



GENERAL DESCRIPTION

The EHP2606 is a front-end over voltage and over current protection device. It achieves wide input voltage range from 2.8V_{DC} to 36V_{DC}. The over voltage threshold can be programmed externally or set to internal default setting. The ultra-low resistance of integrated power path nFET switch ensures better performance for battery charging system applications. It can deliver up to 2A current to satisfy the battery supply system. It integrates the over-temperature protection shutdown and auto-recovery circuit with hysteresis to protect against over current events. This device is available in ultra-small CSP-6L footprint, DFN2x2-8L and SOT23-6L package, ideally for small PCB area application.

APPLICATIONS

- Wearable Device
- Mobile device
- In-Car device

FEATURES

- Absolute maximum input voltage: 36V
- Maximum load current: 2A
- Extremely low power path resistance:
CSP-6L: 80mΩ (typ.)
DFN2x2-8L: 90mΩ (typ.)
SOT23-6L: 120mΩ (typ.)
- Fixed Internal OVP threshold:
6.1 (Typ.) or customization
- OVP response time: 50ns
- Internal 15-ms Start-Up or OVP Recovery Delay
- Internal over current limit protection: 3A (Min)
- Programmable over voltage threshold: 4V to 11V
- Internal soft start to prevent In-rush current
- Thermal shutdown protection & Auto recovery
- Output short-circuit protection
- RoHS compliant and Halogen free
- Compact package: CSP-6L, DFN2x2-8L, SOT23-6L

TYPICAL APPLICATION CIRCUIT

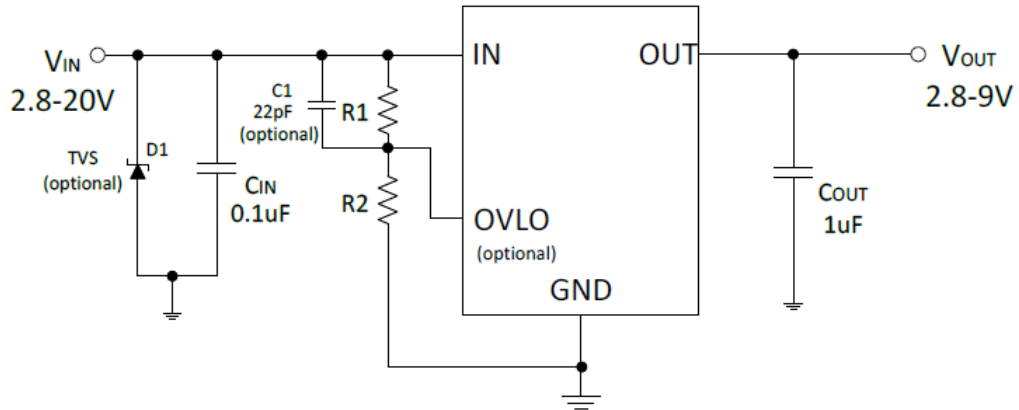


Figure 1. Typical Application Schematic with OVLO

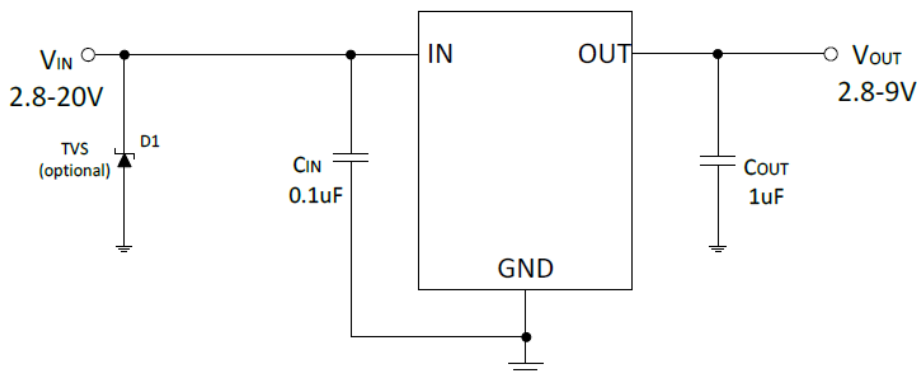


Figure 2. Typical Application Schematic without OVLO

Note:

1. If OVLO is connected to ground, OVP is the internally set OVLO value.
2. R2 is recommend to use 100K, R1 can be calculated from the following formula:

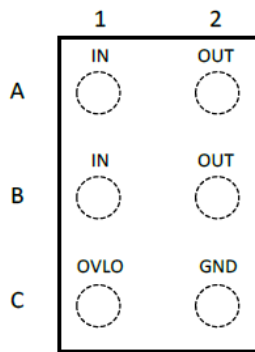
$$V_{IN_OVP} = V_{OVLO_TH} \times (1 + R1/R2)$$

$$V_{OVLO_TH}$$
 is OVLO Preset Threshold, please see electrical characteristics.
3. R1 and R2 is recommend to use high precision resister, and R2 should connected to IC's GND, not CIN's or VIN's.
4. D1 is recommended for hot-plug input application, such as USB interface.
5. C1 is recommended for the situation that input voltage is raising very slowly to trigger OVP. It can help to eliminate the shake of output voltage.

ORDERING INFORMATION

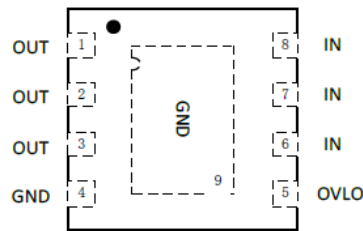
PART NO	OVP TYPE	PACAKGE	TEMPERATUR	TAPE & REEL	Active
EHP2606C6-61	6.1V/adj	CSP-6L	-40 ~ +85°C	3000/REEL	Yes
EHP2606D8-61	6.1V/adj	DFN-2x2-8L	-40 ~ +85°C	4000/REEL	Yes
EHP2606B3-61	6.1V	SOT23-6L	-40 ~ +85°C	3000/REEL	Yes
EHP2606S6-XX	customization	SOT23-6L	-40 ~ +85°C	3000/REEL	No

PIN ASSIGNMENT



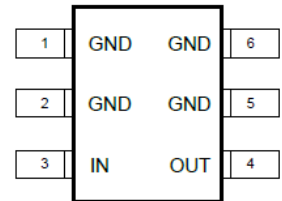
Top View

CSP-6L



Top View

DFN2x2-8L



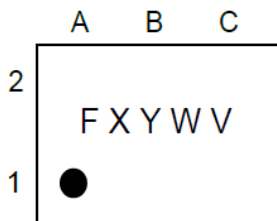
SOT23-6L

PIN DESCRIPTION

PIN (CSP)	PIN (DFN)	PIN (SOT)	SYMBOL	TYPE	PIN DESCRIPTION
A1/B1	6/7/8	3	IN	I	Power input pin. Connect IN pin together. Decouple high frequency noise by connecting at least 0.1uF MLCC to ground.
A2/B2	1/2/3	4	OUT	O	Output voltage pin. Source side of the internal FET. Connect OUT pins together for normal operation.
C1	5	/	OVLO	I	External OVLO program pin. Connect resistor divider to this pin to program the OVLO threshold. Make sure V_{OVLO} is higher than the internal pre-set threshold; otherwise the internal default threshold will be activated. Pull down this pin to ground to disable external program function.
C2	4	1/2/5/6	GND	Ground	Power ground pin.

MARKING DESCRIPTION

CSP-6L:



“F”: Product Code.

“F” stands for EHP2606

“XY”: Internal Control Code.

“W”: The week of manufacturing.

“A” stands for week 1,

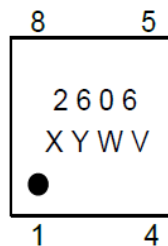
“Z” stands for week 26,

“a” stands for week 27,

“z” stands for week 52.

“V”: Version.

DFN2x2-8L:



“XY”: Internal Control Code

“W”: The week of manufacturing.

