WL2817S

Ultra low dropout, 500mA, CMOS LDO

Http://www.ovt.com

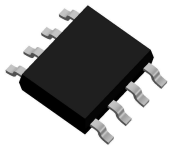
Descriptions

The WL2817S series are ultra low dropout, Low quiescent current, high PSRR CMOS LDO.

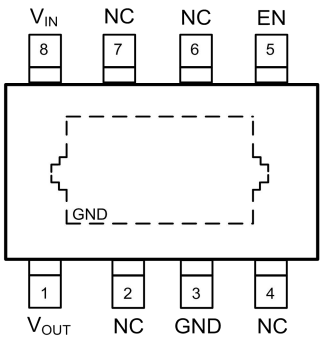
Using CMOS construction, the quiescent current consumed by the WL2817S is typically 160uA over the entire input voltage range, making it attractive for appliciations that demand high output current.

To assure the stability of chip and power system at wrong condition, the WL2817S series offer thermal shutdown (OTP) and current limit functions. They are also use trimming technique to guarantee output voltage accuracy within ±2%(V_{OUT}≥2V).

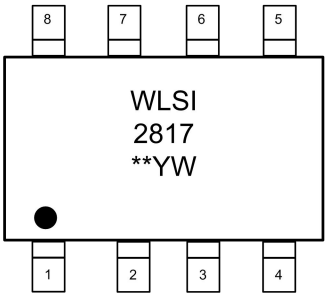
The WL2817S regulators are available in SOP-8L-EP packages. Standard products are Pb-free and Halogen-free.



SOP-8L-EP



Pin Configuration (Top View)



WLSI : Company Code
2817 : Device Code
**** : Voltage Code**
Y : Year Code
W : Week Code

For detail marking information, please see page 14.

Marking

Features

- Input voltage : 2.5V~5.5V
- Output voltage range :1.1V , 1.2V
- Output current : 500mA
- PSRR : 75dB@ 1kHz,V_{OUT}=1.2V
- Output noise : 20μV_{RMS}(10Hz to 100kHz)
- Quiescent current : 160μA Typ.
- Output voltage accuracy :±2%(V_{OUT}≥2V)
- Thermal-Overload and Short-Circuit Protection

Applications

- LCD TV
- STB
- Computer, Graphic card
- Network communication equipments
- Others portable electronics devices

Order Information

For detail order information, please see page 14.

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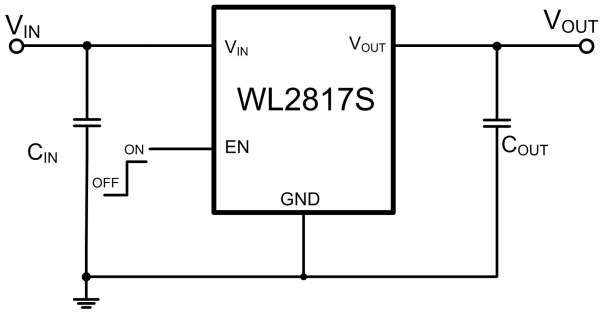
Typical Application

