

Features

- Input Voltage Range : 1.4V to 5.5V
- 15 μ A Ground Current (I_Q) at no Load
- PSRR = 70dB at 1kHz
- $\pm 1.5\%$ Output Accuracy
- Low (0.1 μ A) Shutdown Current
- Dropout Voltage : 0.15V at 300mA when $V_{OUT} \geq 3V$
- Support Fixed Output Voltage 0.8V, 1.0V, 1.05V, 1.1V, 1.2V, 1.25V, 1.3V, 1.5V, 1.8V, 1.85V, 2V, 2.5V, 2.8V, 2.85V, 3V, 3.1V, 3.3V, 3.45V
- Current Limit Protection
- Over Temperature Protection
- Output Active Discharge Function
- DFN-4L 1x1 Packages

Applications

- CDM/GSM mobile phone
- PDAs /MP3
- Audio/Video equipment

General Description

The TPNCP114 is a low-dropout (LDO) voltage regulator with enable function that operates from a 1.4V to 5.5V supply. It provides up to 300mA of output current in miniaturized packaging.

The feature of 15 μ A low quiescent current and 0.5 μ A shutdown current are ideal for the battery application with long service life. The other features include current limit function, over temperature protection and output discharge function.

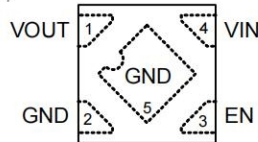
Ordering Information

TPNCP114AMX330TCG

Output Voltage: 330=3.3V
300=3.0V
280=2.8V
180=1.8V
xx.xV

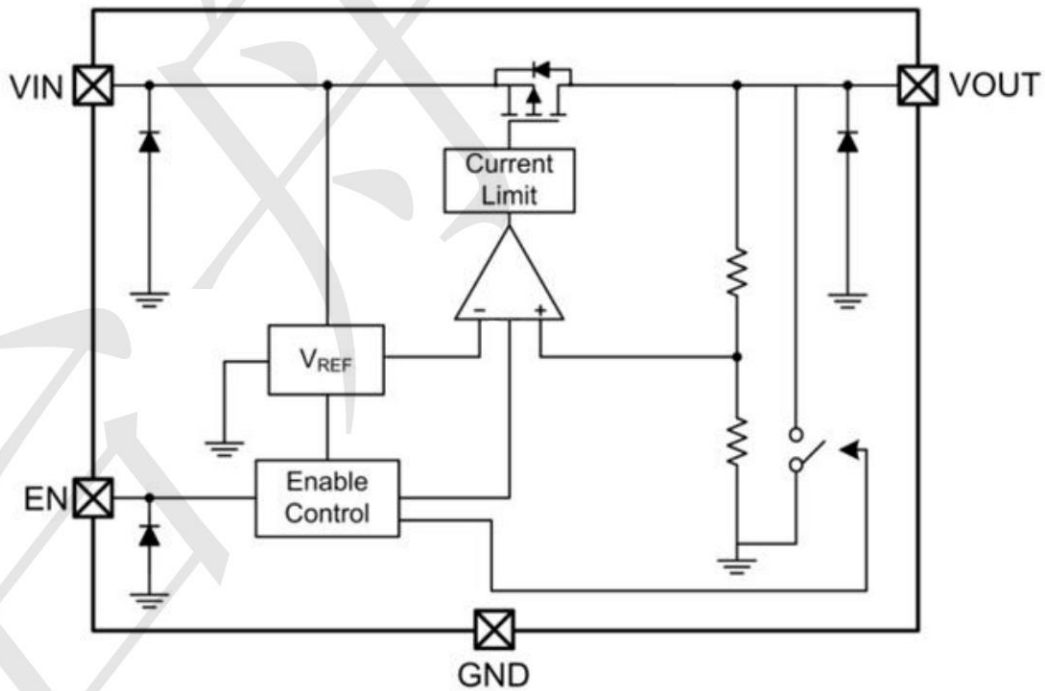
TPNCP114= TECH PUBLIC LDO Series

Pin Configuration



PIN	Symbol	Description
1	VOUT	Output
2	GND	Ground
3	EN	Enable (Active high, not floating)
4	VIN	Input

BLOCK DIAGRAM



Absolute Maximum Rating ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

- $V_{IN}, V_{OUT}, \text{EN}$ to GND ----- -0.3V to 6.5V
- V_{OUT} to V_{IN} ----- -6.5V to 0.3V
- DFN-4L 1x1 ----- 0.44W
- Package Thermal Resistance (Note 2)
- DFN-4L 1x1 θ_{JA} ----- 226°C/W
- DFN-4L 1x1 θ_{JC} ----- 43°C/W
- Lead Temperature (Soldering, 10 sec.) ----- 260°C
- Junction Temperature ----- 150°C
- Storage Temperature Range ----- -65°C to 150°C
- ESD Susceptibility (Note 3)
- HBM (Human Body Model) ----- 2kV

Recommended Operating Conditions (Note 4)