“A” stands for week 1,

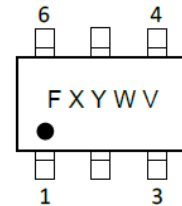
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SOT23-6L:



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“V”: Version.



PART NUMBER RULES

EHP2606¹ - ²

Code	Description
¹	Package: C6: CSP-6L D8: DFN2x2-8L S6: SOT23-6L
²	OVP version: XX: OVP threshold voltage Example: 61: 6.1V

ABSOLUTE MAXIMUM RATINGS (Note)

SYMBOL	ITEMS	VALUE	UNIT	
V_{IN}	Input Voltage	-0.3~36	V	
V_{OUT}	Output Voltage	-0.3~15	V	
V_{OVLO}	OVLO Voltage	-0.3~20	V	
I_{OMAX}	Maximum Output Continues Load Current	2	A	
P_{DMAX}	Power Dissipation	CSP-6L	1.1	W
		DFN2x2-8L	1	
		SOT23-6L	0.5	
$R_{\theta JA}$	Thermal Resistance	CSP-6L	110	°C/W
		DFN2x2-8L	118	
		SOT23-6L	220	
T_J	Junction Temperature	-40~150	°C	
T_{stg}	Storage Temperature	-55~150	°C	
T_{solder}	Package Lead Soldering Temperature (10s)	260	°C	
HBM	ESD Susceptibility, Human Body Model	8	KV	

Note: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.



RECOMMENDED OPERATING RANGE

SYMBOL	ITEMS	VALUE	UNIT
V_{IN}	Input Supply Voltage	5 to 30	V
V_{OUT}	Output Voltage	≤ 10	V
I_{OUT}	Continue Output Current	≤ 2	A
	Peak Output Current	≤ 4	A
V_{OVLO}	OVLO Voltage	0 to 12	V
T_{OPR}	Operating Temperature	-40 to +85	$^{\circ}C$

