ET631XXYB - Ultra-Low IQ 150mA LDO

General Description

The ET631XXYB series of CMOS low dropout regulators are designed specifically for portable battery-powered applications which require ultra-low quiescent current. The ultra-low consumption of type 0.6uA ensures long battery life and dynamic transient boost feature improves device transient response for wireless communication applications.

The device is available in small 1mm×1mm DFN4 packages.

Features

- Operating Input Voltage Range From 2.2V to 5.5V
- Output Voltage Range From 1.1V to 3.6V (0.05V Steps)
- Ultra-Low Quiescent Current Typical 0.6uA
- Low Dropout is Typical 240mV at 150mA@V_{OUT}=1.8V
- High Output Voltage Accuracy ±1%
- Stable with Ceramic Capacitors 1uF
- Over-Current Protection
- Thermal Shutdown Protection
- Auto Discharge Function
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant
- Package Information:

Part No.	Package	MSL
ET631XXYB	DFN4 (1mm×1mm)	Level 1

Applications

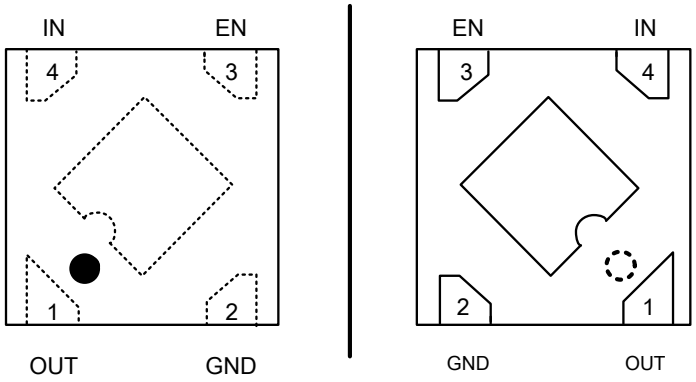
- Battery Powered Equipments
- Portable Communication Equipments
- Cameras, Image Sensors and Camcorders
- Label Information

Device Information

ET 631 XX Y B

XX Output Voltage		**Y** Package		**B** Auto-Discharging Function	
XX	Output Voltage For example, 18 is 1.8V output	Y	DFN4(1×1)	B	Auto-discharging available

Pin Configuration

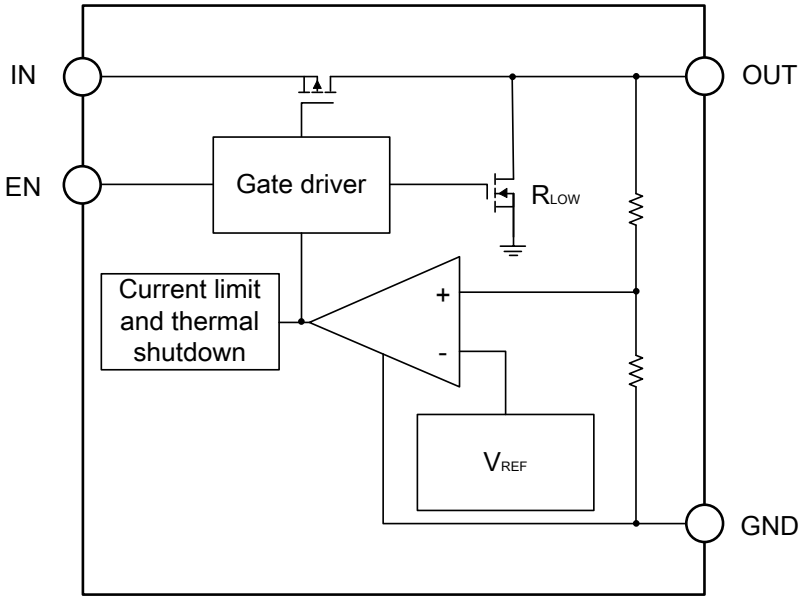


Top view Bottom view

Pin Function

Pin No.	Pin Name	Pin Function
1	OUT	Output pin. A 1μF low-ESR capacitor should be connected to this pin to ground.
2	GND	Ground
3	EN	Enable control input, active high. Do not leave EN floating
4	IN	Supply input pin. Must be closely decoupled to GND with a 1μF or greater ceramic capacitor
-	Thermal Pad	Thermal pad for DFN4(1×1) package, connect to GND or leave floating. Do not connect to any potential other than GND

Block Diagram



Functional Description

General

The ET631XXYB is a high performance 150mA Linear Regulator with Ultra Low IQ. This device delivers low Noise and high Power Supply Rejection Ratio with excellent dynamic performance due to employing the Dynamic Quiescent Current adjustment which assure ultra low IQ consumption at no-load state. These parameters make this device very suitable for various battery powered applications.