- Input Voltage, V_{IN} ----- 1.4V to 5.5V
- Junction Temperature Range ----- -40°C to 125°C

Electrical Characteristics ($T = 25^{\circ}\text{C}$ unless otherwise noted)

($V_{OUT} + 1 < V_{IN} < 5.5\text{V}$, $T_A = 25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Fixed Output Voltage Range	V_{OUT}		0.8	--	3.45	V
DC Output Accuracy		$I_{LOAD} = 1\text{mA}$	-2	--	2	%
Dropout Voltage ($I_{LOAD} = 300\text{mA}$) (Note 5)	V_{DROP}	$0.8\text{V} \leq V_{OUT} < 1.05\text{V}$	--	0.7	0.97	V
		$1.05\text{V} \leq V_{OUT} < 1.2\text{V}$	--	0.5	0.92	
		$1.2\text{V} \leq V_{OUT} < 1.5\text{V}$	--	0.4	0.57	
		$1.5\text{V} \leq V_{OUT} < 1.8\text{V}$	--	0.3	0.47	
		$1.8\text{V} \leq V_{OUT} < 2.1\text{V}$	--	0.24	0.33	
		$2.1\text{V} \leq V_{OUT} < 2.5\text{V}$	--	0.21	0.3	
		$2.5\text{V} \leq V_{OUT} < 2.8\text{V}$	--	0.18	0.25	
		$2.8\text{V} \leq V_{OUT} < 3\text{V}$	--	0.16	0.23	
Dropout Voltage ($I_{LOAD} = 200\text{mA}$) (Note 6)	V_{DROP}	$1.8\text{V} \leq V_{OUT} < 2.1\text{V}$	--	0.16	0.2	V
V_{CC} Consumption Current	I_Q	$I_{LOAD} = 0\text{mA}, V_{OUT} \leq 5.5\text{V}$ $V_{IN} \geq V_{OUT} + V_{DROP}$	--	15	18	μA

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Shutdown GND Current (Note 7)		$V_{EN} = 0V$	--	0.1	0.5	μA	
Shutdown Leakage Current (Note 7)		$V_{EN} = 0V, V_{OUT} = 0V$	--	0.1	0.5	μA	
EN Input Current	I_{EN}	$V_{EN} = 5.5V$	--	--	0.1	μA	
Line Regulation	$\Delta LINE$	$I_{LOAD} = 1mA$	$1.2V \leq V_{IN} < 1.5V$	--	0.3	0.6	%
			$1.5V \leq V_{IN} < 1.8V$	--	0.15	0.3	
			$1.8V \leq V_{IN} \leq 5.5V$	--	0.13	0.35	
Load Regulation	$\Delta LOAD$	$1mA < I_{LOAD} < 300mA$	--	0.5	1	%	
Power Supply Rejection Ratio	PSRR	$V_{IN} = 3V, I_{LOAD} = 50mA,$ $C_{OUT} = 1\mu F, V_{OUT} = 2.5V, f = 1kHz$	--	70	--	dB	
Output Voltage Noise		$C_{OUT} = 1\mu F,$ $I_{LOAD} = 150mA,$ $BW = 10Hz \text{ to } 100kHz,$ $V_{IN} = V_{OUT} + 1V$	$V_{OUT} = 0.8V$	--	38	--	μV_{RMS}
			$V_{OUT} = 1.2V$	--	46	--	
			$V_{OUT} = 1.8V$	--	48	--	
			$V_{OUT} = 3.3V$	--	51	--	
Output Current Limit	I_{LIM}	$V_{OUT} = 90\% \text{ of } V_{OUT(NOM)}$	300	600	--	mA	
Enable Threshold Voltage	H-Level	V_{ENH}	$V_{IN} = 5V$	0.5	0.7	0.9	V
	L-Level	V_{ENL}	$V_{IN} = 5V$	0.4	0.65	0.85	
Thermal Shutdown Temperature	T_{SD}	$I_{LOAD} = 30mA, V_{IN} \geq 1.5V$	--	150	--	$^{\circ}C$	
Thermal Shutdown Hysteresis	ΔT_{SD}		--	20	--	$^{\circ}C$	
Discharge Resistance		$EN = 0V, V_{OUT} = 0.1V$	--	80	--	Ω	

