WL2836D

Low noise, High PSRR, High speed, CMOS LDO

Http://www.sh-willsemi.com

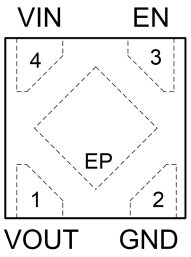
Descriptions

The WL2836D 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.

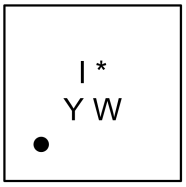
The WL2836D has the fold-back maximum output current which depends on the output voltage. So the current limit functions both as a short circuit protection and as an output current limiter.

The WL2836D regulators are available in standard DFN1x1-4L Package. Standard products are Pb-free and Halogen-free.

DFN1x1-4L



Pin Configuration (Top View)



I : Device 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 :±1% @ V_{OUT}>2V
- Recommend capacitor : 1μF
- Thermal-Overload and Short-Circuit Protection

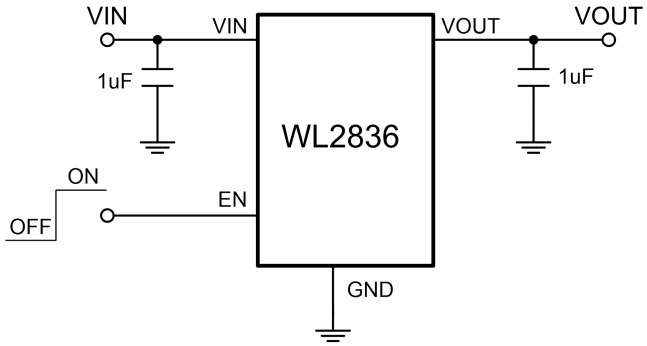
Applications

- 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

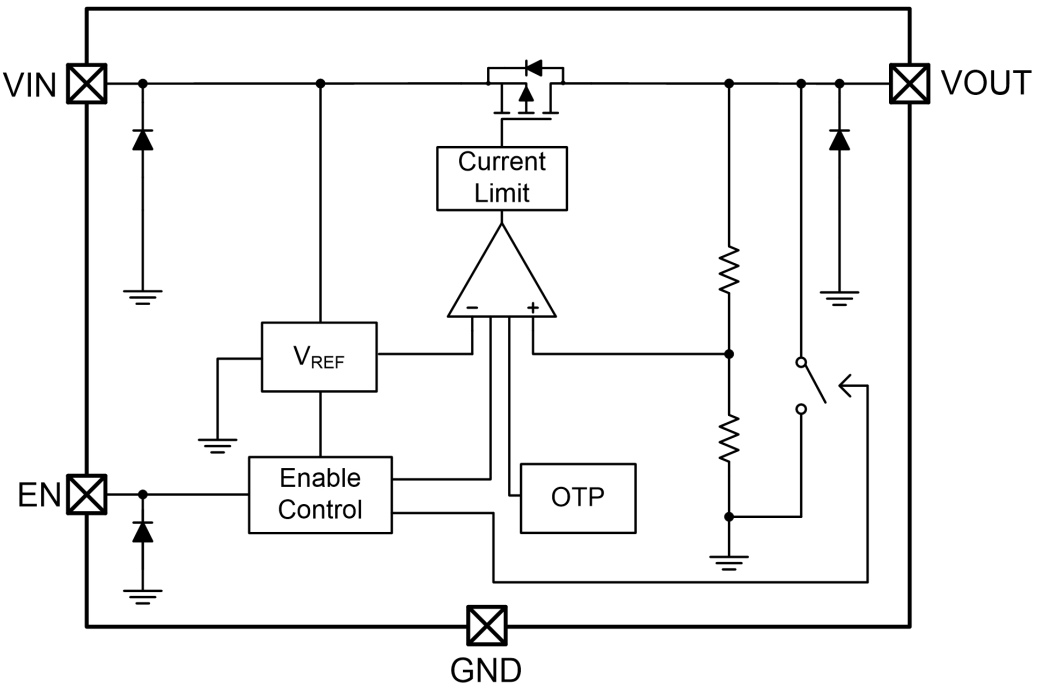


Pin Description

DFN1x1-4L

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}		Internally Limited	
Lead Temperature Range		260	°C
Storage Temperature Range		-55 ~ 150	°C
Operating Junction Temperature Range		150	°C
MSL		Level-1	
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	°C
Thermal Resistance, $R_{\theta JA}$ (DFN1x1-4L)	250	°C/W

