WL2810X

Low noise, High PSRR, High speed, CMOS LDO

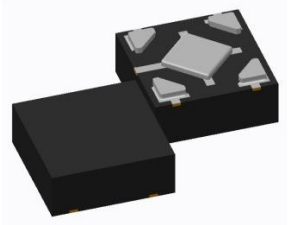
Http://www.sh-willsemi.com

Descriptions

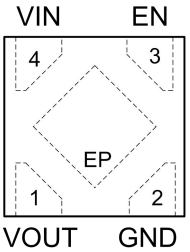
The WL2810X series is a high accuracy, low noise, high speed, high PSRR, low dropout CMOS Linear regulator with high ripple rejection. The devices offer a new level of cost effective performance in cellular phones, laptop and notebook computers, and other portable devices.

The WL2810X has the fold-back maximum output current which depends on the output voltage. So the current limit functions both as a short circuit protection and as an output current limiter.

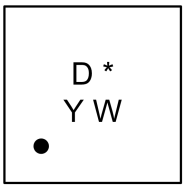
The WL2810X regulators are available in standard FBP1x1-4L Package. Standard products are Pb-free and Halogen-free.



FBP1x1-4L



Pin Configuration (Top View)



D: Package Code
*** : Voltage Code**
Y : Year Code
W: Week Code

For detail marking information, please see page 14.

Marking

Features

- Input Voltage Range :1.4V~5.5V
- Output Voltage Range : 0.9V~3.3V
- Output current : 300mA
- Quiescent current : 50μA Typ.
- Shut-down current : < 1μA
- Dropout voltage : 140mV @ I_{OUT}=0.3A
- PSRR : 78dB @ 1kHz, V_{OUT}=1.8V
- Low Output Voltage Noise : 13×V_{OUT} μV_{RMS}
- Output Voltage Tolerance :±2% @ V_{OUT}>2V
- Recommend capacitor : 1μF
- Thermal-Overload and Short-Circuit Protection

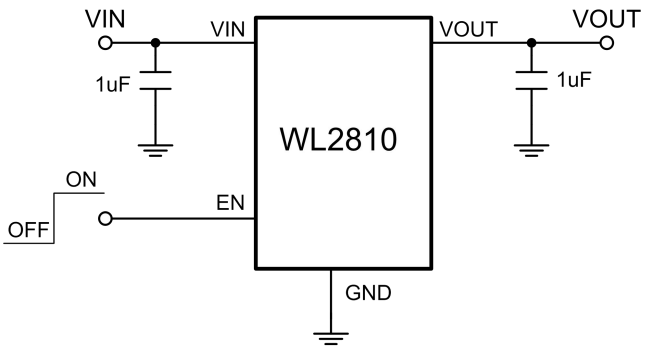
Applications

- MP3/MP4 Players
- Cellphones, radiophone, digital cameras
- Bluetooth, wireless handsets
- Others portable electronics device

Order Information

For detail order information, please see page 14.

Typical Application

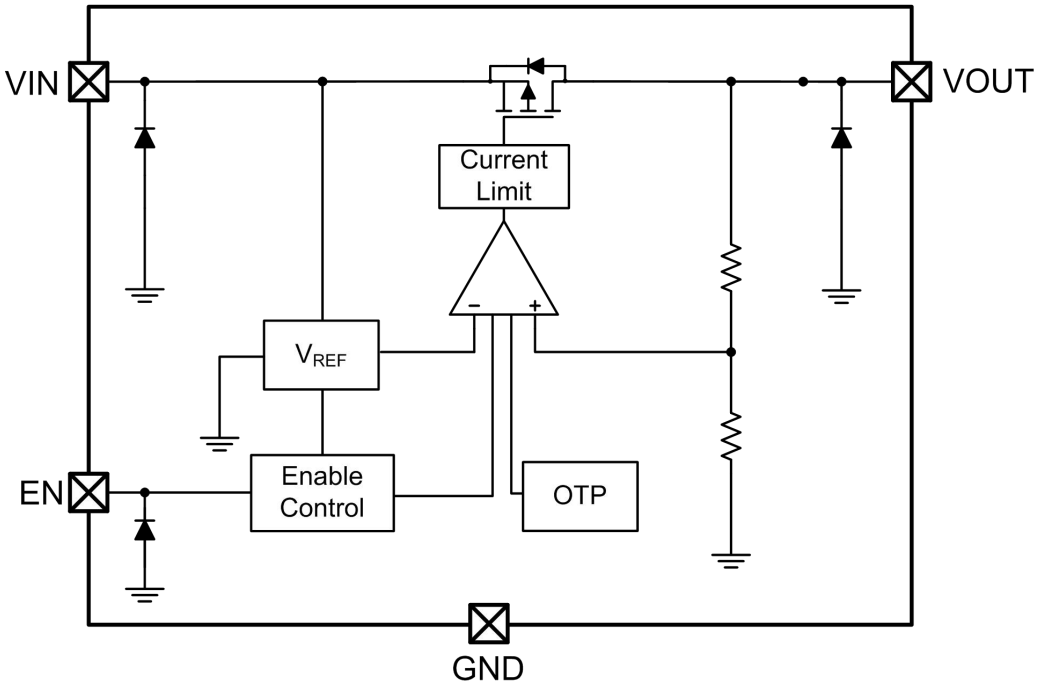


Pin Description

FBP1x1-4L

PIN	Symbol	Description
1	V_{OUT}	Output
2	GND	Ground
3	EN	Enable (Active high)
4	V_{IN}	Input
EP		GND level, this pin must connect to GND.