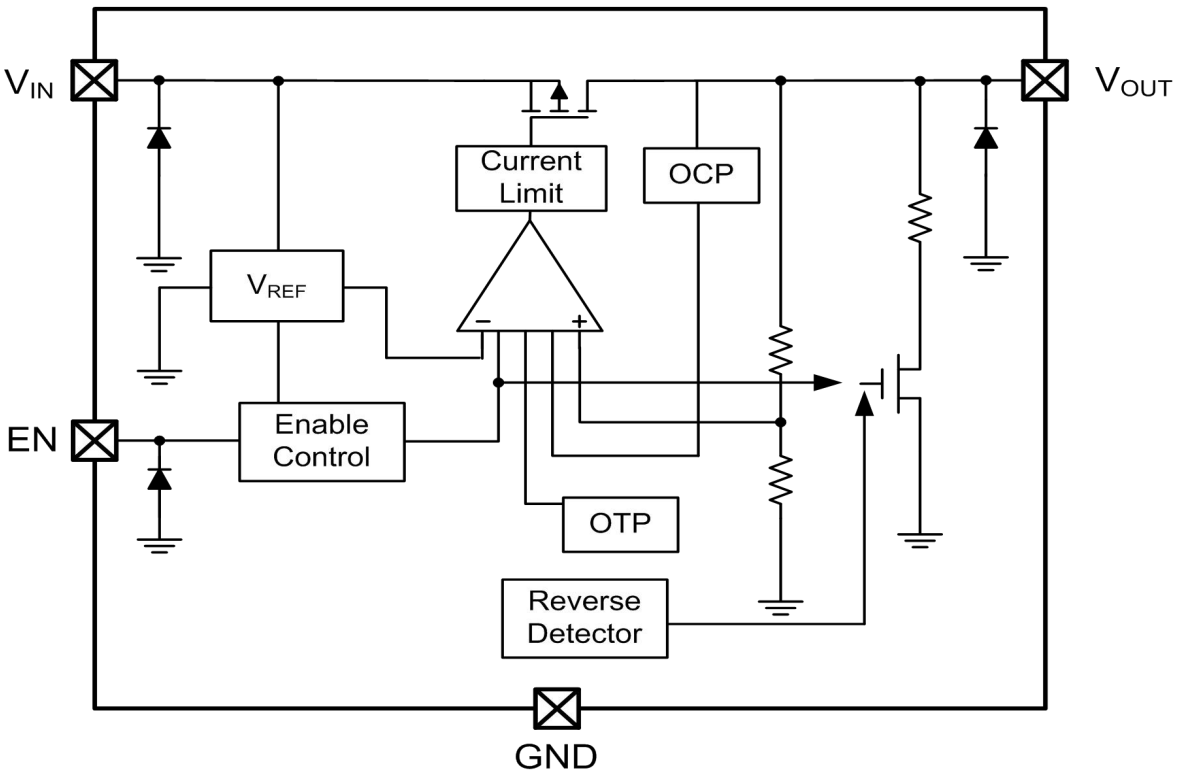


	Min.	Typ.	Max.
C_{IN}		4.7uF	
C_{OUT}		1uF	

Pin Description

PIN	Symbol	Description
1	V_{OUT}	Output
2	NC	
3	GND	Ground
4	NC	
5	EN	Enable, Active High
6	NC	
7	NC	
8	V_{IN}	Input
EP		GND level, this pin must connect to GND.

Block Diagram



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Absolute Maximum Ratings

Parameter		Value	Unit
Input voltage range		-0.3～6.5	V
EN voltage range		-0.3～V_{IN}	V
Output voltage range		-0.3～V_{IN}	V
Output Current		Internally Limited	mA
Power dissipation ,P_D@T_A=25℃		1.1	W
Junction temperature		150	ºC
Lead temperature(10s)		260	ºC
Storage temperature		-55 ~ 150	ºC
ESD Ratings	HBM	2000	V
	MM	200	V

Recommend Operating Ratings

Parameter	Value	Unit
Operating Supply voltage	2.5～5.5	V
Operating Temperature Range	-40～85	ºC
Thermal Resistance, $R_{\theta JA}$ (SOP-8L-EP), Note1	90	ºC/W

Note1. Surface mounted on FR-4 Board using 1 oz, 1 square inch Cu area, PCB board size 1.5*1.5 square inches.

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Electronics Characteristics

(Ta=25°C, V_{IN}=max(2.5V, V_{OSET}+1V), V_{EN}=V_{IN}, C_{IN}=4.7uF, C_{OUT}=1uF, unless otherwise noted)

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	V_{OUT}≥2V		0.98×V_{OUT}	V_{OUT}	1.02×V_{OUT}	V
		V_{OUT}<2V		V_{OUT}-40mV	V_{OUT}	V_{OUT}+40mV	
Current Limit	I_{LIM}	V_{IN}=V_{OSET} + 1V		500			mA
Load Regulation	△V_{Load}	V_{IN}=V_{OSET} + 1V, 1mA≤I_{OUT}≤500mA			2	18	mV
Line Regulation	△V_{LINE}	2.5V≤V_{IN}≤5.5V			2	10	mV
Quiescent Current	I_Q	I_{OUT}=0			160	205	uA
Shut-down Current	I_{SHDN}	V_{EN} = 0V			0.9	3	uA
Short Current Limit	I_{SC}	V_{OUT}=0V			70	205	mA
Inrush Current Limit	I_{INRUSH}*1	C_{OUT}=220uF			180		mA
Reverse Current	I_{rev}*2	V_{OUT}=V_{OSET}+1V, EN=0V, 0≤V_{IN}≤V_{OUT}-V_{rev_det}			6	10	uA
Detector offset voltage in reverse current protection mode	V_{rev_det}*3	V_{OUT}=V_{OSET}+1V, EN=0V			0.35		V
Release offset voltage in reverse current protection mode	V_{rev_rel}*4	V_{OUT}=V_{OSET}+1V, EN=0V			0.15		V
Discharge resistance	R_{DIS}	EN=0, V_{OUT}=1V			120		Ω
Power Supply Ripple Rejection	PSRR	V_{IN}=3V_{DC}+0.2V_{P-P}, I_{OUT}=10mA	F=100Hz		85		dB
			F=1KHz		75		
Output Noise Voltage	e_{NO}	BW=10Hz to 100KHz I_{OUT}=10mA			20		uV_{RMS}
EN logic high voltage	V_{ENH}	V_{IN}=5.5V, I_{OUT}=1mA		1.2			V
EN logic low voltage	V_{ENL}	V_{IN}=5.5V, I_{OUT}=0mA				0.4	V
EN pull-down current	I_{EN}				0.25	1	uA
Thermal shutdown threshold	T_{SD}	V_{IN}=2.5V, I_{OUT}=1mA			165		°C
Thermal shutdown hysteresis	△ T_{SD}	V_{IN}=2.5V, I_{OUT}=1mA			30		°C

*1: For CC (Constant Current) mode, please refer to Start-up Characteristics.

