TPNCP160AMXxxxTBG Series

300mA Low- Dropout Linear Regulator

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Features

- **Input Voltage Range : 1.4V to 5.5V**
- **15 µA Ground Current (I_Q) at no Load**
- **PSRR = 70dB at 1kHz**
- **±1.5% Output Accuracy**
- **Low (0.1µA) Shutdown Current**
- **Dropout Voltage : 0.15V at 300mA when V_{OUT} ≥ 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 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.

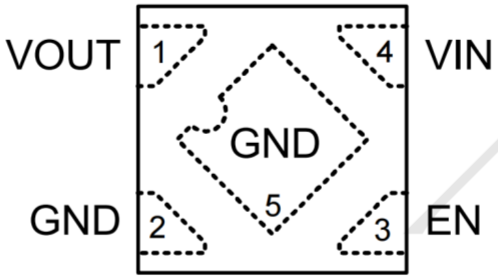
The feature of 15 µA low quiescent current and 0.5µA shutdown current are ideal for the battery application with long service life. The other features include current limit function, over temperature protection and output discharge function.

Ordering Information

TPNCP160AMX300TBG

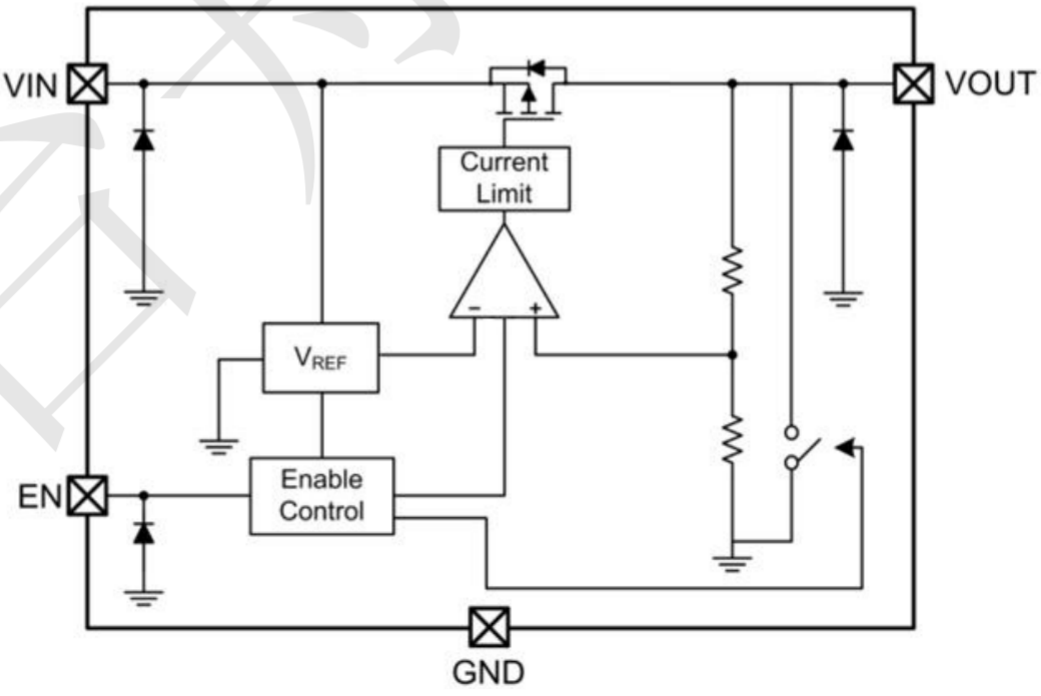
Output Voltage: 330=3.3V
300=3.0V
280=2.8V
180=1.8V
xxx=x.xV

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°C unless otherwise noted)

- VIN, VOUT, ,EN to GND ---------- –0.3V to 6.5V
- VOUT to VIN ---------- –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, VIN ---------- 1.4V to 5.5V
- Junction Temperature Range ---------- –40°C to 125°C

Electrical Characteristics (T =25°C unless otherwise noted)

