

CJ6211 Series

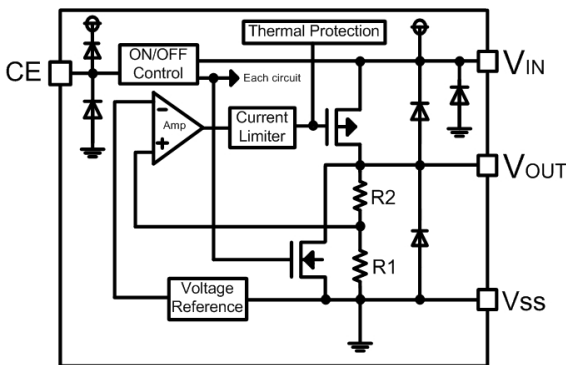
■ INTRODUCTION

The CJ6211 series are a group of positive voltage regulators manufactured by CMOS technologies with high ripple rejection, ultra low noise, low power consumption and low dropout voltage, which can prolong battery life in portable electronics. The CJ6211 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The CJ6211 series consume less than 0.1 μ A in shutdown mode and have fast turn-on time less than 50 μ s. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

■ APPLICATIONS

- Cellular and Smart Phones
- Laptop, Palmtops and PDA
- Digital Still and Video Cameras

■ BLOCK DIAGRAM



■ FEATURES

- High Ripple Rejection: 80dB@1kHz
- Low Dropout Voltage: 55mV@100mA
- Low Quiescent Current: 50 μ A
- Excellent Line and Load Transient Response
- Operating Voltage Range: 1.8V ~ 6.0V
- Output Voltage Range: 0.8V ~ 5.0V
- High Accuracy: \pm 2% (Typ.)
- Output Noise Voltage: 40 μ V_{RMS}
(V_{OUT} = 3.3V, 10Hz ~ 100kHz)
- Built-in Current Limiter, Short-Circuit Protection
- TTL- Logic-Controlled Shutdown Input

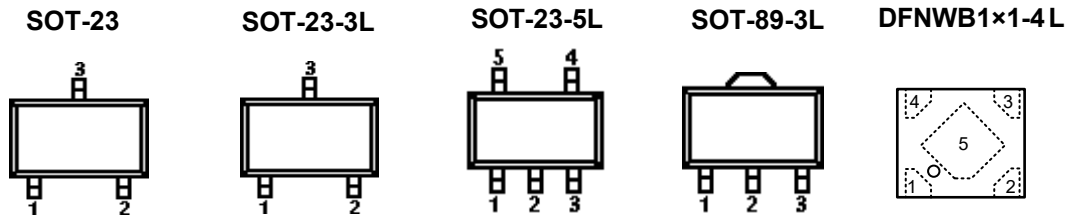
- Portable Audio Video Equipments
- Radio control systems
- Battery-Powered Equipments

■ ORDER INFORMATION

CJ6211①②③④

DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Standard
	B	High Active, pull-down resistor built in, with C _{OUT} discharge resistor
②③	Integer	Output Voltage e.g. 1.8V=②:1, ③:8
④	N	Package:SOT-23
	M	Package:SOT-23-3L/5L
	P	Package:SOT-89-3L
	F	Package:DFNWB1x1-4L

Pin Configuration



PIN NAME	SOT-23	SOT-23-3L	SOT-23-5L	SOT-89-3L	DFNWB1x1-4L	I / O	DESCRIPTION
	AxxN	AxxM	BxxM	AxxP	BxxF		
V _{IN}	3	3	1	2	4	I	Input to the device.
V _{SS}	1	1	2	1	2	-	Regulator ground.
CE	-	-	3	-	3	I	Enable pin. Logic high to enable, logic low to disable. Don't float the pin, if CE pin is not used, connect the CE to IN.
NC	-	-	4	-	-	-	Internal not connected.
V _{OUT}	2	2	5	3	1	O	Output of the regulator.
Thermal Pad	-	-	-	-	5	-	Internal connection to GND.

