DESCRIPTION

The JX2212 is an Over-Voltage-Protection (OVP) and Over-Current-Protection (OCP) IC with adjustable OCP thresholds current. It can disconnect IN and OUT to protect load when wrong input operating conditions are detected. The maximum operation voltage and current of JX2212 are 36V and 2A.The internal default over-voltage thresholds is 6.1V . The maximum operation current of JX2212 is 2A, over current protection will be triggered if operation current is large than 2.3A with ISET pin floating, and the OCP current decreases if Rset is defined, as the value of Rset increases,the OCP current decreases. JX2212 also has internal over temperature protection (OTP) function, it can monitor chip temperature to protect the device.

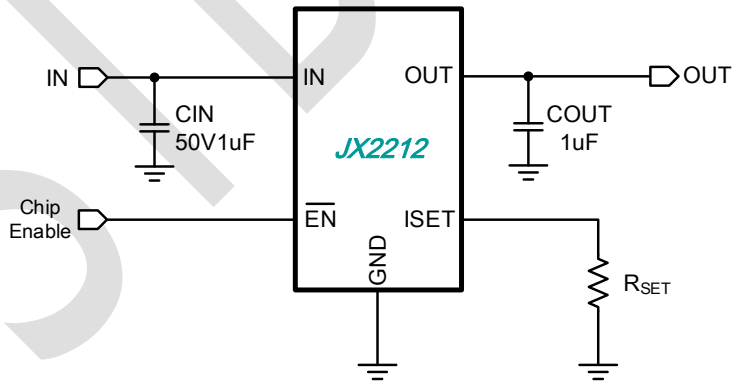
FEATURES

- Typical R_{ON}: 130mΩ N-Channel MOSFET @5V/1A
- Maximum Output Current: 2A.
- Maximum input voltage: 36V
- Internal Over-voltage Lockout : 6.1V ±3% accuracy
- Internal Over-current Lockout :
  2.3A (Typ.) (ISET pin Floating)
- Adjustable OCP threshold current:
  OCP adjustment range: 700mA~2.3A
- Internal Thermal-Shutdown Protection
- ESD Protected: Human Body Model：
  JESD22-A114(All pins)±2KV
- SOT23-6L、DFN2×2-8L

APPLICATIONS

- GPS
- PMP
- MID
- PAD
- Digital cameras
- Digital Videos

TYPICAL APPLICATION CIRCUIT



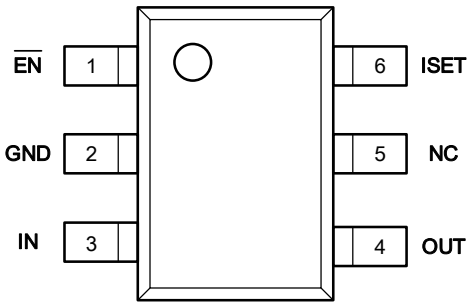
Note: RSET=100K, I_{OCP_MIN}=1.1A

ORDER INFORMATION

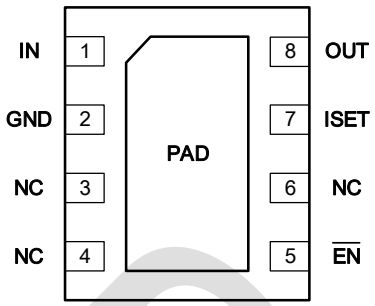
Part Number	Package	Marking	Packing Option
JX2212MR-G	SOT23-6L	JX2212 XXYY	Tape and Reel, 3000
JX2212DR-G	DFN2×2-8L	JX2212 XXYY	Tape and Reel, 4000

PIN CONFIGURATION/ DESCRIPTION

SOT23-6L
(Top View)