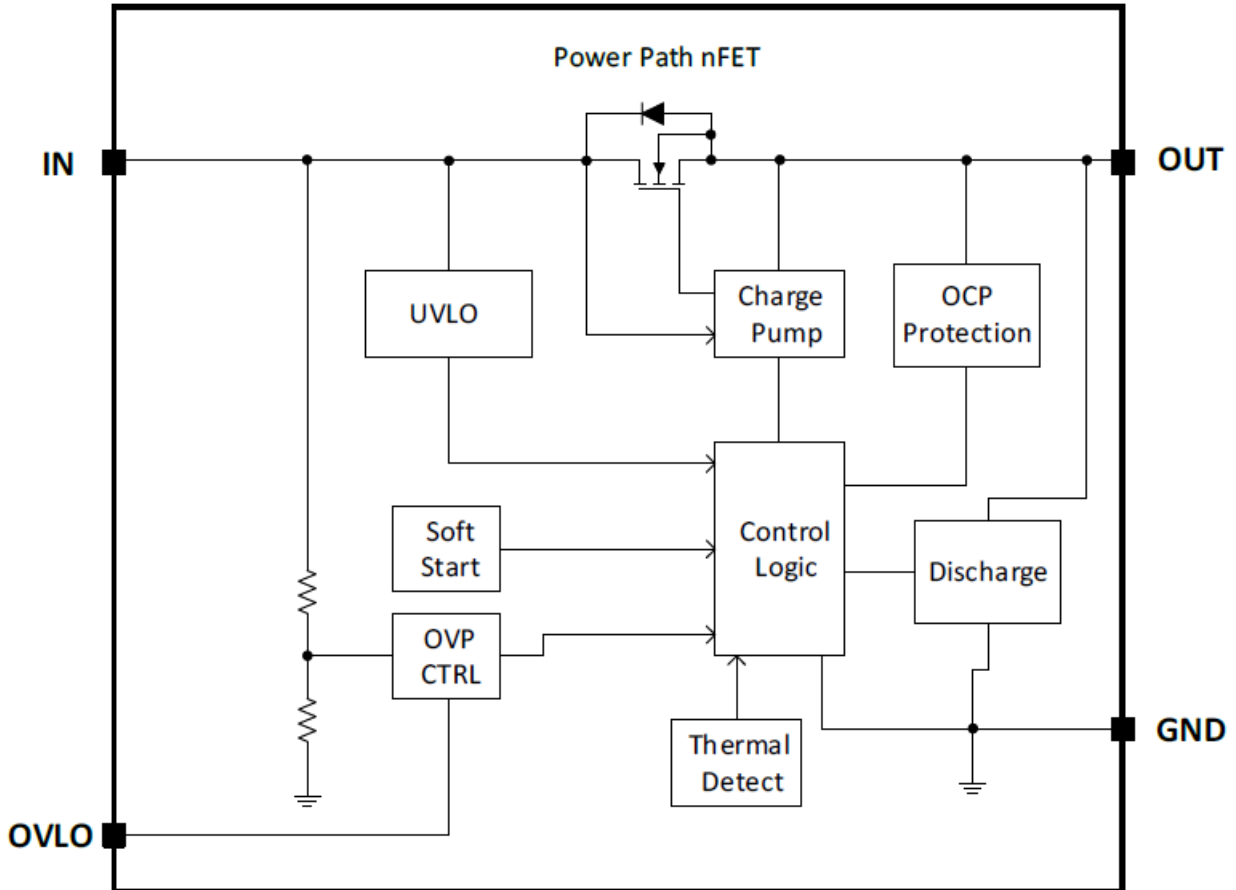


ELECTRICAL CHARACTERISTICS

(VIN = 2.8V to 36V, CIN=0.1uF, COUT=1uF, TA=25 °C, unless otherwise noted.)

Parameter	Symbol	Test Conditions		MIN	TYP	MAX	UNIT
Input Voltage	VIN			2.8		36	V
Input UVLO Threshold	VUVLO				2.4		V
UVLO Hysteresis	VHYS				260		mV
Input Quiescent Current	Iq	VIN=5V, VIN<VOVLO			210		µA
OVLO Input Leakage Current	Iovlo	VOVLO=VOVLO_TH		-100		100	nA
Internal Default OVP Threshold	VOVLO	Rising	EHP2606xx-61	5.9	6.1	6.3	V
Internal OVP Hysteresis	VOVLO_HYS	Falling			190		mV
Internal OCP Threshold		Thermal foldback limited		3		5	A
OVLO Preset Threshold	VOVLO_TH	Rising, 6.1V OVP version		1.218	1.25	1.281	V
OVLO Hysteresis		Falling			40		mV
External OVLO Select Threshold	VOVLO_SEL	Falling			0.25	0.30	V
Programmable OVLO range	VOVPPR			4		11	V
On Resistance of power path	RON	VIN=5V, IOUT=500mA, from IN to OUT	CSP-6L		80		mΩ
			DFN2x2-8L		90		
			SOT23-6L		120		
Startup or OVP Recovery Debounce Time	TDEB	Time from 2.5V<VIN<VOVLO to VOUT=10% of VIN			15		mS
Soft start Turn-On Time	tON	VIN=5V, RL=100, COUT=100uF; VOUT=10% of VIN to 90% VIN			0.2		mS
OVP Switch Turn-Off Time	tOFF	VIN> VOVLO to VOUT stop rising			50	100	nS
Output Discharge Resistance	RDISC	OVP Triggered, VOUT=1V			500		Ω
Thermal Shutdown Temperature	TSD				150		°C
Thermal Shutdown Hysteresis	THYS				25		°C