■ THERMAL METRIC

THERMAL METRIC	SYMBOL	CJ6211 Series			UNIT
Junction-to-ambient thermal resistance	R _{θJA}	SOT-23	SOT-23-3L	SOT-23-5L	°C/W
		357.2	261.3	252.5	
		SOT-89-3L	DFNWB1x1-4L		
		162.9	219.2		
Junction-to-case thermal resistance	R _{θJC}	SOT-23	SOT-23-3L	SOT-23-5L	°C/W
		135.7	66.2	65.4	
		SOT-89-3L	DFNWB1x1-4L		
		54.4	115.8		
Reference maximum power dissipation for continuous operation	P _{D Ref}	SOT-23	SOT-23-3L	SOT-23-5L	W
		0.28	0.38	0.40	
		SOT-89-3L	DFNWB1x1-4L		
		0.63	0.45		

Thermal metric is measured in still air with T_A = 25°C and mounted on a 1 in² FR-4 substrate PCB covered with 2 ounces of copper.

Electrical Characteristics

■ ABSOLUTE MAXIMUM RATINGS⁽¹⁾

(Unless otherwise specified, $T_A=25^{\circ}\text{C}$)

PARAMETER	SYMBOL	RATINGS	UNITS
Input Voltage ⁽²⁾	V_{IN}	-0.3~7	V
Output Voltage ⁽²⁾	V_{OUT}	-0.3~ $V_{IN}+0.3$	V
Output Current	I_{OUT}	700	mA
Operating free air temperature range	T_A	-40~85	$^{\circ}\text{C}$
Operating Junction Temperature Range ⁽³⁾	T_J	-40~125	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-40~125	$^{\circ}\text{C}$
Lead Temperature(Soldering, 10 sec)	T_{solder}	260	$^{\circ}\text{C}$
ESD rating ⁽⁴⁾	Human Body Model(HBM)	2	kV
	Machine Model(MM)	200	V

(1) Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltages are with respect to network ground terminal.

(3) This IC includes over temperature protection that is intended to protect the device during momentary overload. Junction temperature will exceed 125°C when over temperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

(4) ESD testing is performed according to the respective JESD22/JEDEC standard. The human body model is a 100pF capacitor discharged through a 1.5k Ω resistor into each pin. The machine model is a 200pF capacitor discharged directly into each pin.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	MIN.	NOM.	MAX.	UNITS
Supply Voltage at V_{IN}	1.8		6	V
Operating Junction Temperature Range, T_J	0		125	$^{\circ}\text{C}$
Operating Free Air Temperature Range, T_A	0		85	$^{\circ}\text{C}$

Electrical Characteristics

($V_{IN}=V_{OUT}+1V$, $C_{IN}=C_{OUT}=1\mu F$, $T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP. ⁽³⁾	MAX.	UNITS
Output Voltage	$V_{OUT(E)}$ ⁽⁴⁾	$I_{OUT}=1mA$	$V_{OUT}^{(5)}$	$V_{OUT}^{(5)}$	$V_{OUT}^{(5)}$	V
Supply Current	I_{SS}	$I_{OUT}=0$		50	90	μA
Standby Current	I_{STBY}	$CE = V_{SS}$		0.1	1	μA
Output Current	I_{OUT}	$V_{OUT} \geq 1.8V$	500	700		mA
		$V_{OUT} \geq 0.8V$	300	500		
Dropout Voltage	$V_{DO}^{(6)}$	$V_{OUT} = 3.3V$ $I_{OUT} = 100mA$		55		mV
Load Regulation	ΔV_{OUT}	$V_{IN} = V_{OUT} + 1V$		1		mV
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	$I_{OUT} = 10mA$ $V_{OUT} + 1V \leq V_{IN} \leq 6V$		0.01	0.2	%/V
Output Voltage Temperature	$\frac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	$I_{OUT} = 10mA$ $-40 \leq T \leq +85^\circ C$		50		ppm
Short Current	I_{Short}	$V_{OUT} = V_{SS}$		100		mA
Input Voltage	V_{IN}	—	1.8		6.0	V
Power Supply Rejection Rate	100Hz	PSRR	$I_{OUT}=50mA$		75	dB
	1kHz				80	
	10kHz				70	
CE "High" Voltage	$V_{CE} "H"$		1.5		V_{IN}	V
CE "Low" Voltage	$V_{CE} "L"$				0.3	V
Thermal Shutdown	T_{SD}			160		$^\circ C$
Thermal Shutdown	ΔT_{SD}			20		$^\circ C$
C_{OUT} Auto-Discharge	$R_{DISCHRG}$	$V_{IN}=5V$		100		Ω