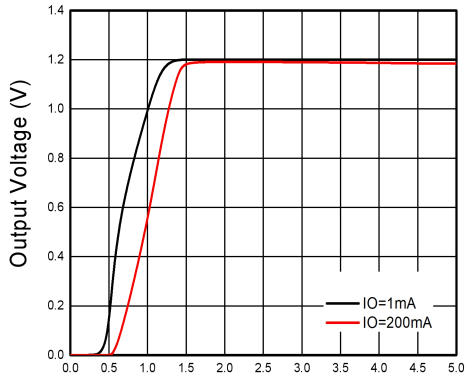
Electronics Characteristics

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

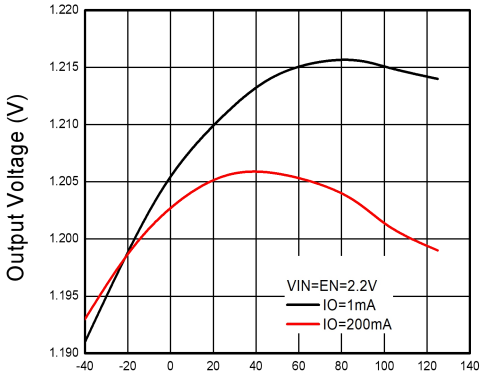
Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	V_{OUT} ≤2V		-20	V_{OUT}	+20	mV
		V_{OUT}>2V		0.99× V_{OUT}	V_{OUT}	1.01× V_{OUT}	V
Input Voltage	V_{IN}			1.4		5.5	V
Current Limit	I_{LIM}	V_{EN}=V_{IN}		300			mA
Dropout Voltage	V_{DROP}	V_{OUT}=3.3V, I_{OUT}=300mA			118	185	mV
		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	△V_{LINE}	V_{IN}=V_{OUT}+0.5V~5.5V			1	5	mV
Load Regulation	△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	△ T_{SD}				30		℃
Auto-discharge Nch Tr, ON Resistance	R_{LOW}	V_{IN}=4V, V_{CE}=0V, V_{OUT}=2.8V			120		Ω