SIMPLIFIED BLOCK DIAGRAM



TIMING DIAGRAM

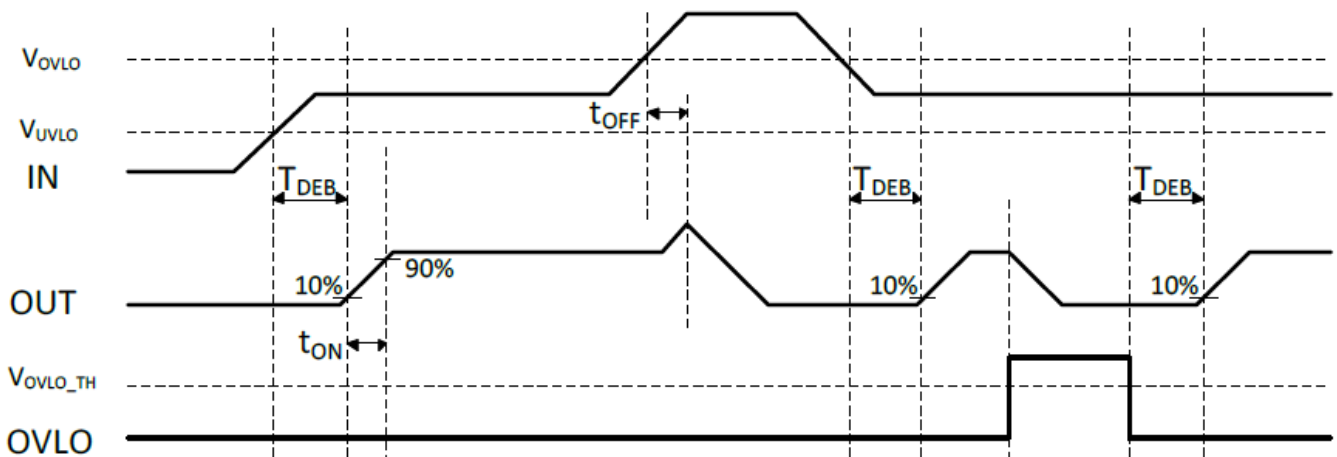
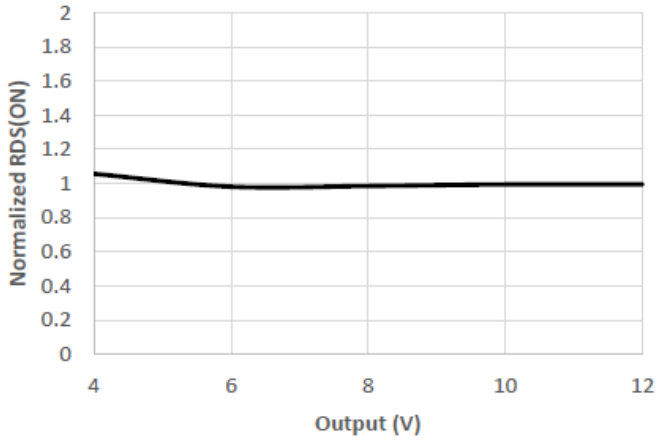


