Single Output Hall Effect Latch

❖ GENERAL DESCRIPTION

SW7020/B is an integrated Hall effect latched sensor designed for electronic commutation of brush-less DC motor applications. The device is using HV BCD process 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.

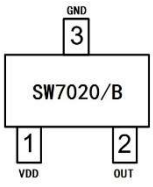
If a magnetic flux density larger than threshold Bop, OUT is turned on(low). The output state is held until a magnetic flux density reversal falls below Brp causing OUT to be turned off (high).

❖ FEATURES

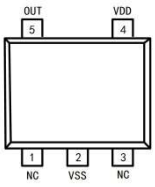
- 2.5V to 26V DC operation voltage
- Temperature compensation
- Wide operating voltage range
- Open-Drain pre-driver
- 25mA maximum sinking output current.
- Packages: SOT23-3L , SIP-3L(TO-92S) , DFN1.6x1.6-6L , SOT553.

❖ PIN ASSIGNMENT

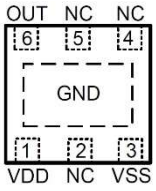
The package of SW7020/B , the pin assignment is given by:



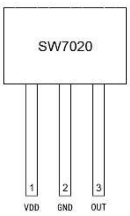
SOT23-3L



SOT553



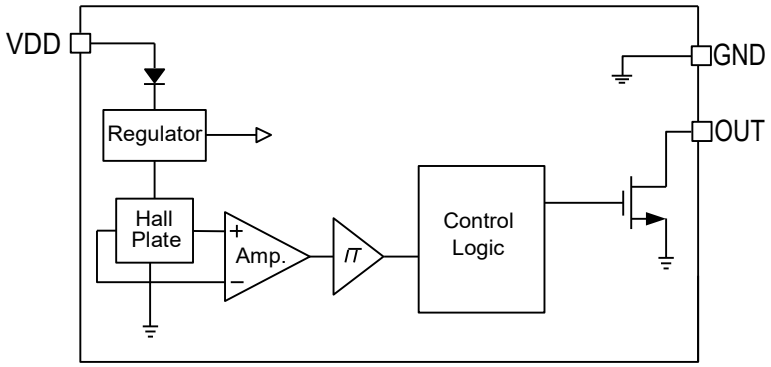
DFN-6L(1.6x1.6)



SIP-3L

Name	Description
VDD	Supply Voltage
OUT	Output
GND	Ground.

❖ BLOCK DIAGRAM



❖ RDER/MARKING INFORMATION

Order Information	Top Marking (SIP-3L)
SW7020X XXX Blank: SW7020 B: SW7020B Device Name P3: SIP-3L A: SOT23-3L B553: SOT553 D1: DFN1.6x1.6-6L Packing Blank: Bag A : Taping	7020 → Part number YYWW X → X: Internal ID code WW: 01~52 YY: 13=2013
Top Marking (DFN/SOT553)	**Top Marking (SOT23-3L)**
DFN SOT553 H6 YWX H6YW X: Internal ID code W: 01~26（A~Z） 27~52（a~z） Y: 9=2019	H X Y W X → X: Internal ID code W: 01~26(A~Z) 27~52(a~z) Y: 7 = 2017 H6=SW7020, H7=SW7020B

❖ A BSOLUTE MAXIMUM RATINGS (at T_A=25°C)

Characteristics	Symbol	Rating	Unit
Supply Voltage	VCC	28	V
Reverse VCC Polarity Voltage	VRCC	-28	V
Magnetic Flux Density	B	Unlimited	Gauss
Output Current（Continuous）	IO	25	mA
Power Dissipation（SIP3 / SOT23 / DFN / SOT553）	PD	550/230	mW
Storage Temperature Range	TSTG	-65 to+150	°C
Thermal Resistance from Junction to case (SIP3 / SOT23 / DFN)	θJC	49/410	°C/W
Thermal Resistance from Junction to ambient (SIP3 / SOT23 / DFN)	θJA	227/543	°C/W
Junction temperature	TJ	150	°C
Operating temperature	TO	-40 to120	°C
Magnetic signal input frequency（note1）	Fsw	0~3	kHz

Note1 : Not subject to production test, verified by design/characterization.

❖ ELECTRICAL CHARACTERISTICS

(V_{DD} = 12V, T_A = +25°C, unless otherwise noted.)