(V_{OUT} + 1 < V_{IN} < 5.5V, T_A = 25°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} = 1mA	–2	--	2	%
Dropout Voltage (I_{LOAD} = 300mA) (Note 5)	V_{DROP}	0.8V ≤ V_{OUT} < 1.05V	--	0.7	0.97	V
		1.05V ≤ V_{OUT} < 1.2V	--	0.5	0.92	
		1.2V ≤ V_{OUT} < 1.5V	--	0.4	0.57	
		1.5V ≤ V_{OUT} < 1.8V	--	0.3	0.47	
		1.8V ≤ V_{OUT} < 2.1V	--	0.24	0.33	
		2.1V ≤ V_{OUT} < 2.5V	--	0.21	0.3	
		2.5V ≤ V_{OUT} < 2.8V	--	0.18	0.25	
		2.8V ≤ V_{OUT} < 3V	--	0.16	0.23	
		3V ≤ V_{OUT}	--	0.15	0.2	
Dropout Voltage (I_{LOAD} = 200mA) (Note 6)	V_{DROP}	1.8V ≤ V_{OUT} < 2.1V	--	0.16	0.2	V
V_{CC} Consumption Current	I_Q	I_{LOAD} = 0mA, V_{OUT} ≤ 5.5V V_{IN} ≥ 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		ΔLINE	I_{LOAD} = 1mA	1.2V ≤ V_{IN} < 1.5V	--	0.3	0.6	%
				1.5V ≤ V_{IN} < 1.8V	--	0.15	0.3	
				1.8V ≤ V_{IN} ≤ 5.5V	--	0.13	0.35	
Load Regulation		ΔLOAD	1mA < I_{LOAD} < 300mA		--	0.5	1	%
Power Supply Rejection Ratio		PSRR	V_{IN} = 3V, I_{LOAD} = 50mA, C_{OUT} = 1μF, V_{OUT} = 2.5V, f = 1kHz		--	70	--	dB
Output Voltage Noise			C_{OUT} = 1μF, I_{LOAD} = 150mA, BW = 10Hz 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% 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} ≥ 1.5V		--	150	--	°C
Thermal Shutdown Hysteresis		$ΔT_{SD}$			--	20	--	°C
Discharge Resistance			EN = 0V, V_{OUT} = 0.1V		--	80	--	Ω

TYPICAL APPLICATION

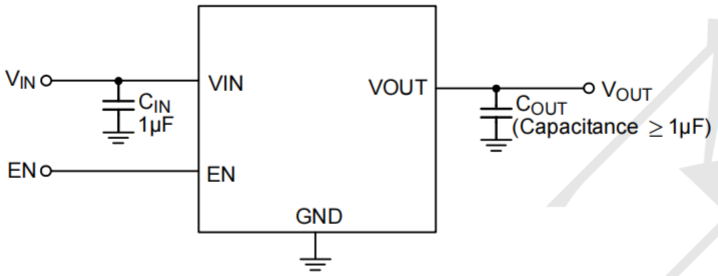
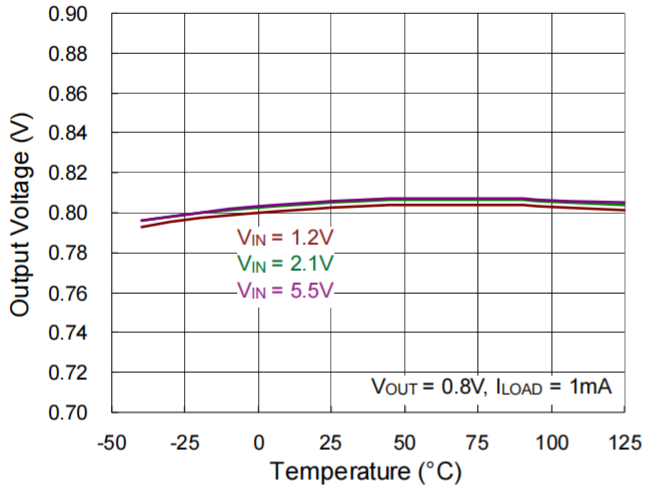