Figure 2. Timing diagram

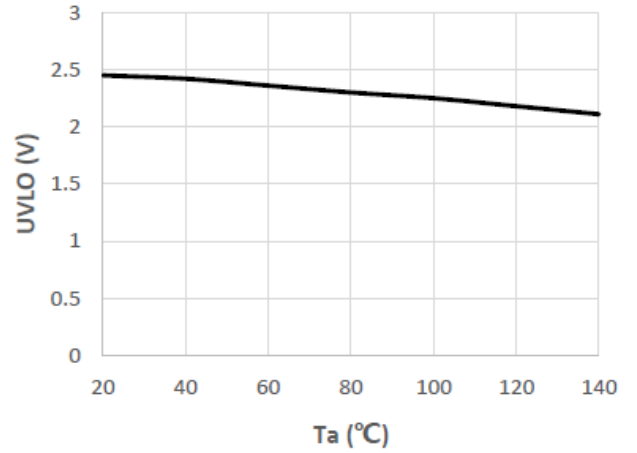


TYPICAL PERFORMANCE CHARACTERISTICS

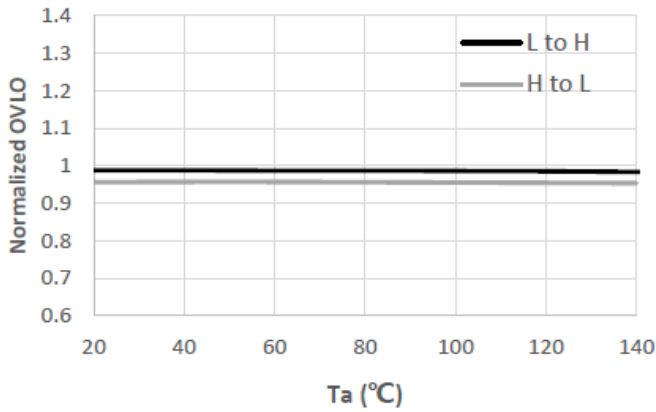
Normalized RDS(ON) vs Output Voltage



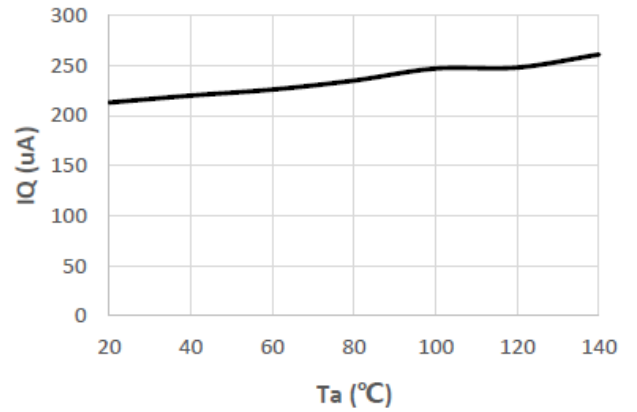
UVLO vs Ta



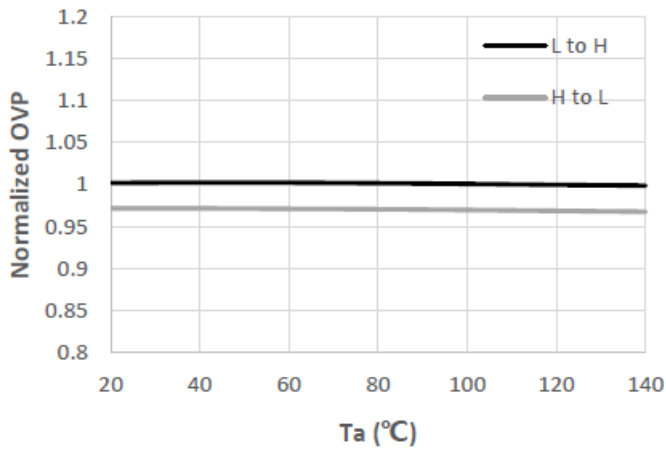
Normalized OVLO Preset vs Ta



IQ vs Ta



Normalized Internal OVP vs Ta



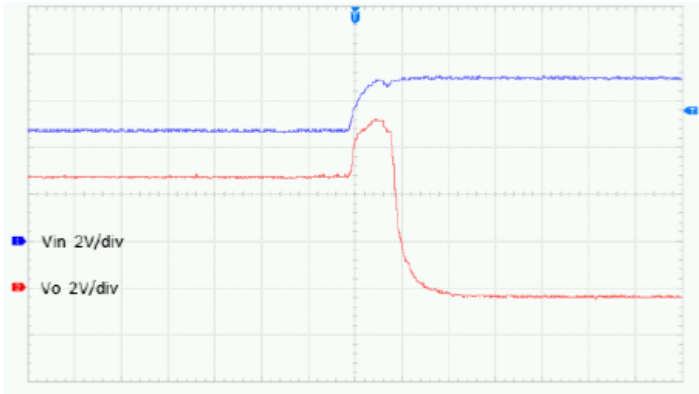