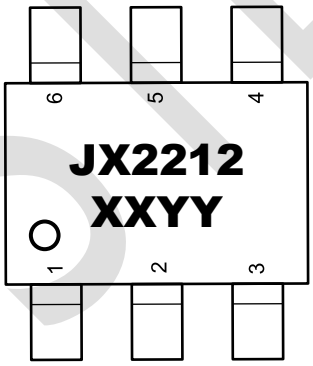


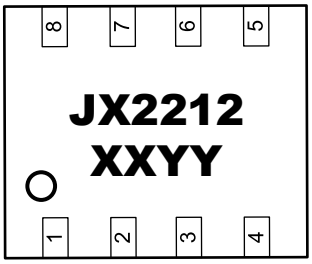
DFN2×2-8L
(Top View)



Pin		Name	Description
SOT-23-6	DFN2×2-8L		
1	5	$\overline{EN}$	Chip enable pin, Active low.
2	2,PAD	GND	Ground.
3	1	IN	Input pin.
4	8	OUT	Output pin.
5	3,4,6	NC	No connector. These pin must be floating.
6	7	ISET	Current limit adjustment. Connect a resistor to GND to set over current threshold. Internal maximum fixed current limitation is used when ISET floating.

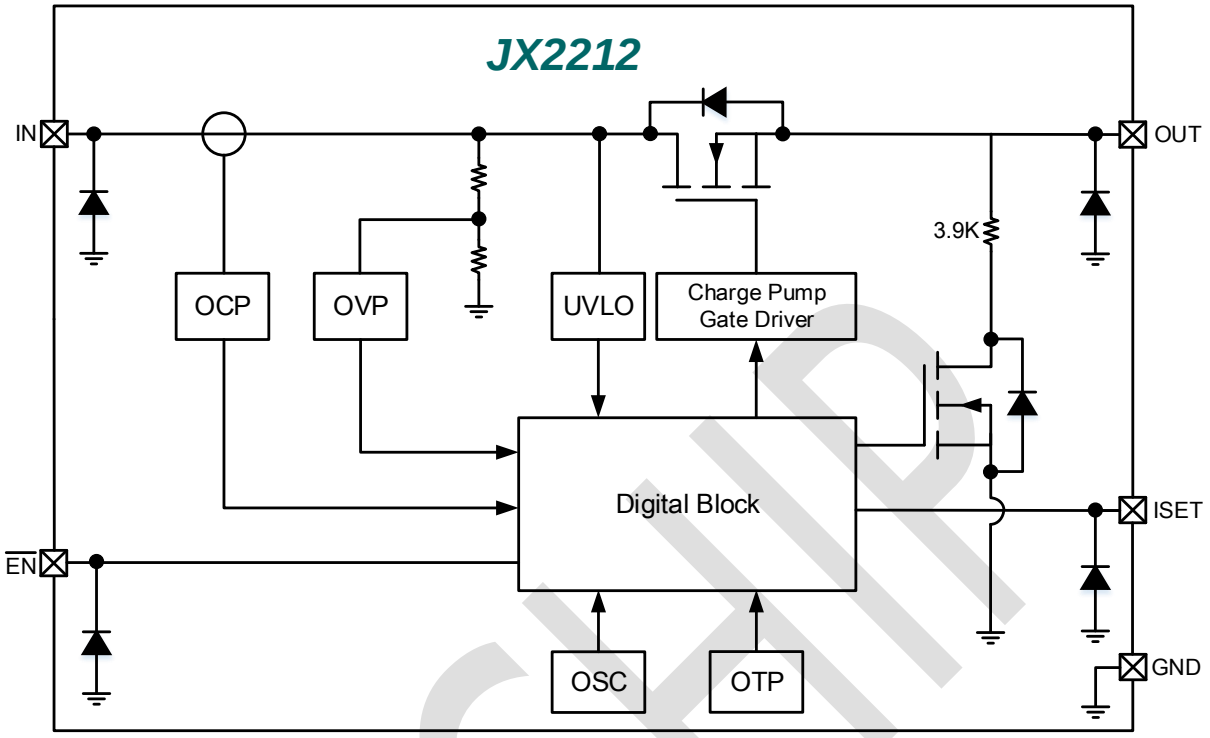
MARKING RULE





Note：JX2211 = Device code , XXYY = Date Code

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

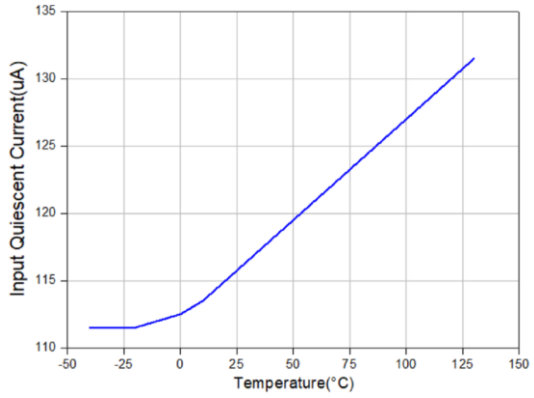
PARAMETER	SYMBOL	MIN	MAX	UNIT
VIN to GND	V_{IN}	-0.3	36	V
VOUT to GND	V_{OUT}	-0.3	15	V
$\overline{EN}$,ISET		-0.3	6	V
Maximum Continuous Current of switch IN-OUT	I_{SW1}	—	2.0	A
Maximum Peak Current of switch IN-OUT(10ms)	I_{SW2}	—	2.3	A
Power Dissipation (SOT-23-6L, T_A= +25℃)	P_D	—	0.45	W
Power Dissipation (DFN2×2-8L, T_A= +25℃)	P_D	—	1.5	W
Thermal resistance(SOT-23-6L)	θ_{JA}	—	250	℃/W
Thermal resistance(DFN2×2-8L)	θ_{JA}	—	65	℃/W
Storage Temperature Range &Junction Temperature	T_{stg},T_J	-65	+150	℃
Operating Temperature Range	T_A	-40	+85	℃
ESD HBM (Human Body Mode)		2000		V

ELECTRICAL CHARACTERISTICS

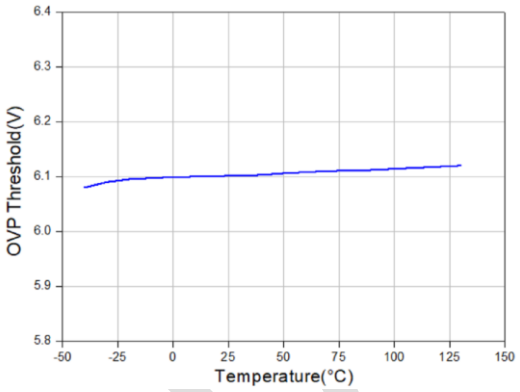
(Unless otherwise noted, typical values are at V_{IN}=5V and T_A=25℃)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Basic Operation						
