

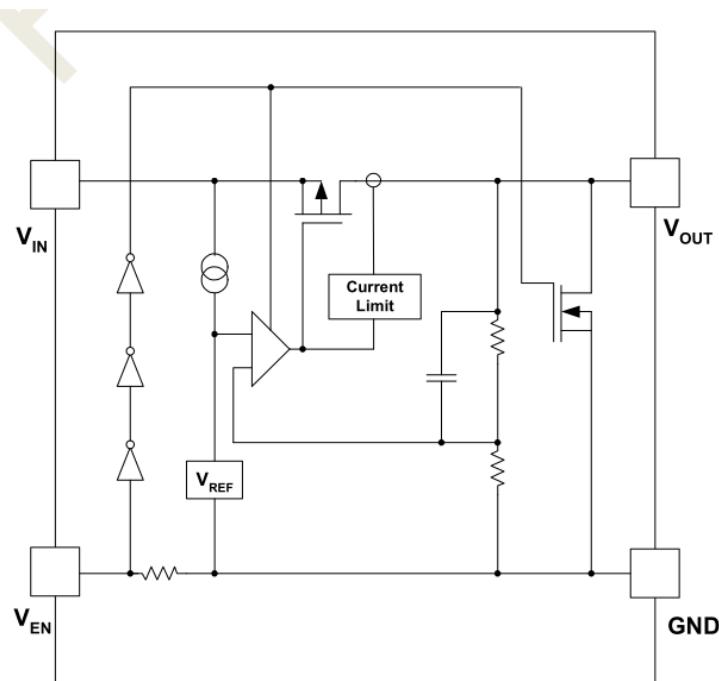
General Description

The EC3111 is a 300mA, low dropout and low noise linear regulator with high ripple rejection ratio and fast turn-on time. It has fixed output voltage ranging from 1.1V to 4.8V.

The EC3111 includes a voltage reference unit, an error amplifier, resistor net for voltage setting, a current limit circuit and a chip enable circuit. These ICs perform with low dropout voltage and a chip enable function (SOT23-5L/TSOT23-3L/TSOT23-5L/SC70-4L/SC70-5L/DFN-6L/UDFN-4L package only).

The EC3111 works well with low ESR ceramic capacitors, suitable for portable RF and wireless battery-powered applications with stringent space requirements and demanding performance. It also offers ultra low noise output and has low quiescent current.

Function Block Diagram



Features

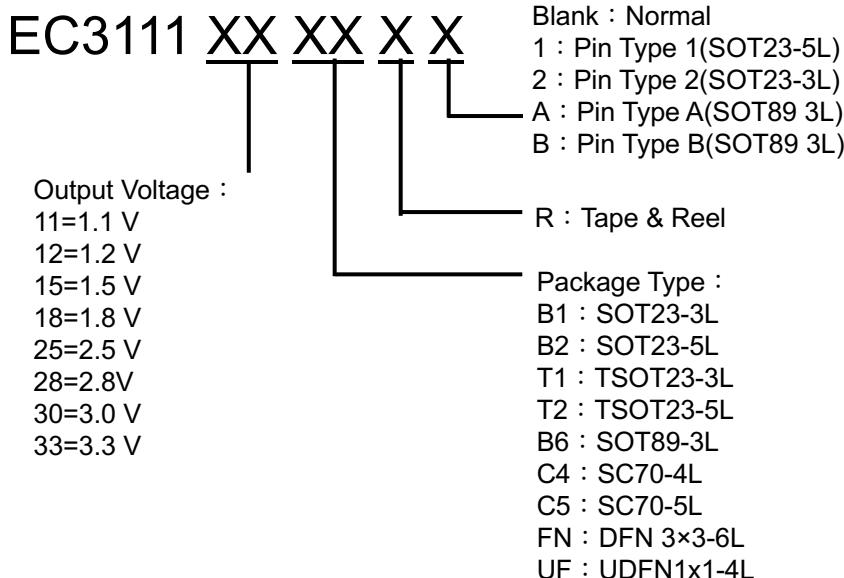
- VIN Range: 2.0V to 6.0V
- Low Dropout Voltage: 0.22V (Typ)
($V_{OUT} = 3.3V$, $I_{OUT} = 150mA$)
- High Ripple Rejection: 65dB (Typ)(f=10kHz)
- Excellent Line Regulation: 0.01% / V(Typ)
- Output Voltage Accuracy: $\pm 2.0\%$
- Low Supply Current: 25 μ A (Typ)
- Standby Current: 0.01 μ A (Typ)
- Over Current Protection
- Fixed Output Voltage: 1.1V ~ 4.8V
- Ultra Fast Transient Response

Applications

- Portable Communication Equipment
- Battery-Powered Equipment



Ordering Information



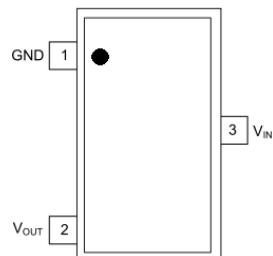
Marking Information

Device	Marking Information	Package Type	Remarks
EC3111VVB1R	3111 VVYW	SOT23-3L	
EC3111VVB1R2	3111 VVYW2	SOT23-3L (Pin type 2)	
EC3111VVB2R	3111 VVYW	SOT23-5L	
EC3111VVB2R1	3111 VVYW1	SOT23-5L (Pin type 1)	1. VV : Output Voltage(Ex : 11 : 1.1V;12 : 1.2V;15 : 1.5V) 2. Y : Year code(D=2013;E=2014;F=2015...) 3. W : Week Code(The big character of A~Z is for the week of 1~26, and small a~z is for the week of 27~52.) 4. A : Pin Type A 5. B : Pin Type B 6. 1 : Pin type 1
EC3111VVT1R	3111 VVYW	TSOT23-3L	
EC3111VVT2R	3111 VVYW	TSOT23-5L	
EC3111VVFNR	3111 VVYW	DFN3x3-6L	
EC3111VVB6RA	3111 VVYWA	SOT89-3L (Pin Type A)	
EC3111VVB6RB	3111 VVYWB	SOT89-3L (Pin Type B)	
EC3111VVC4R	1 <u>V</u> f	SC70-4L	1. VV : Output Voltage(Ex : 11 : 1.1V;12 : 1.2V;36 : 3.6V) 2. Starting with underlined first-V, a bar is for production year 2012. The next bar is mark on top of second-V is for year 2013. The next bar is mark on bottom of second-V is for year 2014. The next bar is mark on top of f is year for 2015. The naming pattern continues with consecutive characters for later years. 3. f is the week of production. The big character of A~Z is for the week of 1~26, and small a~z is for the week of 27~52.
EC3111VVC5R	8130 TTTTT	SC70-5L	1. TTTTT : Tracking code