TYPICAL APPLICATION

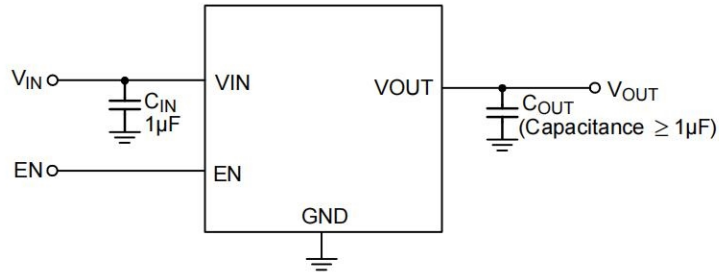
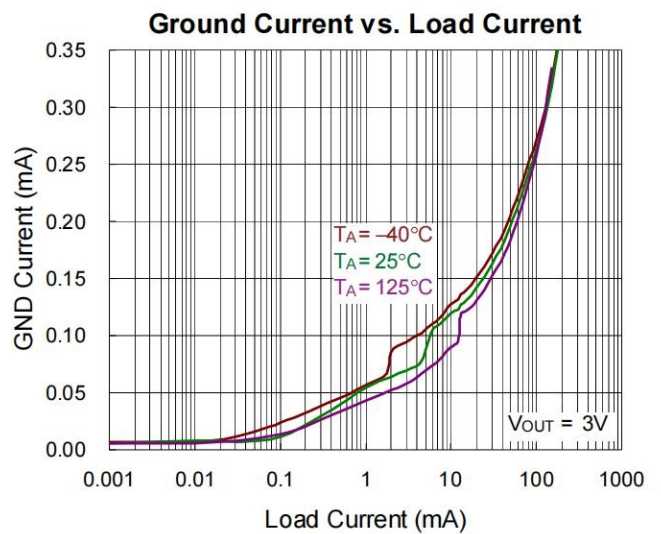
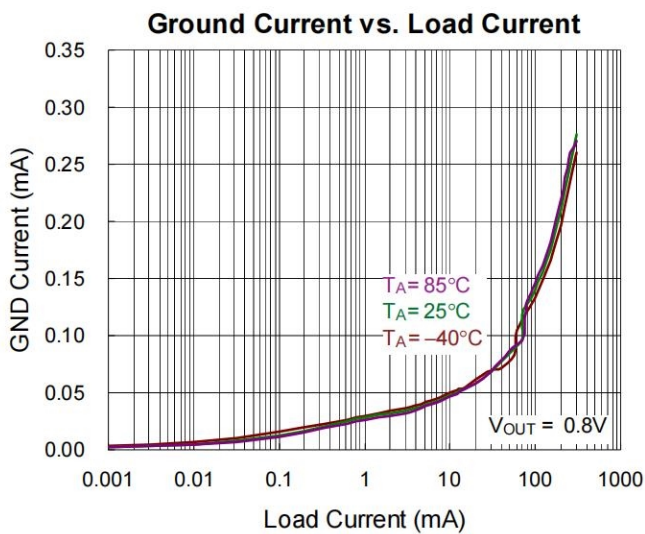
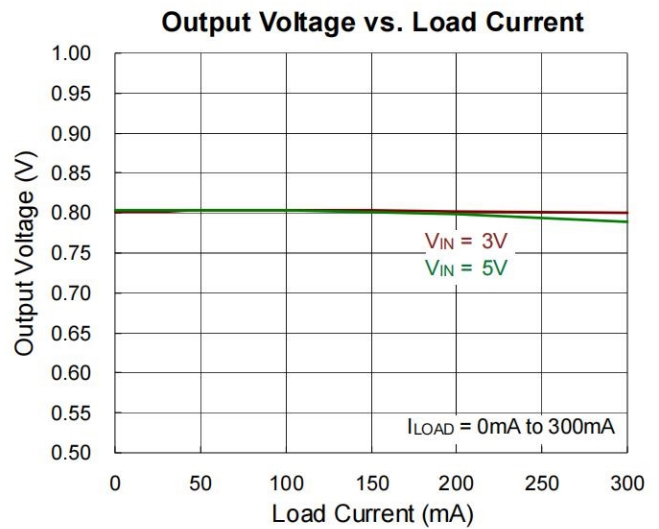