*2 *3 *4 : Please refer to reverse current protection mode

Start-up Characteristics

Constant slope circuit is included in the WL2817S to prevent the overshoot of the output voltage. If inrush current increases due to the large capacitance of C_{OUT}, the operation mode will be shift from Constant Slope (CS) mode to Constant Current (CC) mode. The CC mode maintains a constant inrush current. In the CC mode, T_{ON} varies with the size of C_{OUT} and the load current.

Reverse Current Protection Circuit

The WL2817S include a Reverse Current Protection Circuit, which stop the reverse current from V_{OUT} pin to V_{IN} pin or GND pin when V_{OUT} becomes higher than V_{IN}.

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Following figure shows the load characteristics of each mode. When giving the V_{OUT} pin a constant voltage and decreasing the V_{IN} voltage,the V_{IN} voltage will become lower than V_{OUT}-V_{rev_det}, the reverse current protection starts to function to stop the load current. By increasing the V_{IN} voltage higher than V_{OUT}-V_{rev_rel}, the protection mode will be released to let the load current to flow. When V_{IN} voltage is between V_{OUT} and V_{rev_det}, the parasitic diode between V_{IN} pin and V_{OUT} pin becomes forward direction. As a result, the current flows from V_{OUT} pin to V_{IN} pin, and the maximum of the current is I_{revmax}.

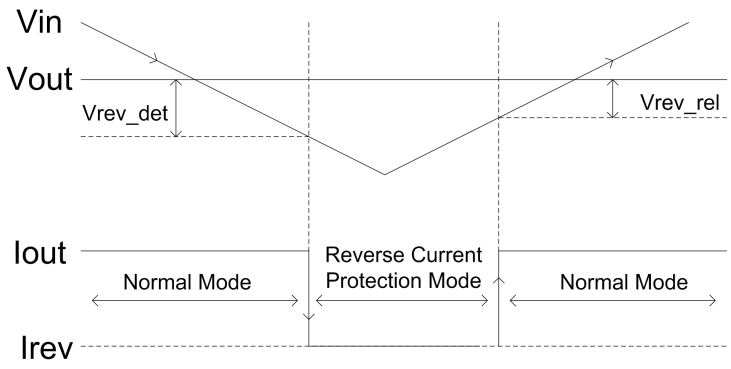
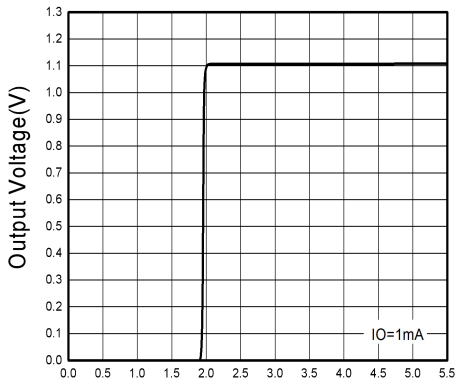


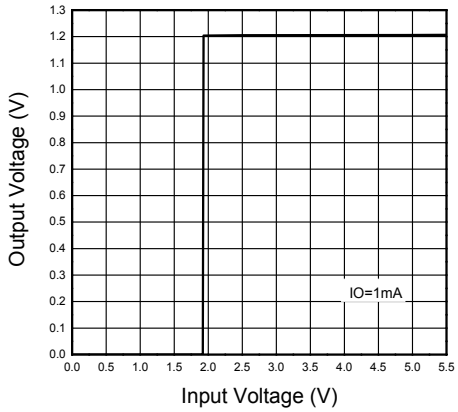
Figure1.Detection/Release Threshold value of Reverse Current Protection

Typical characteristics

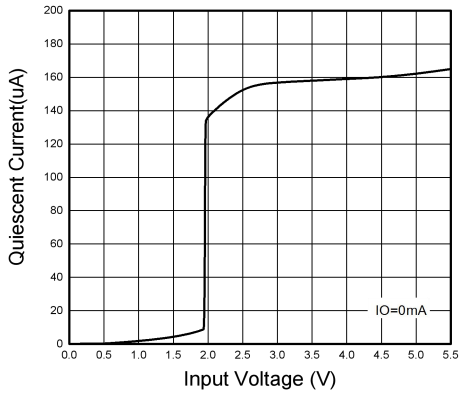
(Ta=25°C, V_{IN}=max(2.5V, V_{OSET}+1V), V_{EN}=V_{IN}, C_{IN}=4.7uF, C_{OUT}=1uF, unless otherwise noted)