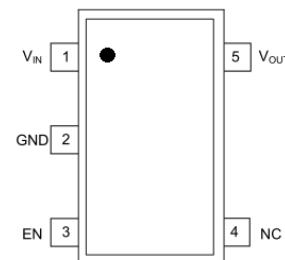
EC3111VVUFR	LV XX	UDFN1*1-4L	1. L : Production code 2. V : Voltage code G→1.2V ; H→1.8V ; O→2.8V 3. XX : Serial number
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Pin Configurations

SOT23-3L/TSOT23-3L



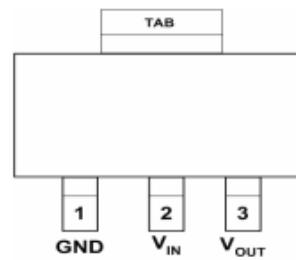
SOT23-5L/TSOT23-5L



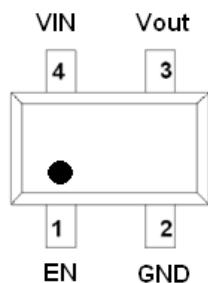
SOT89-3L(Pin Type A)



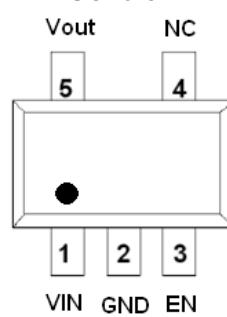
SOT89-3L(Pin Type B)



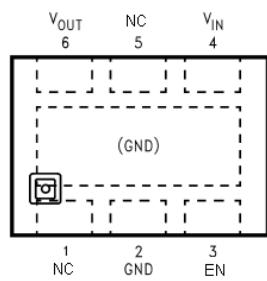
SC70-4L



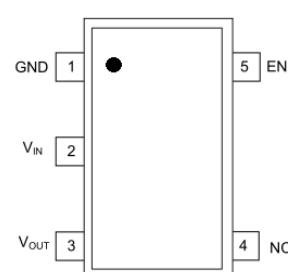
SC70-5L



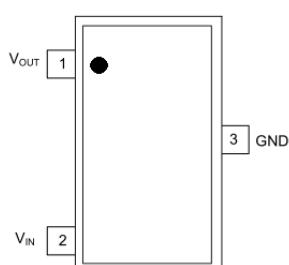
DFN 3x3-6L



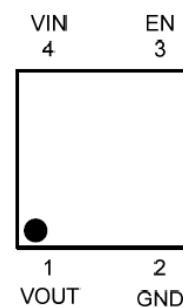
SOT23-5L(Pin type 1)



SOT23-3L(Pin type 2)

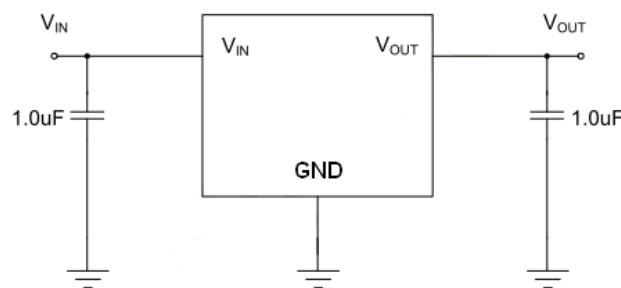


UDFN-4L

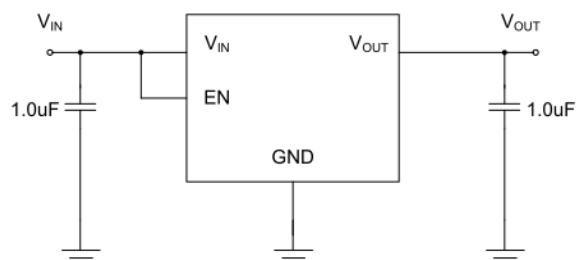


UDFN-4L

Typical Application Circuit



SOT23-3L/Tsot23-3L/SOT89-3L



SOT23-5L/Tsot23-5L/SC70-4L/SC70-5L/DFN 3x3-6L

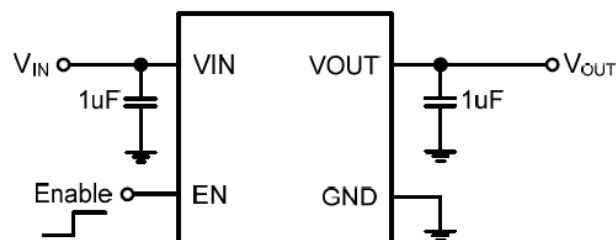


Figure 1. UDFN-4L Package



Absolute Maximum Ratings (Note1)

Enable Voltage (V_{EN}) :	6.5V
Power Input Voltage (V_{IN}) :	6.5V
Maximum Junction Temperature(T_J) :	125°C
Storage Temperature Range(T_{STG}) :	-65°C to 150°C
ESD Susceptibility(Note 2) :	
HBM (Human Body Mode) :	2KV
MM (Machine Mode) :	200V

Thermal Information

Thermal Resistance(Note 3)

Junction to Ambient(θ_{JA})

SOT23-3L/TSOT23-3L	357°C/W
SOT23-5L/TSOT23-5L	333°C/W
SOT89-3L	175°C/W
SC70-4L	500°C/W
SC70-5L	330°C/W
DFN3x3-6L	70°C/W
UDFN1x1-4L	250°C/W

Power Dissipation, P_D @ $T_A=25^\circ C$ (Note 4)

SOT23-3L/TSOT23-3L	280mW
SOT23-5L/TSOT23-5L	300mW
SOT89-3L	571mW
SC70-4L	200mW
SC70-5L	303mW
DFN3x3-6L	1429mW
UDFN1x1-4L	400mW

Recommended Operating Conditions (Note 5)

Operating Junction Temperature Range(T_J) : -40°C to +125°C

Operating Ambient Temperature Range(T_{OPA}) : -40°C to +85°C

Enable Voltage(V_{EN}) : -0.3V to V_{IN}

Power Input Voltage(V_{IN}) : +6V

Note 1:Stresses listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device.