Input Capacitor

It is recommended to connect at least a 1μF Ceramic X5R or X7R capacitor between IN and GND pins of the device. This capacitor will provide a low impedance path for any unwanted AC signals or Noise superimposed onto constant Input Voltage. The good input capacitor will limit the influence of input trace inductances and source resistance during sudden load current changes.

Higher capacitance and lower ESR Capacitors will improve the overall line transient response.

Output Capacitor

The ET631XXYB does not require a minimum Equivalent Series Resistance (ESR) for the output capacitor. The X5R and X7R types have the lowest capacitance variations over temperature thus they are recommended.

There is recommended connect the output capacitor as close as possible to the output pin of the regulator.

ON/OFF Input Operation

The ET631XXYB uses the EN pin to enable /disable its device and to activate /deactivate the active discharge function at devices with this feature. If the EN pin voltage is pulled below 0.4V the device is guaranteed to be disable. The active discharge transistor at the devices with Active Discharge Feature is activated and the output voltage VOUT is pulled to GND through an internal circuitry with effective resistance about 45Ω.

If the EN pin voltage is higher than 1.2V the device is guaranteed to be enabled. The internal active discharge circuitry is switched off and the desired output voltage is available at output pin. In case the Enable function is not required the EN pin should be connected directly to input pin.

Current Limit Protection

When output current at the OUT pin is higher than current limit threshold, the current limit protection will be triggered and clamp the output current to approximately 300mA to prevent over-current and to protect the regulator from damage due to overheating.

Thermal shutdown Protection

When the die temperature exceeds the Thermal Shutdown point (T_{SD} = 155°C typical) the device goes to disabled state and the output voltage is not delivered until the die temperature decreases to 135°C. The Thermal Shutdown feature provides a protection from a catastrophic device failure at accidental overheating. This protection is not intended to be used as a substitute for proper heat sinking.

Power Dissipation and Heat sinking

The maximum power dissipation supported by the device is dependent upon board design and layout. Mounting pad configuration on the PCB, the board material and the ambient temperature affect the rate of junction temperature rise for the part. The maximum power dissipation the ET631XXYB device can handle is given by:

$$P_{D(MAX)} = \frac{\left[T_{J(MAX)} - T_A\right]}{R_{\theta JA}}$$

Absolute Maximum Ratings

Symbol	Parameters (Items)	Value	Unit
V_{IN}	IN Voltage(1)	-0.3 to 6.0	V
V_{EN}	Input Voltage (EN Pin)	-0.3 to 6.0	V
V_{OUT}	Output Voltage	-0.3 to V_{IN}+0.3	V
P_D	Maximum Power Consumption	400	mW
$R_{\theta JA}$	Junction-to-ambient thermal resistance	250	°C/W
T_J	Operating Junction Temperature	-40 to 150	°C
T_{STG}	Storage Temperature	-65 to 150	°C
V_{ESD}	Human Body Model (JESD22-A114)	±4000	V
	Charged Device Model (JESD22-C101)	±1500	
I_{LU}	Latch up Current Maximum Rating (JESD78E)	±200	mA

Note1: Refer to ELECTRICAL CHARACTERISTIS for safe operating area.

Recommended Operating Conditions

Symbol	Parameters	Rating	Unit
V_{IN}	Input Voltage	2.2 to 5.5	V
I_{OUT}	Output Current	0 to 150	mA
T_A	Operating Ambient Temperature	-40 to 85	ºC
C_{IN}	Effective Input Ceramic Capacitor Value	0.47 to 4.7	µF
C_{OUT}	Effective Output Ceramic Capacitor Value	0.47 to 4.7	µF
ESR	Input and Output Capacitor Equivalent Series Resistance (ESR)	5 to 100	mΩ

Electrical Characteristics

VOLTAGE VERSION 1.1V

(V_{IN}=2.5V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) (2)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	1.085	1.1	1.115	V
		-40°C≤T_A≤85°C	1.070	1.1	1.130	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=2.5V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=2.5V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA (3) (5)			1100	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=2.5V+200mVVpp Modulation, I_{OUT}=150mA(4)		55		dB
e_N	Output Noise	V_{IN}=2.5V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF(4)		55		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at Off State	EN=0V, V_{IN}=4V	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising(4)		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown(4)		20		°C