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

V_{OUT}=1.2V

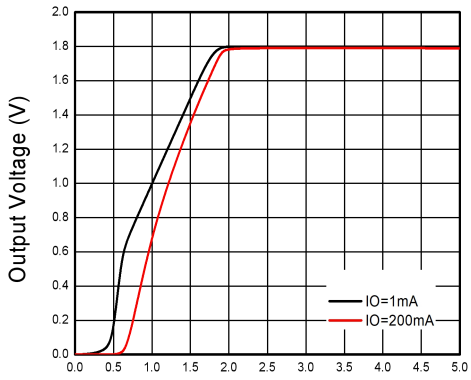


Output Voltage vs. Input Voltage

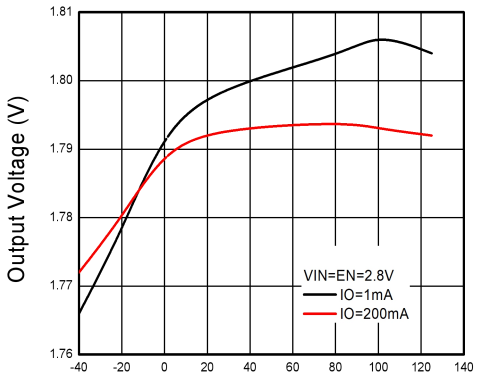


Output Voltage vs. Temperature

V_{OUT}=1.8V

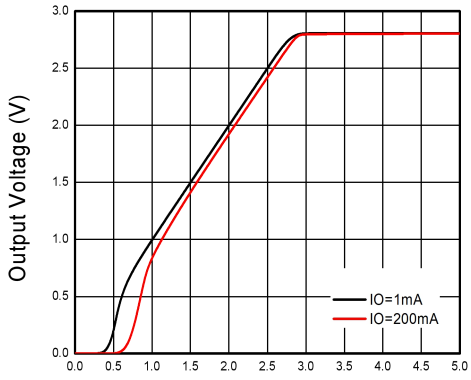


Output Voltage vs. Input Voltage

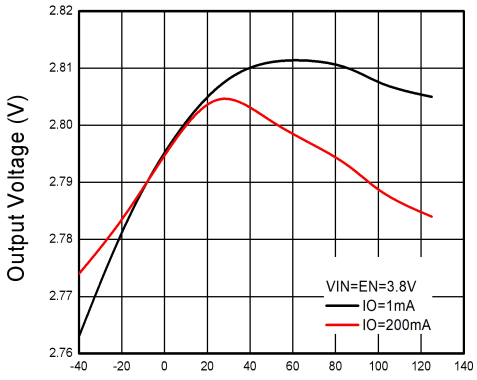


Output Voltage vs. Temperature

V_{OUT}=2.8V

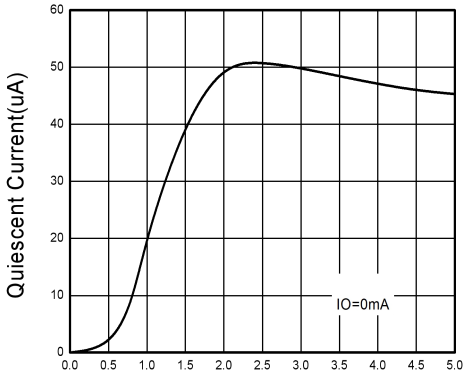


Output Voltage vs. Input Voltage

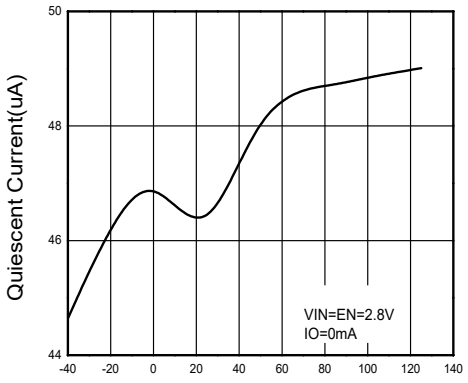


Output Voltage vs. Temperature

V_{OUT}=1.8V

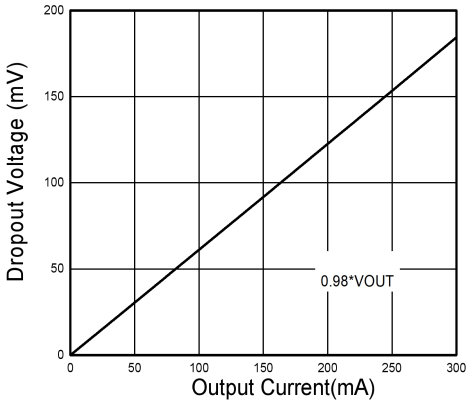


Quiescent Current vs. Input Voltage



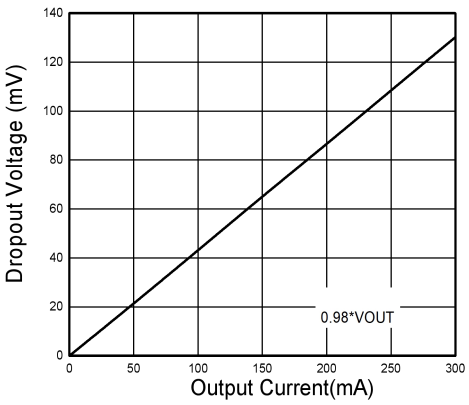
Quiescent Current vs. Temperature

V_{OUT}=1.8V



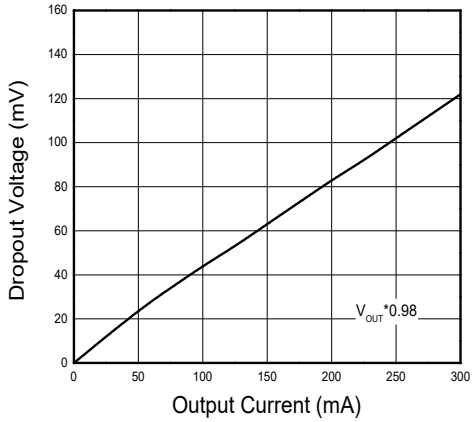
Dropout Voltage vs. Output Current

V_{OUT}=2.8V