Block Diagram



Absolute Maximum Ratings

Parameter		Value	Unit
Power Dissipation, P_D@T_A=25˚C		400	mW
V_{IN} Range		-0.3～6.5	V
V_{EN} Range		-0.3～V_{IN}	V
V_{OUT} Range		-0.3～V_{IN}	V
I_{OUT}		400	mA
Lead Temperature Range		260	ºC
Storage Temperature Range		-55 ~ 150	ºC
Operating Junction Temperature Range		150	ºC
MSL		Level-3	
ESD Ratings	HBM	7500	V
	MM	300	V

Recommend Operating Ratings

Parameter	Value	Unit
Operating Supply voltage	1.4～5.5	V
Operating Temperature Range	-40～85	ºC
Thermal Resistance, $R_{\theta JA}$ (FBP1x1-4L)	250	ºC/W

Electronics Characteristics

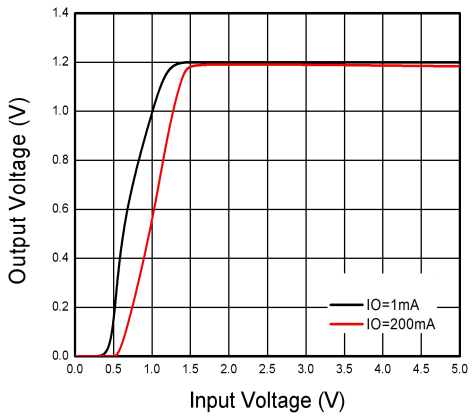
(Ta=25°C, V_{IN}=V_{OUT}+1V, C_{IN}=C_{OUT}=1 μ F, I_{OUT}=1mA, unless otherwise noted)

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}			0.98× V_{OUT}	V_{OUT}	1.02× V_{OUT}	V
Input Voltage	V_{IN}			1.4		5.5	V
Current Limit	I_{LIM}	V_{EN}=V_{IN}		300			mA
Dropout Voltage	V_{DROP}	V_{OUT}=3.3V, I_{OUT}=300mA			118	185	mV
		V_{OUT}=3V, I_{OUT}=300mA			122	192	
		V_{OUT}=2.8V, I_{OUT}=300mA			130	204	
		V_{OUT}=2.5V, I_{OUT}=300mA			140	220	
		V_{OUT}=1.6V, I_{OUT}=300mA			205	320	
		V_{OUT}=1V, I_{OUT}=300mA			370	555	
Line Regulation	$\triangle V_{LINE}$	V_{IN}=V_{OUT}+0.5V~5.5V			1	5	mV
Load Regulation	$\triangle V_{Load}$	I_{OUT}=1~300mA			15	28	mV
Quiescent Current	I_Q	V_{OUT}=2.8V, I_{OUT}=0			50	90	μA
Short Current	I_{SHORT}	V_{EN}=V_{IN}, V_{OUT} Short to GND			120		mA
Shut-down Current	I_{SHDN}	V_{EN}=0V				1.0	μA
Power Supply Rejection Rate	PSRR	V_{IN}=(V_{OUT}+1V)$_{DC}$+ 0.5V_{P-P} I_{OUT}=10mA, V_{OSET}=1.8V	f=100Hz		80		dB
			f=1kHz		78		dB
			f=10kHz		65		dB
			f=100kHz		56		dB
			f=1MHz		43		dB
EN logic high voltage	V_{ENH}	V_{IN}=5.5V, I_{OUT}=1mA		1			V
EN logic low voltage	V_{ENL}	V_{IN}=5.5V, V_{OUT}=0V				0.4	V
EN Input Current	I_{EN}	V_{EN}= 0 to 5.5V			120		nA
Output Noise Voltage	e_{NO}	10Hz to 100KHz, C_{OUT}=1μF			13× V_{OUT}		μV_{RMS}
Thermal shutdown threshold	T_{SD}				160		℃
Thermal shutdown hysteresis	$\triangle T_{SD}$				30		℃

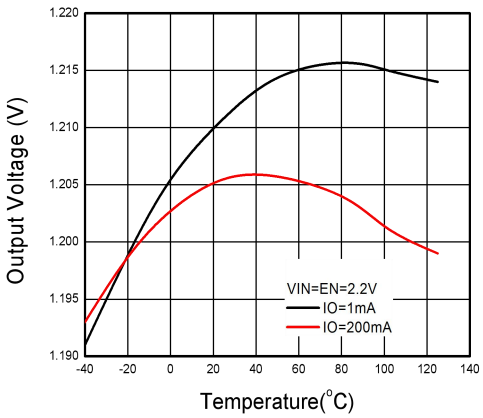
Typical characteristics (Ta=25°C, V_{IN}=V_{OUT}+1V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1 μ F, unless otherwise noted)