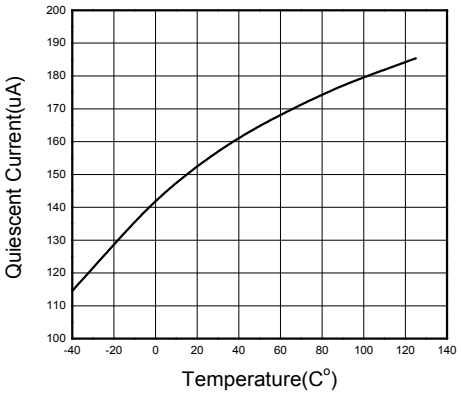
Output Voltage vs. Input Voltage



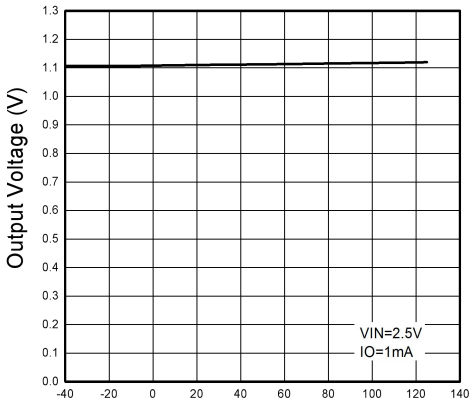
Output Voltage vs. Input Voltage



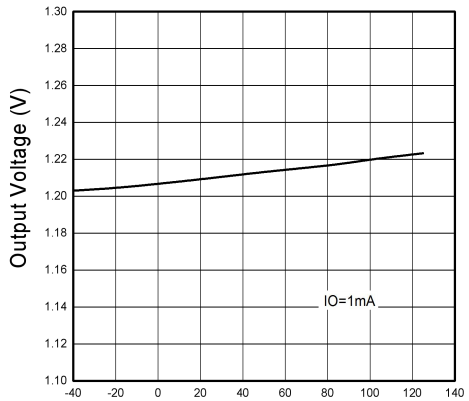
Quiescent Current vs. Input Voltage



Quiescent Current vs. Temperature



Output Voltage vs. Temperature



Output Voltage vs. Temperature

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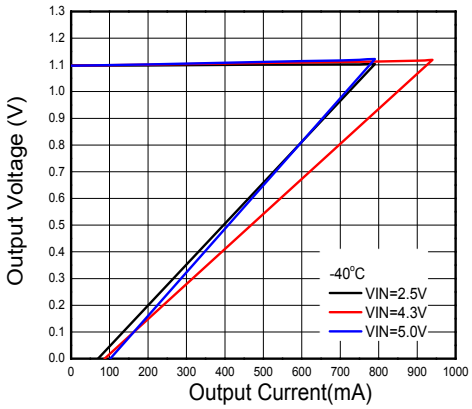
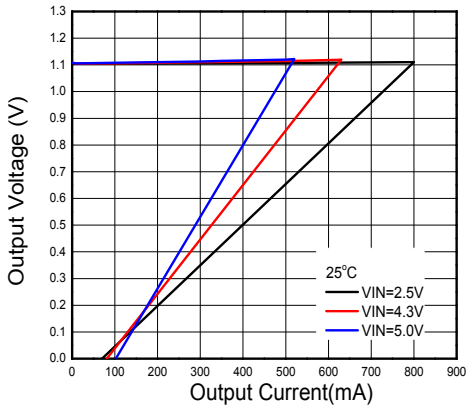
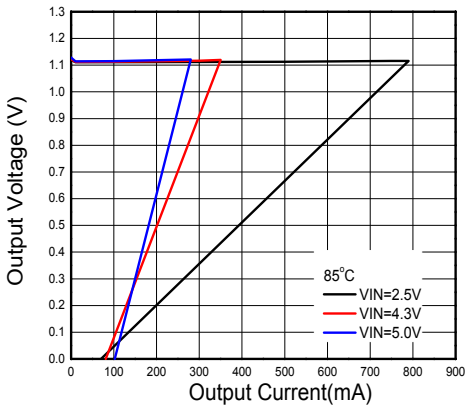