VOLTAGE VERSION 1.2V

(V_{IN}=2.5V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) (2)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	1.185	1.2	1.215	V
		-40°C≤T_A≤85°C	1.170	1.2	1.230	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=2.5V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=2.5V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA (3) (5)			1000	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=2.5V+200mVVpp Modulation, I_{OUT}=150mA(4)		55		dB
e_N	Output Noise	V_{IN}=2.5V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF(4)		55		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at off State	EN=0V, V_{IN}=4V	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising(4)		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown(4)		20		°C

VOLTAGE VERSION 1.5V

(V_{IN}=2.5V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) (2)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	1.485	1.5	1.515	V
		-40°C≤T_A≤85°C	1.470	1.5	1.530	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=2.5V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=2.5V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA (3) (5)			700	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=2.5V+200mVVpp Modulation, I_{OUT}=150mA(4)		55		dB
e_N	Output Noise	V_{IN}=2.5V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF(4)		60		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at Off State	EN=0V, V_{IN}=4V	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising(4)		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown(4)		20		°C

VOLTAGE VERSION 1.8V

(V_{IN}=2.8V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) (2)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	1.782	1.8	1.818	V
		-40°C≤T_A≤85°C	1.764	1.8	1.836	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=2.8V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=2.8V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA (3)		240	340	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=2.8V+200mVVpp Modulation, I_{OUT}=150mA(4)		55		dB
e_N	Output Noise	V_{IN}=2.8V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF(4)		70		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at Off State	EN=0V, V_{IN}=4V	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising(4)		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown(4)		20		°C

VOLTAGE VERSION 2.5V

(V_{IN}=3.5V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) (2)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	2.475	2.5	2.525	V
		-40°C≤T_A≤85°C	2.450	2.5	2.550	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=3.5V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=3.5V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA (3)		180	280	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=3.5V+200mVVpp Modulation, I_{OUT}=150mA(4)		45		dB
e_N	Output Noise	V_{IN}=3.5V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF(4)		85		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at Off State	EN=0V, V_{IN}=4V	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising(4)		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown(4)		20		°C

VOLTAGE VERSION 2.8V

(V_{IN}=3.8V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) (2)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	2.772	2.8	2.828	V
		-40°C≤T_A≤85°C	2.744	2.8	2.856	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=3.8V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=3.8V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA (3)		170	270	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=3.8V+200mVVpp Modulation, I_{OUT}=150mA(4)		45		dB
e_N	Output Noise	V_{IN}=3.8V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF(4)		90		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at Off State	EN=0V, V_{IN}=4V	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising(4)		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown(4)		20		°C

VOLTAGE VERSION 3.0V

(V_{IN}=4.0V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) [2]

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	2.970	3.0	3.030	V
		-40°C≤T_A≤85°C	2.940	3.0	3.060	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=4.0V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=4.0V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA [3]		170	270	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=4.0V+200mVVpp Modulation, I_{OUT}=150mA[4]		45		dB
e_N	Output Noise	V_{IN}=4.0V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF[4]		93		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at Off State	EN=0V, V_{IN}=4V	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising[4]		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown[4]		20		°C

VOLTAGE VERSION 3.3V

(V_{IN}=4.3V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.) (2)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.2		5.5	V
V_{OUT}	Regulated Output Voltage	T_A=25°C	3.267	3.3	3.333	V
		-40°C≤T_A≤85°C	3.234	3.3	3.366	
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=4.3V to 5.5V, I_{OUT}=1mA		0.05	0.20	%/V
	Output Voltage Load Regulation	I_{OUT} from 1mA to 150mA, V_{IN}=4.3V		5	20	mV
V_{DROP}	Dropout Voltage	I_{OUT}=150mA (3)		160	260	mV
I_{LIMIT}	Current Limit	T_A=25°C	200	400	600	mA
I_{SHORT}	Short Current Limit	V_{OUT}=0V	70	170	270	mA
I_{Q_ON}	Input Quiescent Current	Active mode: V_{EN}=V_{IN} I_{OUT}=0mA		0.6	0.9	μA
I_{Q_OFF}	Input Shutdown Current	V_{EN}=0V, T_A=25°C		0.1	0.5	μA
V_{IH}	EN High Threshold	V_{IN}=2.2V to 5.5V, V_{EN} rising until the output is enabled	1.2			V
V_{IL}	EN Low Threshold	V_{IN}=2.2V to 5.5V, V_{EN} falling until the output is disabled			0.4	V
I_{EN}	EN Pin Input Current	V_{EN}≤V_{IN}≤5.5V		20	200	nA
PSRR	Power Supply Rejection Ratio	f=1kHz, V_{IN}=4.3V+200mVVpp Modulation, I_{OUT}=150mA(4)		45		dB
e_N	Output Noise	V_{IN}=4.3V, f=10Hz to 100kHz, I_{OUT}=1mA, C_{OUT}=1μF(4)		95		μV_{RMS}
R_{LOW}	Output Resistance of Auto Discharge at Off State	EN=0V, V_{IN}=4V, I_{OUT}=10mA	15	45	90	Ω
T_{TSD}	Over-temperature Shutdown Threshold	T_J rising(4)		155		°C
T_{HYS}	Over-temperature Shutdown Hysteresis	T_J falling from shutdown(4)		20		°C