(1) EN is driven by square pulse, the duty cycle is less than 20%

V_{OUT}=1.2V

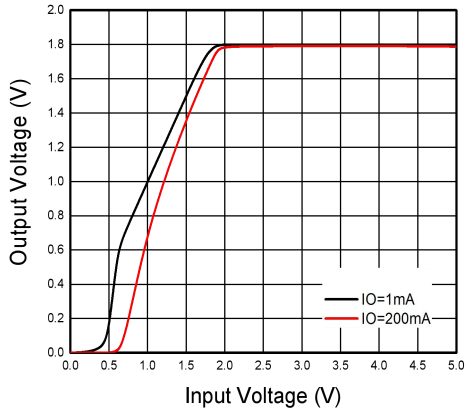


Output Voltage vs. Input Voltage

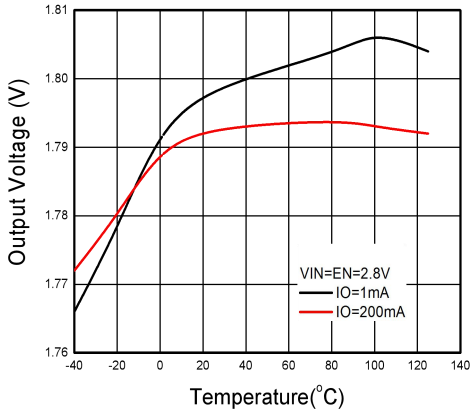


Output Voltage vs. Temperature

V_{OUT}=1.8V

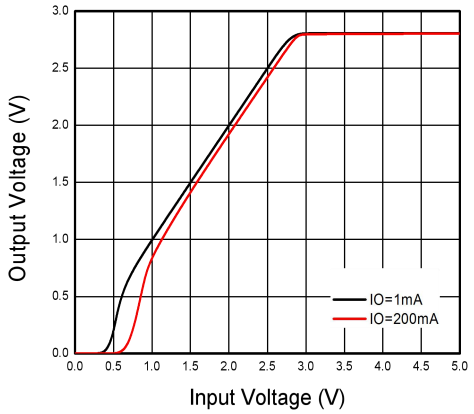


Output Voltage vs. Input Voltage

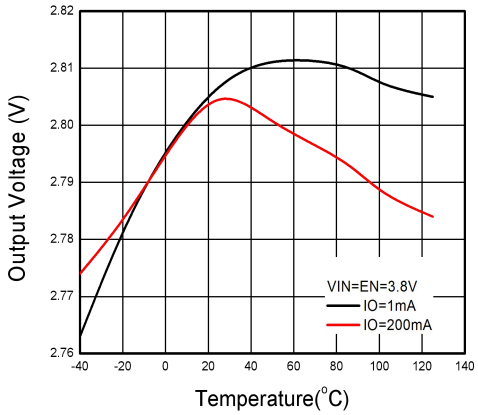


Output Voltage vs. Temperature

V_{OUT}=2.8V

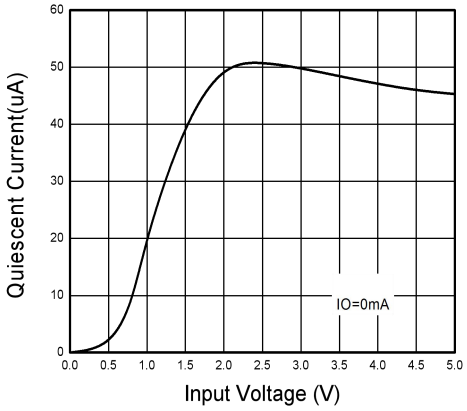


Output Voltage vs. Input Voltage

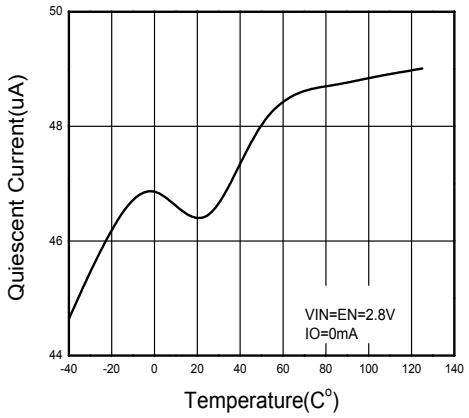


Output Voltage vs. Temperature

V_{OUT}=1.8V

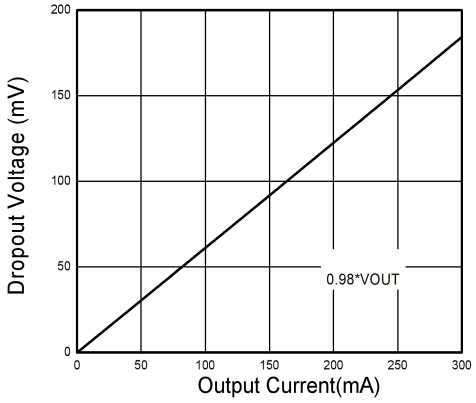


Quiescent Current vs. Input Voltage