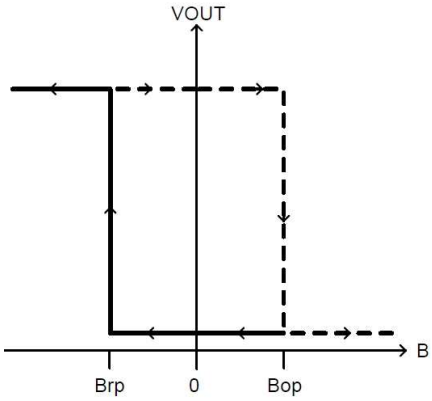
Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Supply Voltage	VDD	Operating	2.5	-	26	V
Supply current	IDD	Operating	-	2.0	3.0	mA
Output Leakage Current	IOFF	VOUT=12V	-	<0.1	10	μA
OutputSaturationVoltage	Vds(sat)	IOUT=20mA	-	0.3	-	V
Chopper frequency（note2）	fosc			50		kHz
Magnetic				(1mT=10 Gauss)		
Operate Point	BOP		5	28	60	Gauss
Release Point	BRP		-60	-28	-5	Gauss
Hysteresis	BHYS		-	56	-	Gauss

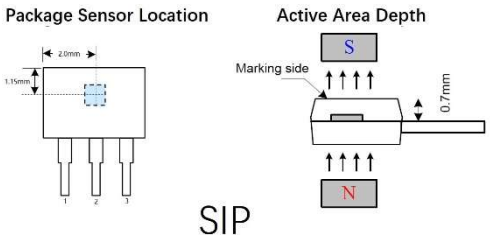
Note2: Not subject to production test, verified by design/characterization.

Driver output vs. magnetic pole（SIP3）

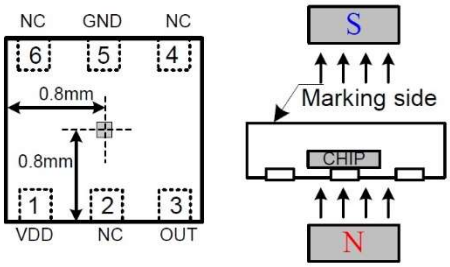
Characteristics	Test Conditions	OUT
North pole	B<Brp	High
South pole	B>Bop	Low