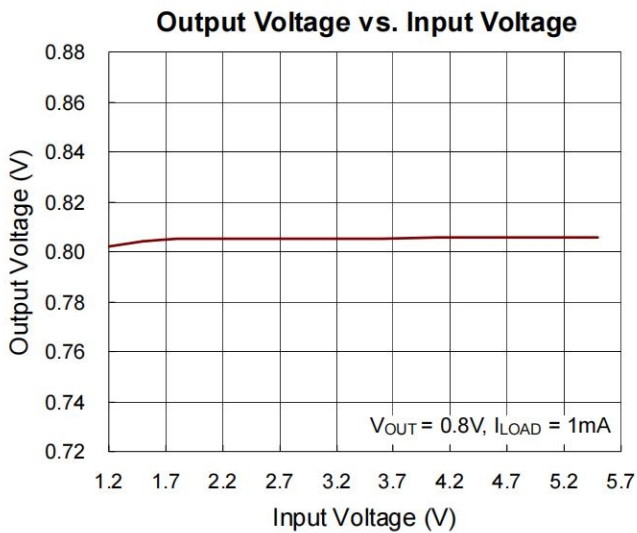
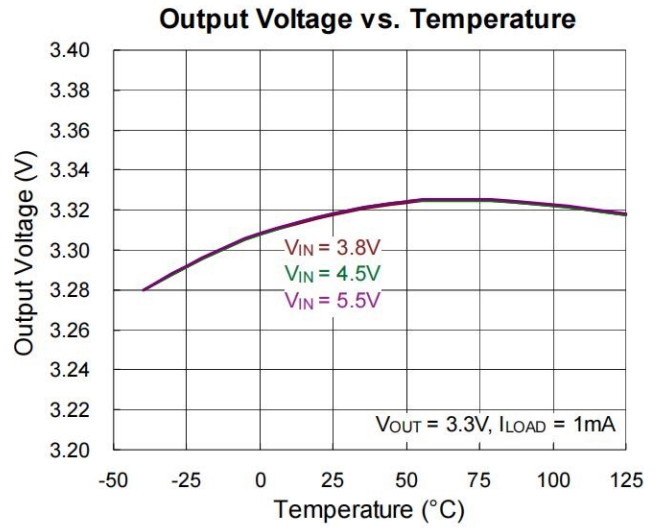
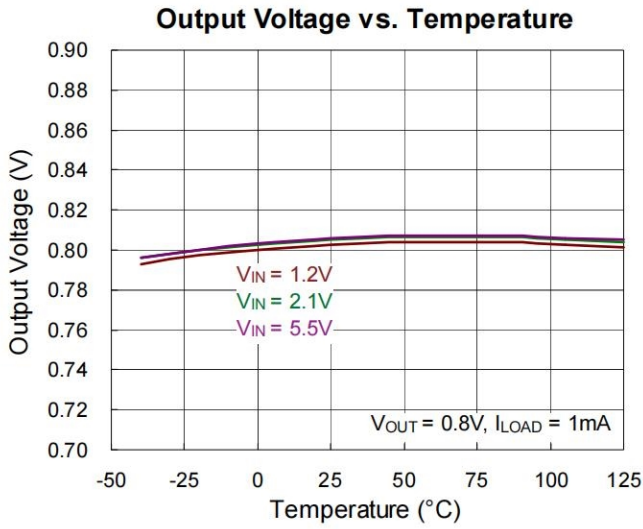
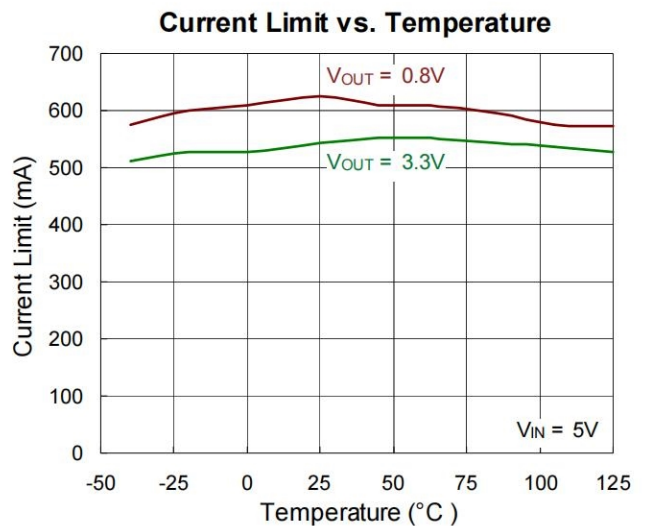
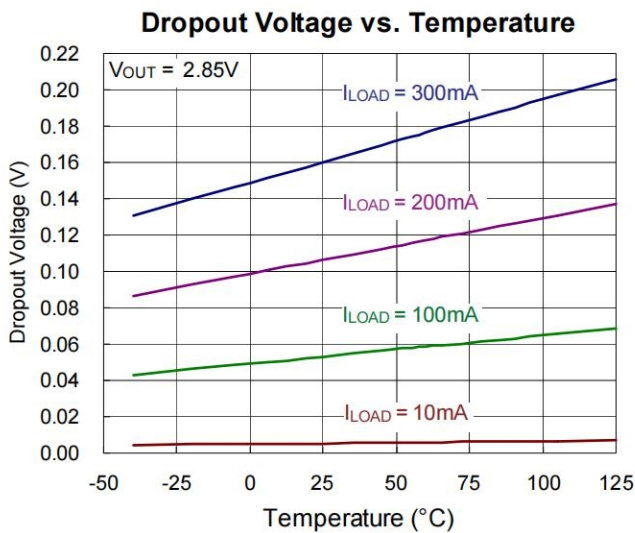