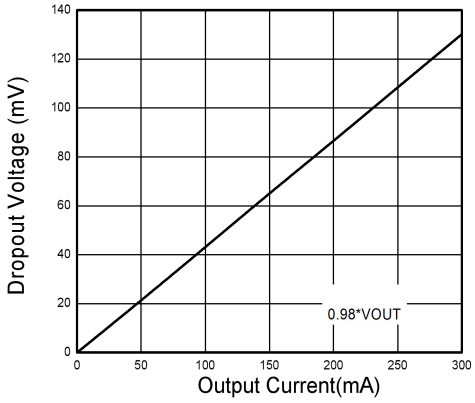
Quiescent Current vs. Temperature

V_{OUT}=1.8V



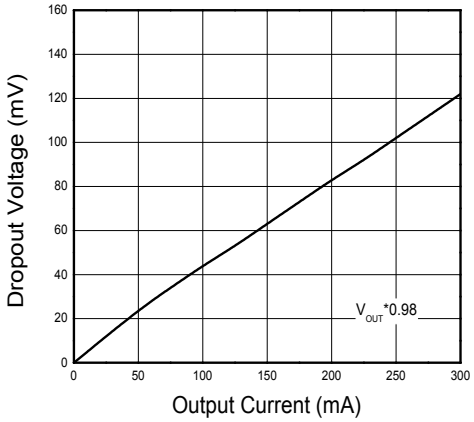
Dropout Voltage vs. Output Voltage

V_{OUT}=2.8V



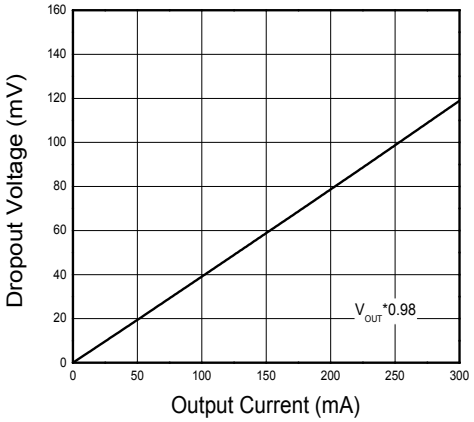
Dropout Voltage vs. Output Voltage

V_{OUT}=3.0V



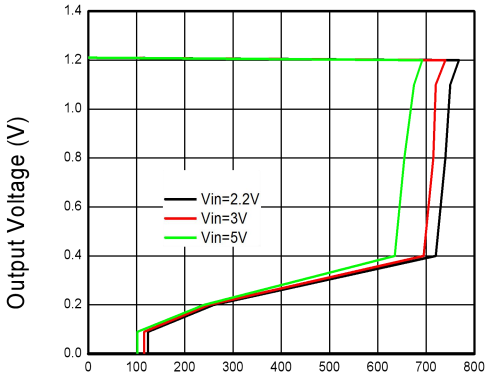
Dropout Voltage vs.Output Current

V_{OUT}=3.3V



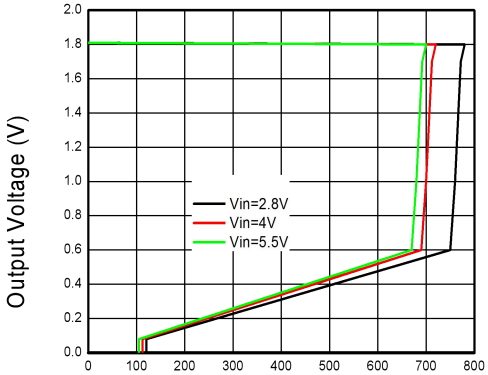
Dropout Voltage vs.Output Current

Vout=1.2V(1)



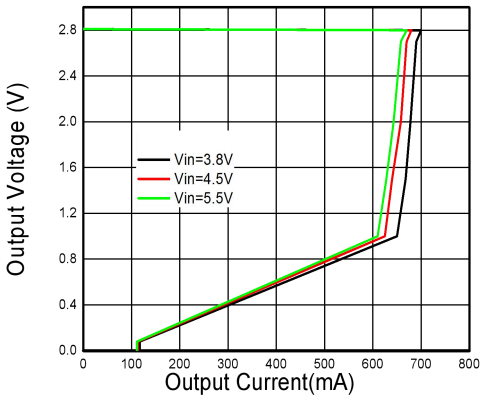
Output Voltage vs. Output Current

Vout=1.8V(1)



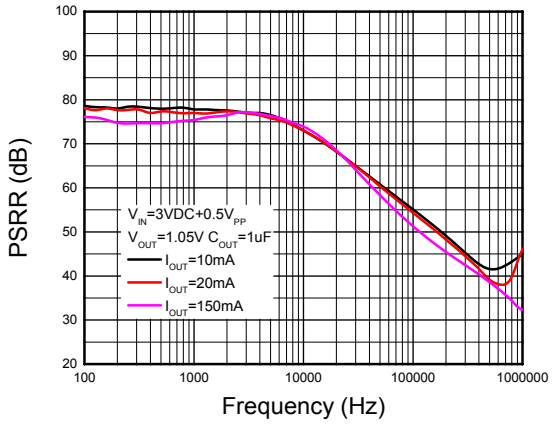
Output Voltage vs. Output Current

Vout=2.8V(1)