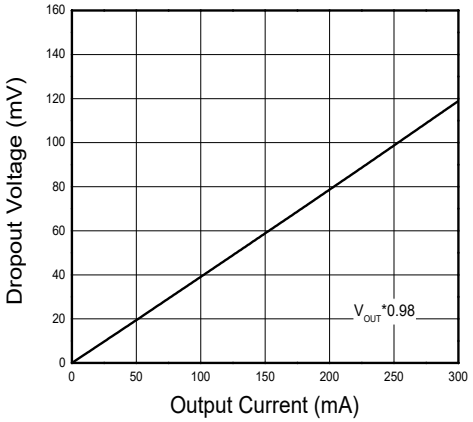
Dropout Voltage vs. Output Current

V_{OUT}=3.0V



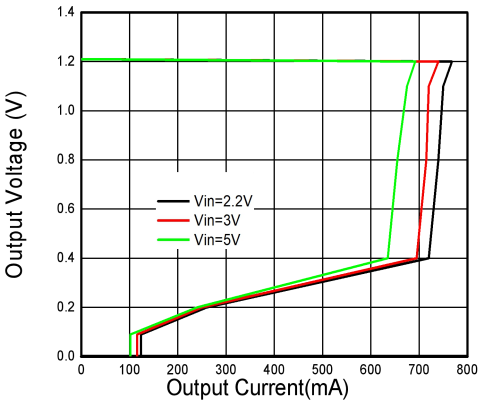
Dropout Voltage vs.Output Current

V_{OUT}=3.3V



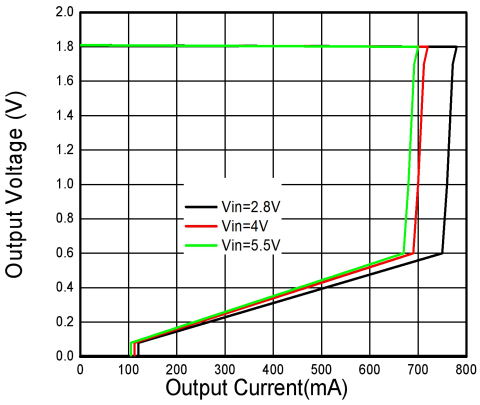
Dropout Voltage vs.Output Current

Vout=1.2V



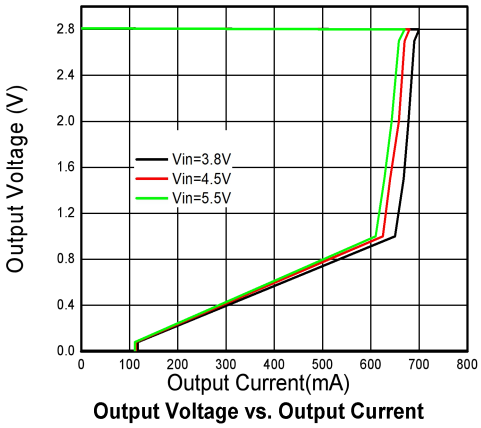
Output Voltage vs. Output Current

Vout=1.8V



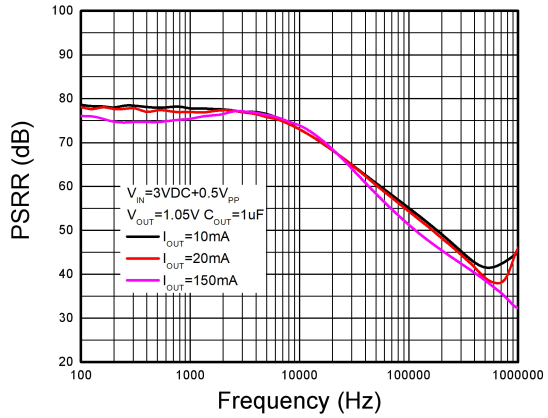
Output Voltage vs. Output Current

Vout=2.8V

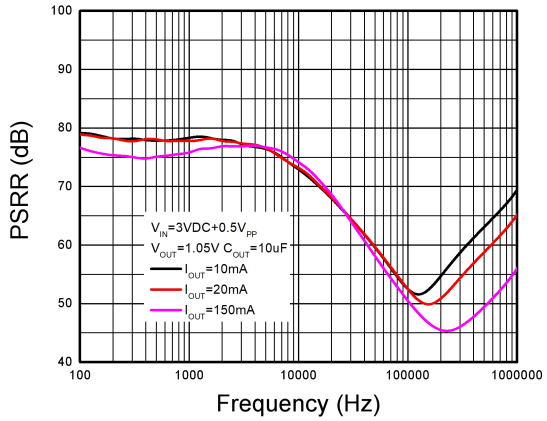


Output Voltage vs. Output Current

VOUT=1.05V

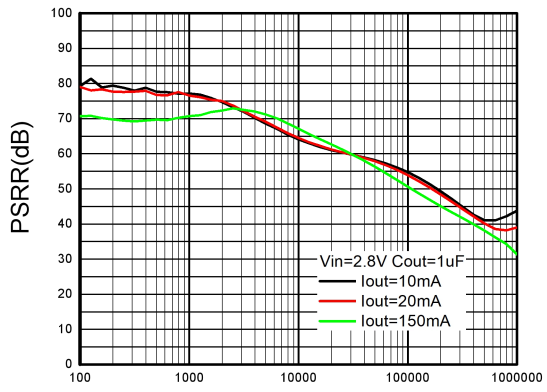


PSRR vs. Frequency

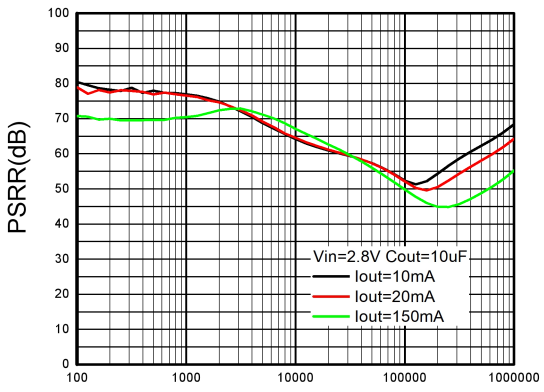


PSRR vs. Frequency

V_{OUT}=1.8V

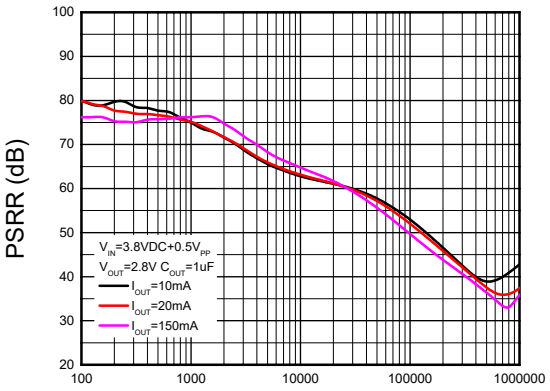


PSRR vs. Frequency

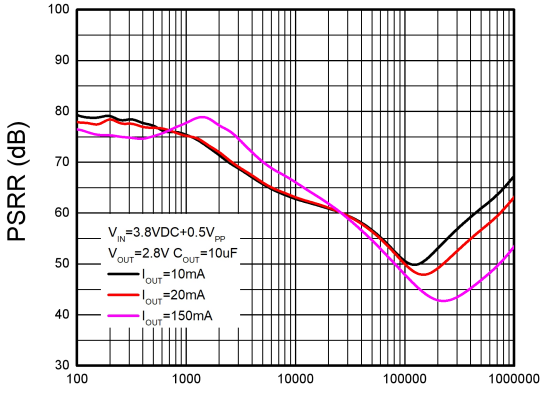


PSRR vs. Frequency

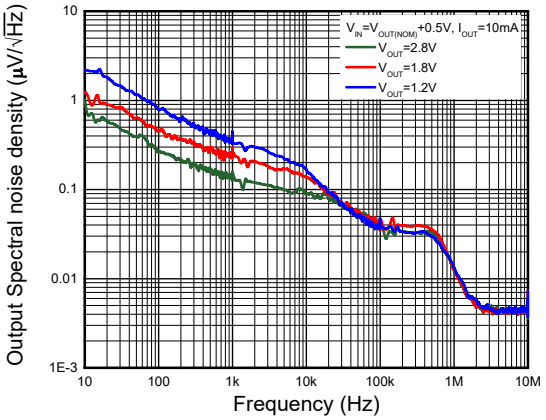