These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

Note 2:Devices are ESD sensitive. Handling precaution recommended.

Note 3:Thermal Resistance is specified with approximately 1 square of 1 oz copper.

Note 4:Thermal Resistance is specified with the component mounted on a low effective thermal conductivity test board in free air at $T_A=25^\circ C$.

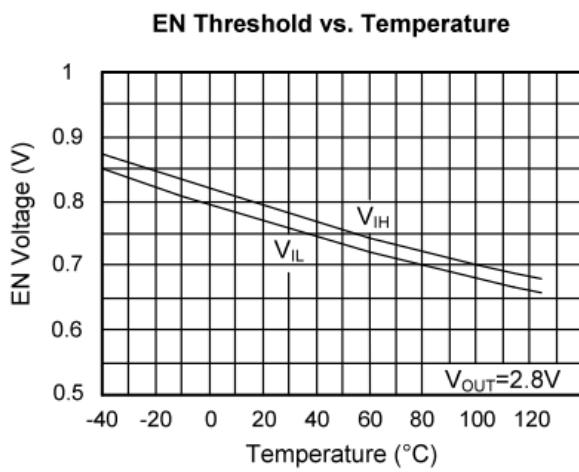
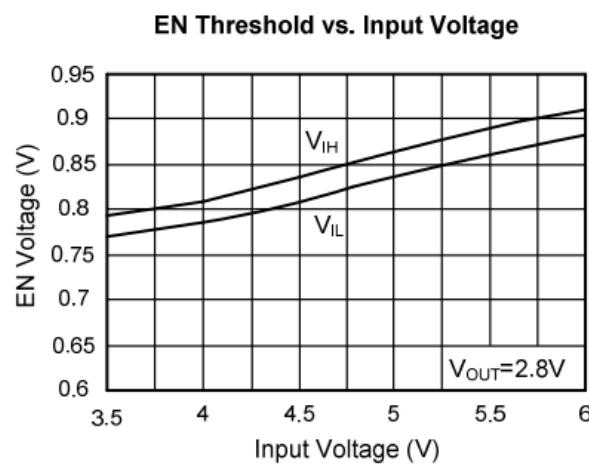
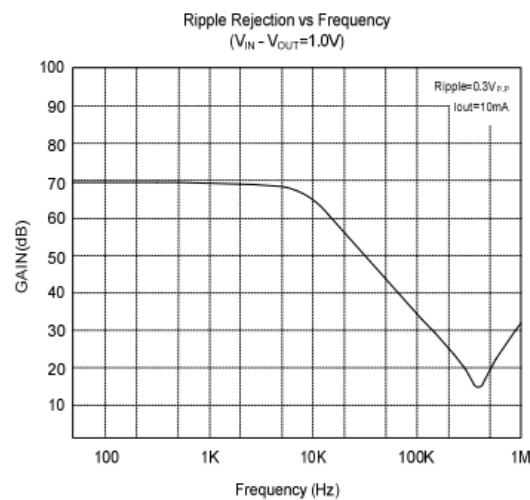
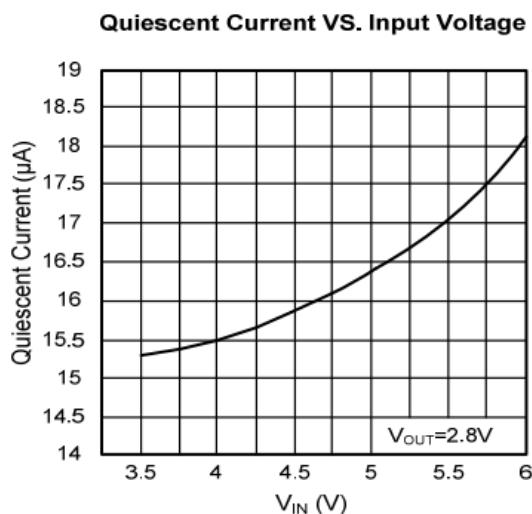
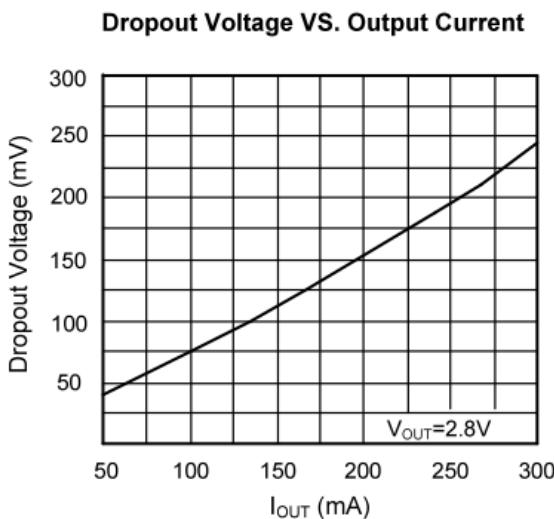
Note 5:The device is not guaranteed to function outside its operating conditions.