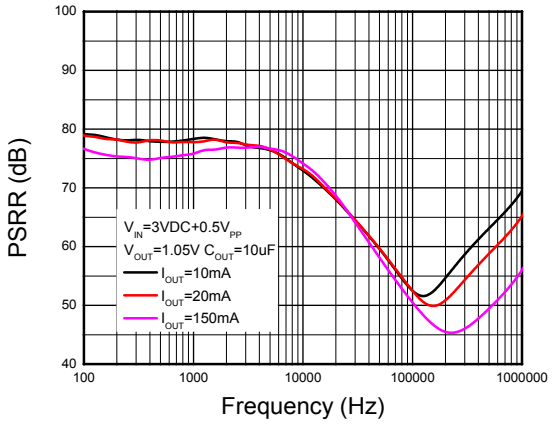


Output Voltage vs. Output Current

V_{OUT}=1.05V

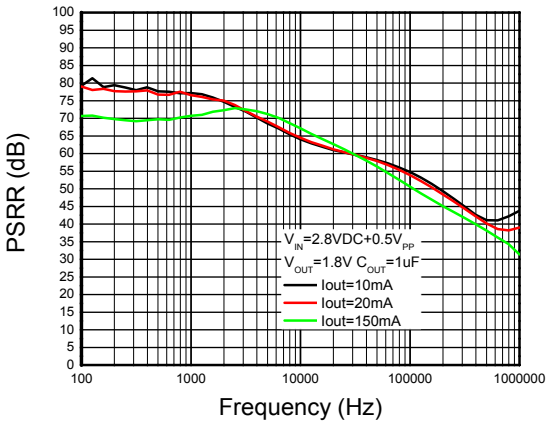


PSRR vs. Frequency

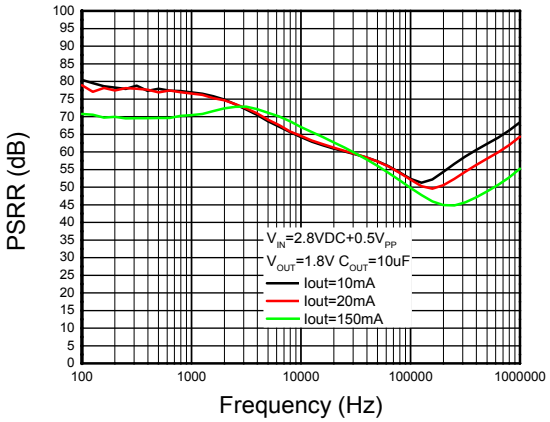


PSRR vs. Frequency

V_{OUT}=1.8V

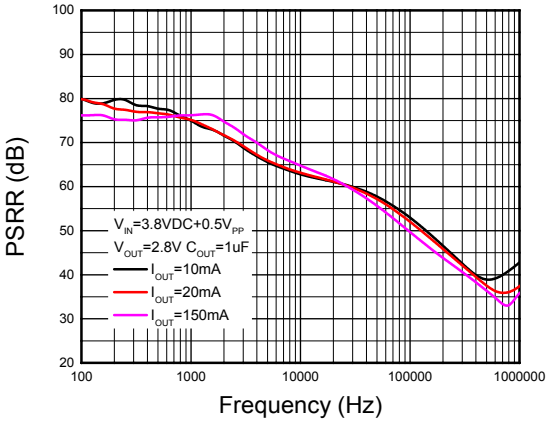


PSRR vs. Frequency

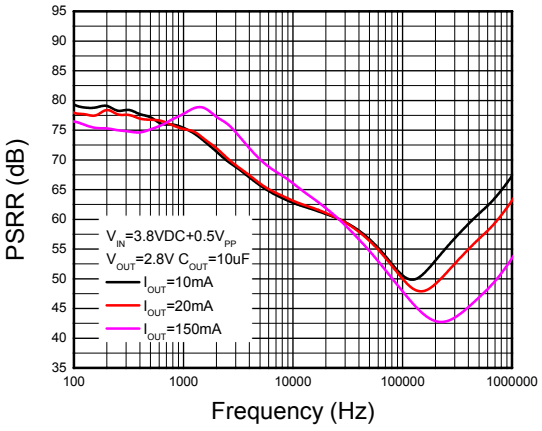


PSRR vs. Frequency

V_{OUT}=2.8V



PSRR vs. Frequency

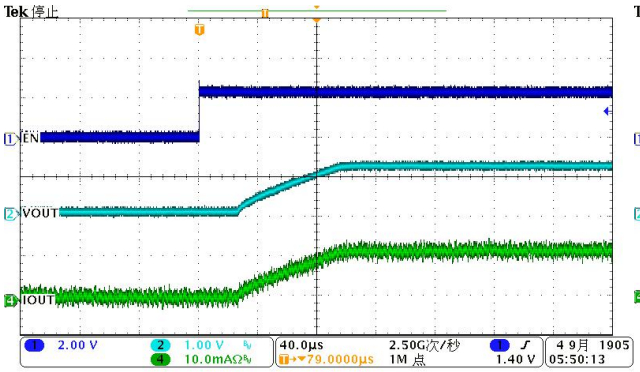


PSRR vs. Frequency

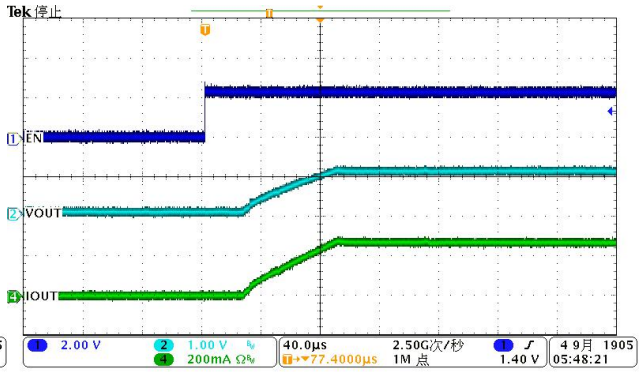
1.Start up (Soft Start from EN)