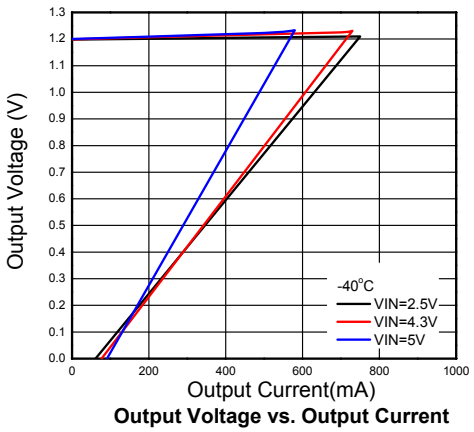
Output Voltage vs. Output Current



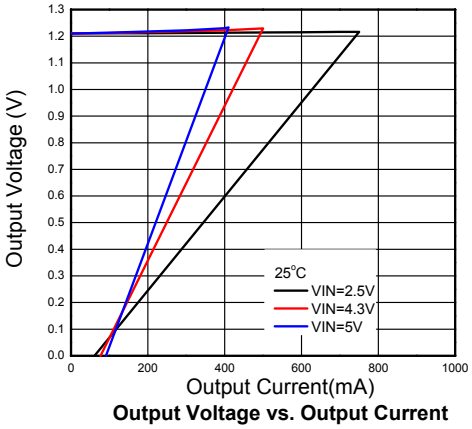
Output Voltage vs. Output Current



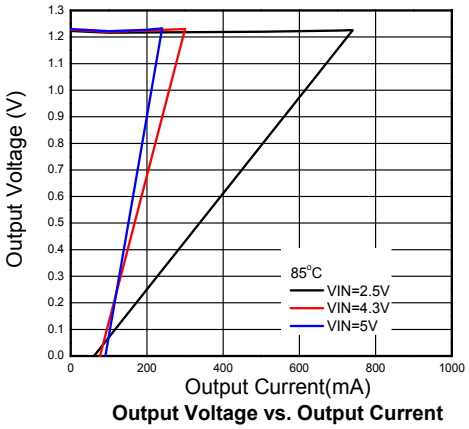
Output Voltage vs. Output Current



Output Voltage vs. Output Current



Output Voltage vs. Output Current



Output Voltage vs. Output Current

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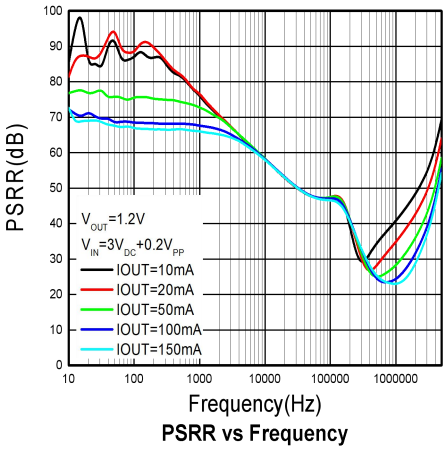
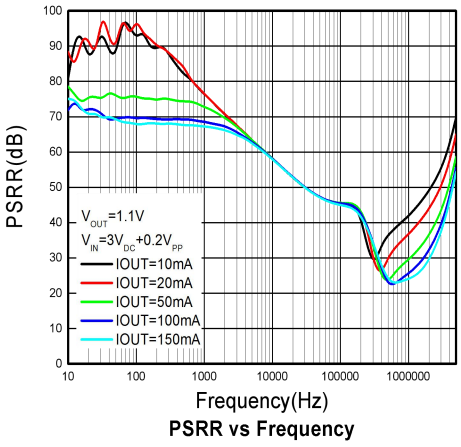


PSRR vs Frequency



PSRR vs Frequency

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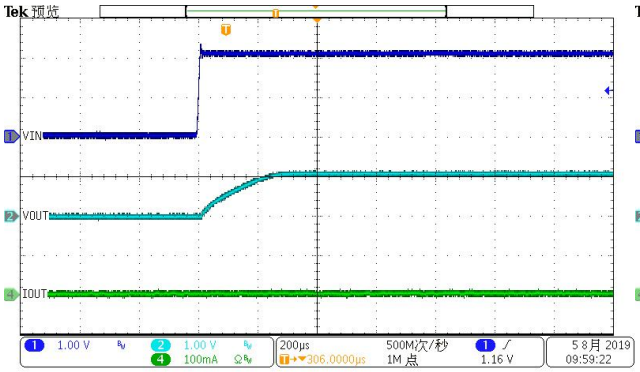
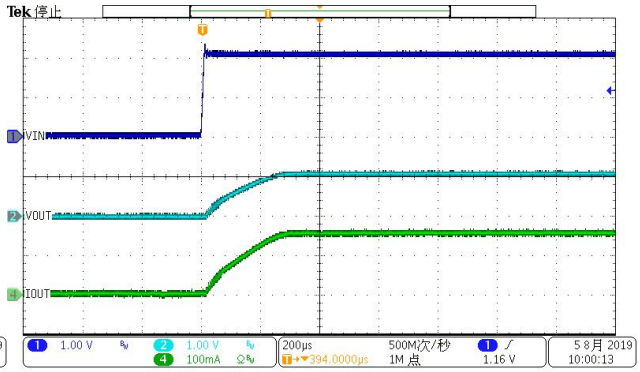
1.Start up(Start from VIN)