(3) Typical numbers are at $25^\circ C$ and represent the most likely norm.

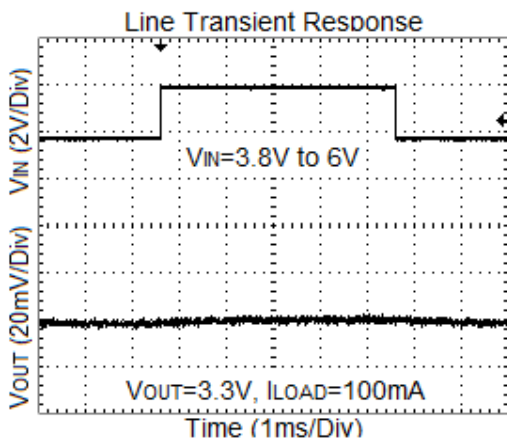
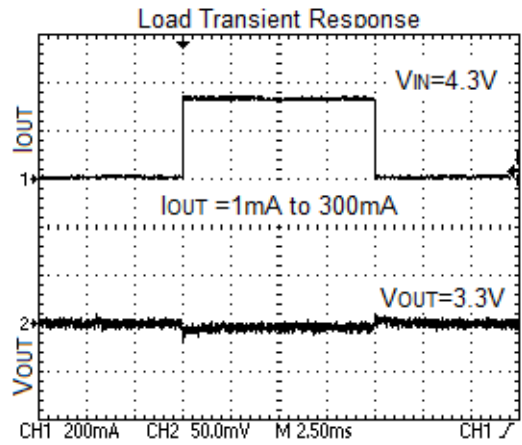
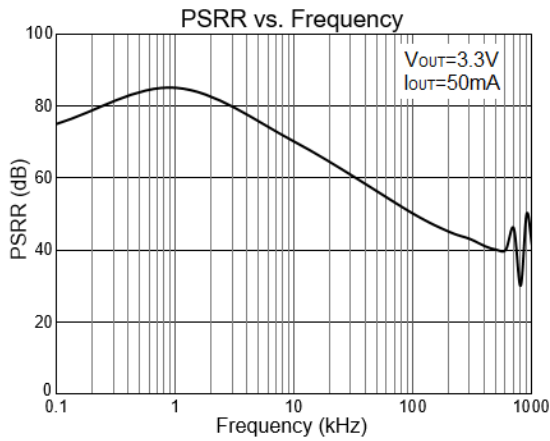
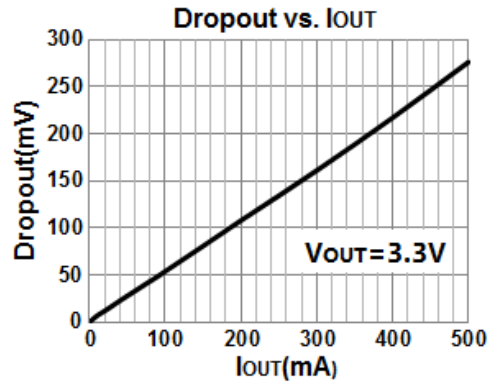
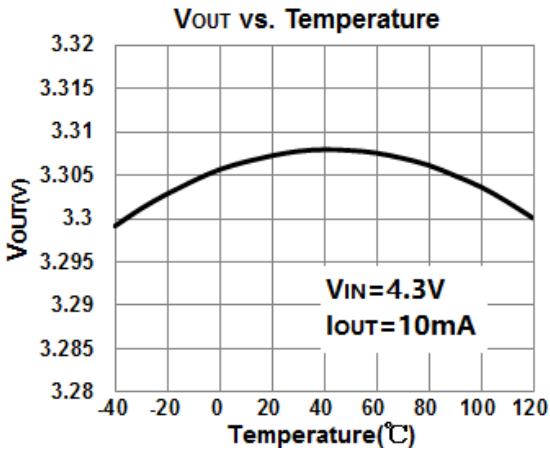
(4) $V_{OUT(E)}$: Effective output voltage (I.e. The output voltage when $V_{IN} = (V_{OUT} + 1.0V)$ and maintain a certain I_{OUT} value).