**Electrical Characteristics** (Unless otherwise specified $V_{IN}=V_{OUT}+1V$, $T_A=25^\circ C$)

Symbol	Parameters	Condition	Min	Typ	Max	Units
V_{OUT}	Output Voltage	$1mA \leq I_{OUT} \leq 30mA$	$V_{OUT} \geq 0.98$		$V_{OUT} \leq 1.020$	V
Reg_load	Load Regulation	$I_{OUT}=1mA$ to $150mA$		0.005	0.015	%/mA
Reg_line	Line Regulation	$V_{OUT}>1.7V, V_{IN}=(V_{OUT}+0.5V)$ to $6V$ $V_{OUT} \leq 1.7V, V_{IN}=2.2V$ to $6V$ $I_{OUT}=1mA$		0.01	0.2	%/V
V_{DROP}	Dropout Voltage(Note 6)	$V_{OUT}<1.5V$			1.00	V
		$V_{OUT}=1.5V$		0.48	0.70	V
		$V_{OUT}=1.6V, I_{OUT}=150mA$		0.46	0.65	V
		$V_{OUT}=1.7V$		0.44	0.60	V
		$1.8V \leq V_{OUT} \leq 2.0V$		0.42	0.55	V
		$2.1V \leq V_{OUT} \leq 2.7V$		0.28	0.50	V
		$2.8V \leq V_{OUT} \leq 4.8V$		0.22	0.35	V
PSRR	Ripple Rejection	$f=10kHz, Ripple 0.5V_{P-P},$ $V_{OUT}>1.7V, V_{IN}-V_{OUT}=1.0V$ $V_{OUT} \leq 1.7V, V_{IN}-V_{OUT}=1.2V$ $I_{OUT}=10mA$		65		dB
		$f=1kHz, Ripple 0.5V_{P-P},$ $V_{OUT}>1.7V, V_{IN}-V_{OUT}=1.0V$ $V_{OUT} \leq 1.7V, V_{IN}-V_{OUT}=1.2V$ $I_{OUT}=10mA$		70		dB
I_{SS}	Supply Current	$I_{OUT}=0mA$		25		uA
$I_{Standby}$	Supply Current (Standby)	$V_{EN}=GND$		0.01	0.1	uA
V_{IN}	Input Voltage		2.0		6.0	V
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	$I_{OUT}=1mA, -40^\circ C \leq T_J \leq 85^\circ C$		± 100		ppm/ $^\circ C$
I_{LIM}	Current Limit			400		mA
R_{PD}	EN Pull-Down Resistance		0.7	2.0	8.0	M Ω
V_{ENH}	EN Input Voltage "H"		1.2		V_{IN}	V
V_{ENL}	EN Input Voltage "L"				0.4	V
eN	Output Noise	$BW=10Hz$ to $100kHz, C_o=1\mu F$		100		uVrms
R_{LOW}	On Resistance for Auto-Discharge	$V_{EN}=0V$		60		Ω

Note 6: Dropout voltage is tested by reducing input voltage until the output drops 2% below its nominal value.

