

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

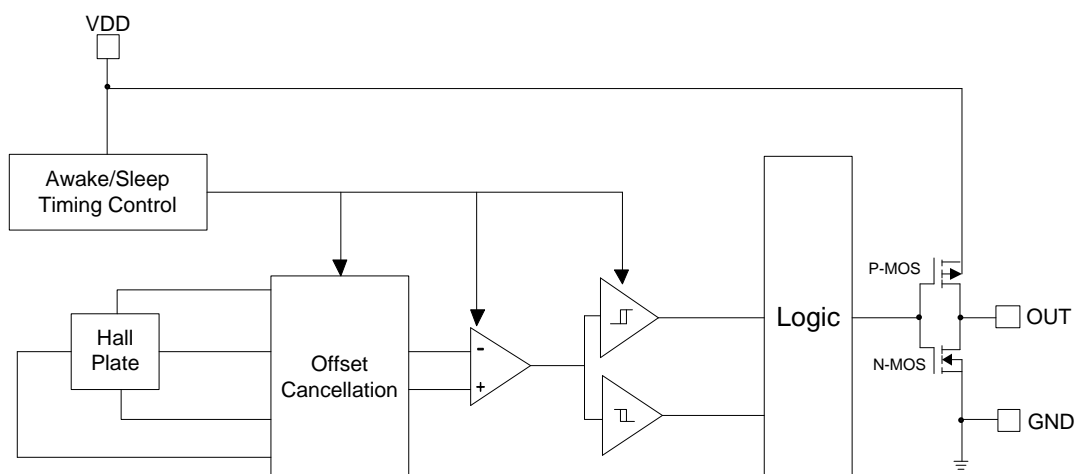


Table: For SOT553 Package Type Week Code

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

❖ ABSOLUTE MAXIMUM RATINGS (at $T_A=25^{\circ}\text{C}$)

Characteristics	Symbol	Rating	Unit
VDD Pin Voltage	V_{DD}	- 0.3 to 4.5V	V
Output Pin Voltage	V_{OUT}	- 0.3 to 4.5V	V
Output Current	I_{OUT}	± 1	mA
Storage Temperature Range	T_{ST}	-65 to +150	$^{\circ}\text{C}$
Junction Temperature	T_J	+125	$^{\circ}\text{C}$
Operating Temperature Range	T_{OP}	-40 to +85	$^{\circ}\text{C}$
Thermal Resistance from Junction to ambient	TSOT23-3L	250	$^{\circ}\text{C/W}$
	UDFN-3L	120	
	SOT553	496	
Power Dissipation[$PD=(T_J-T_A) / \theta_{JA}$]	TSOT23-3L	400	mW
	UDFN-3L	830	mW
	SOT553	135	mW

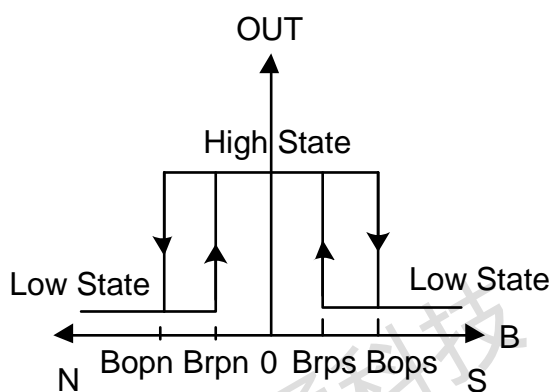
Note : θ_{JA} is measured with the PCB copper area of approximately 1 in²(Multi-layer).