(5) V_{OUT} : Specified output voltage.

(6) V_{DO} : Test the difference of output voltage and input voltage when input voltage is decreased gradually till output voltage equals to 98% of $V_{OUT(E)}$.

Typical Characteristics

($V_{CE} = V_{IN} = V_{OUT} + 1V$, $C_{IN} = 1\mu F$, $C_{OUT} = 1\mu F$, $T_A = 25^\circ C$, unless otherwise specified)



C_{OUT} Auto-Discharge Function

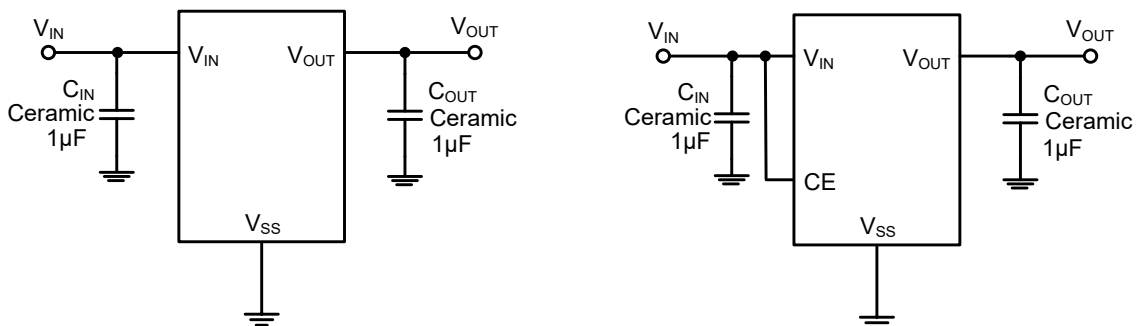
CJ6211 series can discharge the electric charge in the output capacitor (C_{OUT}), when a low signal to the CE pin, which enables a whole IC circuit turn off, is inputted via the N-channel transistor located between the V_{OUT} pin and the V_{SS} pin (cf. BLOCK DIAGRAM). The C_{OUT} auto-discharge resistance value is set at 60Ω ($V_{OUT}=3.0V$ @ $V_{IN}=5.0V$ at typical). The discharge time of the output capacitor (C_{OUT}) is set by the C_{OUT} auto-discharge resistance (R) and the output capacitor (C_{OUT}). By setting time constant of a C_{OUT} auto-discharge resistance value [$R_{DISCHRG}$] and an output capacitor value (C_{OUT}) as $\tau(\tau=C \times R_{DISCHRG})$, the output voltage after discharge via the N-channel transistor is calculated by the following formulas.

$$V = V_{OUT(E)} \times e^{-t/T} \text{ or } t = \tau \ln(V/V_{OUT(E)})$$

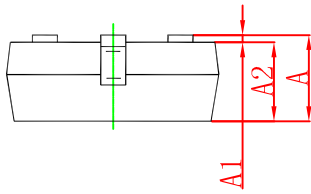
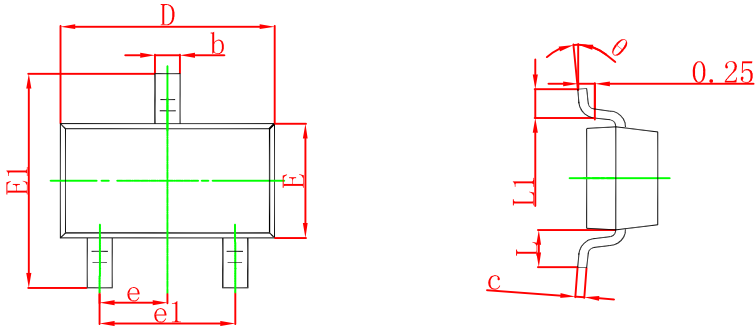
(V : Output voltage after discharge, $V_{OUT(E)}$: Output voltage, t : Discharge time,