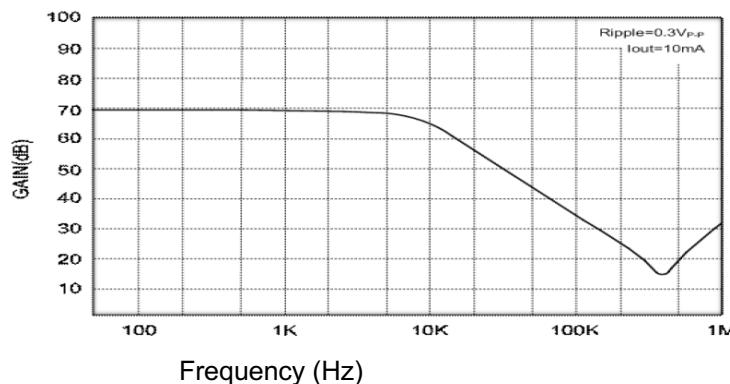
Operating Characteristics



PSRR CURVE

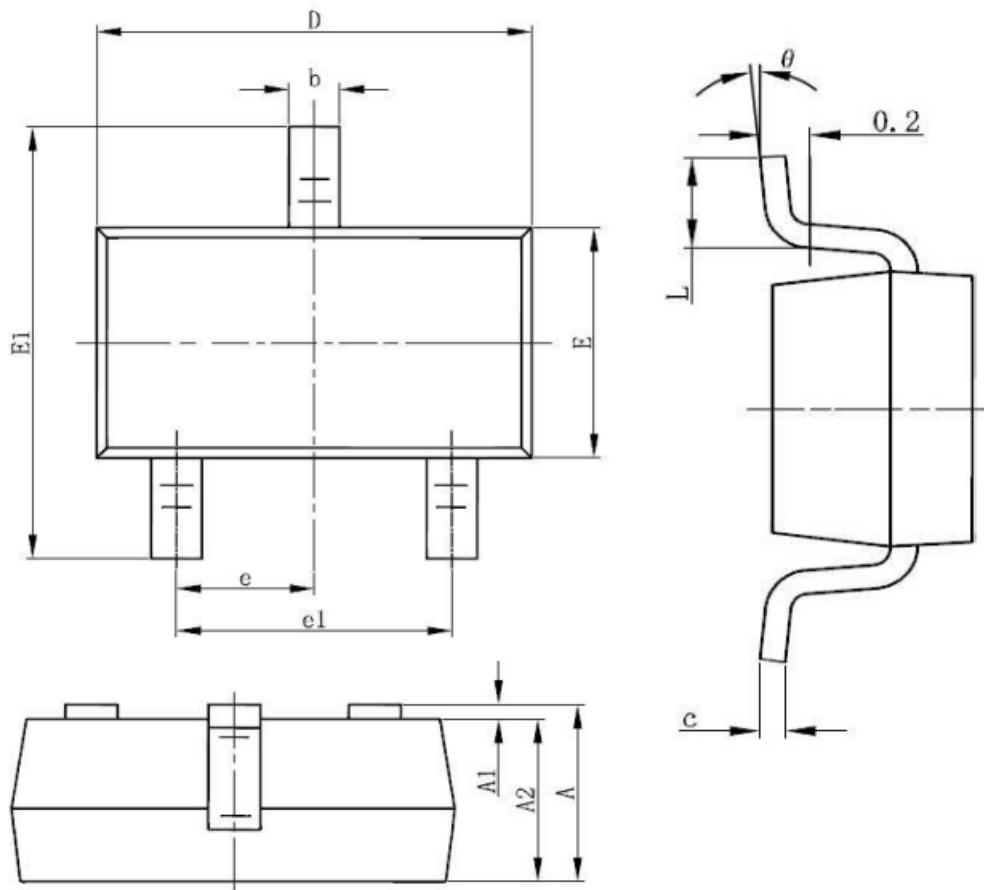
Ripple Rejection vs Frequency

(V_{IN} - V_{OUT}) = 1.0V



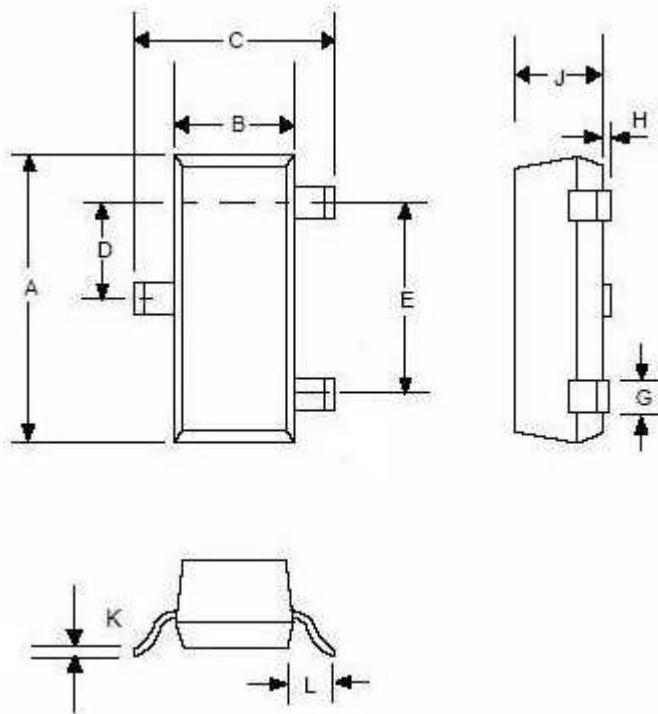
Package Dimension

OUTLINE DRAWING SOT23-3L



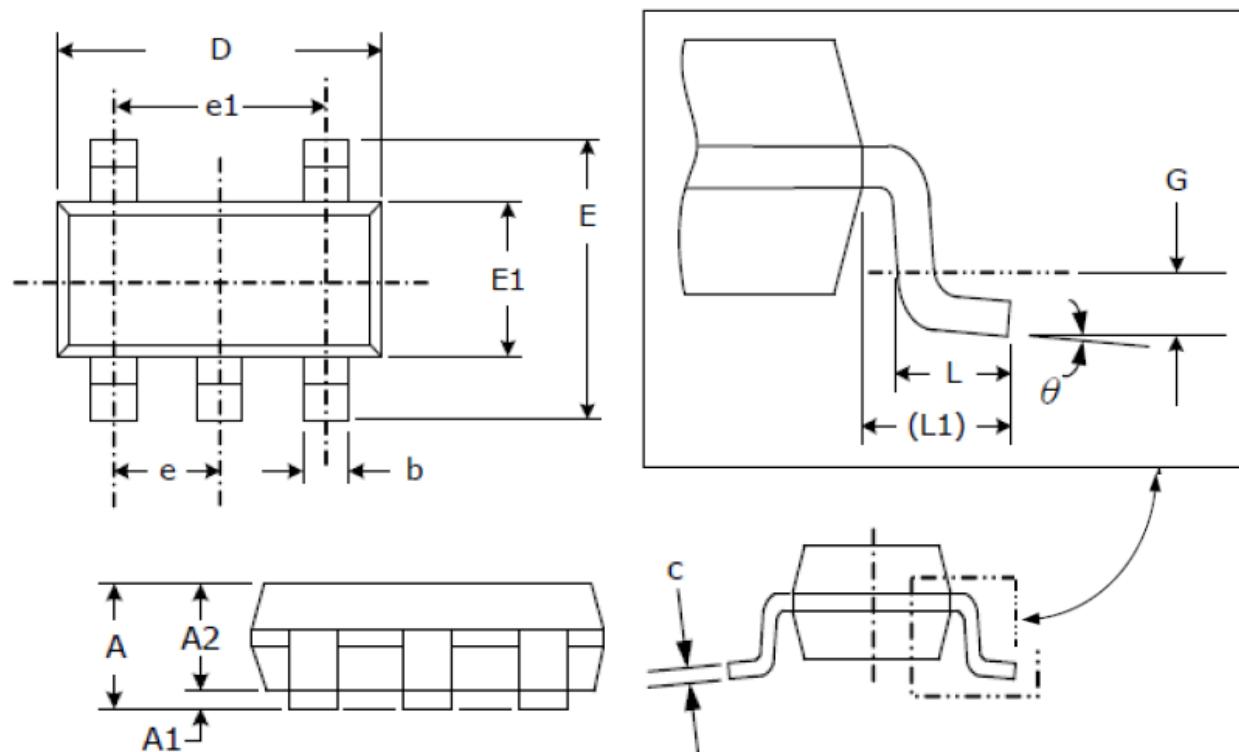
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.00	1.10	1.30	0.039	0.043	0.051
A1	0.00	---	0.10	0.000	---	0.004
A2	1.05	1.10	1.15	0.041	0.043	0.045
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.70	2.90	3.10	0.106	0.114	0.122
E	1.50	1.60	1.80	0.059	0.063	0.071
E1	2.60	2.80	3.00	0.102	0.110	0.118
e	---	0.950	---	---	0.037	---
e1	1.8	1.9	2.0	0.070	0.075	0.79
L	---	0.700	---	---	0.028	---
L1	0.3	0.45	0.6	0.012	0.018	0.024
Θ	0°	---	9°	0°	---	9°

