

## MicroPower, Ultra-sensitive Hall Effect Switch

### ❖ GENERAL DESCRIPTION

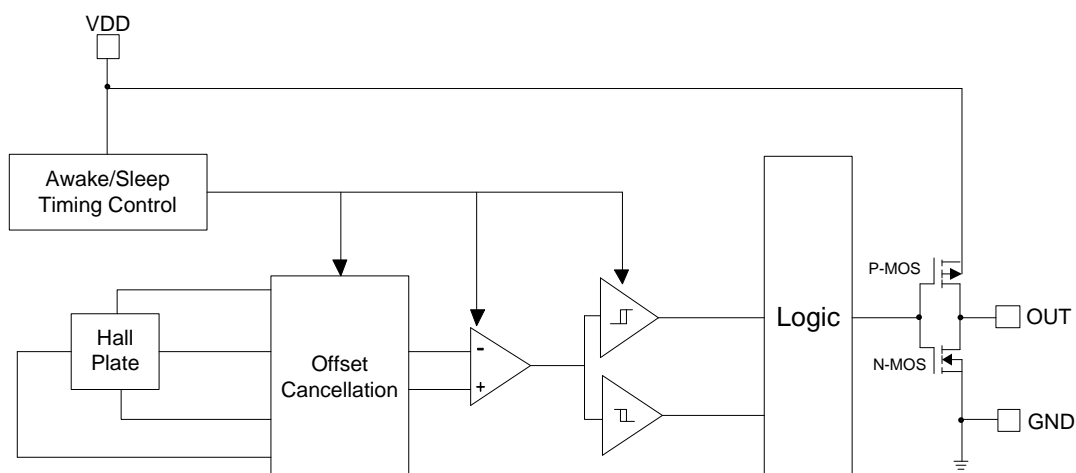
AX8111 is a three-terminal Hall Effect sensor device with an output driver, mainly designed for battery-operation, hand-held equipment (such as Cellular and Cordless Phone, PDA). For AX8111, the total operation power is down to 10uW in the 1.8V supply.

The output is switch with either north or South Pole of sufficient strength will turn the output on. The output will be turned off under no magnetic field. While the magnetic flux density (B) is larger than operate point (Bop), the output will be turned on (low); the output is latched until B is lower than release point (Brp) and then turned off.

### ❖ FEATURES

- Micro Power Operation for Battery Applications
- 1.65V to 3.30V battery operation
- Chopper Stabilized Technology
- Operation with North or South Pole
- Good RF noise immunity
- High sensitivity and high stability of the magnetic switching points
- 3-pin Thin TSOT23, UDFN and SOT553 Package

### ❖ BLOCK DIAGRAM





**Table: For SOT553 Package Type Week Code**

<b>week</b>	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>code</b>	OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM
<b>week</b>	14	15	16	17	18	19	20	21	22	23	24	25	26
<b>code</b>	ON	OO	OP	OQ	OR	OS	OT	OU	OV	OW	OX	OY	OZ
<b>week</b>	27	28	29	30	31	32	33	34	35	36	37	38	39
<b>code</b>	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM
<b>week</b>	40	41	42	43	44	45	46	47	48	49	50	51	52
<b>code</b>	PN	PO	PP	PQ	PR	PS	PT	PU	PV	PW	PX	PY	PZ

**❖ ABSOLUTE MAXIMUM RATINGS** (at T<sub>A</sub>=25°C)

Characteristics	Symbol	Rating	Unit
VDD Pin Voltage	V <sub>DD</sub>	- 0.3 to 4.5V	V
Output Pin Voltage	V <sub>OUT</sub>	- 0.3 to 4.5V	V
Output Current	I <sub>OUT</sub>	±1	mA
Storage Temperature Range	T <sub>ST</sub>	-65 to +150	°C
Junction Temperature	T <sub>J</sub>	+125	°C
Operating Temperature Range	T <sub>OP</sub>	-40 to +85	°C
Thermal Resistance from Junction to ambient	TSOT23-3L	250	°C/W
	UDFN-3L	120	
	SOT553	496	
Power Dissipation[PD=( T <sub>J</sub> -T <sub>A</sub> ) / θ <sub>JA</sub> ]	TSOT23-3L	400	mW
	UDFN-3L	830	mW
	SOT553	135	mW