Note: The magnetic pole is applied facing the branded side of the SIP3 package

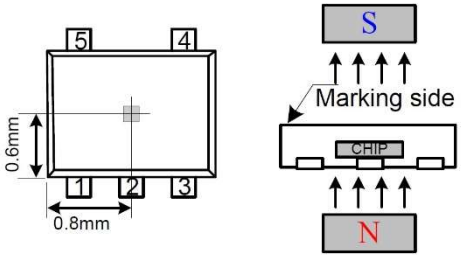




SIP

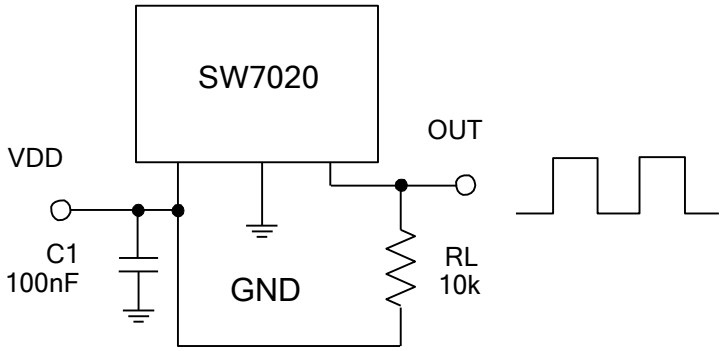


DFN



SOT553

❖ TEST CIRCUIT

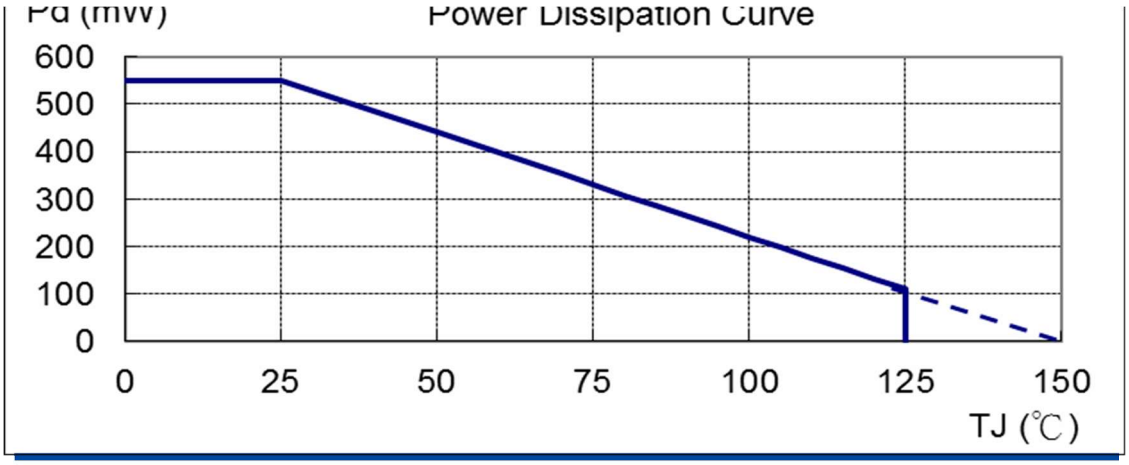


Note : C1 is for power stabilization and to strengthen the noise immunity. RL is the pull-up resistor.

❖ PERFORMANCE CHARACTERISTICS

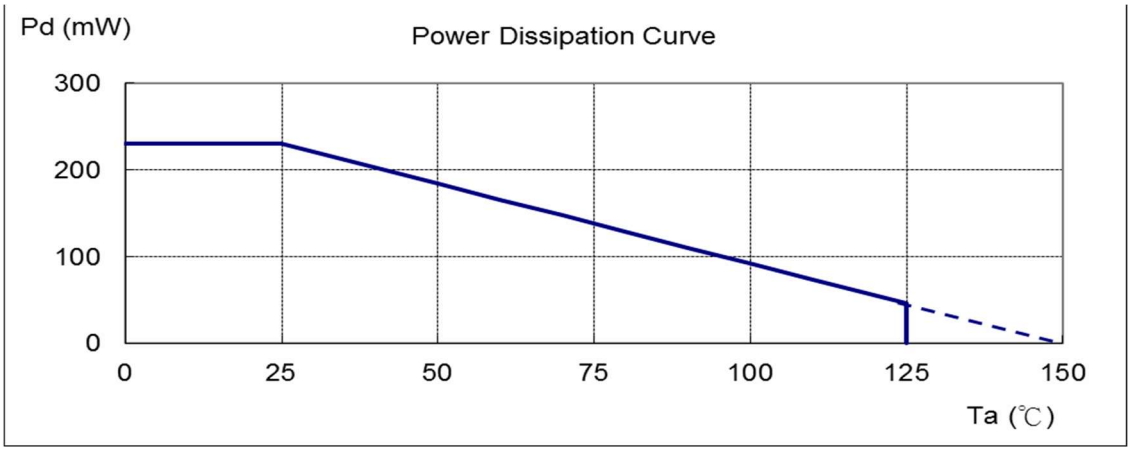
SIP-3L

TA (℃)	25	50	60	70	80	85	90	95	100
Pd (mW)	550	440	396	352	308	286	264	242	220
TA (℃)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**150**
Pd (mW)	198	176	154	132	110	88	66	44	0