V_{OUT}=1.2V

V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=10mA

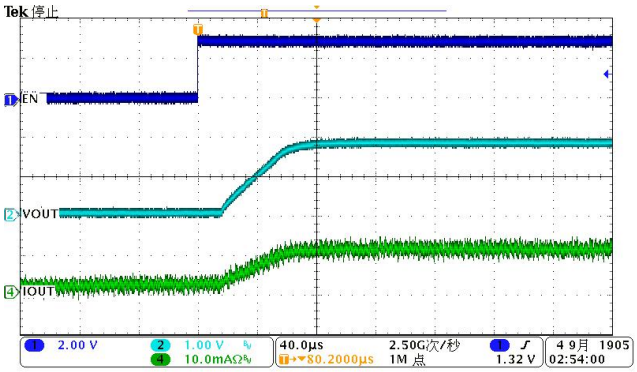


V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=250mA

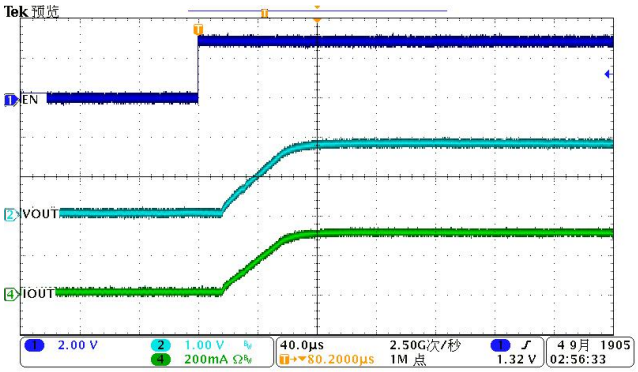


V_{OUT}=1.8V

V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=10mA

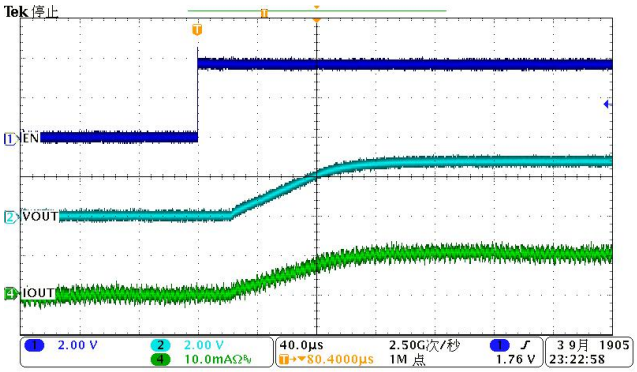


V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=300mA

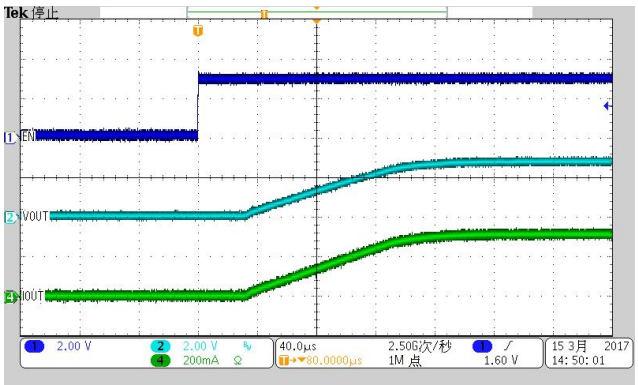


V_{OUT}=2.8V

V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=10mA



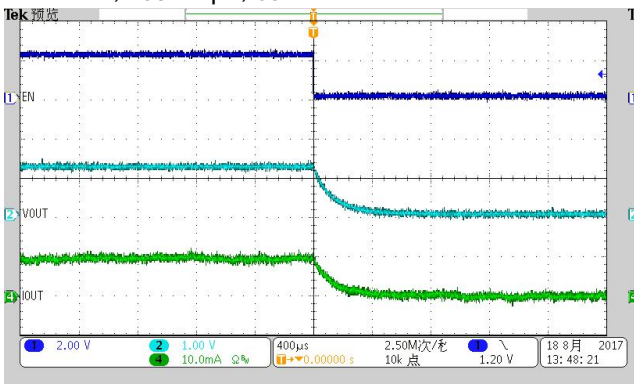
V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=300mA



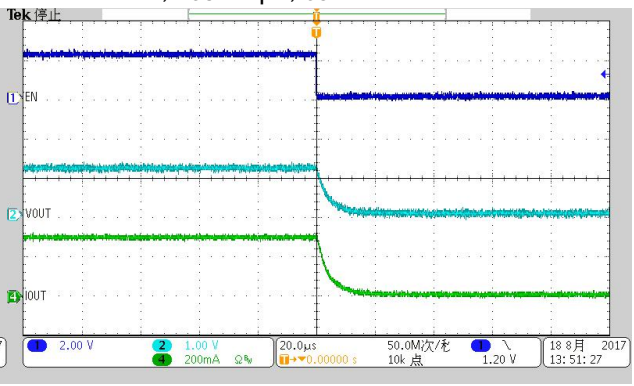
2.Shutdown (Shutdown from EN)