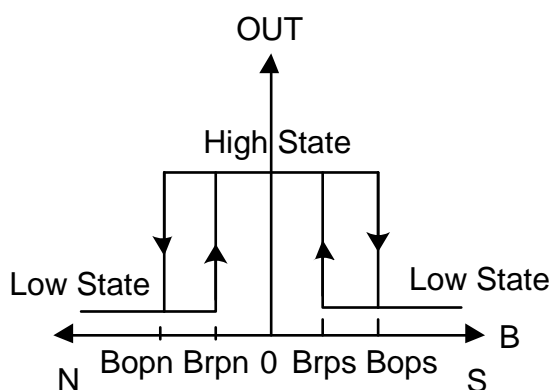
Note : θ<sub>JA</sub> is measured with the PCB copper area of approximately 1 in<sup>2</sup>(Multi-layer).

**❖ ELECTRICAL CHARACTERISTICS** (V<sub>DD</sub> = 1.8V, T<sub>A</sub>=25°C, unless otherwise specified)

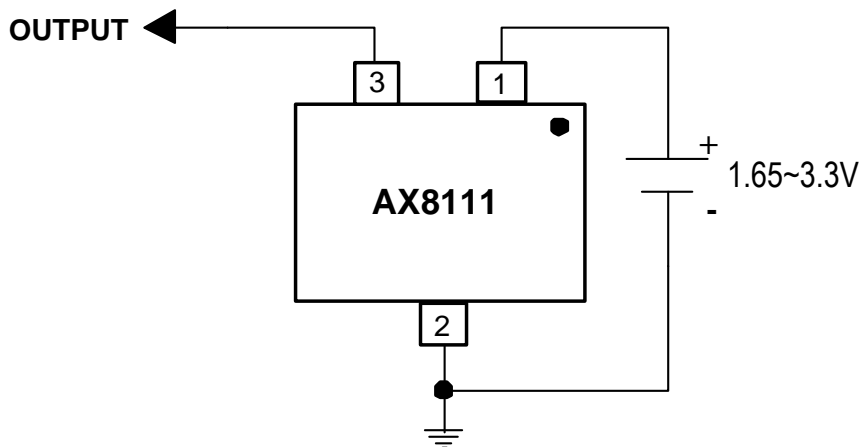
Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Supply Voltage	V <sub>DD</sub>		1.65	1.8	3.3	V
Supply Current	I <sub>DD</sub>	Awake state	-	1.4	3	mA
		Sleep state	-	3.6	7	uA
		Average	-	5	10	uA
Output High Voltage	V <sub>OH</sub>	I <sub>OUT</sub> =0.5mA (Source)	V <sub>DD</sub> -0.2	-	-	V
Output Low Voltage	V <sub>OL</sub>	I <sub>OUT</sub> =0.5mA (Sink)	-	-	0.2	V
Output Wake-Up Time	T <sub>wake-up</sub>		-	40	80	us
Period	T <sub>Period</sub>		-	40	80	ms
Duty Cycle	D.C		-	0.1	-	%

❖ **MAGNETIC CHARACTERISTICS** ( $V_{DD} = 1.8V$ ,  $T_A=25^{\circ}C$ , unless otherwise specified)

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Operating Points	B <sub>OPS</sub>		-	30	42	Gauss
	B <sub>OPN</sub>		-42	-30	-	
Release Points	B <sub>RPS</sub>		10	20	-	
	B <sub>RPN</sub>		-	-20	-10	
Hysteresis	B <sub>Hys</sub>		-	10	-	