Input Voltage	V_{IN}		2.5	-	36	V
V_{IN} Quiescent Current	I_Q	V_{EN}=Low, OUT floating	-	120	-	μA
	I_{SD}	V_{EN}=High, OUT floating	-	19	-	μA
On-Resistance of Switch IN-OUT	R_{ON}	V_{IN}=5.0V, I_{OUT}=1A	-	130	-	mΩ
Output discharge resistance	$R_{DISCHARGE}$	V_{IN}=5.0V	-	3.9	-	KΩ
$\overline{EN}$ Threshold High	V_{EN-H}	V_{EN} Rising	1.4	-	-	V
$\overline{EN}$ Threshold Low	V_{EN-L}	V_{EN} Falling	-	-	0.4	V
Over Voltage Lockout Threshold	V_{OVLO}	V_{IN} Rising	5.92	6.1	6.28	V
Over Voltage Lockout hysteresis	$V_{OVLO-HYS}$	V_{IN} Falling	-	210	-	mV
Under Voltage Lockout Threshold	V_{UVLO}	V_{IN} Rising	-	2.4	-	V
Under Voltage Lockout hysteresis	$V_{UVLO-HYS}$	V_{IN} Falling	-	180	-	mV
Input Over						
Debounce Time	t_{DEB}	Time from 2.3V<V_{IN}< V_{OVLO} to V_{OUT}=10% of V_{IN}	12	14	16	ms
Switch Turn-On Time	t_{ON}	R_L=100Ω, C_L=22μF, V_{OUT} from 0.1×V_{IN} to 0.9×V_{IN}	-	1.4	-	ms
Output power-on Time	t_{ON_ALL}	Time from 2.1V<V_{IN}< V_{OVLO} to V_{OUT}=90% of V_{IN}	-	15.4	-	ms
Switch turn-off response time	t_{OFF_RES} (1)	V_{IN} > V_{OVLO} to V_{OUT} stop rising	-	50	-	ns
Dynamic Characteristics: see figure						
ISET Voltage	V_{ISET}		-	0.66	-	V
OCP LIMIT Current	$I_{OCP-LIMIT}$	Rset=NC	-	2.3	-	A
OCP debounce time	t_{OCP}		-	20	-	ms
OCP recovery time	T_{REC_OCP}		-	900	-	ms
Over Temperature Protection（OTP）						
Thermal Shutdown	V_{OTP}		-	155	-	℃
Thermal-shutdown Hysteresis	$V_{OTP-HYS}$		-	25	-	℃