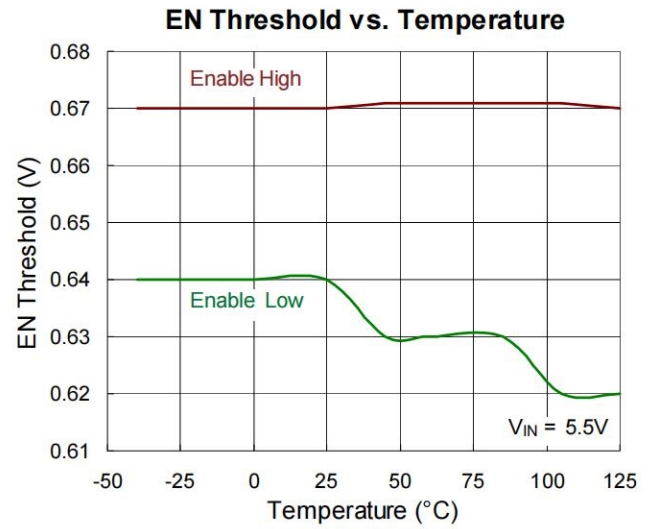
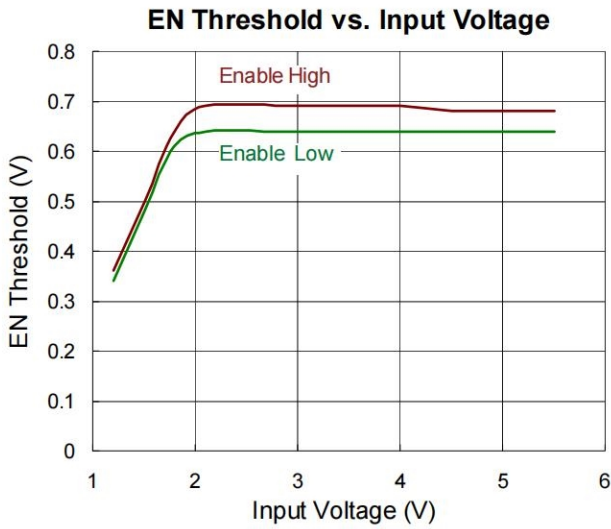
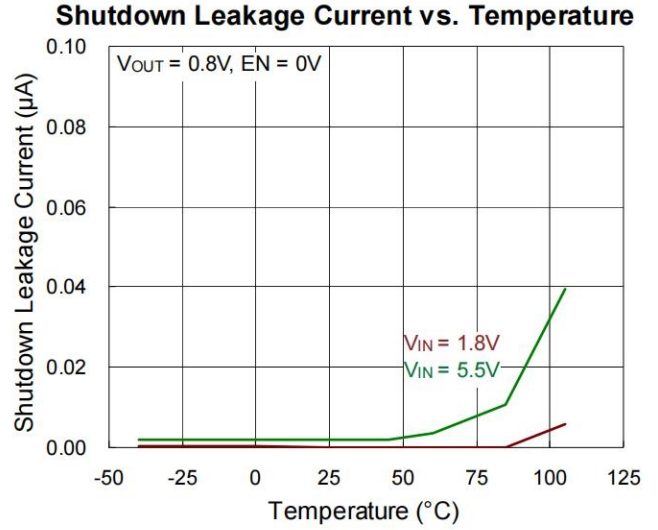
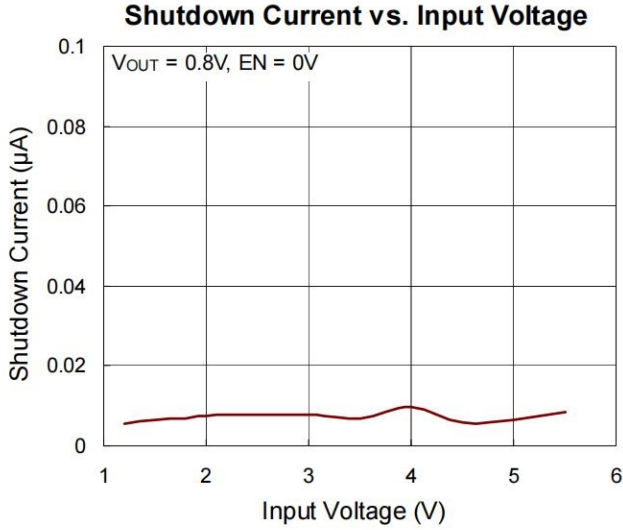