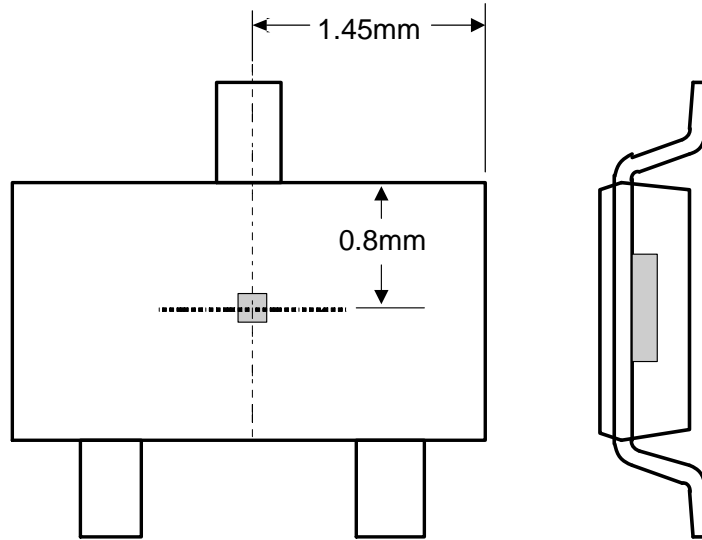


❖ **APPLICATION CIRCUIT**



❖ **SENSOR LOCATION**

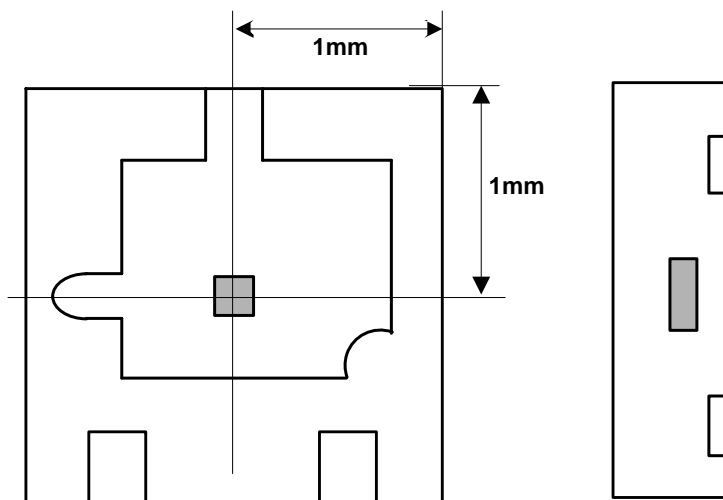
(1) TSOT23-3L



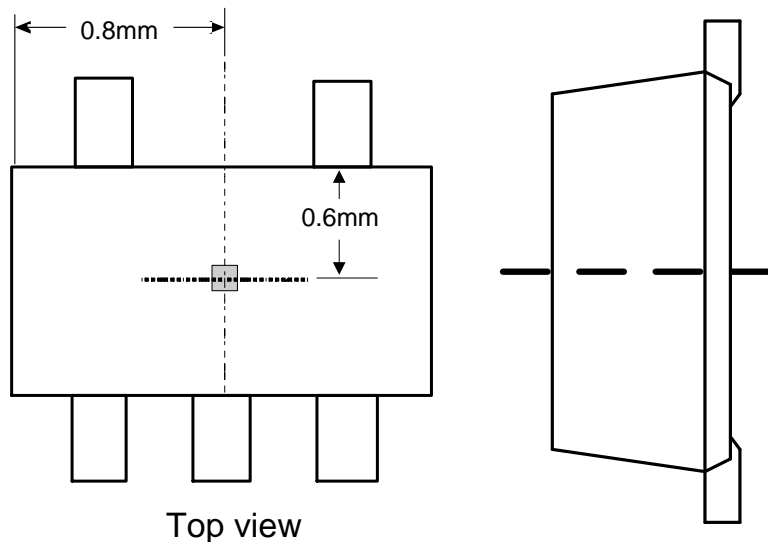