OUTLINE DRAWING TSOT23-3L



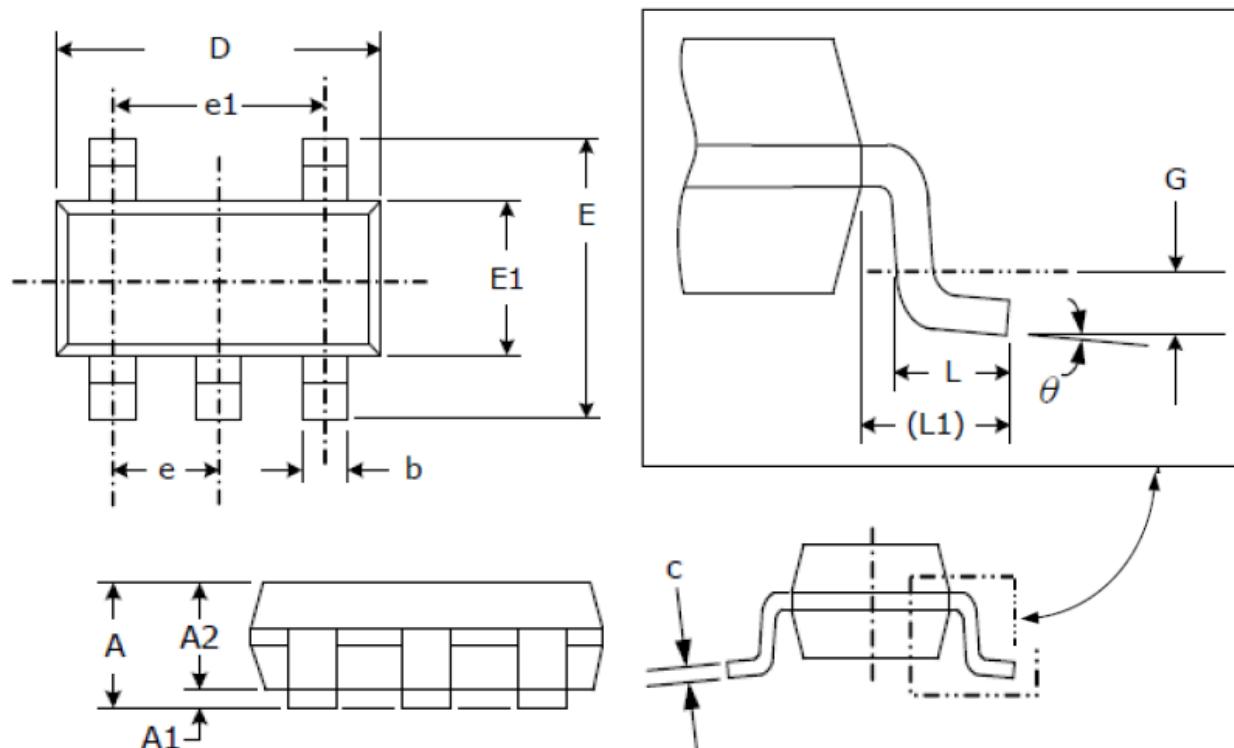
DIMENSIONS				
DIM ^N	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.112	0.116	2.85	2.95
B	0.050	0.052	1.275	1.325
C	0.093	0.096	2.35	2.45
D	0.036	0.038	0.925	0.975
E	0.075REF		1.90REF	
G	0.015	0.018	0.39	0.45
H	0.001	0.004	0.02	0.1
J	0.038	0.040	0.975	1.025
K	0.004	0.006	0.10	0.14
L	0.022REF		0.55 REF	

OUTLINE DRAWING SOT23-5L



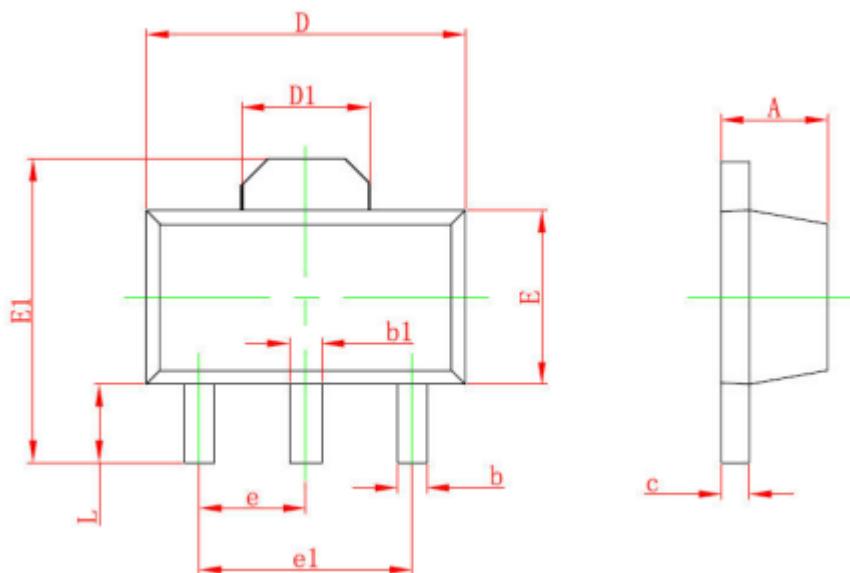
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.95	1.20	1.45	0.037	0.047	0.057
A1	0.05	---	0.15	0.002	---	0.006
A2	0.90	1.1	1.30	0.035	0.043	0.051
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.08	0.15	0.25	0.003	0.006	0.010
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
e	---	0.95	---	---	0.037	---
e1	---	1.90	---	---	0.075	---
L	0.35	---	0.55	0.014	---	0.022
L1	---	0.60	---	---	0.024	---
G	---	0.25	---	---	0.010	---
θ1	0°	---	9°	0°	---	9°

OUTLINE DRAWING TSOT23-5L



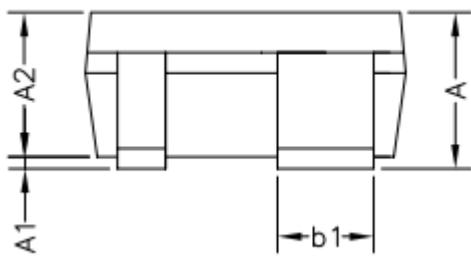
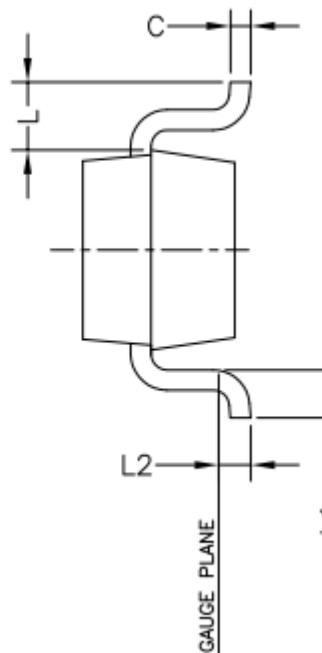
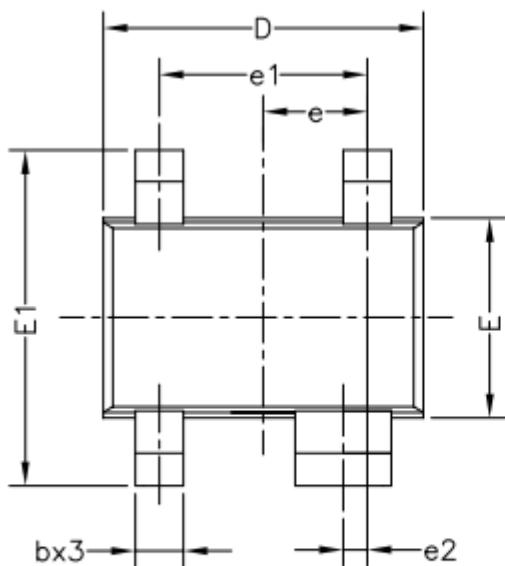
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	0.043
A1	0.00	---	0.10	0.000	---	0.004
A2	---	---	1.00	---	---	0.039
b	0.35	---	0.51	0.014	---	0.020
c	0.1	---	0.25	0.004	---	0.010
D	2.80	2.90	3.00	0.110	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
e	---	0.95	---	---	0.037	---
e1	---	1.90	---	---	0.075	---
L	0.35	---	0.55	0.014	---	0.022
L1	---	0.60	---	---	0.024	---
G	---	0.25	---	---	0.010	---
Theta1	0°	---	9°	0°	---	9°