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

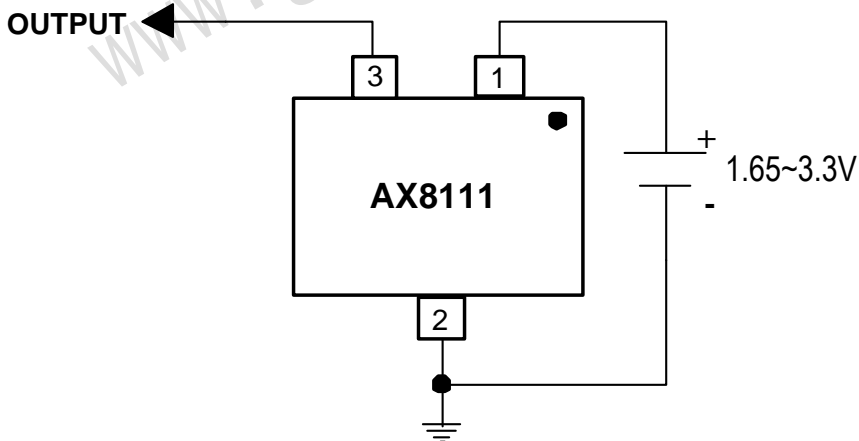
Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Supply Voltage	V_{DD}		1.65	1.8	3.3	V
Supply Current	I_{DD}	Awake state	-	1.4	3	mA
		Sleep state	-	3.6	7	μA
		Average	-	5	10	μA
Output High Voltage	V_{OH}	$I_{OUT}=0.5\text{mA}$ (Source)	$V_{DD}-0.2$	-	-	V
Output Low Voltage	V_{OL}	$I_{OUT}=0.5\text{mA}$ (Sink)	-	-	0.2	V
Output Wake-Up Time	$T_{wake-up}$		-	40	80	μs
Period	T_{Period}		-	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 _{OPS}		-	30	42	Gauss
	B _{OPN}		-42	-30	-	
Release Points	B _{RPS}		10	20	-	
	B _{RPN}		-	-20	-10	
Hysteresis	B _{Hys}		-	10	-	