V_{OUT}=2.8V



PSRR vs. Frequency



PSRR vs. Frequency

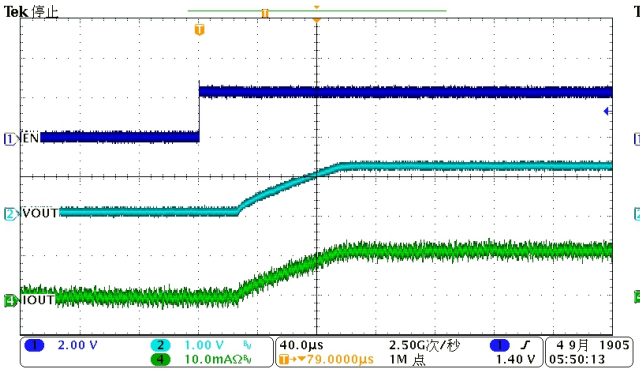


Output spectral noise density vs frequency

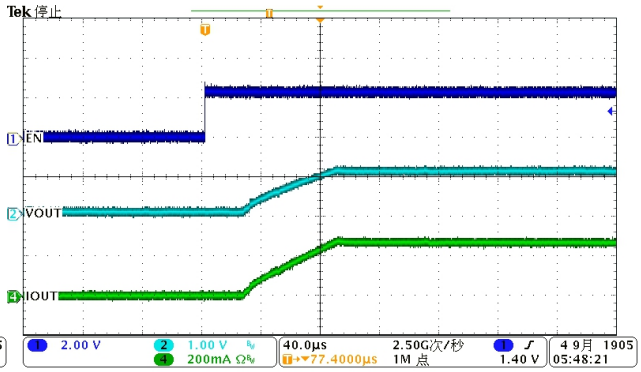
1.Start up (Soft Start from EN)

V_{OUT}=1.2V

V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=10mA

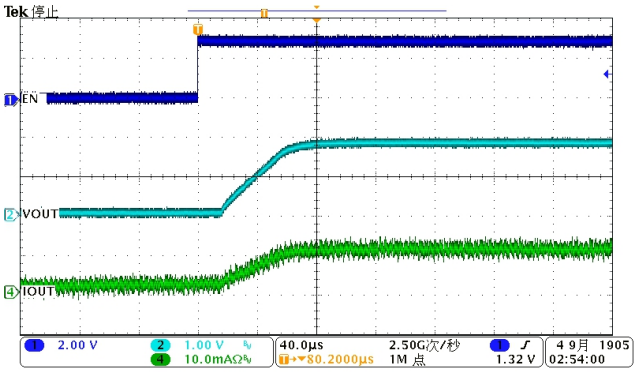


V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=250mA

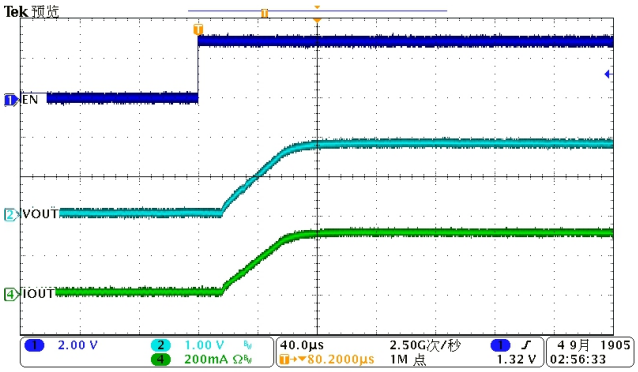


V_{OUT}=1.8V

V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=10mA

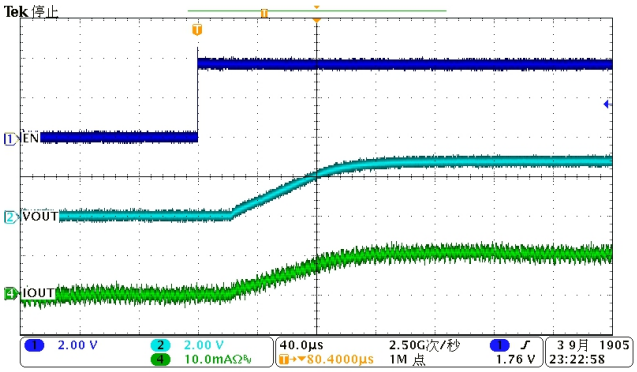


V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=300mA

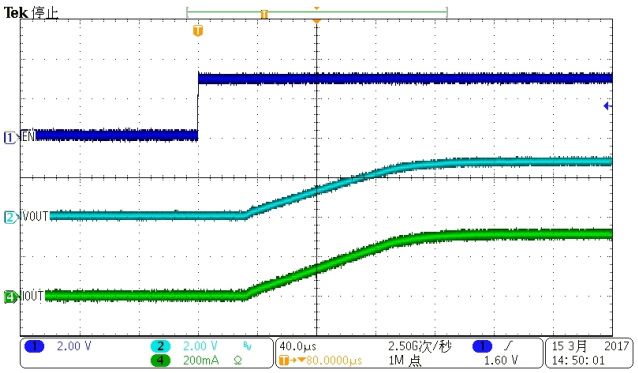


V_{OUT}=2.8V

V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=10mA



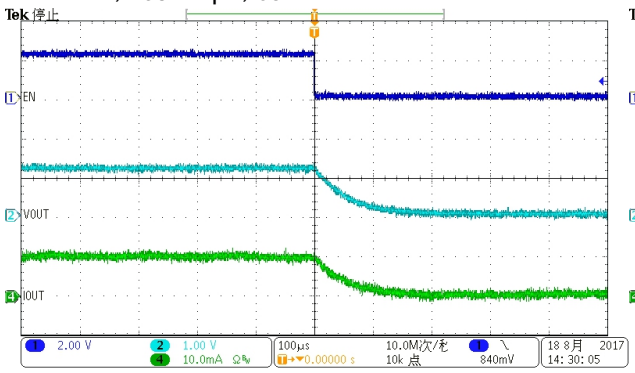
V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=300mA