OUTLINE DRAWING SOT89-3L



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.40	1.50	1.60	0.055	0.059	0.063
b	0.32	0.42	0.52	0.012	0.016	0.020
b1	0.40	0.49	0.58	0.016	0.019	0.023
c	0.35	---	0.46	0.013	---	0.018
D	4.30	4.50	4.70	0.16	0.17	0.18
D1	1.35	---	1.83	0.053	---	0.072
E	2.30	2.50	2.70	0.090	0.098	0.106
E1	3.90	4.15	4.40	0.153	0.163	0.173
e	1.35	1.50	1.65	0.053	0.059	0.064
e1	2.85	---	3.15	0.112	---	0.124
L	0.89	---	1.20	0.035	---	0.047

Outline Drawing For SC70-4

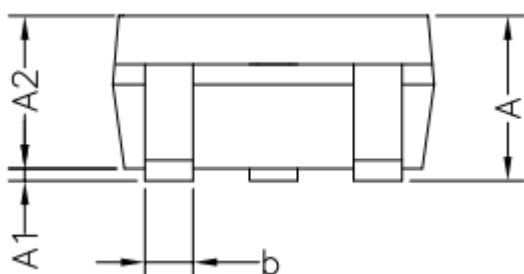
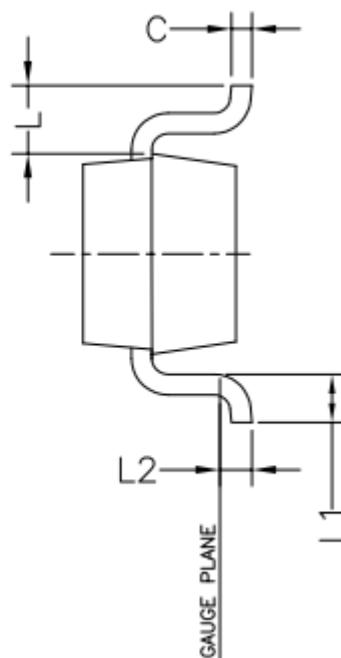
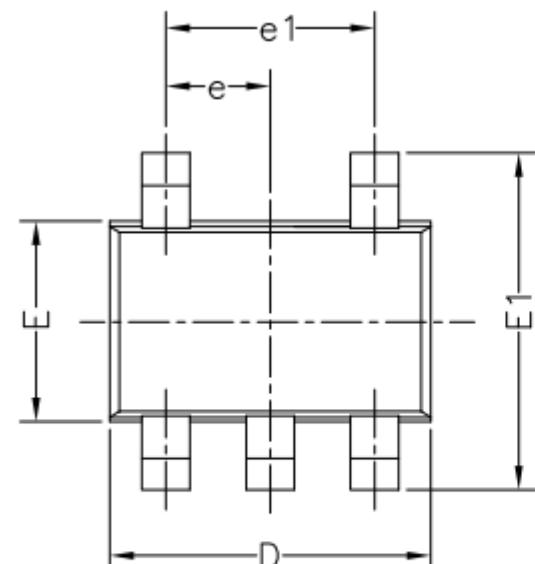


Note:

1. All dimensions are in millimeters, and the dimensions in inches are for reference only.
2. $1\text{mm}=40\text{mils}=0.04\text{inches}$

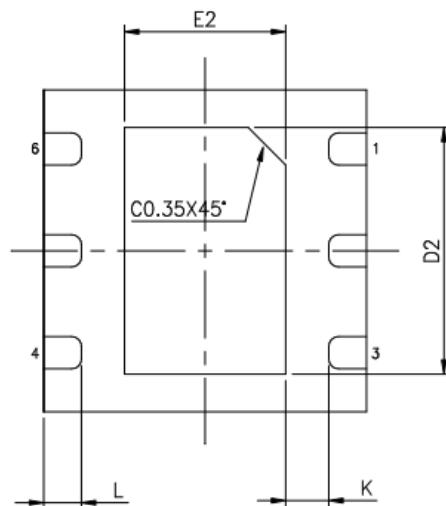
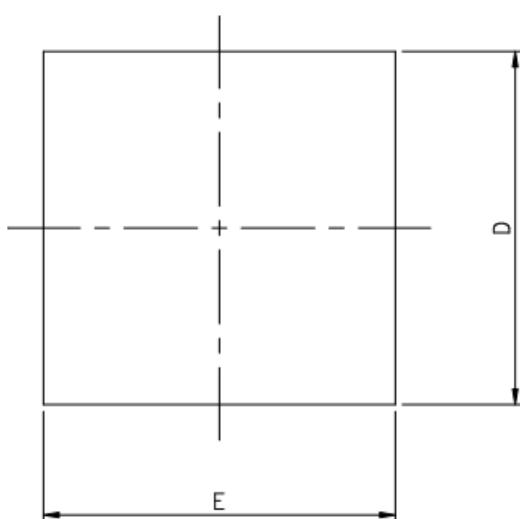
Symbol	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.10	.036	.044
A1	0.025	0.10	.001	.004
A2	0.875	1.00	.035	.040
b	0.20	0.40	.008	.016
b1	0.40	0.60	.015	.024
C	0.10	0.15	.004	.006
D	1.90	2.10	.076	.084
E	1.15	1.35	.046	.054
E1	2.00	2.30	.080	.091
e	0.65 BSC.		.026 BSC.	
e1	1.30 BSC.		.052 BSC.	
e2	0.15 BSC.		.006 BSC.	
L	0.425 REF.		.017 REF.	
L1	0.25	0.45	.010	.018
L2	0.200 REF.		.007 REF.	