Table 1. Recommended External Components

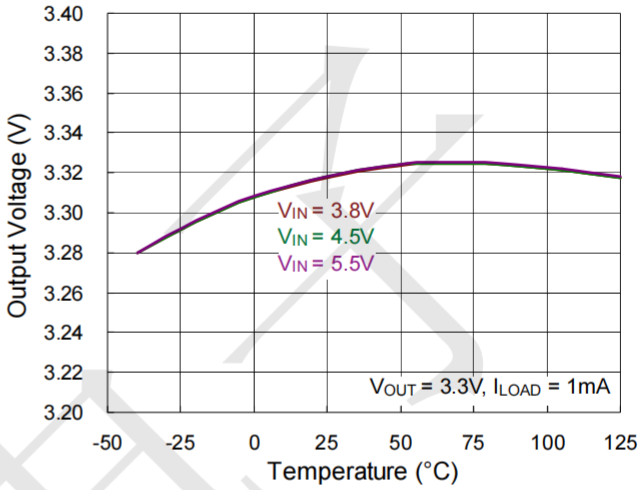
Component	Description	Vendor P/N
C_{IN}	1μF, 10V, X5R, 0402	GRM155R61A105KE15 (Murata)
* C_{OUT}	1μF, 6.3V, X5R, 0402	GRM153R60J105ME95(Murata) CGB2A3X5R0J105M033BB(TDK)
	2.2μF, 6.3V, X5R, 0402	GRM153R60J225ME95 (Murata) C1005X5R0J225M050BC (TDK)
	4.7μF, 6.3V, X5R, 0402	GRM153R60J475ME15 (Murata) C1005X5R0J475K050BE(TDK)