V_{OUT}=1.1V

V_{IN}=2.1V,I_{OUT}=1mA

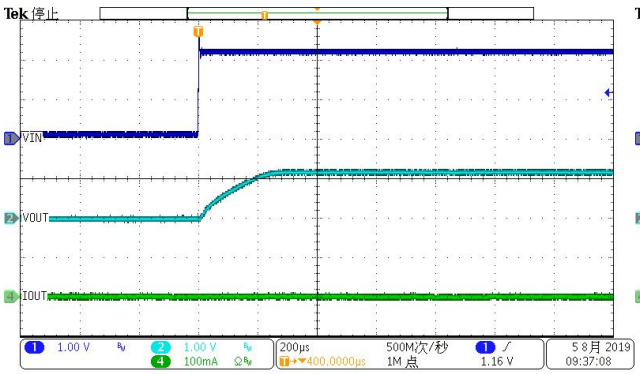


V_{IN}=2.1V,I_{OUT}=150mA

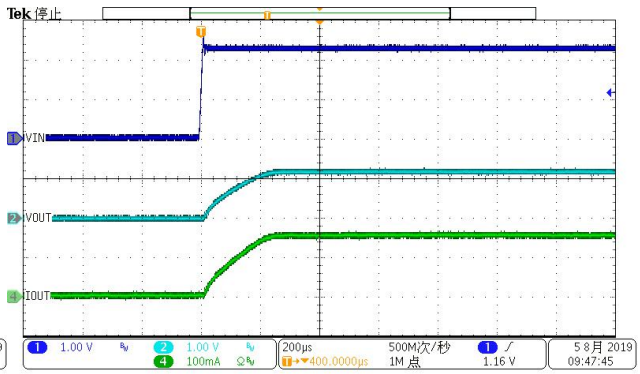


V_{OUT}=1.2V

V_{IN}=2.2V,I_{OUT}=1mA

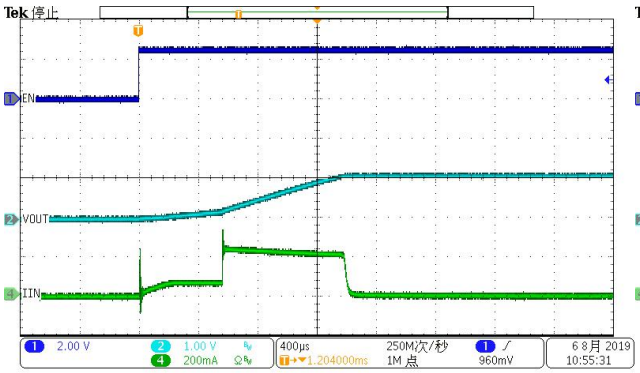


V_{IN}=2.2V,I_{OUT}=150mA

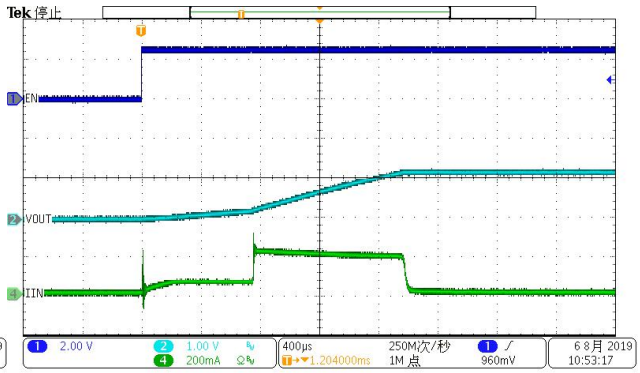


Inrush Current

V_{OUT}=1.1V, V_{IN}=2.5V,C_{OUT}=220uF



V_{OUT}=1.2V, V_{IN}=2.5V,C_{OUT}=220uF



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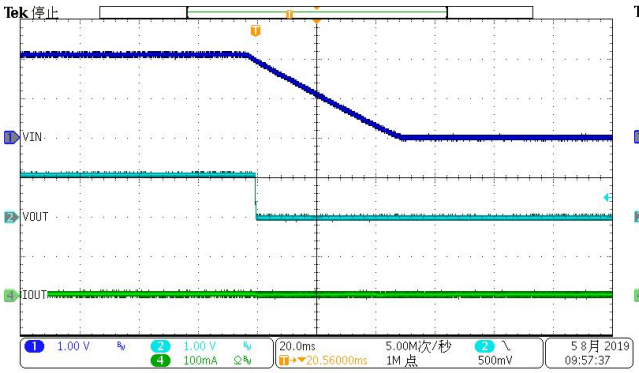
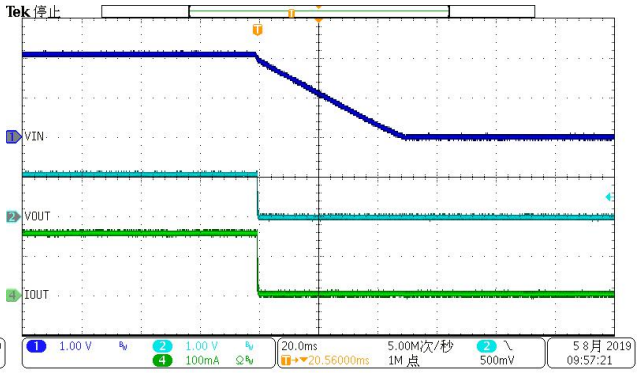
2.Shutdown (Shutdown from VIN)