Outline Drawing For SC70-5



Symbol	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.10	.036	.044
A1	0.025	0.10	.001	.004
A2	0.875	1.00	.035	.040
b	0.20	0.40	.008	.016
C	0.10	0.15	.004	.006
D	1.90	2.10	.076	.084
E	1.15	1.35	.046	.054
E1	2.00	2.30	.080	.091
e	0.65 BSC.		.026 BSC.	
e1	1.30 BSC.		.052 BSC.	
L	0.425 REF.		.017 REF.	
L1	0.25	0.45	.010	.018
L2	0.200 REF.		.007 REF.	

Outline Drawing For DFN 3x3-6L

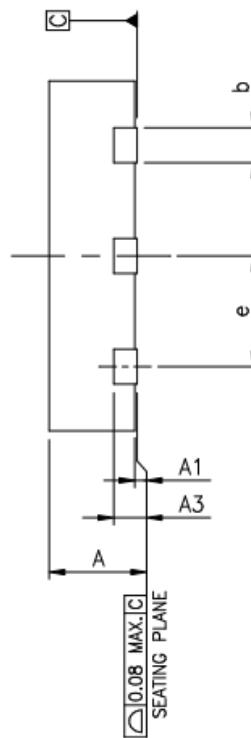


SYMBOLS	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3	0.20 REF.		
b	0.25	0.30	0.35
D	3.00 BSC		
E	3.00 BSC		
e	0.95 BSC		
L	0.25	0.35	0.45
K	0.20	—	—

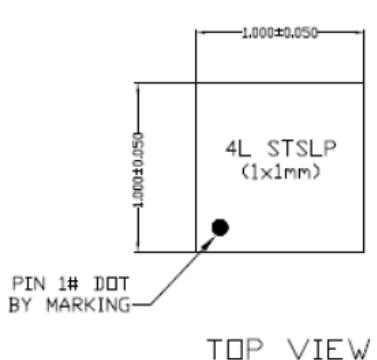
E2			D2		
MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
1.40	1.50	1.55	2.20	2.30	2.35

NOTES :

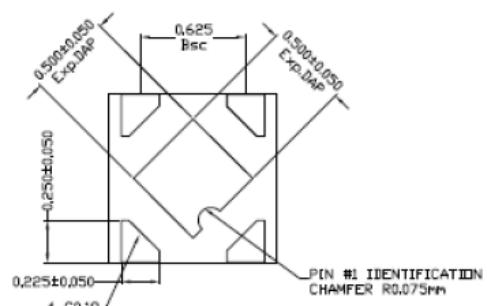
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15mm AND 0.30mm FROM THE TERMINAL TIP. IF THE TERMINAL HAS THE OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMENSION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.
3. BILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.



Outline Drawing For UDFN-4L(1x1)Type A



TOP VIEW

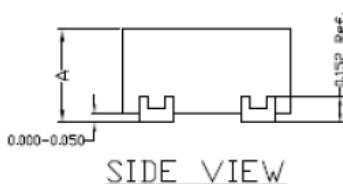


BOTTOM VIEW

NOTE:

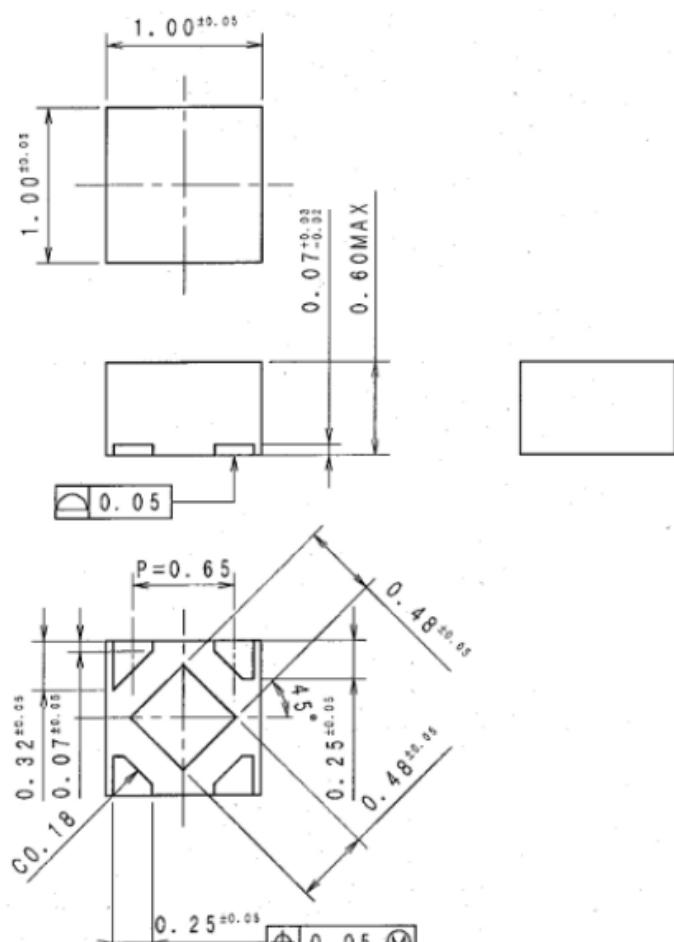
1). 'A' DIMENSION AS BELOW TABLE

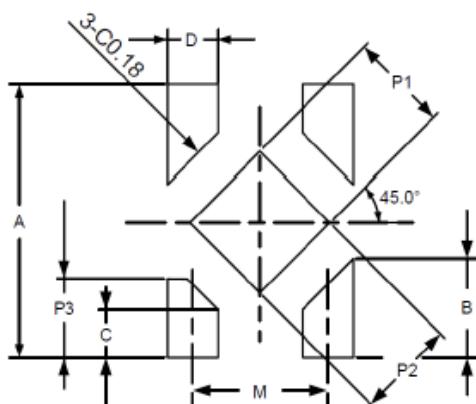
STSLP	
A	MAX.
	NOM.
	MIN.
	0.600
	0.550
	0.500



SIDE VIEW

Outline Drawing For UDFN-4L(1x1)Type B



Outline Drawing For UDFN-4L(1x1)

Package	Number of PIN	Footprint Dimension (mm)								Tolerance
		P1	P2	P3	A	B	C	D	M	
UDFN-4	4	0.48	0.48	0.4	1.3	0.47	0.22	0.25	0.65	±0.10



300mA High-PSRR Low Dropout Voltage Linear Regulators

EC3111