Typical Operating Characteristics

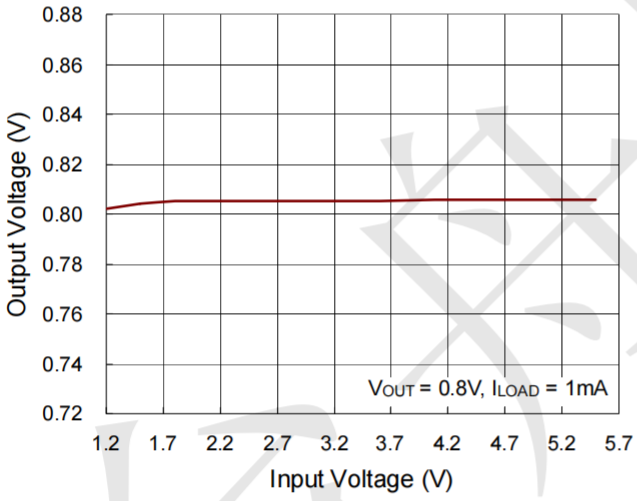
Output Voltage vs. Temperature



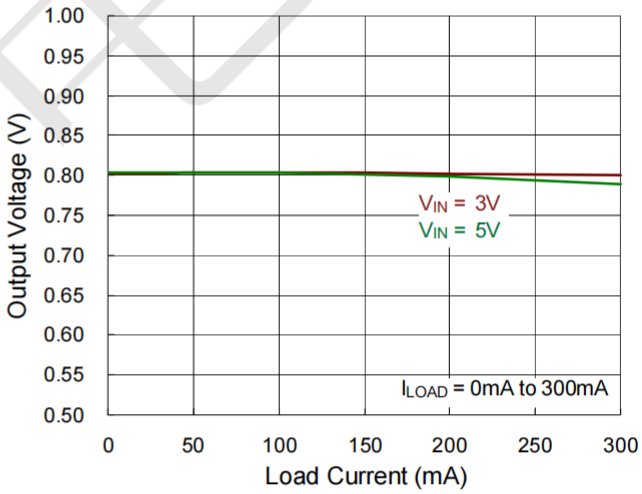
Output Voltage vs. Temperature



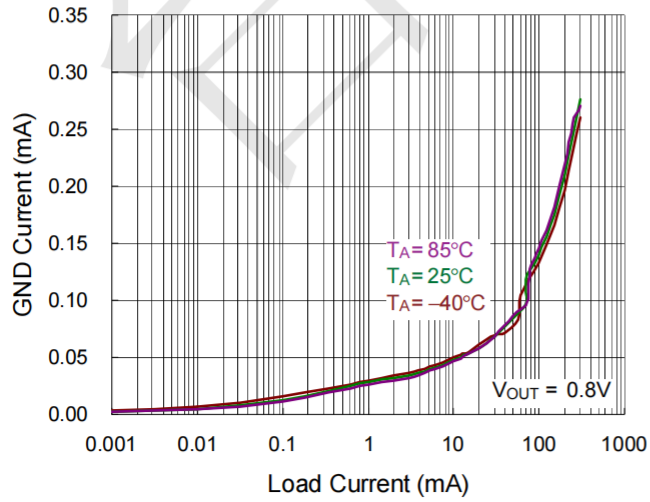
Output Voltage vs. Input Voltage



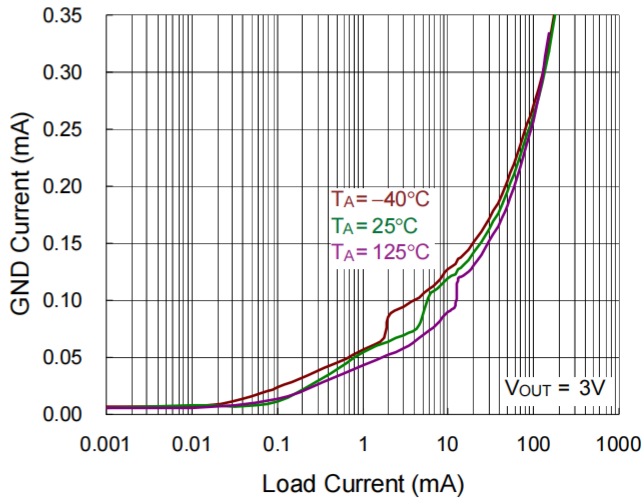
Output Voltage vs. Load Current