Table 1. Recommended External Components

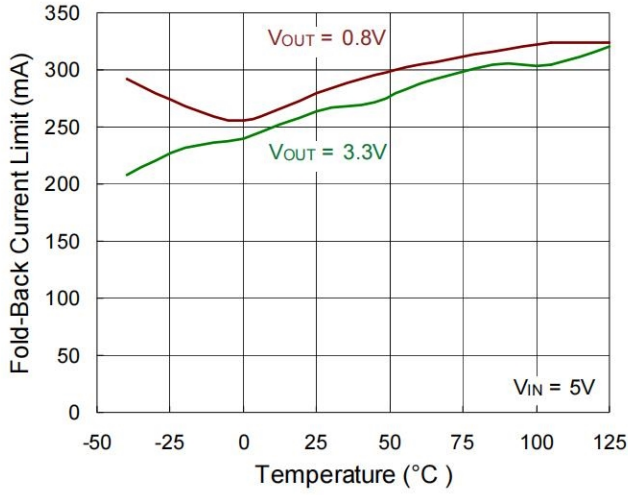
Component	Description	Vendor P/N
C _{IN}	1µF, 10V, X5R, 0402	GRM155R61A105KE15 (Murata)
* C _{OUT}	1µF, 6.3V, X5R, 0402	GRM153R60J105ME95(Murata) CGB2A3X5R0J105M033BB(TDK)
	2.2µF, 6.3V, X5R, 0402	GRM153R60J225ME95 (Murata) C1005X5R0J225M050BC (TDK)
	4.7µF, 6.3V, X5R, 0402	GRM153R60J475ME15 (Murata) C1005X5R0J475K050BE(TDK)