Figure-1 OVP Protection Response

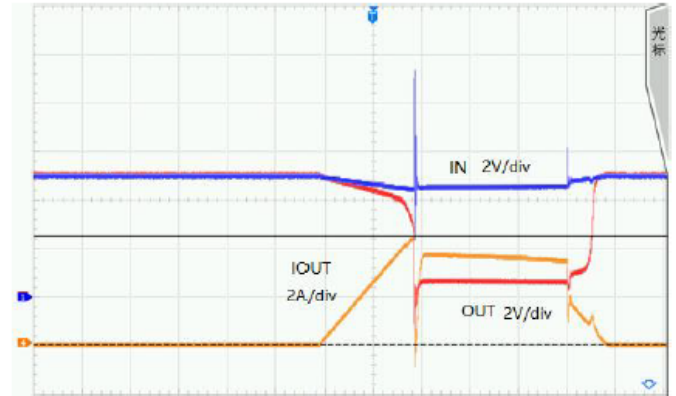
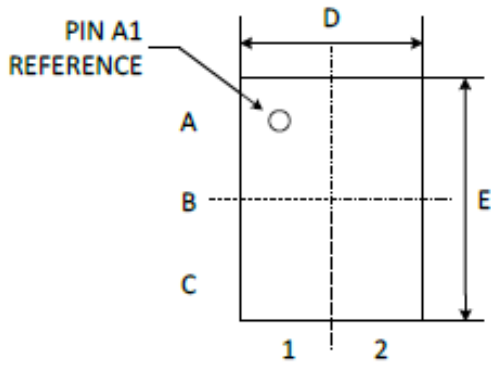


Figure 2 OCP Protection & Recovery

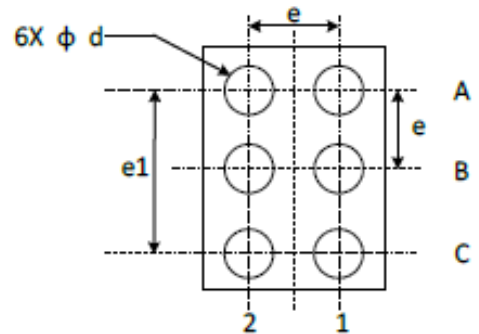
PACKAGE OUTLINE

Package	CSP-6L	Devices per reel	3000	Unit	mm
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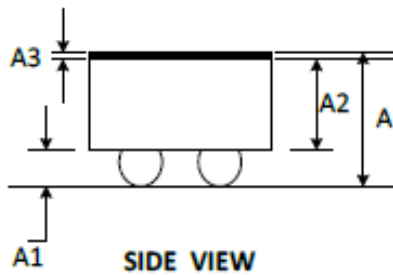
Package Dimension:



TOP VIEW



BOTTOM VIEW



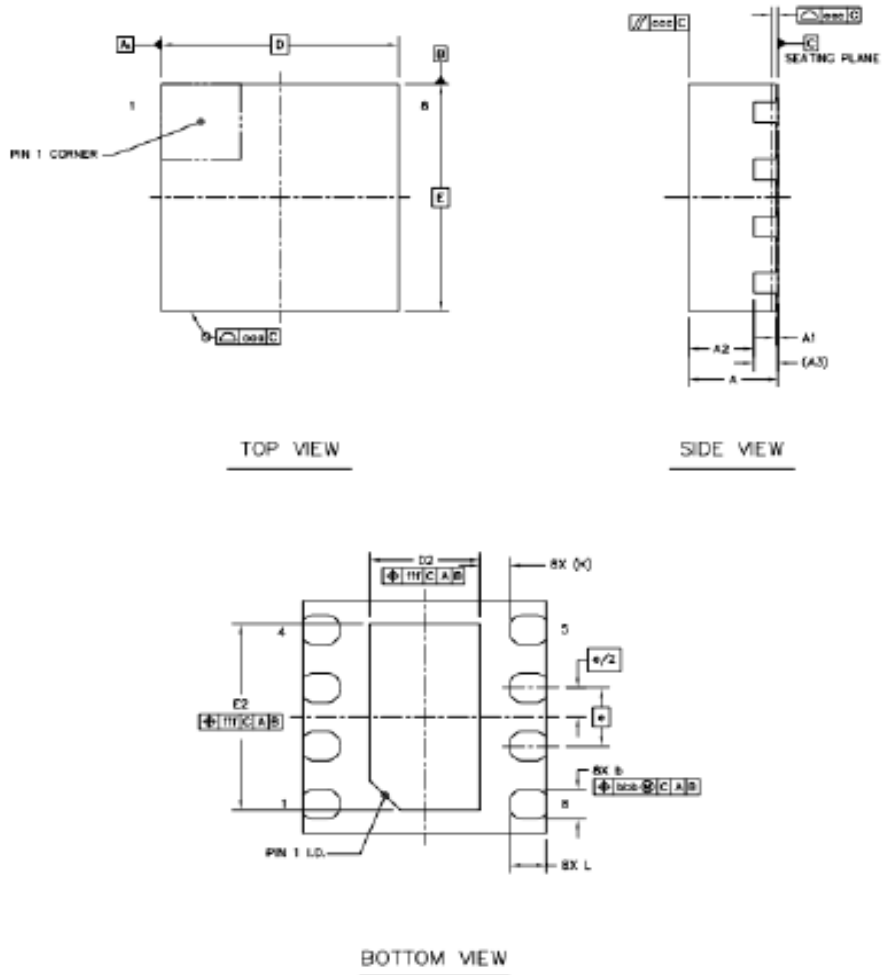
SIDE VIEW

Symbol	Dimensions In Millimeter		
	Min.	Typ.	Max.
A	0.520	0.570	0.620
A1	0.164	0.194	0.224
A2	0.316	0.351	0.386
A3	0.020	0.025	0.030
d	0.190	0.230	0.270
D	0.750	0.785	0.820
E	1.340	1.375	1.410
e	0.400 Typ.		
e1	0.800 Typ.		

PACKAGE OUTLINE

Package	DFN-2x2-8L	Devices per reel	4000pcs	Unit	mm
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Package Dimension:

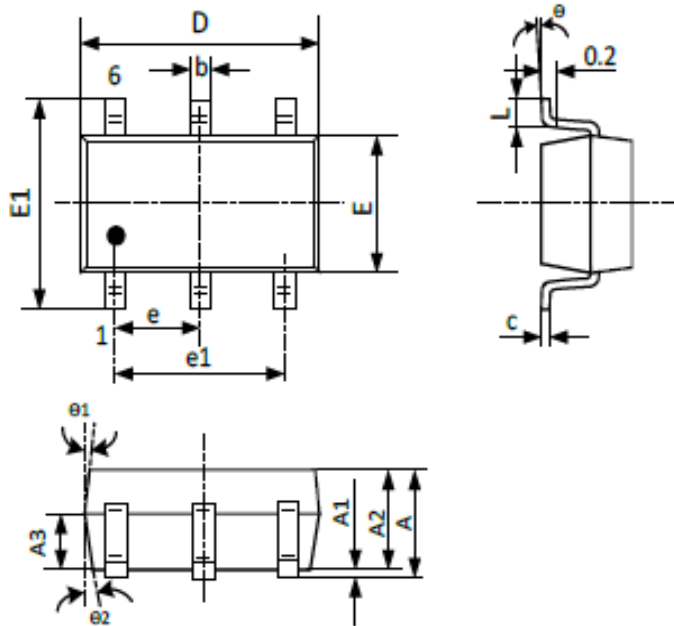


Symbol	Dimensions in Millimeters		
	Min	Nom	Max
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.2 REF.		
D	1.95	2.00	2.05
E	1.95	2.00	2.05
b	0.20	0.25	0.30
L	0.25	0.30	0.35
D2	0.80	0.90	1.00
E2	1.50	1.60	1.70
e	0.50 BSC		

PACKAGE OUTLINE

Package	SOT23-6L	Devices per reel	3000Pcs	Unit	mm
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Package Dimension:



Symbol	Dimensions In Millimeters		
	Min	Nom	Max
A	-	-	1.260
A1	0.010	0.060	0.110
A2	1.050	1.100	1.150
A3	0.620	0.650	0.680
b	0.350 BSC		
c	0.126	0.127	0.130
D	2.870	2.920	2.970
E	1.550	1.600	1.650
E1	2.700	2.800	2.900
e	0.950 BSC		
e1	1.900 BSC		
L	0.320	0.400	0.480
θ	0°	-	6°
θ1		10°	
θ2		12°	