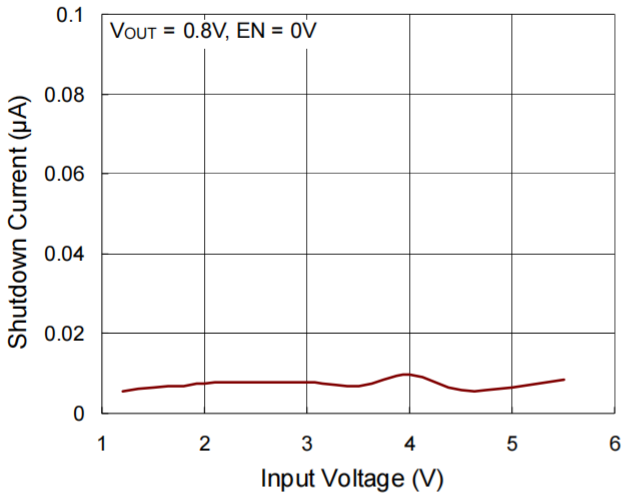
Ground Current vs. Load Current



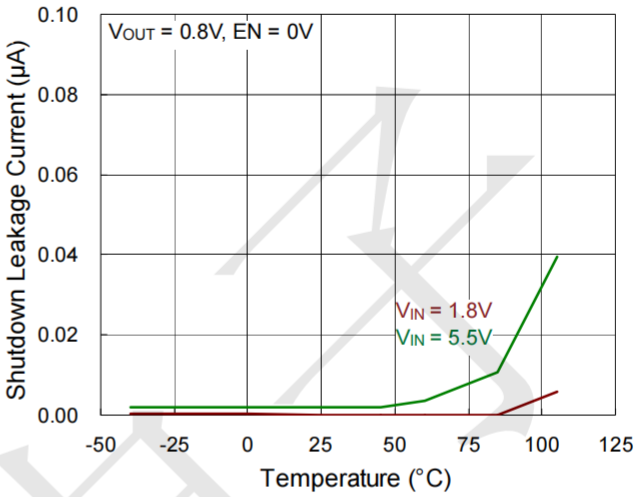
Ground Current vs. Load Current



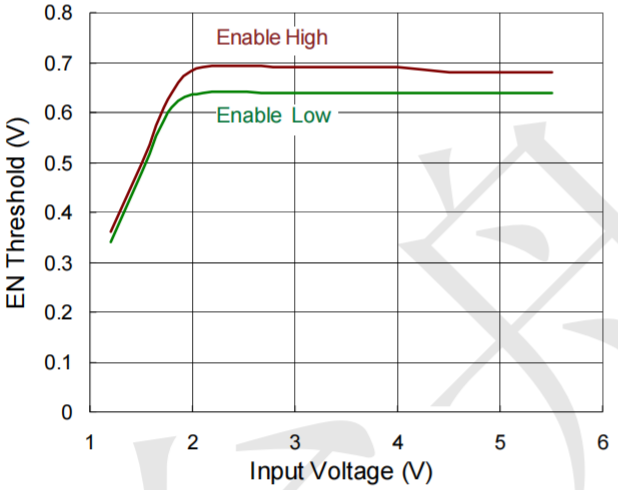
Shutdown Current vs. Input Voltage



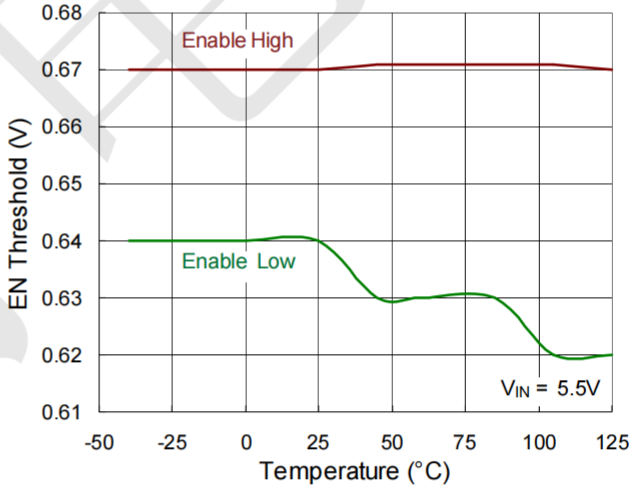
Shutdown Leakage Current vs. Temperature