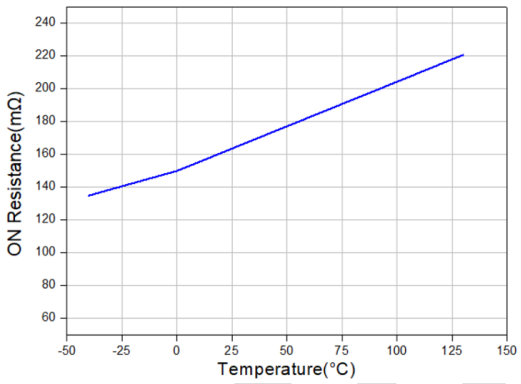
TYPICAL OPERATING PERFORMANCE



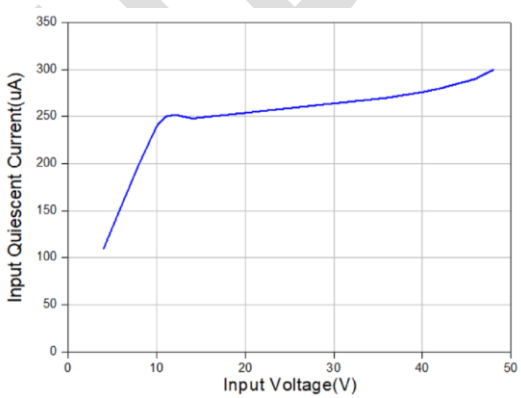
Input Quiescent Current VS. Temperature



OVP Threshold VS. Temperature

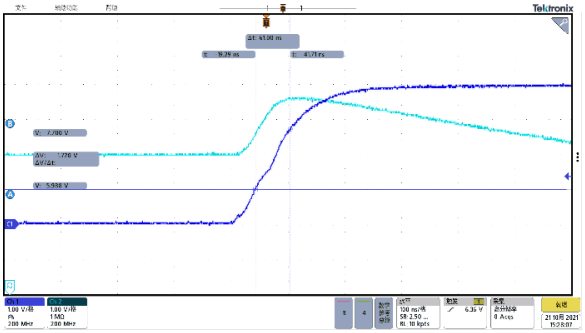


On Resistance VS. Temperature

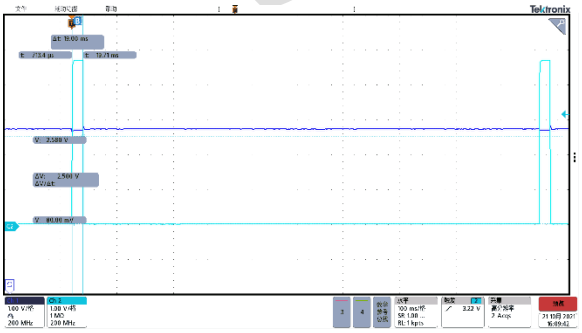


Input Quiescent Current VS. Input Voltage