Top view

(2) UDFN-3L

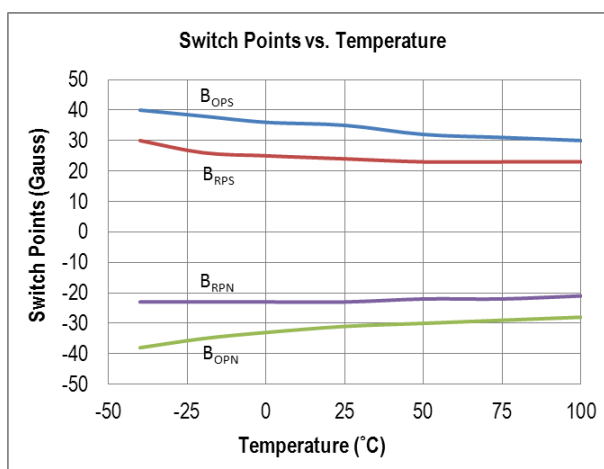
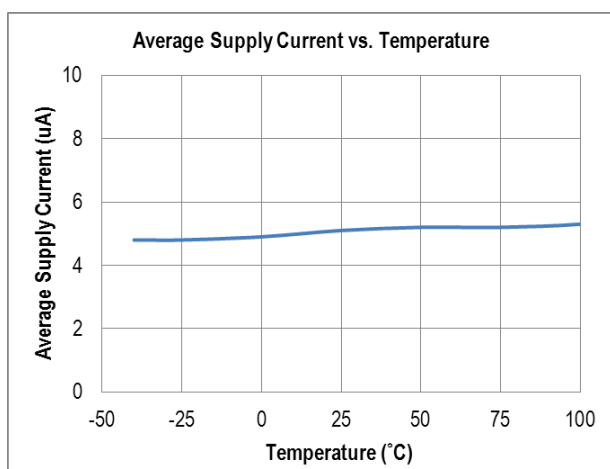
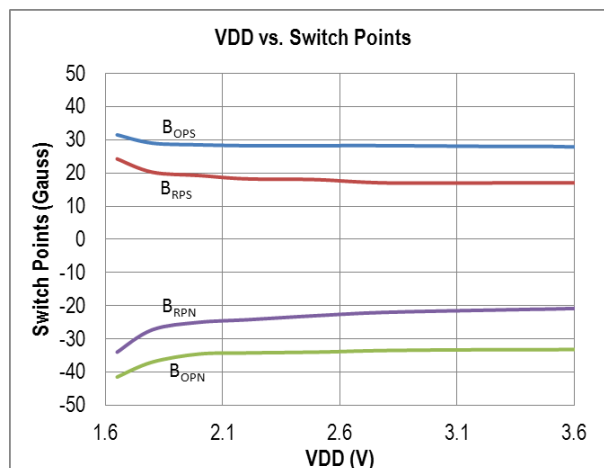
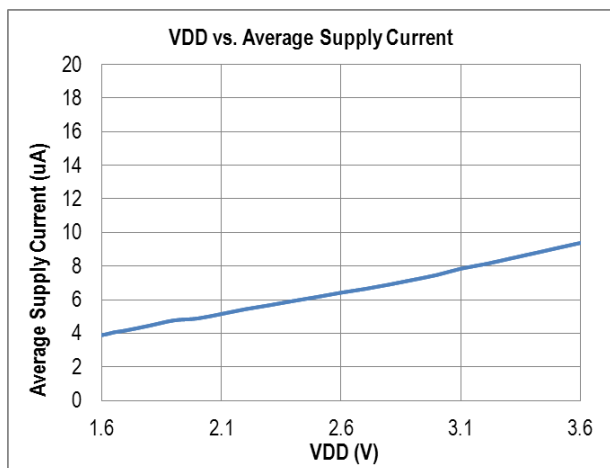
(Bottom View)