V_{OUT}=1.1V

V_{IN}=2.1V, I_{OUT}=1mA

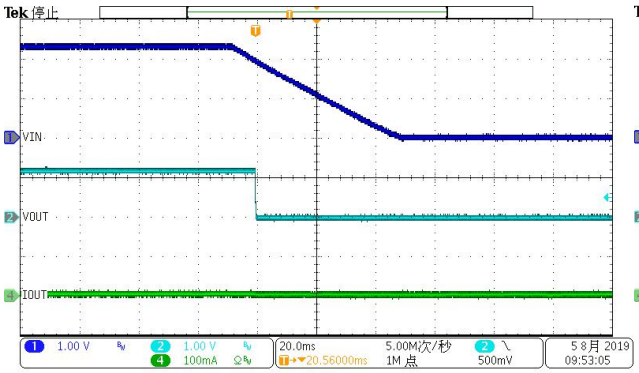


V_{IN}=2.1V, I_{OUT}=150mA

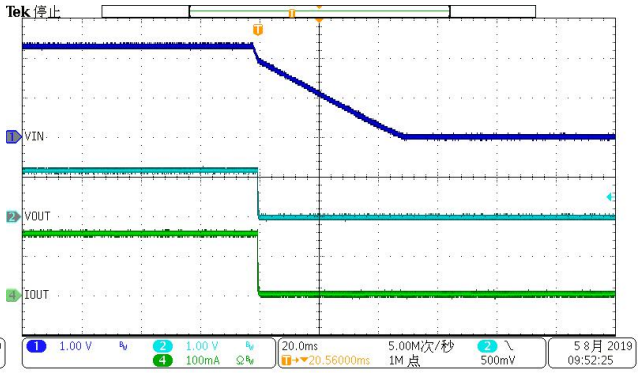


V_{OUT}=1.2V

V_{IN}=2.2V, I_{OUT}=1mA



V_{IN}=2.2V, I_{OUT}=150mA

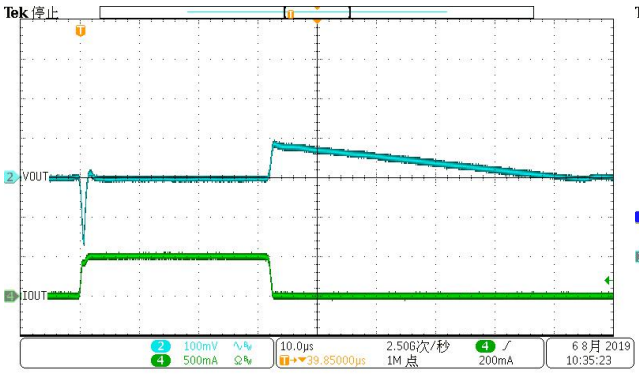


3.Load & Line Transient

Load Transient

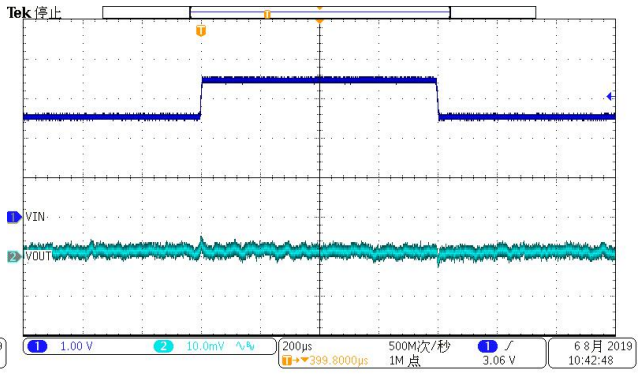
V_{OUT}=1.1V

V_{IN}=2.5V, I_{OUT}=1mA-500mA



Line Transient

V_{IN}=2.5V-3.5V, I_{OUT}=1mA



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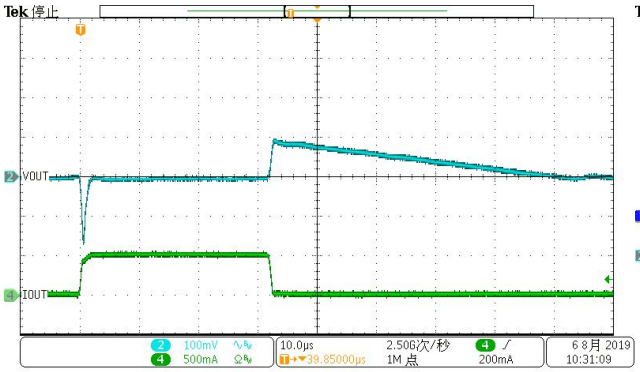
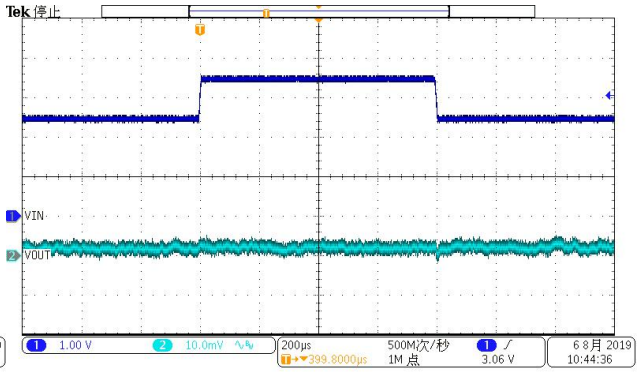
V_{OUT}=1.2V