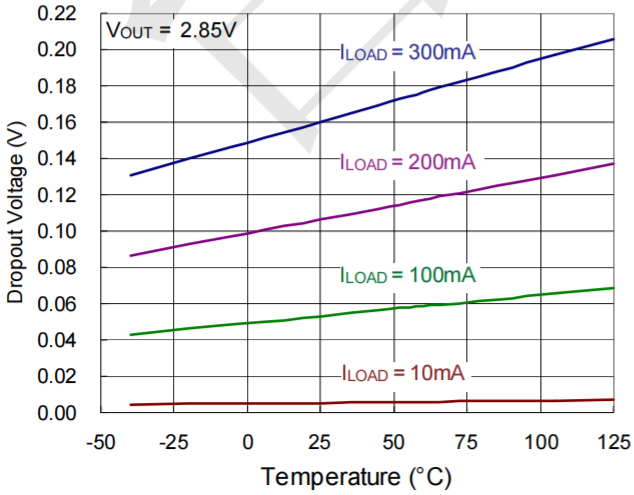
EN Threshold vs. Input Voltage



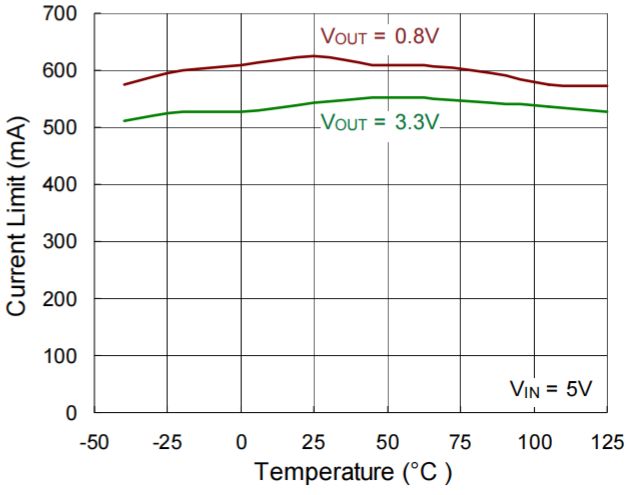
EN Threshold vs. Temperature



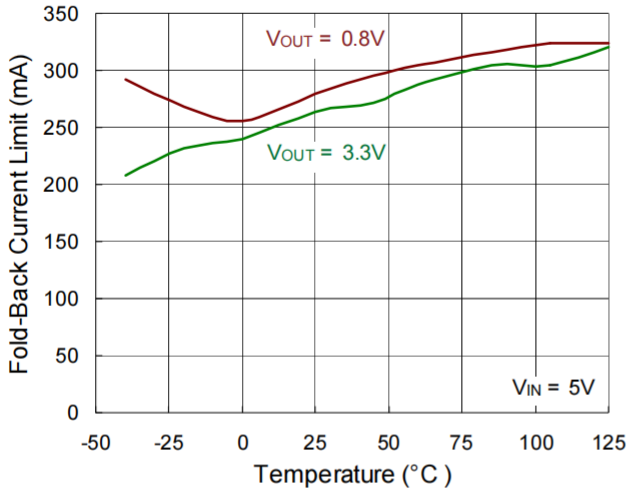
Dropout Voltage vs. Temperature



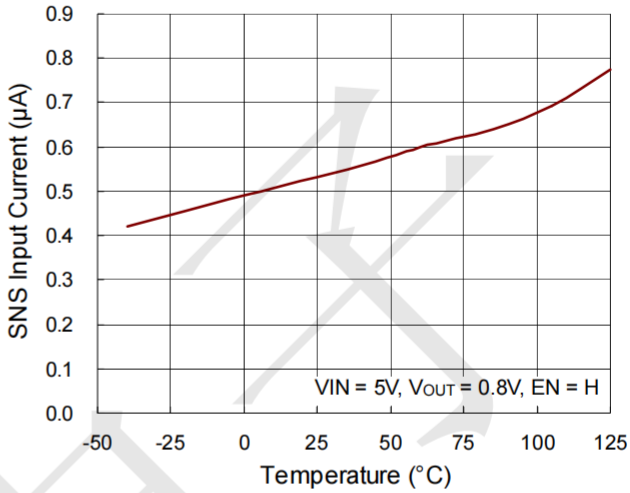
Current Limit vs. Temperature



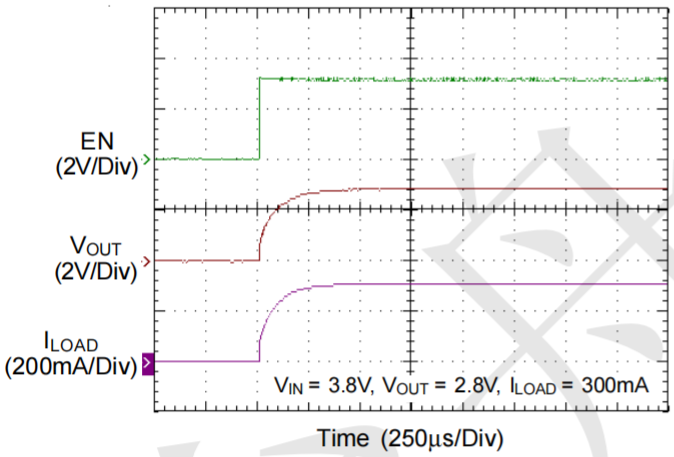