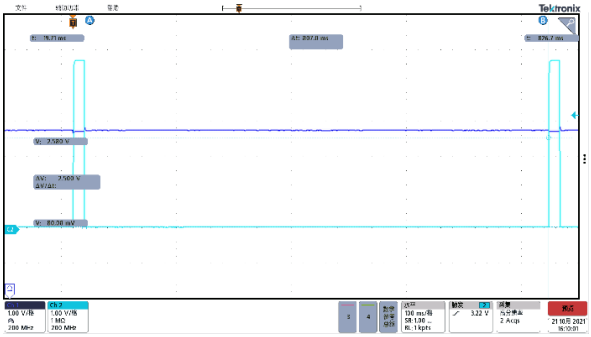
Power on Debounce Time, T_{DEB}=12.88ms



OVP Response time, T_{OFF_RES}=61ns



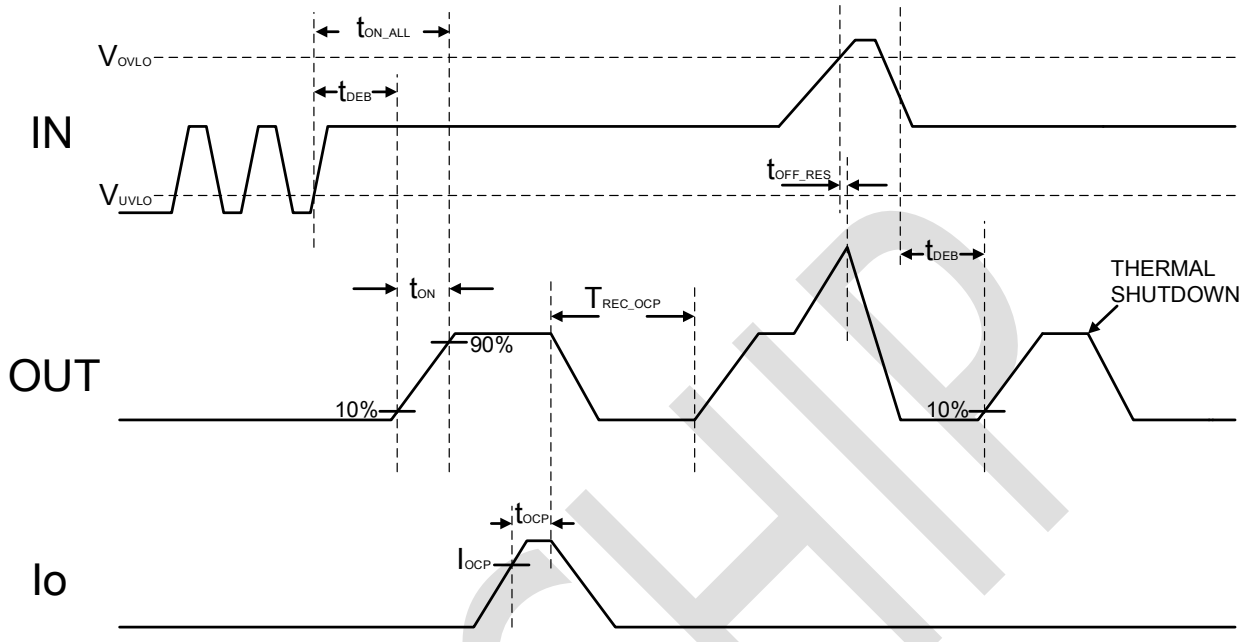
OCP debounce time, T_{OCP}=19.0ms



OCP recovery time, T_{REC_OCP}=807.0ms

AC ELECTRICAL CHACRACTERISTICS

(V_{IN}= 5V, unless otherwise specified. Typical values are at T_A= 25℃.)