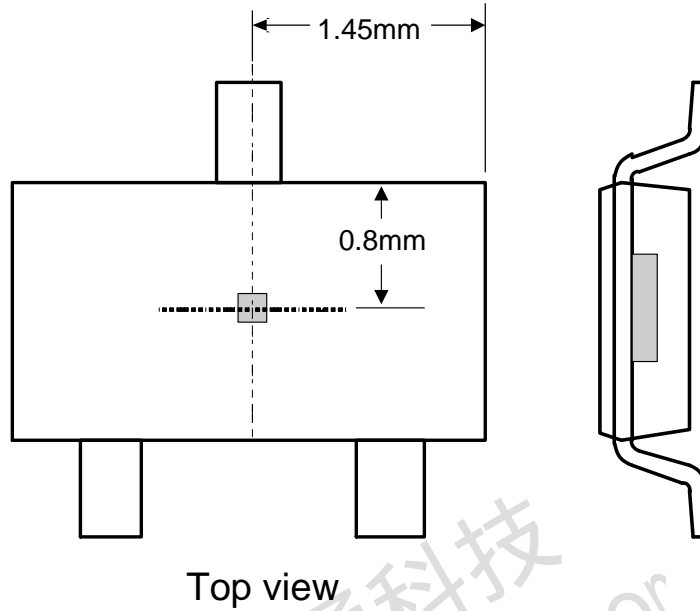


❖ **APPLICATION CIRCUIT**



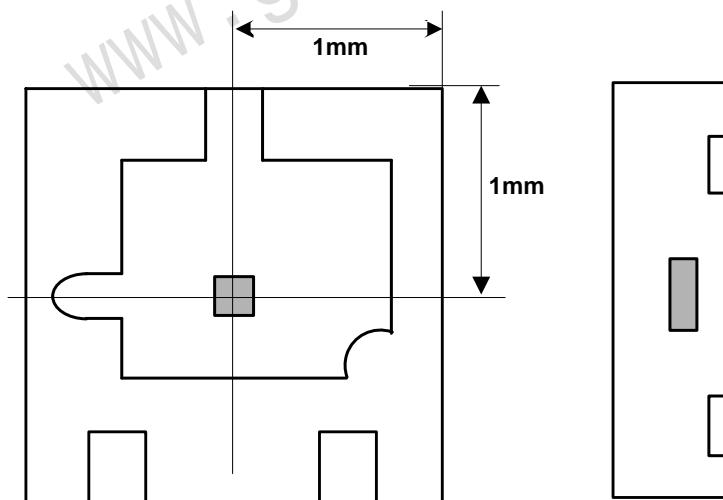
❖ SENSOR LOCATION

(1) TSOT23-3L

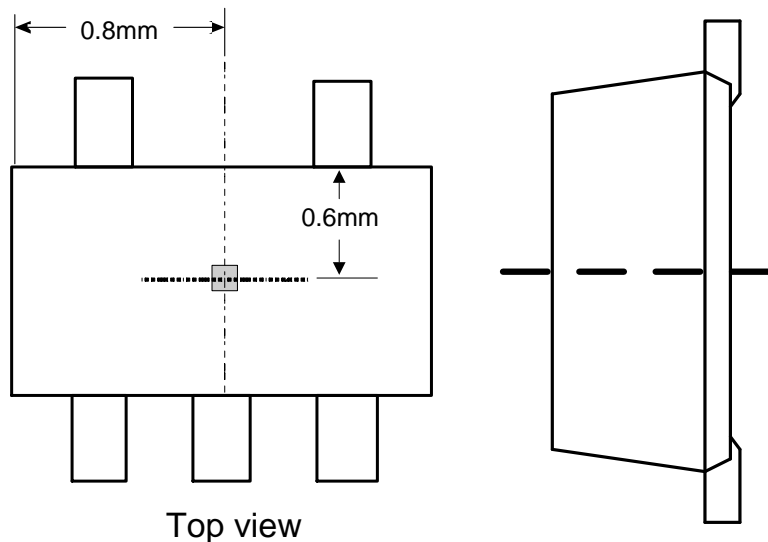


(2) UDFN-3L

(Bottom View)

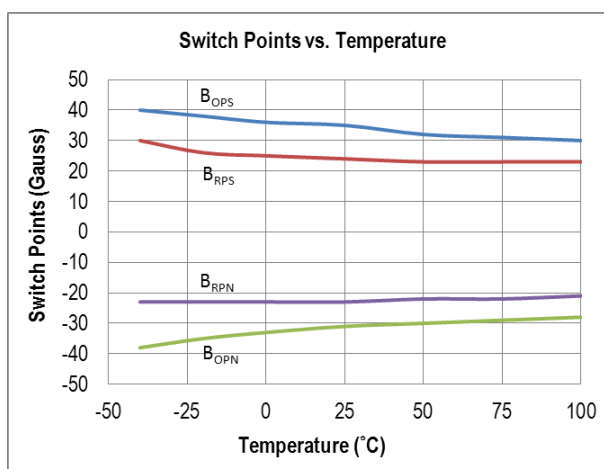
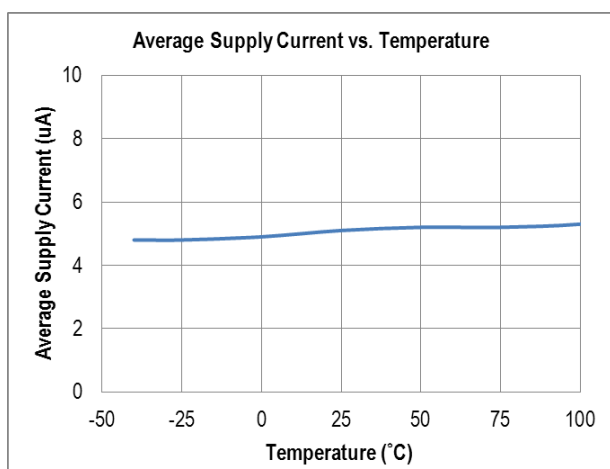
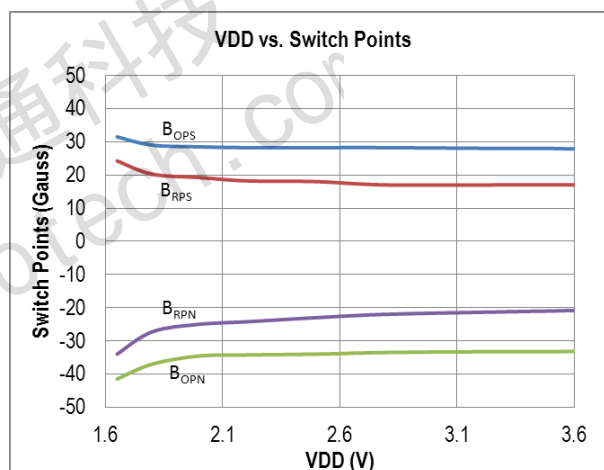
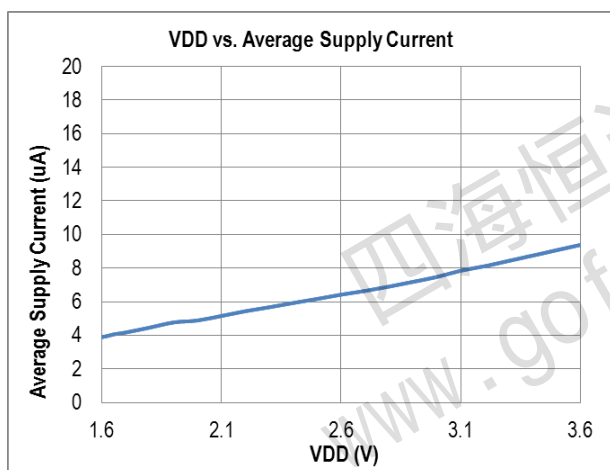