Typical Operating Characteristics

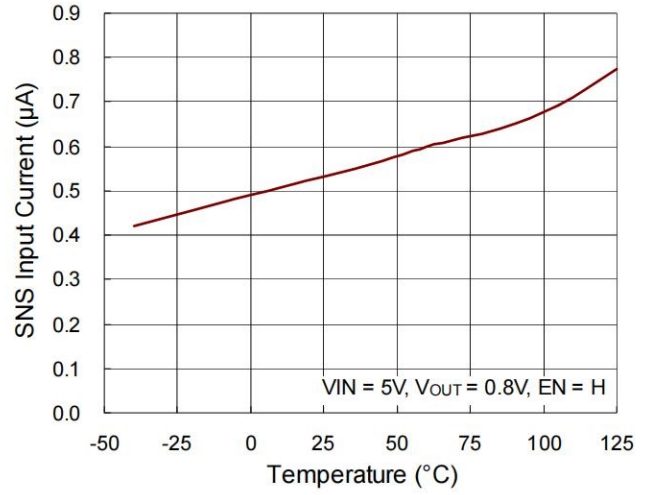




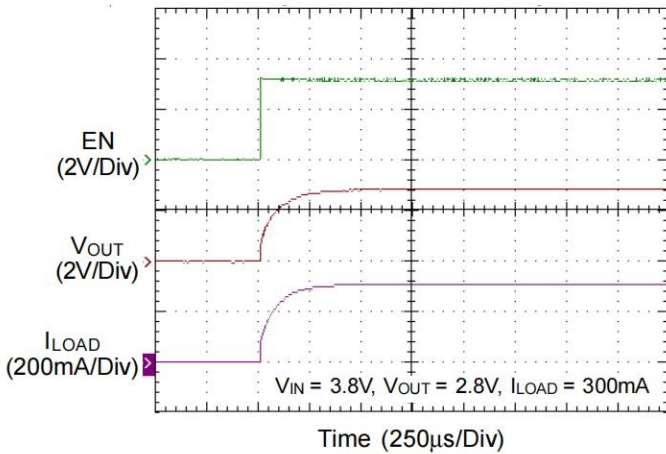
Fold-Back Current Limit vs. Temperature



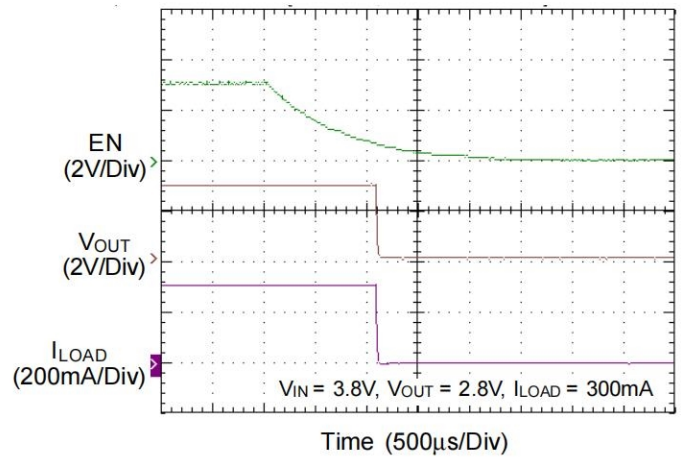
SNS Input Current vs. Temperature



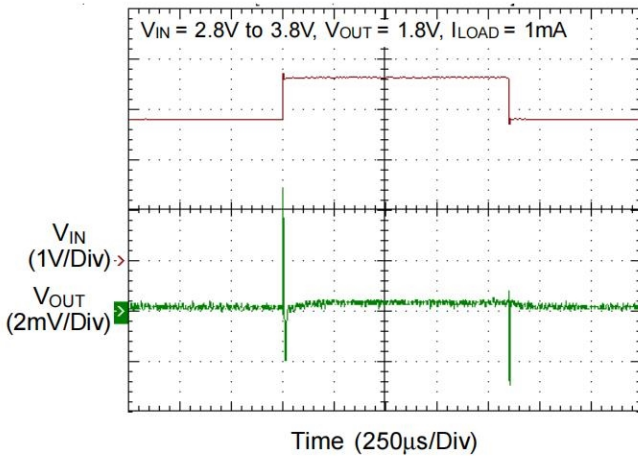
Power On from EN



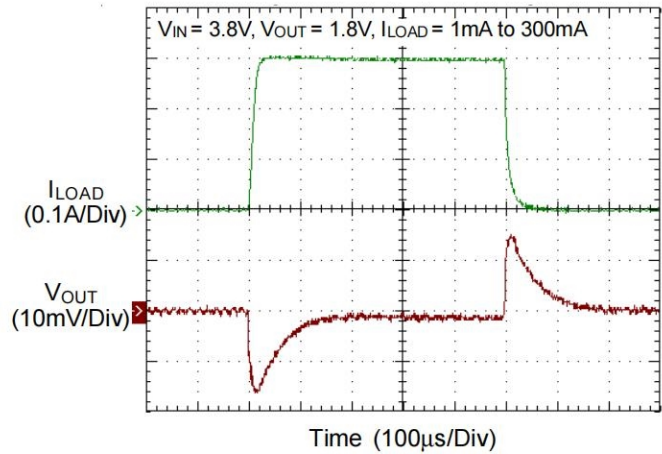
Power Off from EN



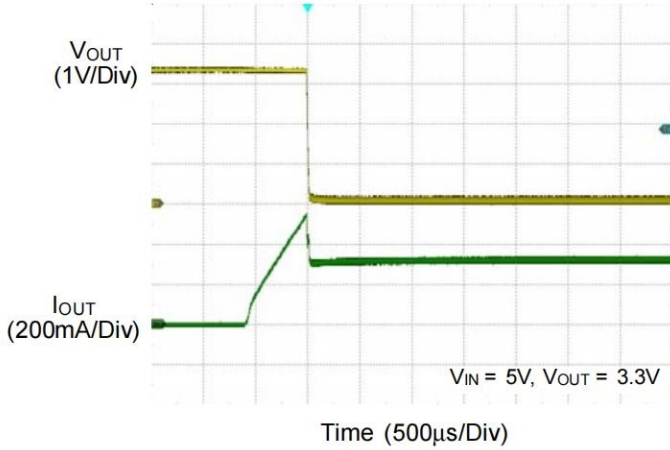
Line Transient



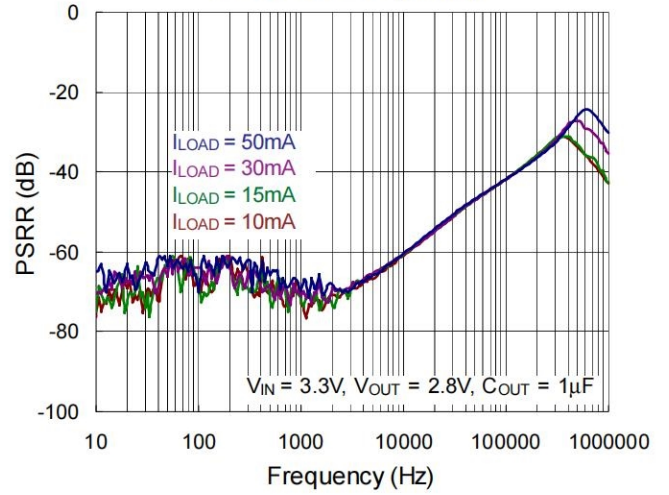
Load Transient



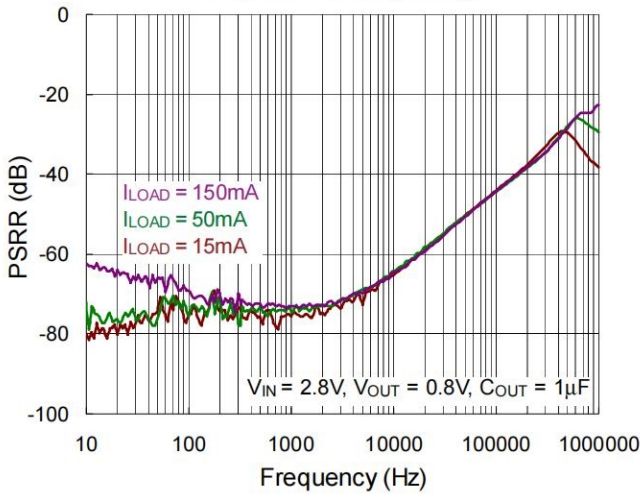