*NOTE: Waveform Without Scale

FUNCTIONAL DESCRIPTION

Power on reset Function

The JX2212 has a threshold of 2.5V power on reset (POR) with a built-in hysteresis of 180mV. Before the input voltage reaches the POR threshold, the JX2212 is off. When the input voltage is over the POR threshold, the VOUT of JX2212 will delay for 15.4ms which includes debounce time of 14ms. During the soft-start transition, the JX2212 slowly turns on the internal MOSFET to reduce the inrush current.

The JX2212 has Over-Voltage-Protection (OVP) and Over-Current-Protection (OCP) function with adjustable OCP thresholds current. JX2212 also has internal over temperature protection (OTP) function, it can monitor chip temperature to protect the device.

OVP Function

The JX2212 has Over-Voltage-Protection (OVP) function , ,internal 6.1V OVLO function enable, once the Vin exceeds 6.1 volts, the OUT pin will discharge to ground quickly with typical 50ns turn-off time.

OTP Function

The JX2212 monitors its internal temperature to prevent thermal failures. The chip turns off the POWER MOSFET when the temperature reaches 155°C, and restarts IC after the junction temperature down to 130°C.

OCP Function

The JX2212 monitors the output current to prevent the output short. The JX2212 has a built-in 20ms delay time to prevent any transient noise triggering the OCP. If the OCP situation keeps for 20ms, the internal

MOSFET will be turned off, after 900ms JX2212 returns to normal operation.

Customers can define OCP through an external resistor Rset. The relationship between Rset and the current is shown in the following table. If the OCP current is set less than 500mA, the current accuracy becomes worse, as shown below.

Rset	Iocp_min	Iocp_typ
100KΩ	1.1A	1.4A
150KΩ	0.73A	0.93A
200KΩ	0.55A	0.7A

Thermal consideration

For continuous operation, do not exceed absolute maximum junction temperature. The maximum power dissipation depends on the thermal resistance of the IC package, PCB layout, rate of surrounding airflow, and difference between junction and ambient temperature. The maximum power dissipation can be calculated by the following formula :

$P_{D(MAX)} = (T_{J(MAX)} \quad T_A) / \theta_{JA}$

Where $T_{J(MAX)}$ is the maximum junction temperature, T_A is the ambient temperature, and $\theta_{JA}$is the junction to ambient thermal resistance. For recommended operating condition specifications, the maximum junction temperature is 125°C.

For SOT-23-6L package, the typical thermal resistance, θ_{JA}, is 250°C/W on a standard four-layer thermal test board. The maximum power dissipation at T_A = 25°C can be calculated by the following formula :

$P_{D(MAX)}$ = (125°C 25°C) / (250°C/W) = 0.4W

For SOT-23-6L package the maximum power dissipation depends on the operating ambient temperature for fixed $T_{J(MAX)}$ and thermal resistance, θ_{JA}.

For DFN2X2-8 package, the typical thermal resistance, θ_{JA}, is 65°C/W on a standard four-layer thermal test board. The maximum power dissipation at T_A = 25°C can be calculated by the following formula :

$P_{D(MAX)}$ = (125°C 25°C) / (65°C/W) = 1.54W

For DFN2X2-8 package the maximum power dissipation depends on the operating ambient temperature for fixed $T_{J(MAX)}$ and thermal resistance, θ_{JA}.