Fold-Back Current Limit vs. Temperature



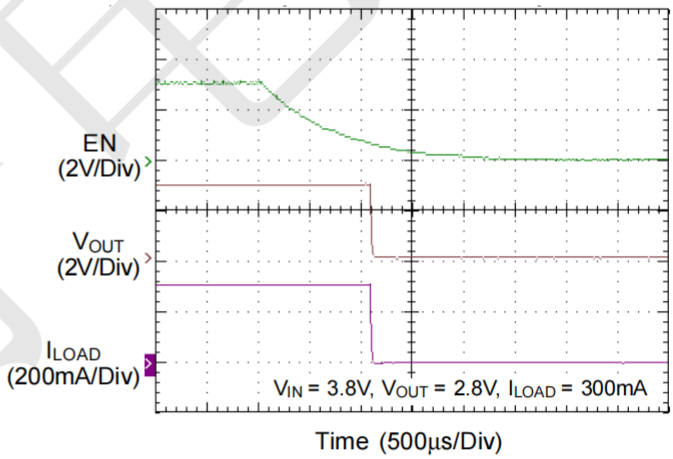
SNS Input Current vs. Temperature



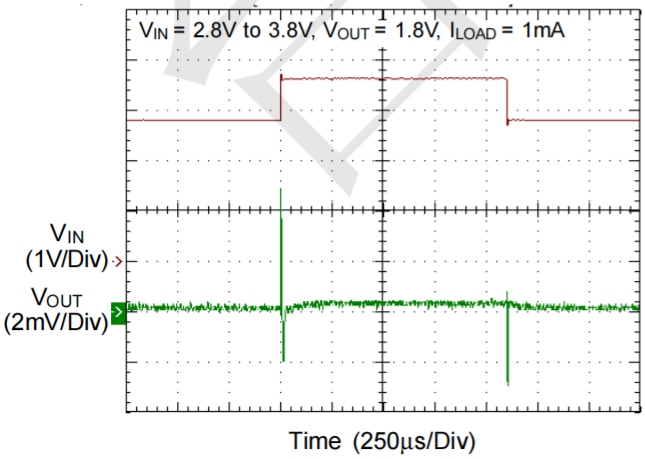
Power On from EN



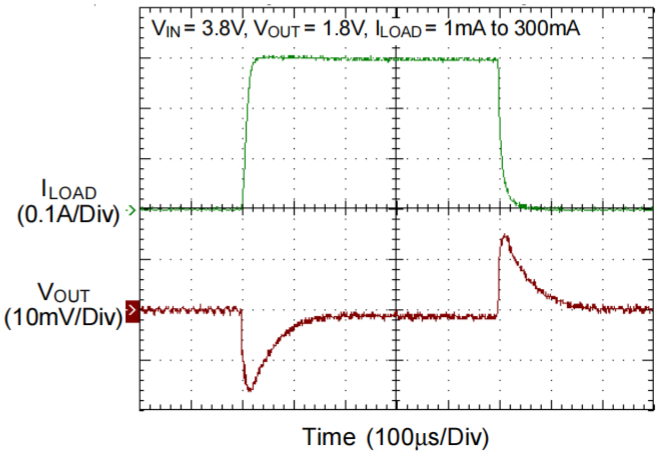
Power Off from EN



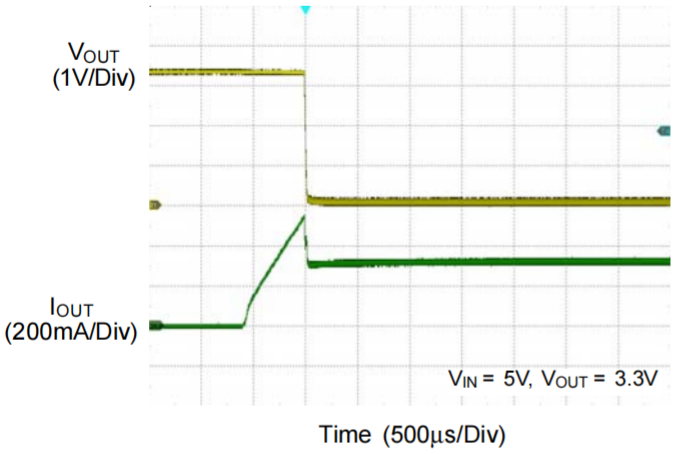
Line Transient



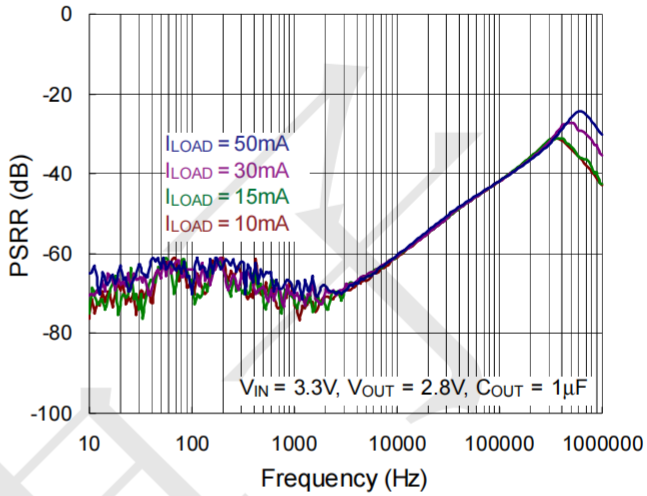
Load Transient