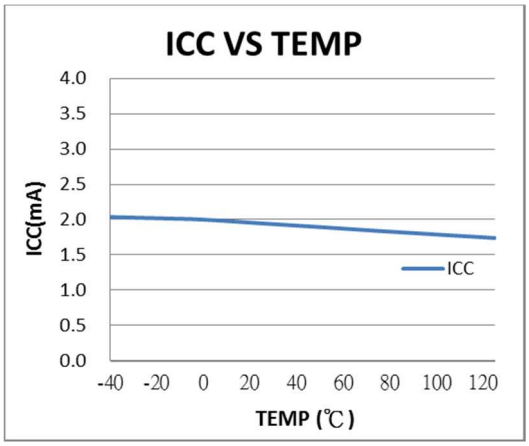


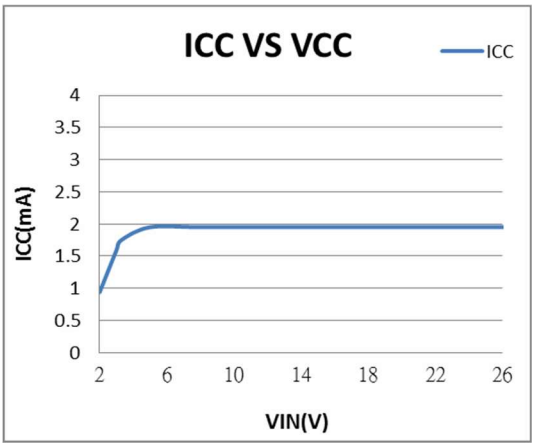
SOT23 / DFN

TA (℃)	25	50	60	70	80	85	90	95	100
Pd (mW)	230	230	184	166	147	129	120	110	101
TA (℃)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**150**
Pd (mW)	83	74	64	55	46	37	27	18	0