V_{OUT}=1.2V

V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=10mA

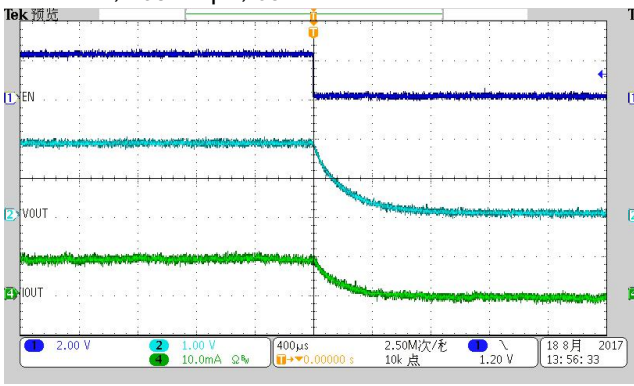


V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=300mA

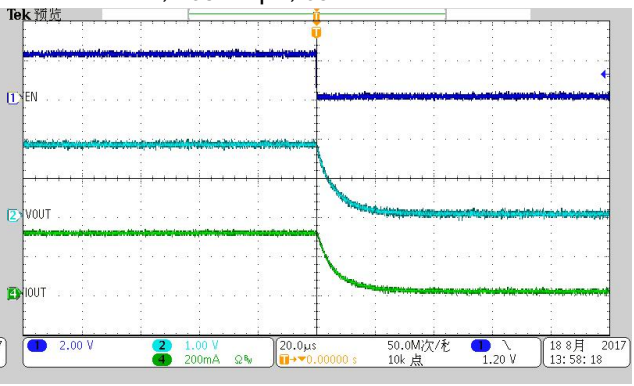


V_{OUT}=1.8V

V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=10mA

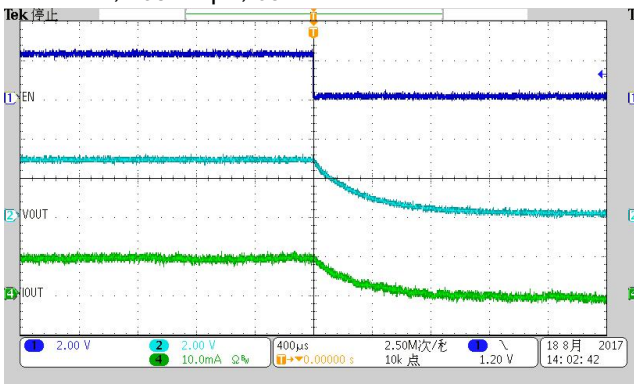


V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=300mA

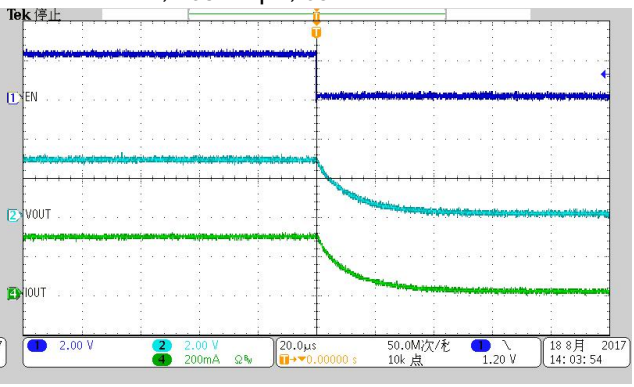


V_{OUT}=2.8V

V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=10mA



V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=300mA

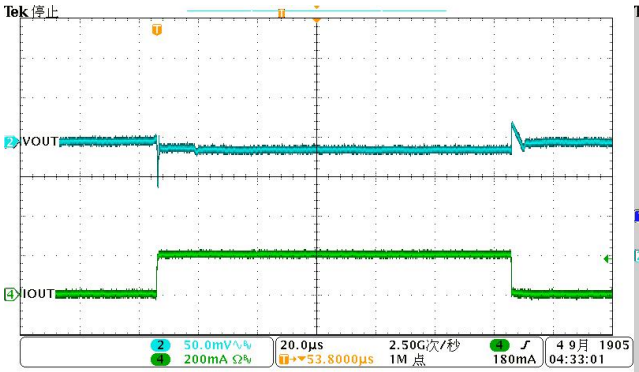


3.Load & Line Transient

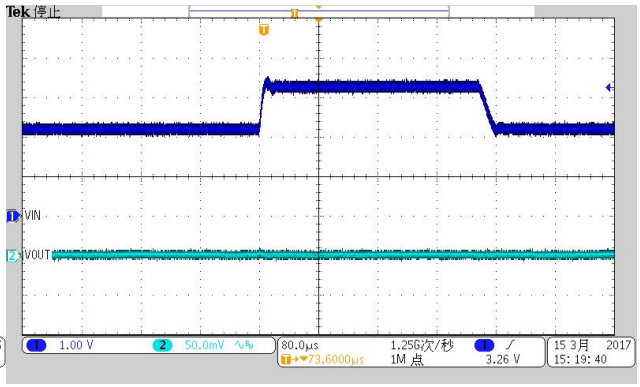
Load step **Line Step**

V_{OUT}=1.2V

V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=1mA-200mA in 1μs

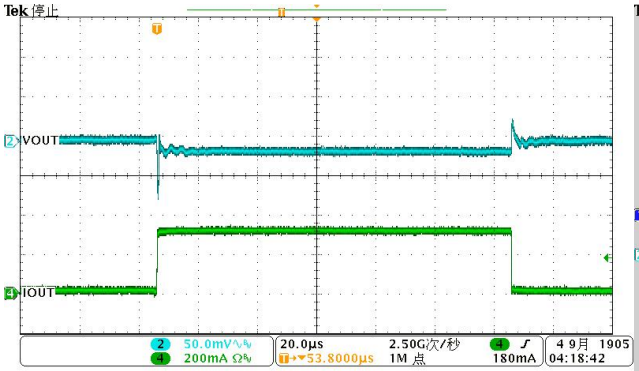


V_{IN}=2.2V-3.2V in 20μs,C_{OUT}=1μF,I_{OUT}=1mA

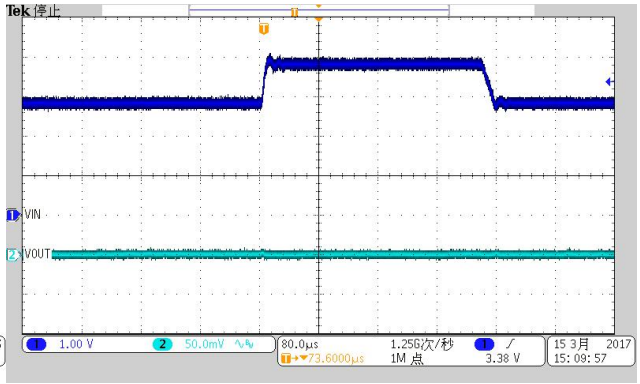


V_{OUT}=1.8V

V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=1mA-300mA in 1μs

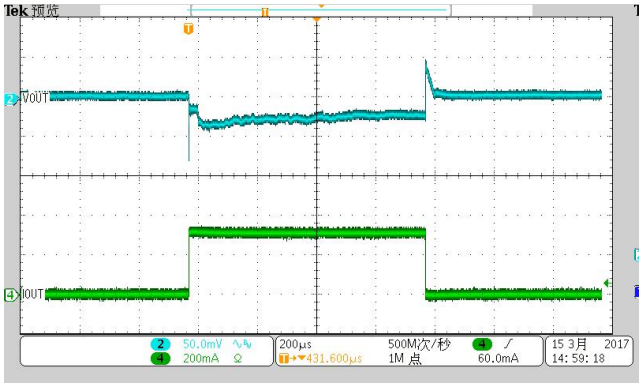


V_{IN}=2.8V-3.8V in 20μs,C_{OUT}=1μF,I_{OUT}=1mA

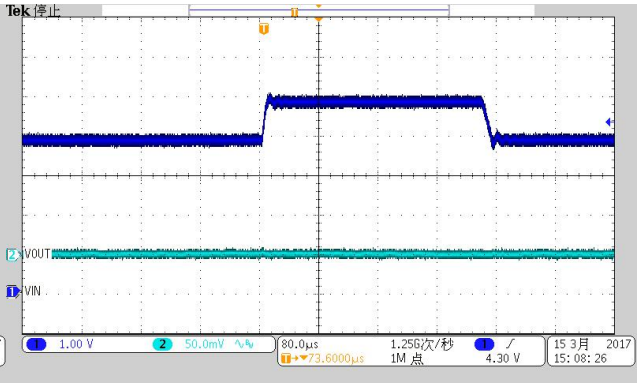


V_{OUT}=2.8V

V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=1mA-300mA in 1μs

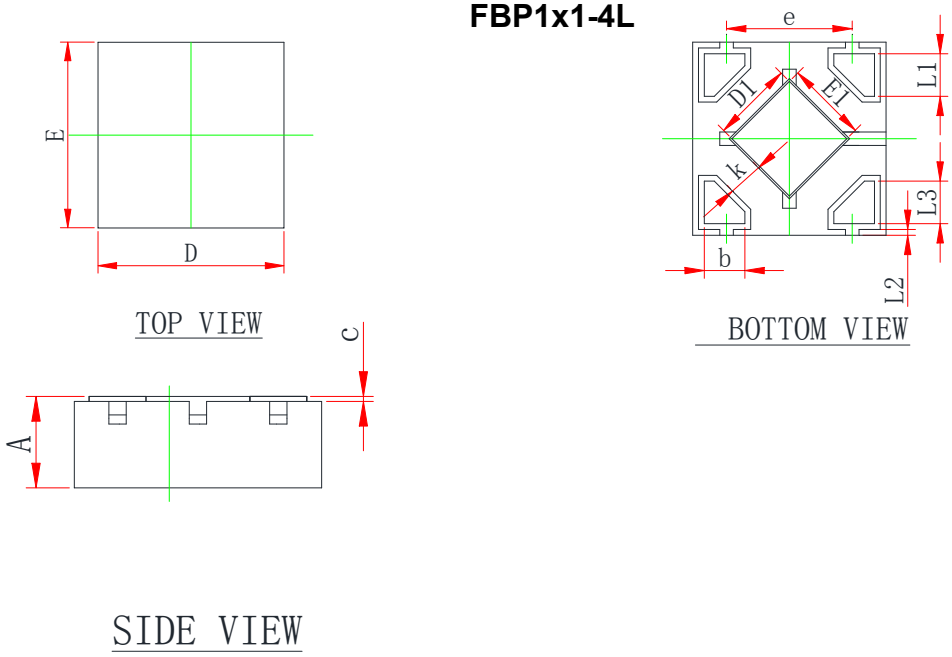