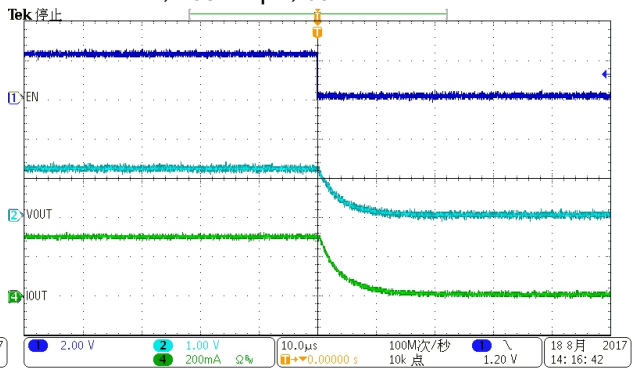
2.Shutdown (Shutdown from EN)

V_{OUT}=1.2V

V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=10mA

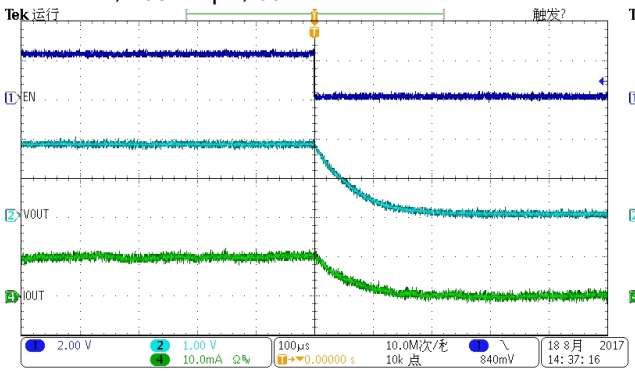


V_{IN}=2.2V,C_{OUT}=1μF,I_{OUT}=300mA

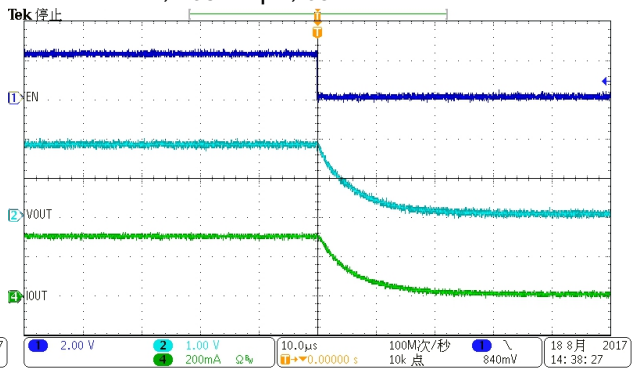


V_{OUT}=1.8V

V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=10mA

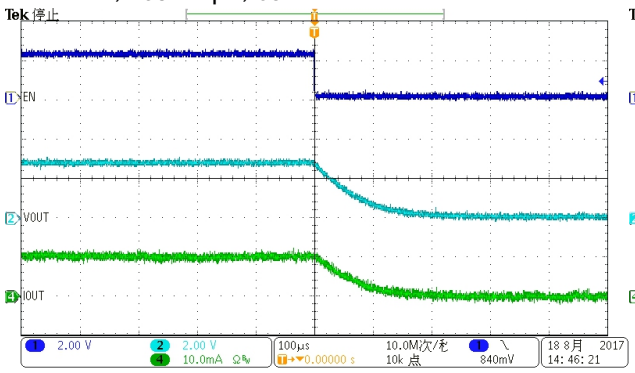


V_{IN}=2.8V,C_{OUT}=1μF,I_{OUT}=300mA

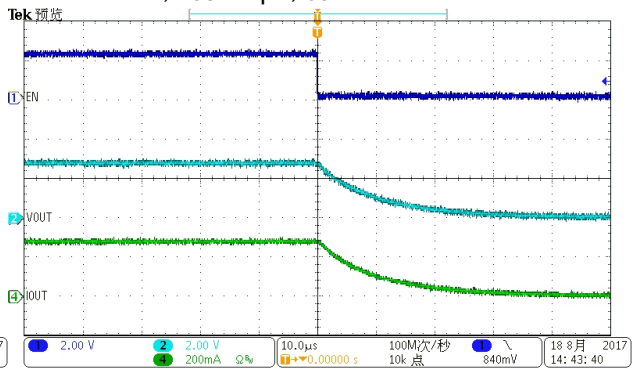


V_{OUT}=2.8V

V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=10mA



V_{IN}=3.8V,C_{OUT}=1μF,I_{OUT}=300mA

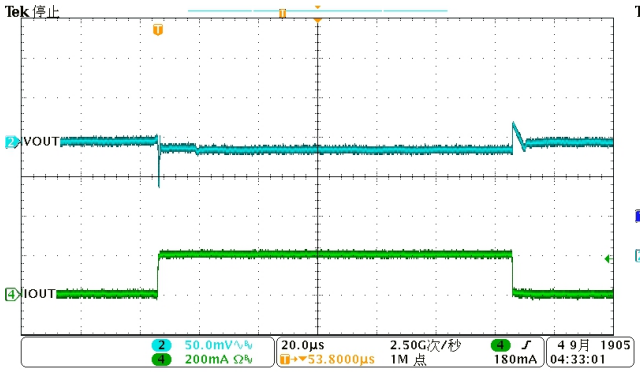


3.Load & Line Transient

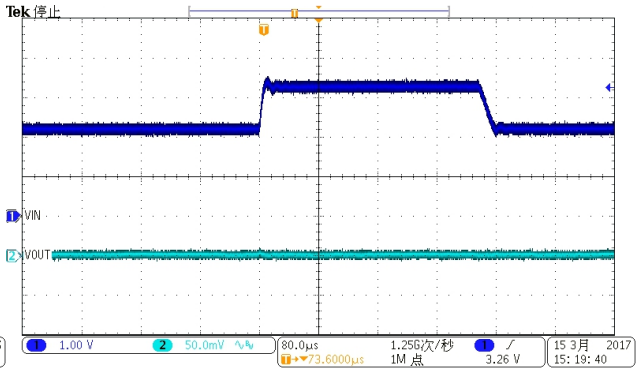
Load step **Line Step**

V_{OUT}=1.2V

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

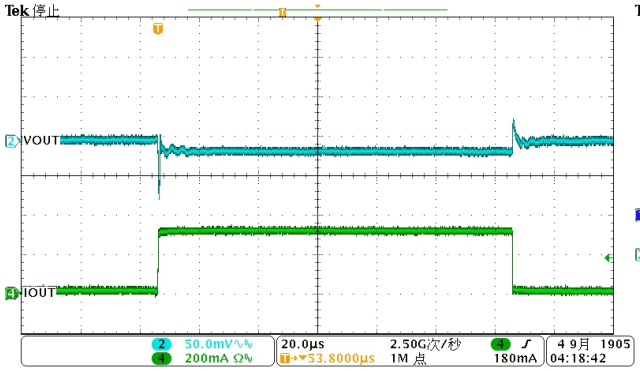


V_{IN}=2.2V-3.2V in 20μs,C_{OUT}=1μF,I_{OUT}=1mA

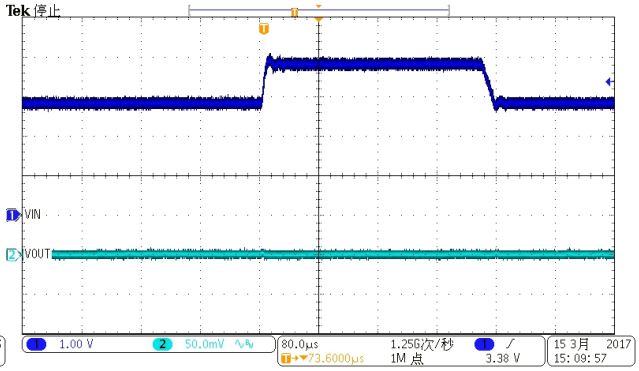


V_{OUT}=1.8V

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

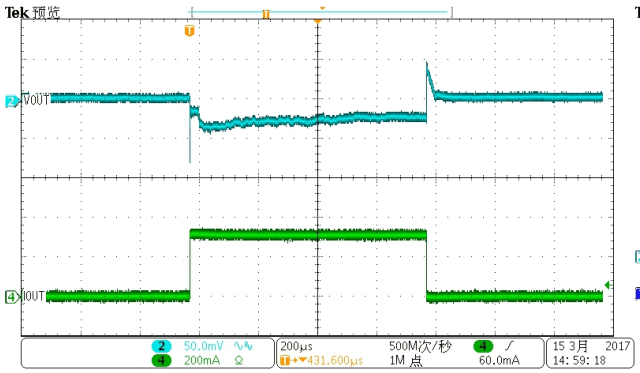