V_{IN}=2.5V, I_{OUT}=1mA-500mA



V_{IN}=2.5V-3.5V, I_{OUT}=1mA



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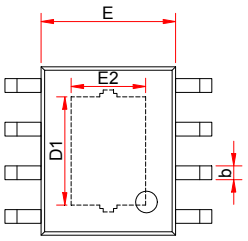
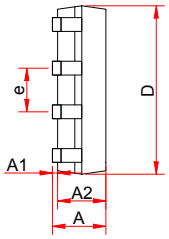
PACKAGE OUTLINE DIMENSIONS

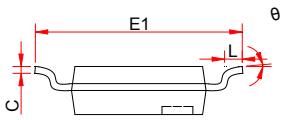
SOP-8L-EP



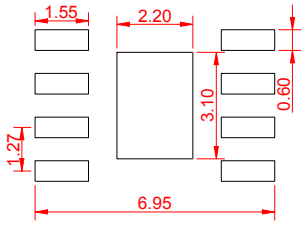
TOP VIEW



SIDE VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN(UNIT:MM)

Symbol	Dimensions In Millimeters (mm)		
	Min.	Typ.	Max.
A	1.30	1.50	1.70
A1	0.00	-	0.10
A2	1.35	1.45	1.55
b	0.33	-	0.51
c	0.17	-	0.25
D	4.70	4.90	5.10
D1	3.05	3.15	3.25
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
E2	2.16	2.26	2.36
e	1.27BSC		
L	0.40	-	1.27
θ	0°	-	8°

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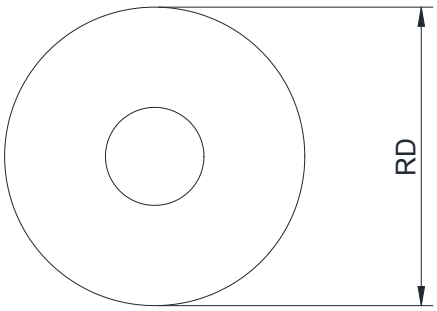
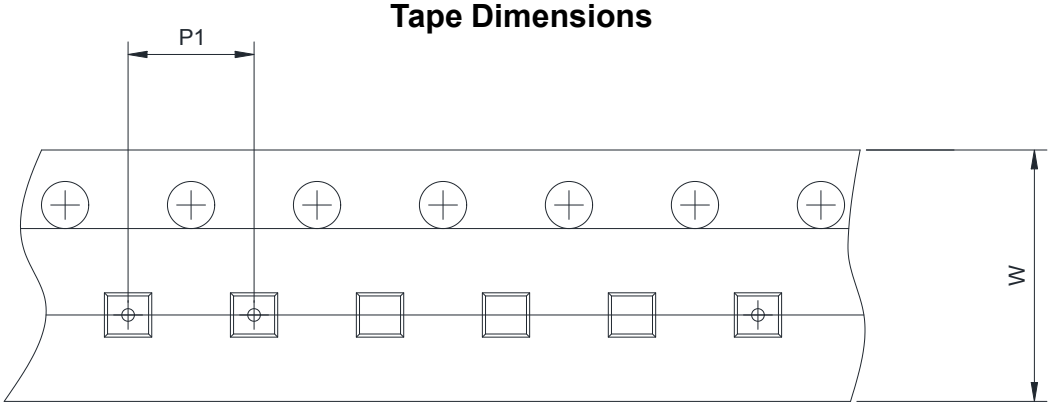
TAPE AND REEL INFORMATION

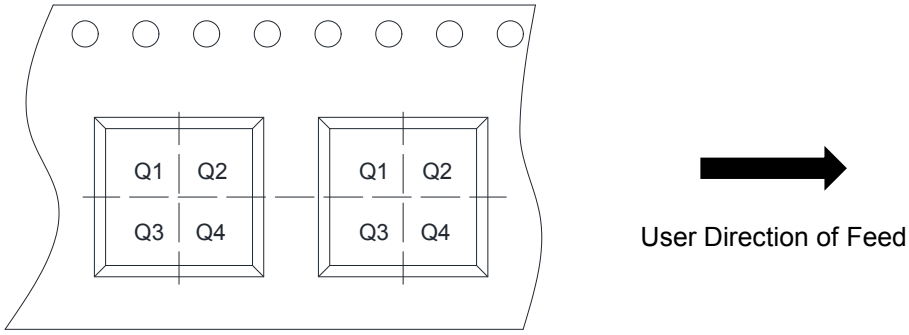
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☐ 7inch	☑ 13inch		
W	Overall width of the carrier tape	☐ 8mm	☑ 12mm		
P1	Pitch between successive cavity centers	☐ 2mm	☐ 4mm	☑ 8mm	
Pin1	Pin1 Quadrant	☑ Q1	☐ Q2	☐ Q3	☐ Q4

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ORDER INFORMATION

Ordering No.	V_{OUT} (V)	Package	Marking	Operating Temperature	Shipping
WL2817S11-8/TR	1.1	SOP-8L-EP	WLSI 2817 11YW	-40 ~ +85°C	4000/Tape and Reel
WL2817S12-8/TR	1.2	SOP-8L-EP	WLSI 2817 12YW	-40 ~ +85°C	4000/Tape and Reel

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