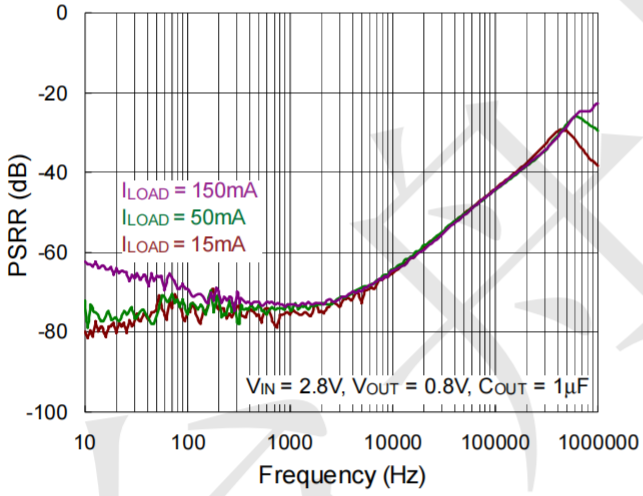
Output Current Limit Protection



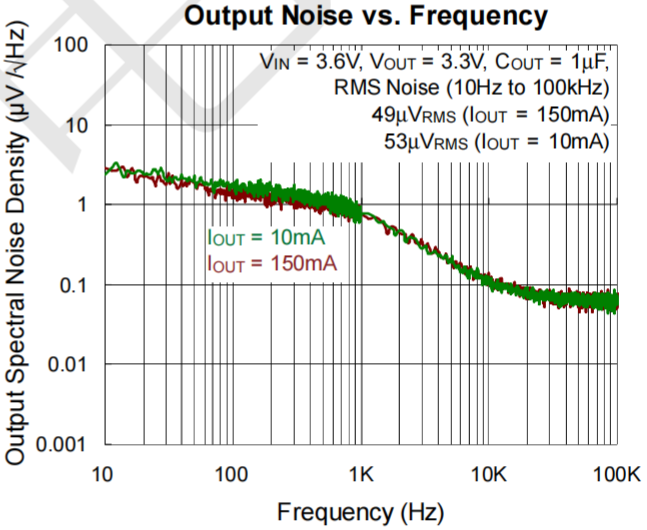
PSRR vs. Frequency



PSRR vs. Frequency

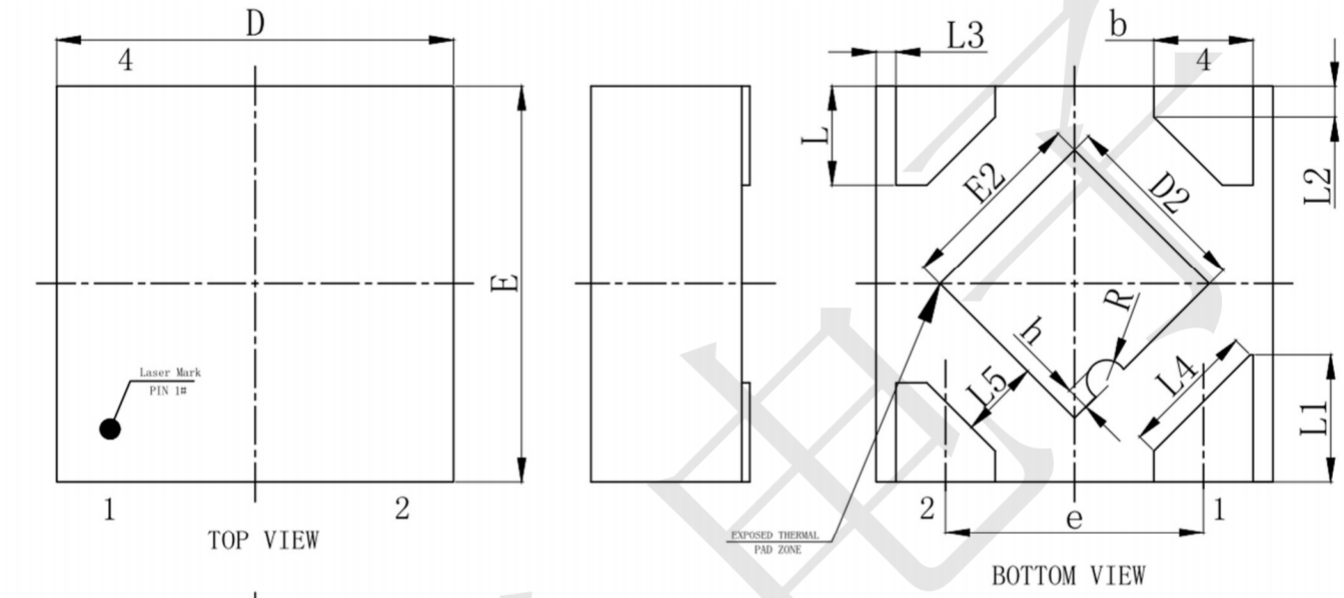


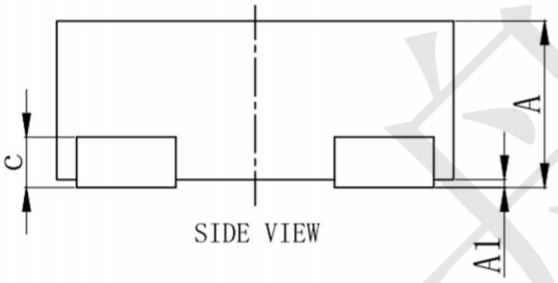
Output Noise vs. Frequency



Package informantion

DFN1X1-4





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		