(3) SOT553

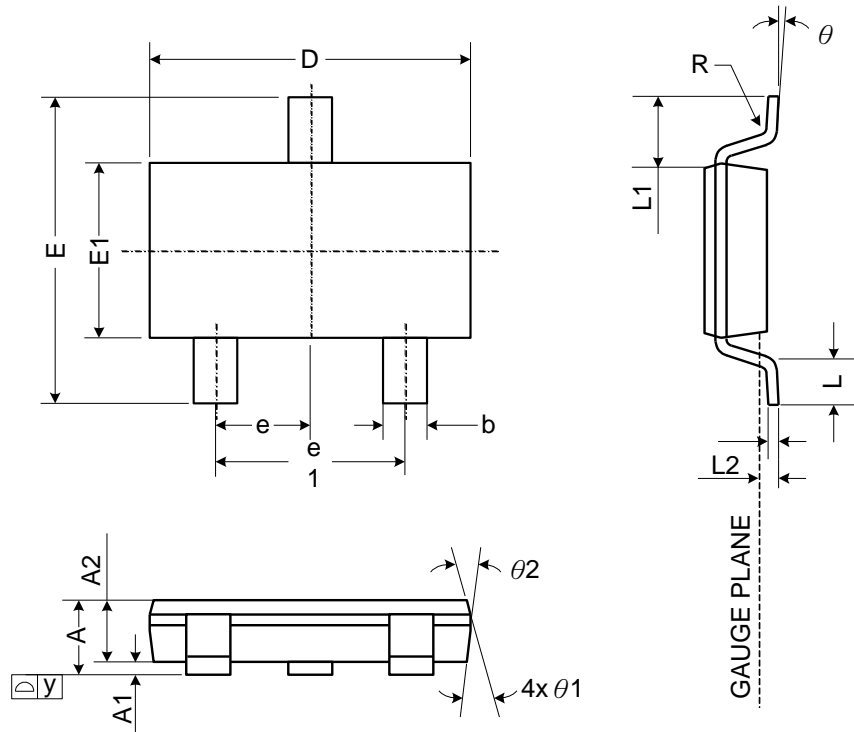


❖ TYPICAL CHARACTERISTICS



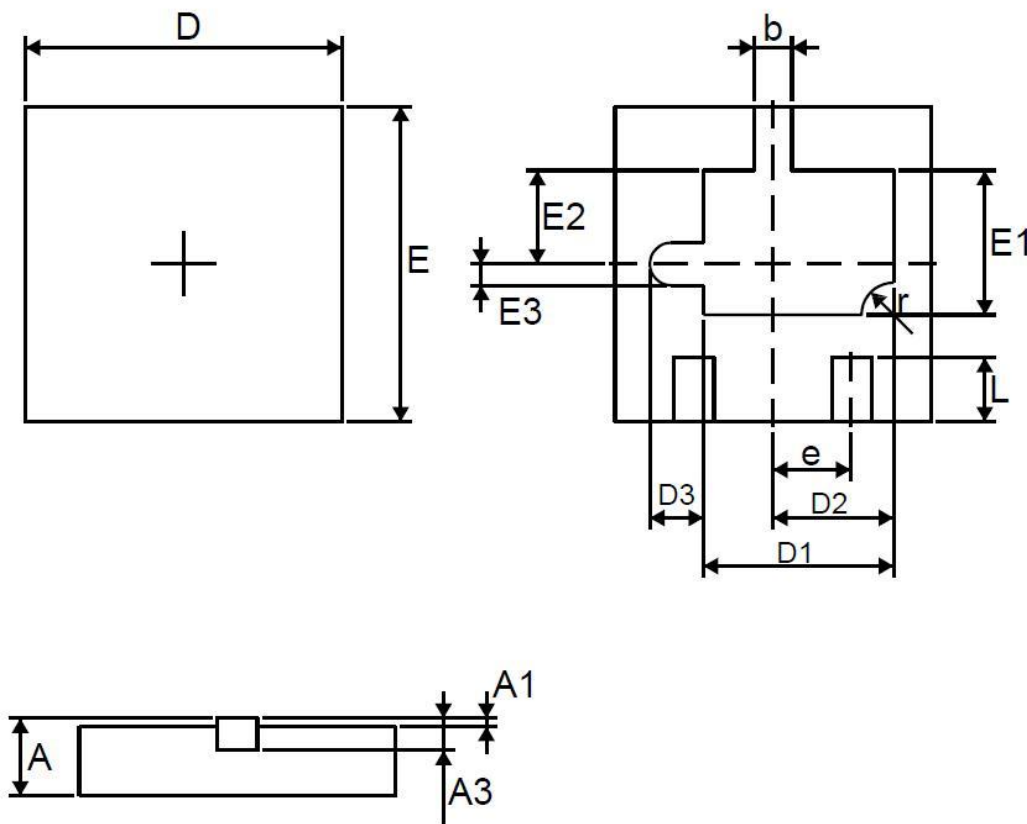
❖ PACKAGE OUTLINES

(1) TSOT23-3L



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.75	-	0.90	0.030	-	0.035
A1	0.00	-	0.10	0.000	-	0.004
A2	0.70	0.75	0.80	0.028	0.030	0.031
b	0.35	-	0.51	0.014	-	0.020
C	0.10	-	0.25	0.004	-	0.010
D	2.80	2.90	3.00	0.110	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
e	0.95 BSC.			0.037 BSC.		
e1	1.90 BSC.			0.075 BSC.		
L	0.37	-	-	0.015	-	-
L1	0.60 REF.			0.024 REF.		
L2	0.25 BSC.			0.010 BSC.		
y	-	-	0.10	-	-	0.004
R	0.10	-	-	0.004	-	-
$\theta$	0°	-	8°	0°	-	8°
$\theta 1$	7° NOM.			7° NOM.		
$\theta 2$	5° NOM.			5° NOM.		