τ : C_{OUT} auto-discharge resistance $R_{DISCHRG}$ × Output capacitor (C_{OUT}) value C)

■ TYPICAL APPLICATION

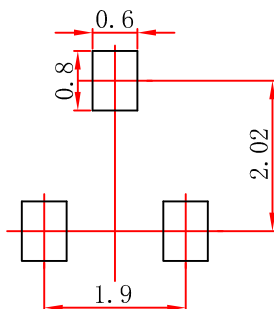


SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

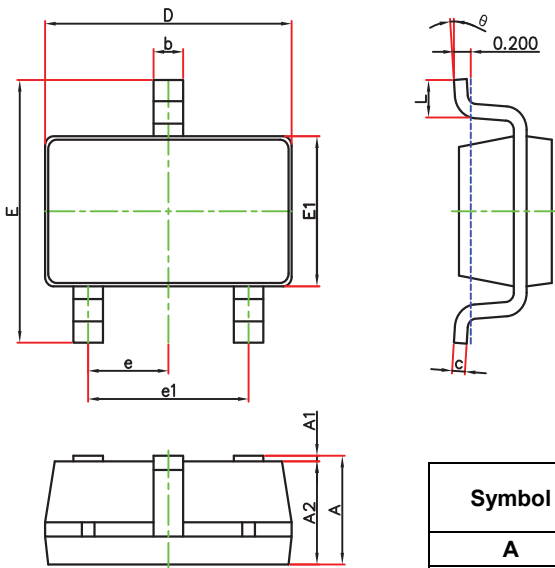
SOT-23 Suggested Pad Layout



NOTE:

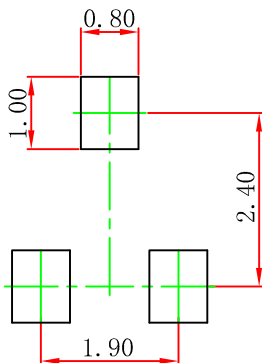
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

SOT-23-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

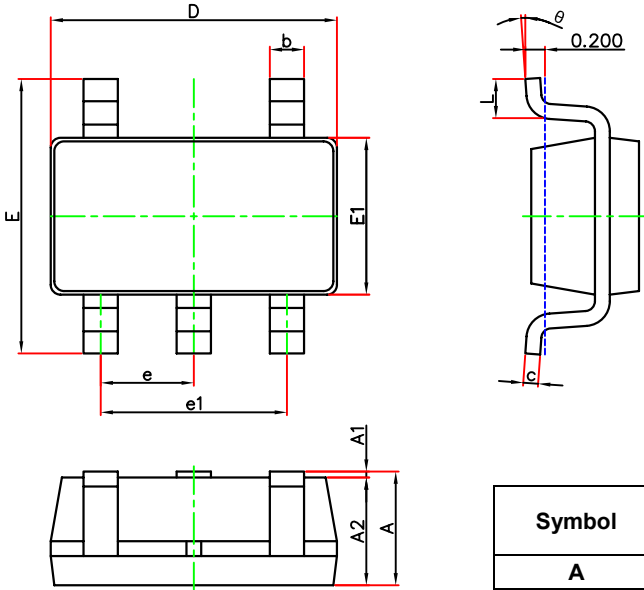
SOT-23-3L Suggested Pad Layout



NOTE:

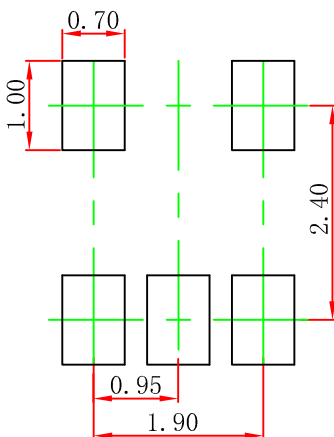
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

SOT-23-5L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

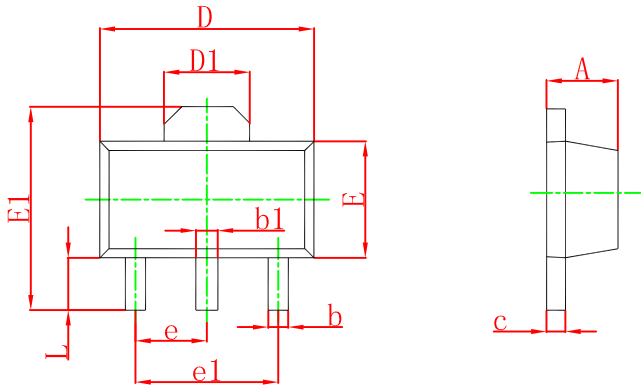
SOT-23-5L Suggested Pad Layout



NOTE:

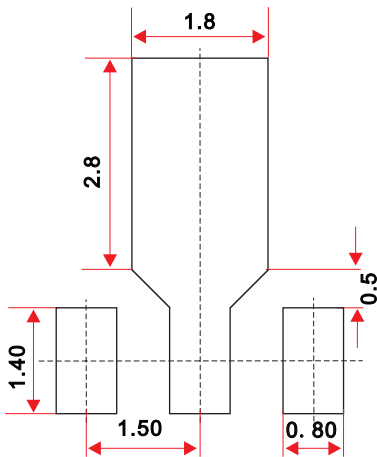
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

SOT-89-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

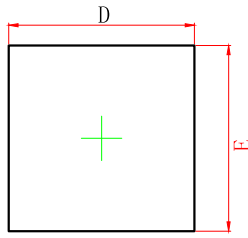
SOT-89-3L Suggested Pad Layout



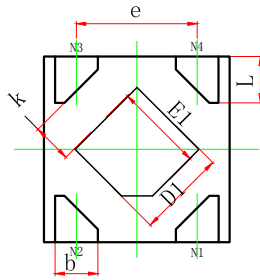
NOTE:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

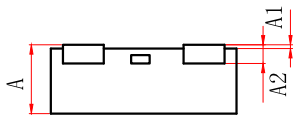
DFNWB1*1-4L Package Outline Dimensions



TOP VIEW



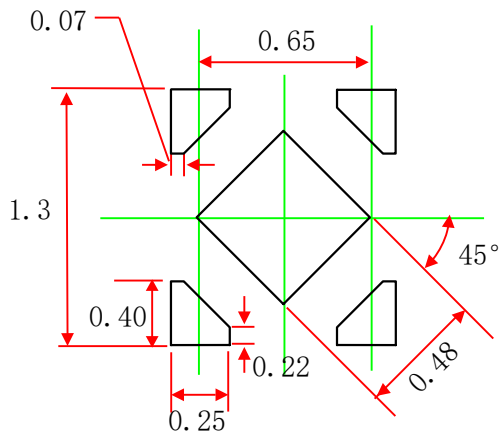
BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.320	0.400	0.013	0.016
A1	0.000	0.050	0.000	0.002
A2	0.100 REF.		0.004 REF.	
D	0.950	1.050	0.037	0.041
E	0.950	1.050	0.037	0.041
D1	0.430	0.530	0.017	0.021
E1	0.430	0.530	0.017	0.021
k	0.150MIN.		0.006MIN.	
b	0.180	0.280	0.007	0.011
e	0.650TYP.		0.026TYP.	
L	0.200	0.300	0.008	0.012
L1	0.200	0.300	0.008	0.012

DFNWB1*1-4L Suggested Pad Layout



NOTE:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

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