V_{IN}=2.8V-3.8V in 20μs,C_{OUT}=1μF,I_{OUT}=1mA

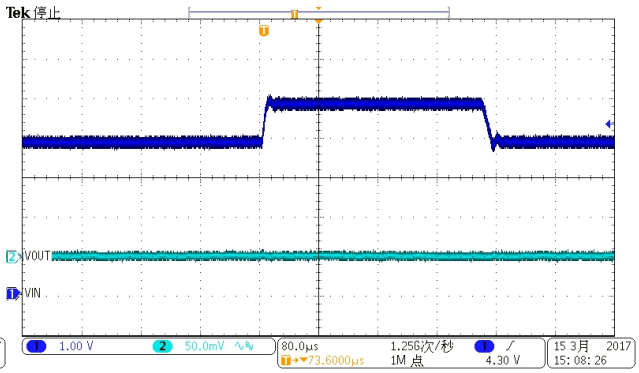


V_{OUT}=2.8V

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

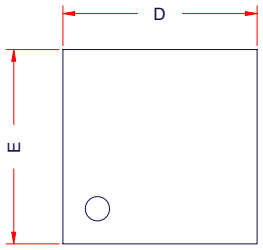


V_{IN}=3.8V-4.8V in 20μs,C_{OUT}=1μF,I_{OUT}=1mA

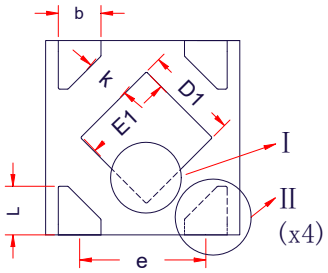


PACKAGE OUTLINE DIMENSIONS

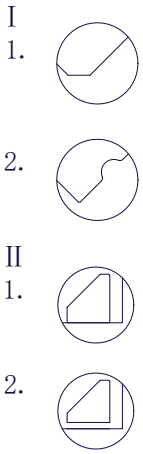
DFN1x1-4L

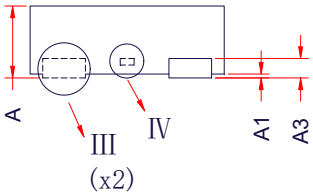


TOP VIEW

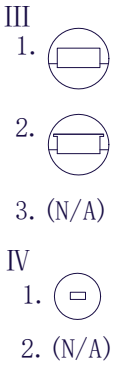


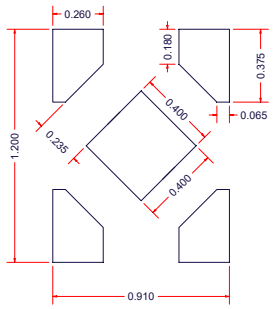
BOTTOM VIEW





SIDE VIEW



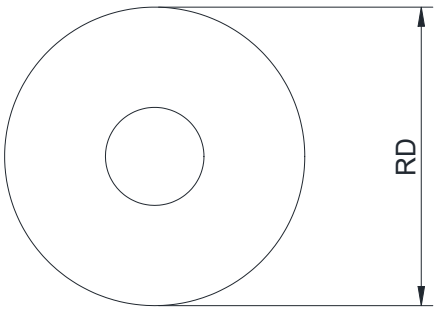


RECOMMENDED LAND PATTERN (Unit:mm)

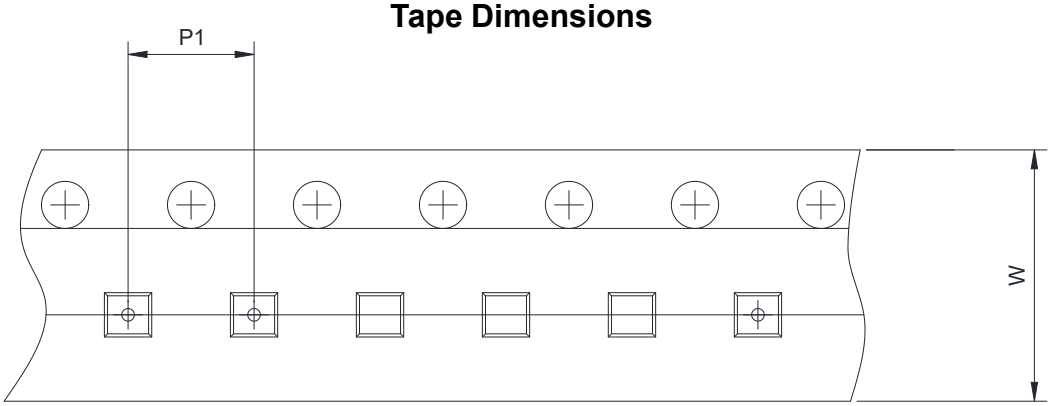
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.32	0.37	0.42
A1	-	-	0.05
A3	0.10 Ref.		
b	0.17	0.22	0.28
L	0.17	-	0.30
D	0.95	1.00	1.05
E	0.95	1.00	1.05
D1	0.43	0.48	0.54
E1	0.43	0.48	0.54
K	0.14	-	-
e	0.65BSC		

TAPE AND REEL INFORMATION

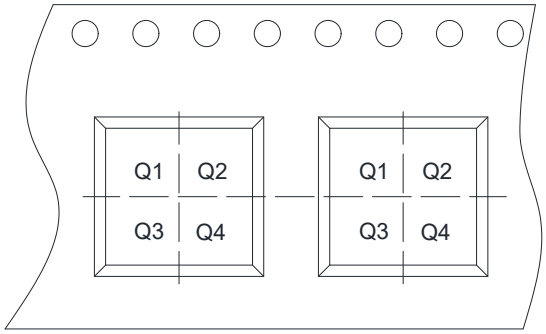
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



User Direction of Feed

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