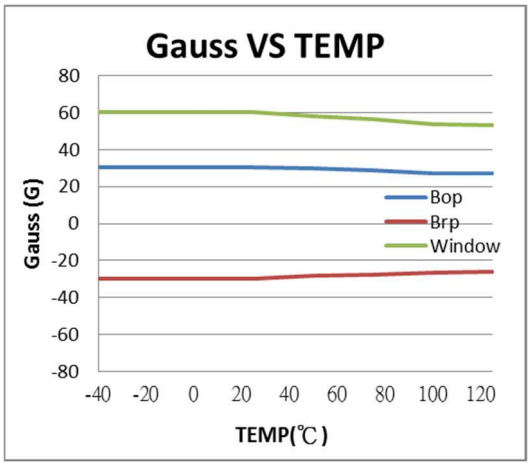


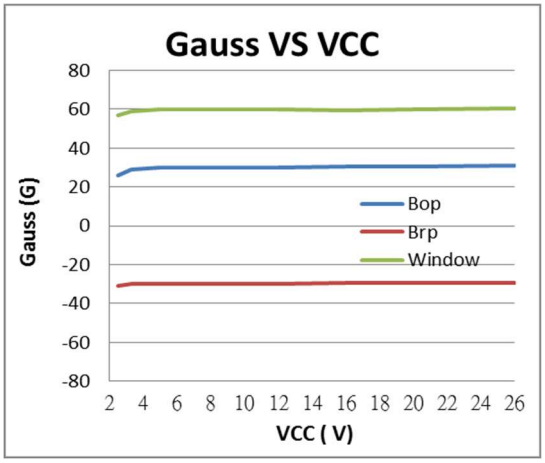
❖ PERFORMANCE CHARACTERISTICS

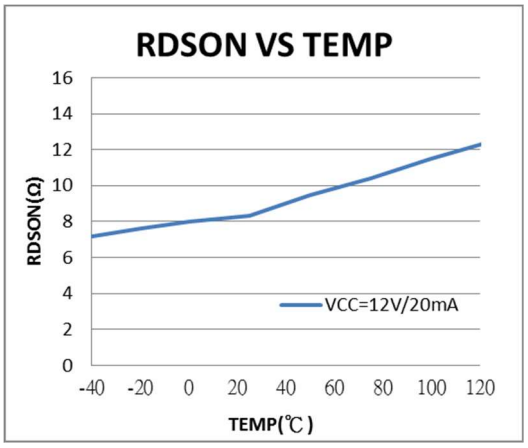


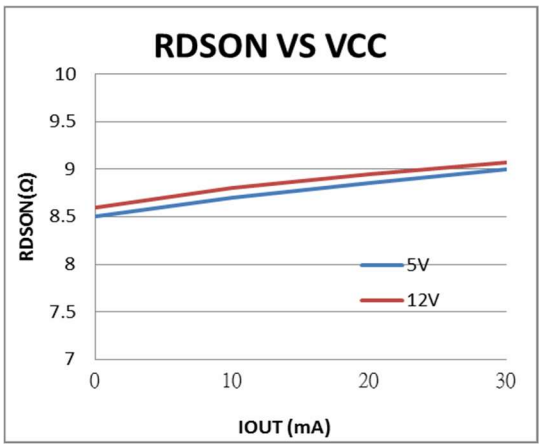


❖ PERFORMANCE CHARACTERISTICS



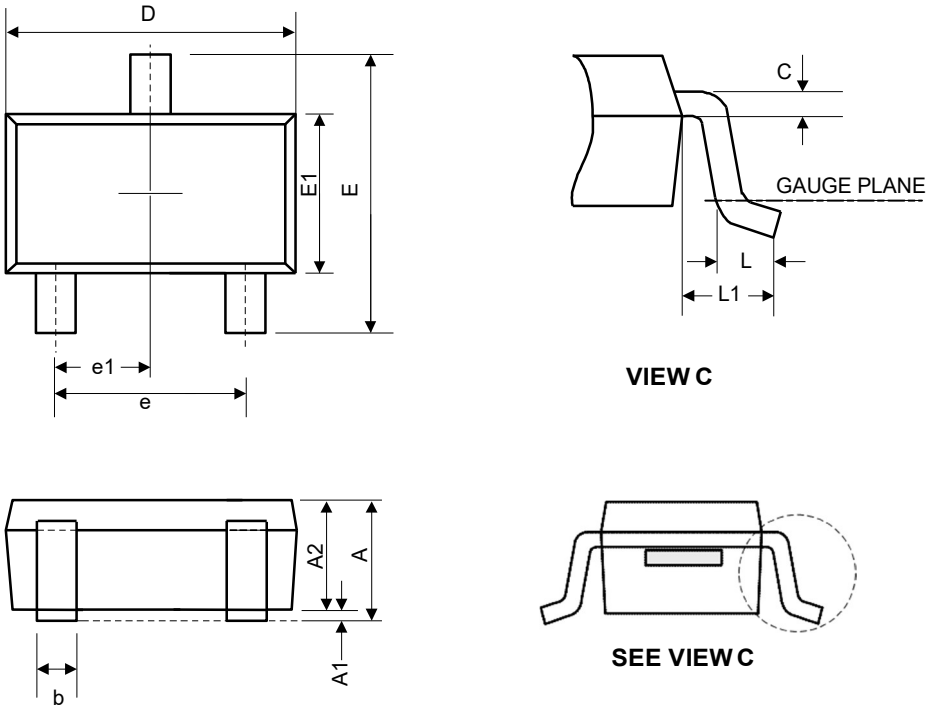






❖ PACKAGE OUTLINES

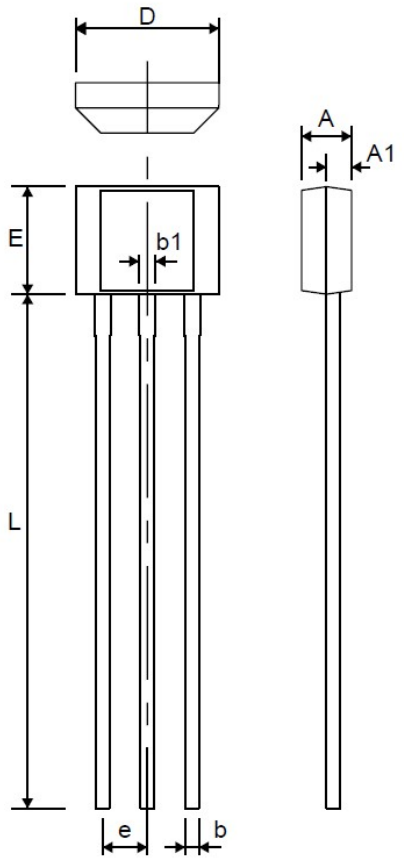
(1) SOT-23-3L



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	1.45	-	-	0.057
A1	0.00	0.08	0.15	-	-	0.006
A2	0.90	1.10	1.30	0.035	0.043	0.051
b	0.30	0.40	0.50	0.012	0.016	0.020
C	0.08	0.15	0.22	0.003	0.006	0.009
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.40	1.60	1.80	0.055	0.063	0.071
L	0.30	0.45	0.60	0.012	0.018	0.024
L1	0.50	0.60	0.70	0.020	0.024	0.028
e	1.90 BSC			0.075 BSC		
e1	0.95 BSC			0.037 BSC		

