0.75REF		
b	0.33	-	0.56
b1	0.54 REF		
D	3.85	-	4.2
E	2.87	-	3.124
L	13.5	-	15.6
e	1.27 REF		

Note:

1. Dimension “D” does not include molding flash, protrusions or gate burrs.
2. Dimension “E” does not include interlead flash, protrusions.

This datasheet contains new product information. Feeling Technology reserves the rights to modify the product specification without notice.
No liability is assumed as a result of the use of this product. No rights under any patent accompany the sales of the product.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Industrial Hall Effect/Magnetic Sensors ***category:***

Click to view products by Feeling ***manufacturer:***

Other Similar products are found below :

GT-13013 GT-13040 GT-14114 DRR-129(62-68) ATS682LSHTN-T SR4P2-C7 GT-13012 GT-14049 GT-14067 GT-14132 GT-18030 103FW12-R3 A1155LLHLT-T SMSA2P30CG P2D-000 GN 55.2-SC-15-3 GN 55.2-SC-5-3 MZA70175 103FW41-R1 KJR-D100AN-DNA-VE KJR-D100AN-DNIA-V2 SR-10018 115L 14E 502 W06017 ATS128LSETN-T TLE4906LHALA1 TLE49452LHALA1 BU52013HFV-TR MRMS591A 103SR14A-1 MZT7-03VPS-KR0 MZT7-03VPS-KW0 MZT8-03VPS-KW0 MZT8-28VPS-KP0 A1326LLHLX-T A1326LLHLT-T A1156LLHLT-T ACS770LCB-100U-PFF-T ATS617LSGTN-T AH49ENTR-G1 SS360PT SS311PT GN 55.2-ND-15-3 GN 55.2-ND-18-3 GN 55.2-ND-4-3 GN 55.2-ND-8-3 GN 55.2-SC-10-3 GN 55.4-ND-10-7,5-2 GN 55.4-ND-12-9,5-2,5 GN 55.4-ND-26-20,3-5 GN 55.4-ND-7,5-4-1,5