V_{IN}=3.8V-4.8V in 20μs,C_{OUT}=1μF,I_{OUT}=1mA



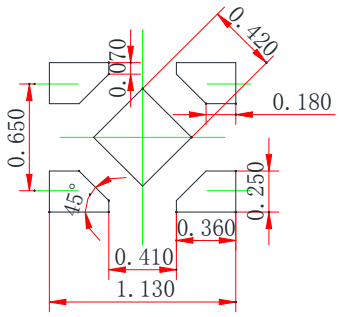
PACKAGE OUTLINE DIMENSIONS

FBP1x1-4L



Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.335	-	0.405
D	0.950	1.000	1.050
E	0.950	1.000	1.050
D1	0.370	-	0.470
E1	0.370	-	0.470
k	0.170 Min.		
b	0.160	0.210	0.260
c	0.010	-	0.090
e	0.600	0.650	0.700
L1	0.185	-	0.255
L2	0.030 Ref.		
L3	0.185	-	0.255

Recommend PCB Layout (Unit: mm)

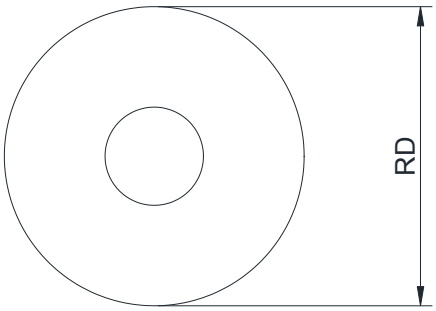


Notes:

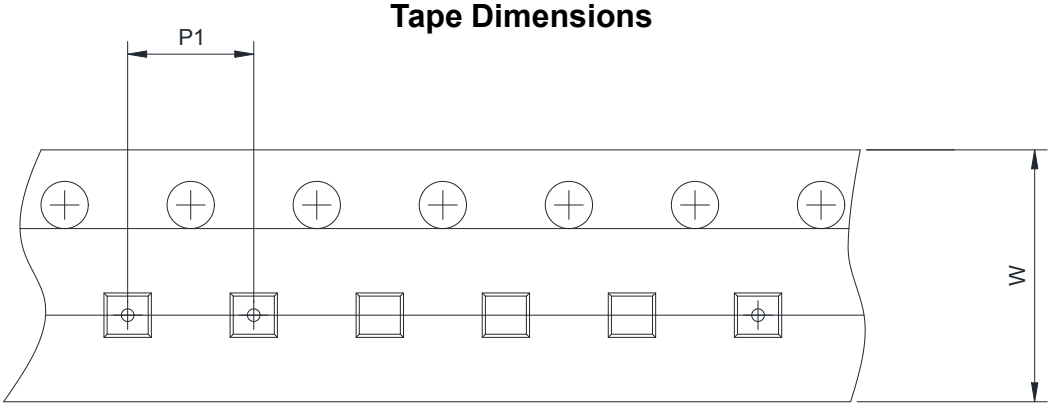
This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

TAPE AND REEL INFORMATION

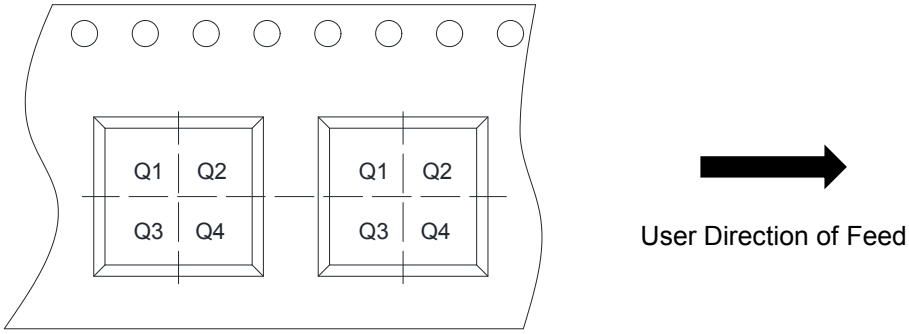
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☑ 7inch ☐ 13inch
W	Overall width of the carrier tape	☑ 8mm ☐ 12mm ☐ 16mm
P1	Pitch between successive cavity centers	☑ 2mm ☐ 4mm ☐ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4

ORDER INFORMATION

Ordering No.	Vout (V)	Package	Operating Temperature	Marking	Shipping
WL2810X12-4/TR	1.2	FBP1x1-4L	-40~+85°C	DE YW	Tape and Reel, 10000
WL2810X18-4/TR	1.8	FBP1x1-4L	-40~+85°C	DH YW	Tape and Reel, 10000
WL2810X28-4/TR	2.8	FBP1x1-4L	-40~+85°C	DL YW	Tape and Reel, 10000
WL2810X30-4/TR	3.0	FBP1x1-4L	-40~+85°C	DM YW	Tape and Reel, 10000
WL2810X33-4/TR	3.3	FBP1x1-4L	-40~+85°C	DN YW	Tape and Reel, 10000