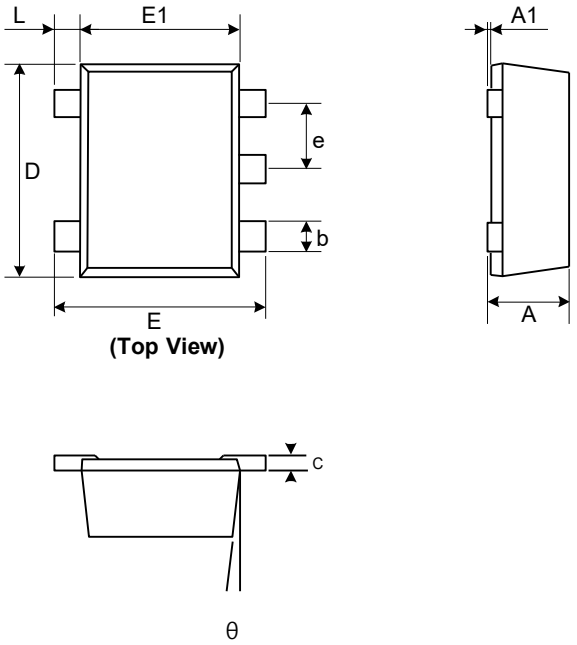
JEDEC outline: NA

2. SIP-3L



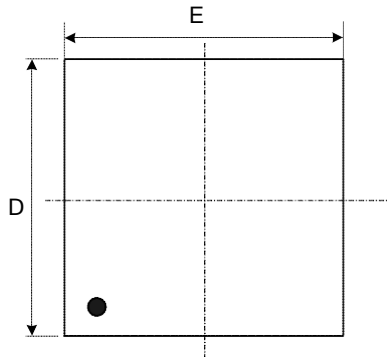
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.20	1.48	1.76	0.047	0.058	0.069
A1	0.75REF.			0.030REF.		
b	0.33	0.38	0.43	0.013	0.015	0.017
b1	0.40	0.45	0.50	0.016	0.018	0.020
D	3.90	4.10	4.30	0.154	0.161	0.169
e1	1.27BSC			0.050BSC		
E	2.80	3.00	3.20	0.110	0.118	0.126
L	13.60	14.60	15.60	0.535	0.575	0.614

3. SOT553

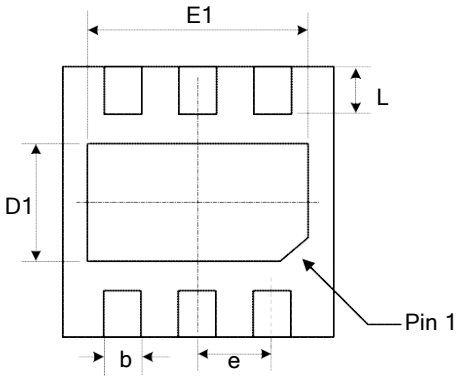


Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.525	0.563	0.600	0.021	0.022	0.024
A1	0.000	0.025	0.050	0.000	0.001	0.002
e	0.450	0.500	0.550	0.018	0.020	0.022
c	0.090	0.125	0.160	0.004	0.005	0.006
D	1.500	1.600	1.700	0.059	0.063	0.067
b	0.170	0.220	0.270	0.007	0.009	0.011
E1	1.100	1.200	1.300	0.043	0.047	0.051
E	1.500	1.600	1.700	0.059	0.063	0.067
L	0.100	0.200	0.300	0.004	0.008	0.012
θ	7° REF			7° REF		

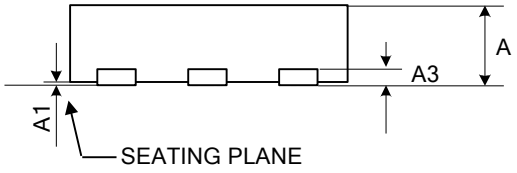
4. DFN1.6X1.6-6L



(Top View)



(Bottom View)



(SIDE View)

Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.4	0.45	0.5	0.016	0.018	0.020
A1	0	0.02	0.05	0.000	0.001	0.002
A3		0.15 REF.			0.006 REF.	
b	0.15	0.2	0.25	0.006	0.008	0.010
D	1.55	1.6	1.65	0.061	0.063	0.065
D1	0.65	0.7	0.75	0.026	0.028	0.030
E	1.55	1.6	1.65	0.061	0.063	0.065
E1	1.25	1.3	1.35	0.049	0.051	0.053
e		0.5 BSC.			0.020 BSC.	
L	0.2	0.25	0.3	0.008	0.010	0.012