WL2836D08-4/TR	0.8	DFN1x1-4L	-40~+85°C	Ih YW	Tape and Reel, 10000
WL2836D09-4/TR	0.9	DFN1x1-4L	-40~+85°C	IA YW	Tape and Reel, 10000
WL2836D10-4/TR	1.0	DFN1x1-4L	-40~+85°C	IB YW	Tape and Reel, 10000
WL2836D105-4/TR	1.05	DFN1x1-4L	-40~+85°C	IC YW	Tape and Reel, 10000
WL2836D11-4/TR	1.1	DFN1x1-4L	-40~+85°C	ID YW	Tape and Reel, 10000
WL2836D12-4/TR	1.2	DFN1x1-4L	-40~+85°C	IE YW	Tape and Reel, 10000
WL2836D15-4/TR	1.5	DFN1x1-4L	-40~+85°C	IG YW	Tape and Reel, 10000
WL2836D18-4/TR	1.8	DFN1x1-4L	-40~+85°C	IH YW	Tape and Reel, 10000
WL2836D25-4/TR	2.5	DFN1x1-4L	-40~+85°C	IK YW	Tape and Reel, 10000
WL2836D27-4/TR	2.7	DFN1x1-4L	-40~+85°C	IY YW	Tape and Reel, 10000
WL2836D28-4/TR	2.8	DFN1x1-4L	-40~+85°C	IL YW	Tape and Reel, 10000
WL2836D29-4/TR	2.9	DFN1x1-4L	-40~+85°C	Ig YW	Tape and Reel, 10000
WL2836D30-4/TR	3.0	DFN1x1-4L	-40~+85°C	IM YW	Tape and Reel, 10000
WL2836D32-4/TR	3.2	DFN1x1-4L	-40~+85°C	Id YW	Tape and Reel, 10000
WL2836D33-4/TR	3.3	DFN1x1-4L	-40~+85°C	IN YW	Tape and Reel, 10000

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