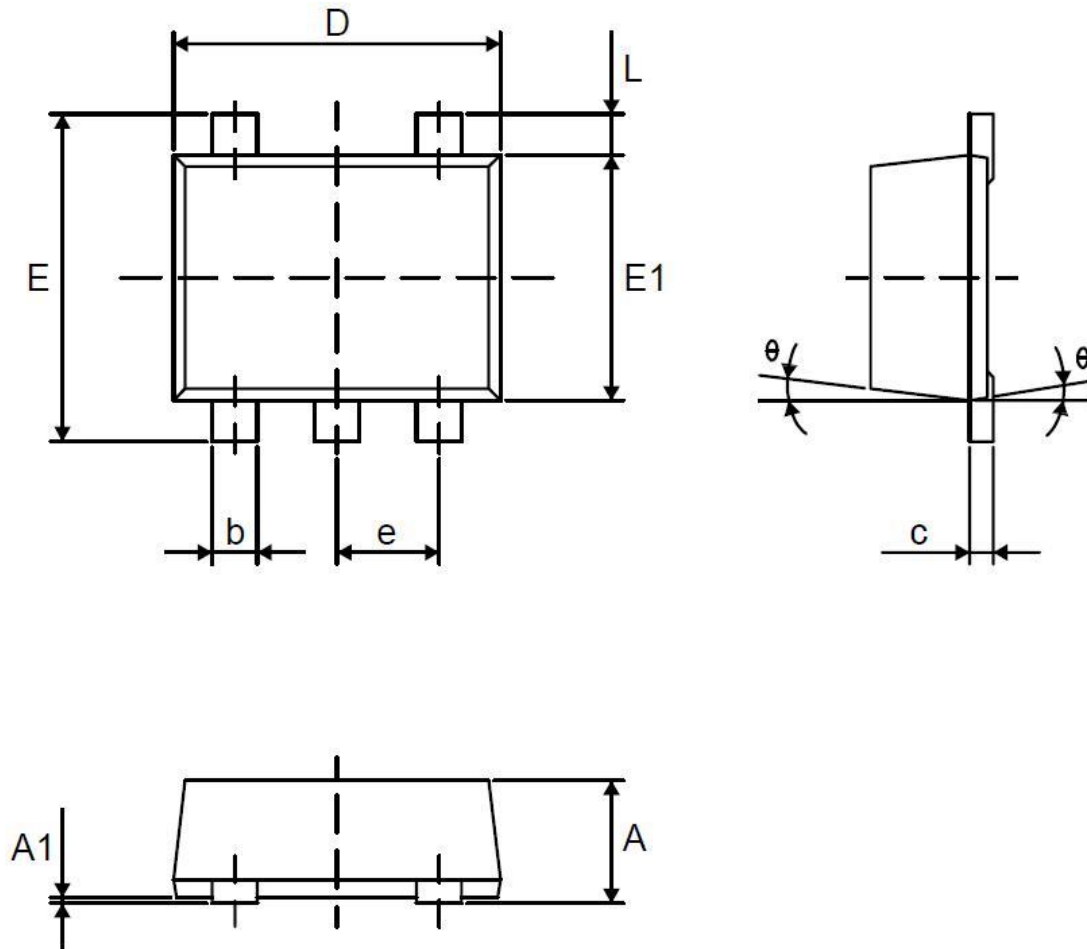
(2) UDFN-3L (2X2X0.5mm)



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.450	-	0.550	0.018	-	0.022
A1	0.000	-	0.05	0.000	-	0.002
A3	0.152REF.			0.006REF.		
D	1.924	-	2.076	0.076	-	0.082
E	1.924	-	2.076	0.076	-	0.082
D1	1.100	-	1.300	0.043	-	0.051
D2	0.325REF.			0.030REF.		
D3	0.763REF.			0.013REF.		
E1	0.800	-	1	0.031	-	0.039
E2	0.600REF.			0.024REF.		
E3	0.138REF.			0.005REF.		
k	0.200MIN.			0.008MIN.		
b	0.200	-	0.300	0.008	-	0.012
e	0.500TYP.			0.020TYP.		
L	0.324	-	0.476	0.013	-	0.019
r	-	0.2	-	-	0.008	-



(3) SOT553



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.525	-	0.600	0.021	-	0.024
A1	0.000	-	0.050	0.000	-	0.002
b	0.170	-	0.270	0.007	-	0.011
c	0.090	-	0.160	0.004	-	0.006
D	1.500	-	1.700	0.059	-	0.067
E	1.500	-	1.700	0.059	-	0.067
E1	1.100	-	1.300	0.043	-	0.051
e	0.450	-	0.550	0.018	-	0.022
L	0.10	-	0.30	0.004	-	0.012
$\theta$	7° REF			7° REF		