(3) SOT553



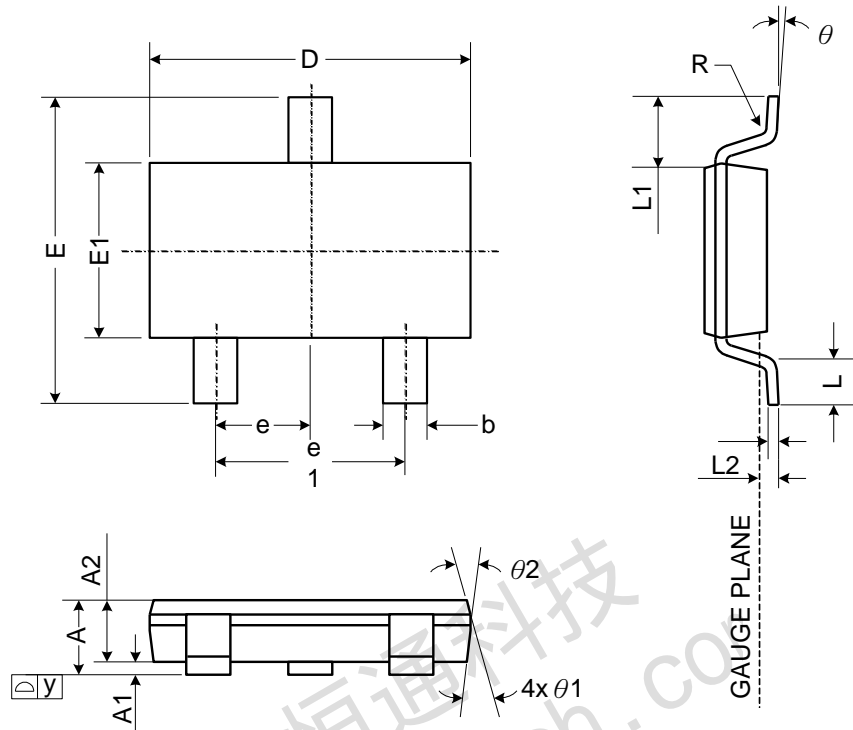
Top view

❖ TYPICAL CHARACTERISTICS



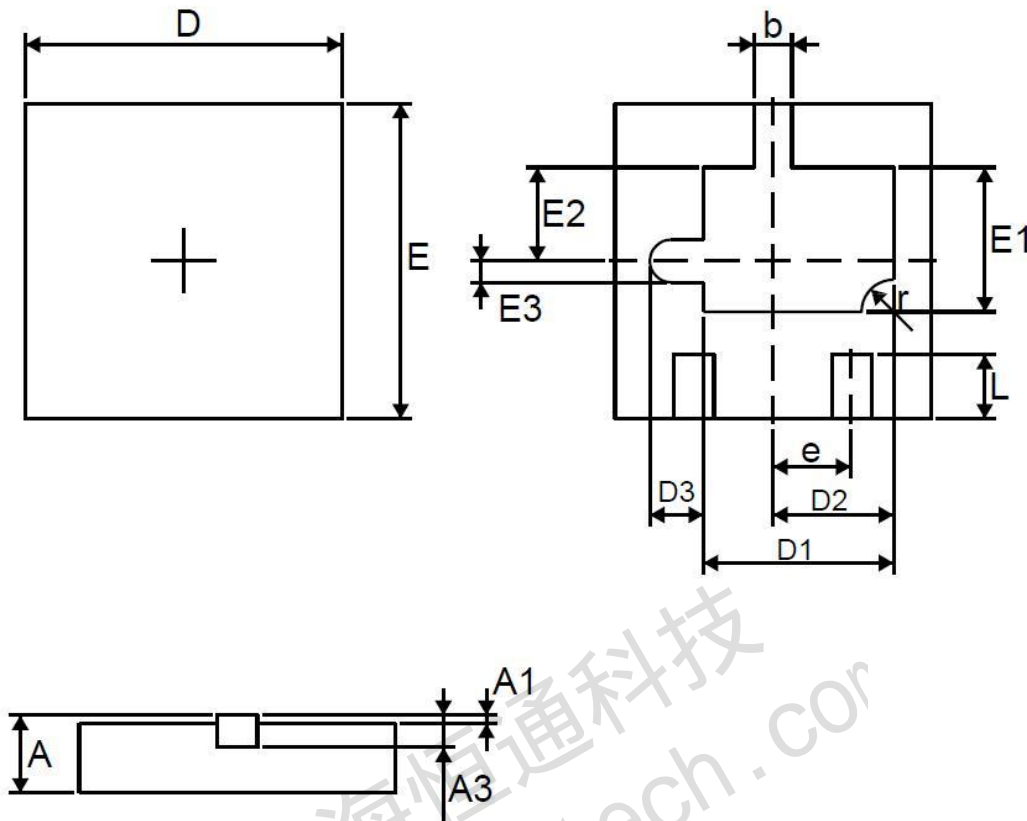
❖ PACKAGE OUTLINES

(1) TSOT23-3L



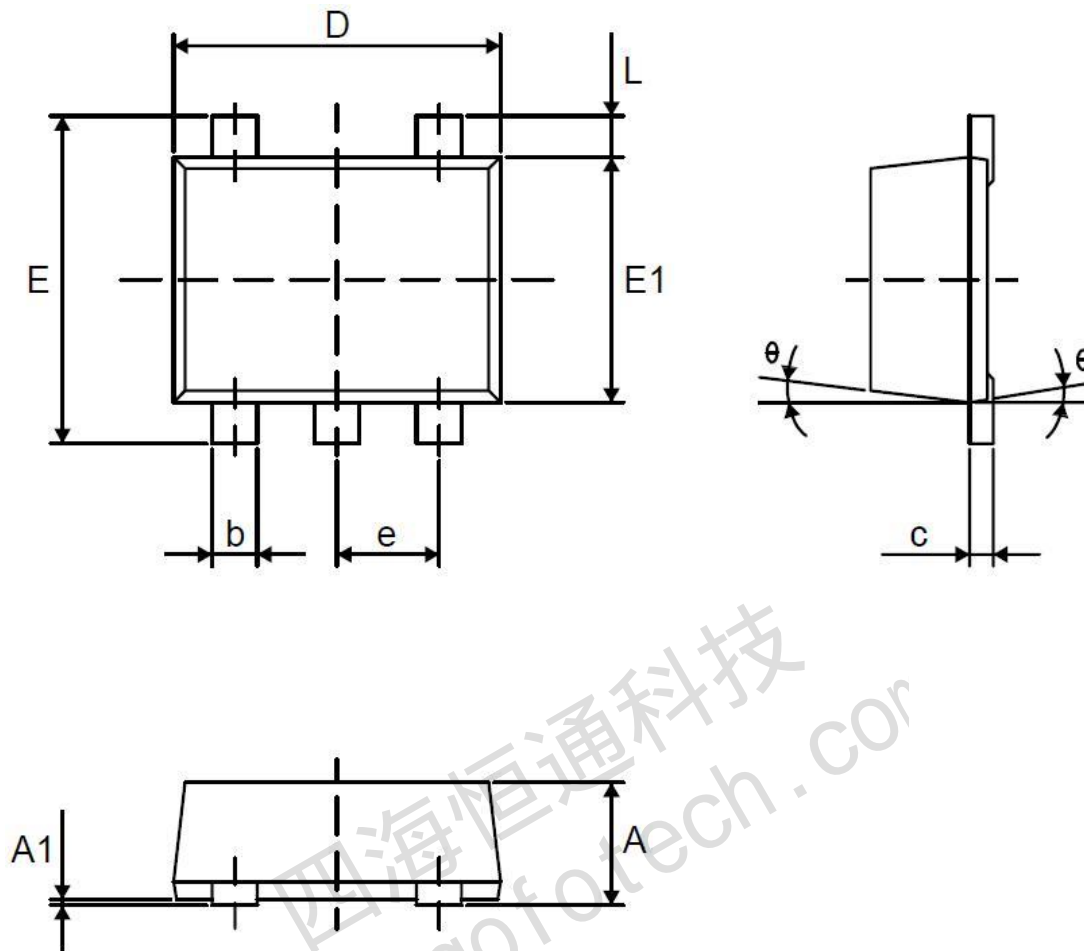
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.75	-	0.90	0.030	-	0.035
A1	0.00	-	0.10	0.000	-	0.004
A2	0.70	0.75	0.80	0.028	0.030	0.031
b	0.35	-	0.51	0.014	-	0.020
C	0.10	-	0.25	0.004	-	0.010
D	2.80	2.90	3.00	0.110	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	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	-	-
θ	0°	-	8°	0°	-	8°
θ1	7° NOM.			7° NOM.		
θ2	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
θ	7° REF			7° REF		