Input Capacitor

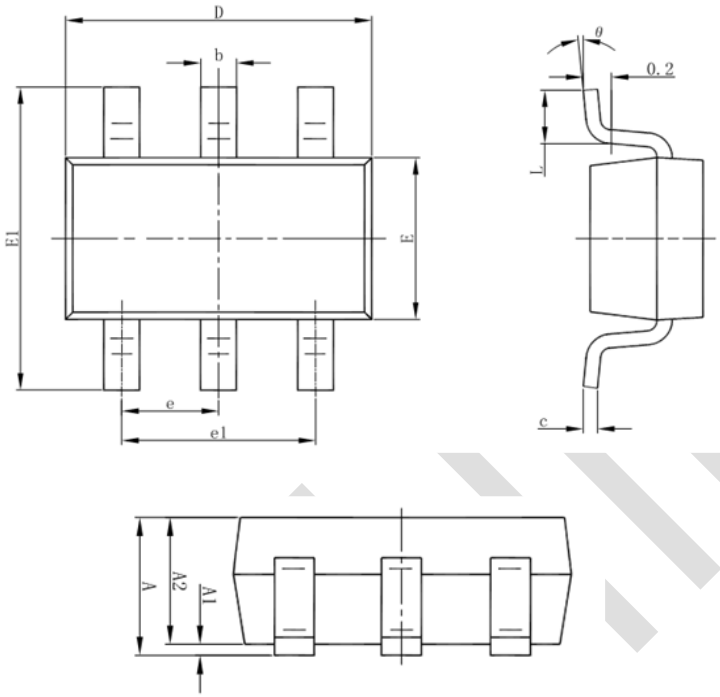
To limit the voltage drop on the input supply caused by transient inrush current when the switch turns on into a discharged load capacitor or short-circuit, a capacitor 1μF or lager must be placed between the VIN and GND pins.

Output Capacitor

A 1μF or lager capacitor should be placed between the OUT and GND pins.

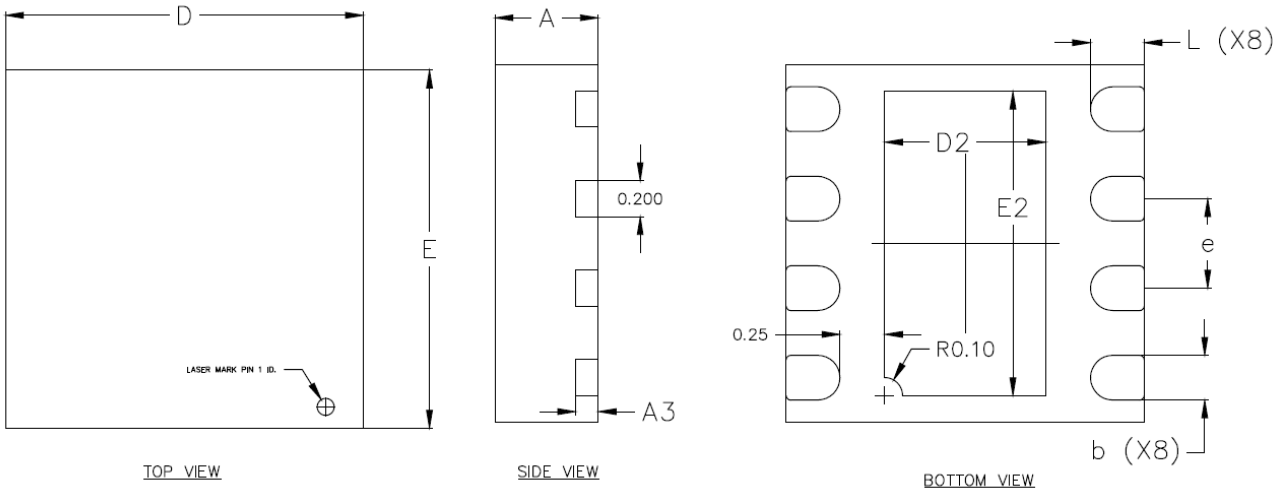
PACKAGE INFORMATION

- **SOT23-6L**



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	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
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°

- **DFN2×2-8L (2x2x0.55-P0.5)**



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.527	0.552	0.577
A3		0.127 REF	
b	0.20	0.25	0.30
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	0.80	0.90	1.00
E2	1.60	1.70	1.80
e		0.50BSC	
L	0.25	0.02	0.05