Output Current Limit Protection



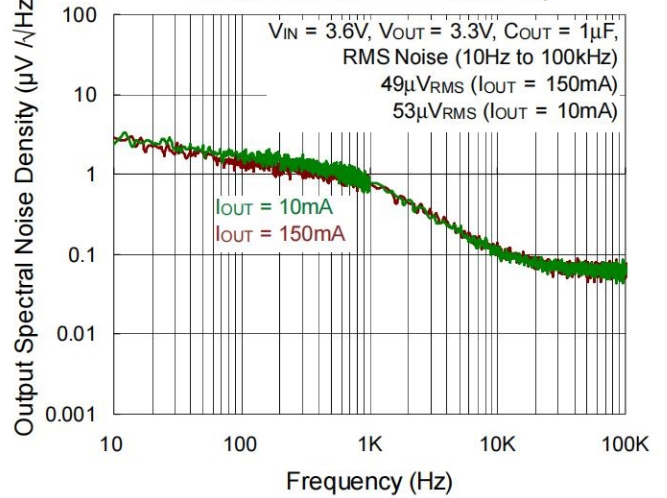
PSRR vs. Frequency



PSRR vs. Frequency

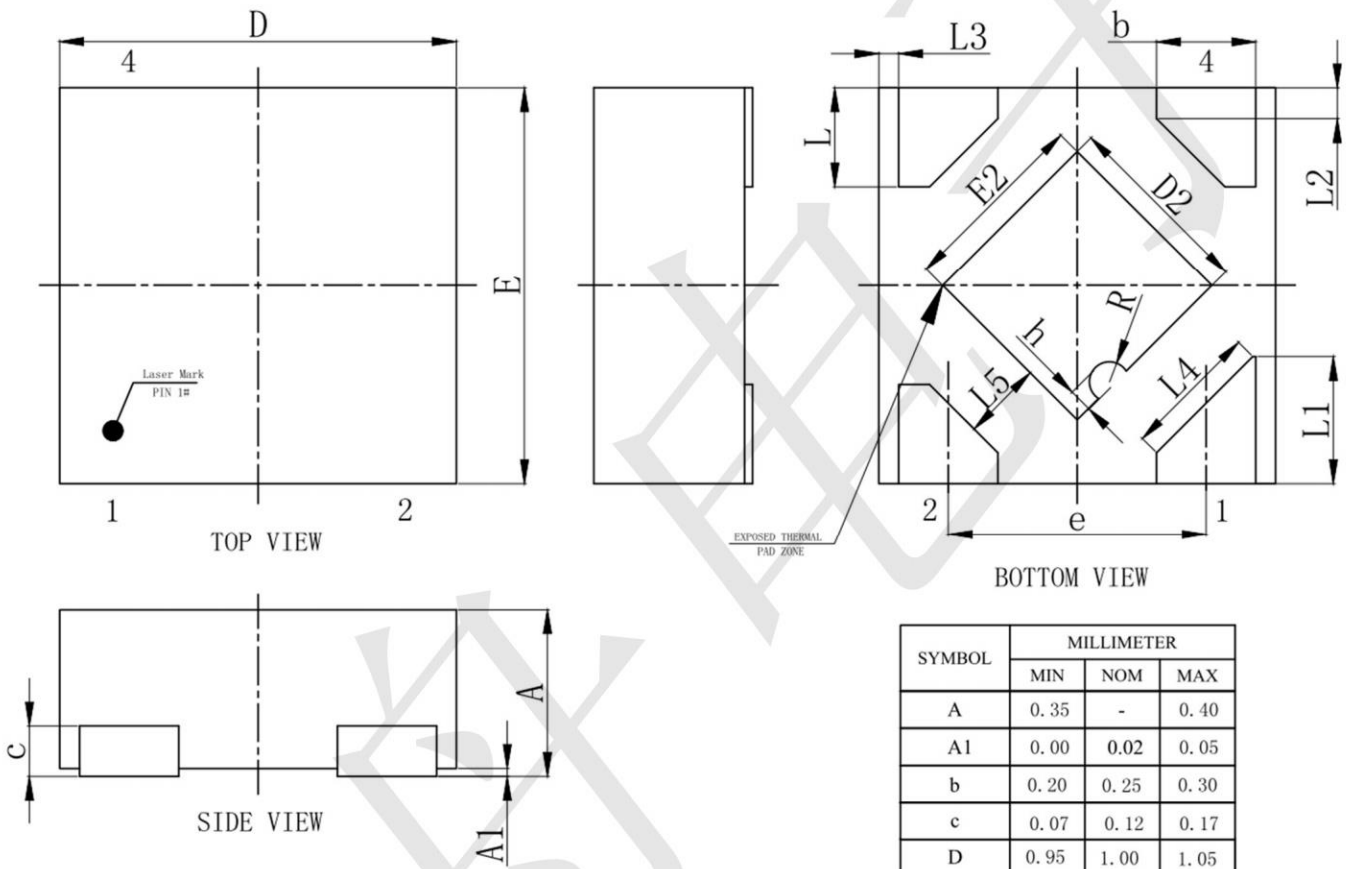


Output Noise vs. Frequency



Package informantion

DFN1X1-4 Outline Dimensions



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.35	-	0.40
A1	0.00	0.02	0.05
b	0.20	0.25	0.30
c	0.07	0.12	0.17
D	0.95	1.00	1.05
D2	0.38	0.48	0.58
e	0.65BSC		
E	0.95	1.00	1.05
E2	0.38	0.48	0.58
L	0.20	0.25	0.30
L1	0.27	0.32	0.37
L2	0.077REF		
L3	0.05REF		
L4	0.34REF		
L5	0.20REF		
R	0.05REF		
h	0.06REF		