Note2: Here V_{IN} means internal circuit can work normal. If V_{IN}<V_{OUT}, Output voltage follow V_{IN} (I_{OUT}=1mA), circuit is safety.

Note3: V_{DROP} FT test method: Test the V_{OUT} voltage at V_{SET}+$V_{DROPMAX}$ with 150mA output current.

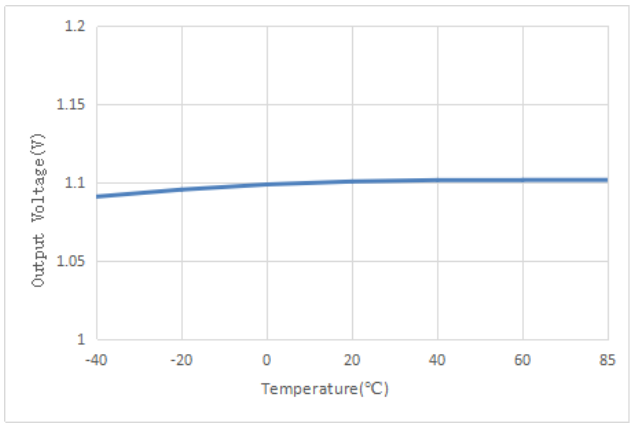
Note4: Guaranteed by design and characterization. Not a FT item.

Note5: The minimum operating voltage is 2.2V. V_{DROP}=$V_{IN(MIN)}$-V_{OUT}.

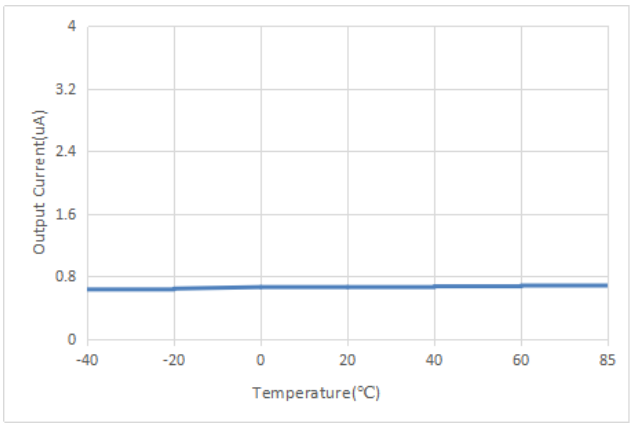
Typical Characteristics

(1) VOLTAGE VERSION 1.1V

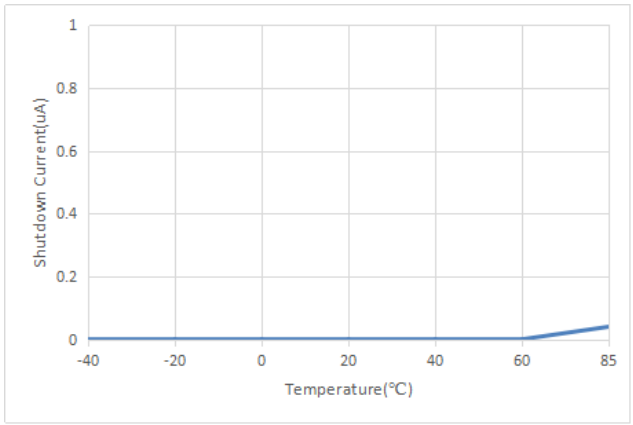
(V_{IN}=2.5V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.)



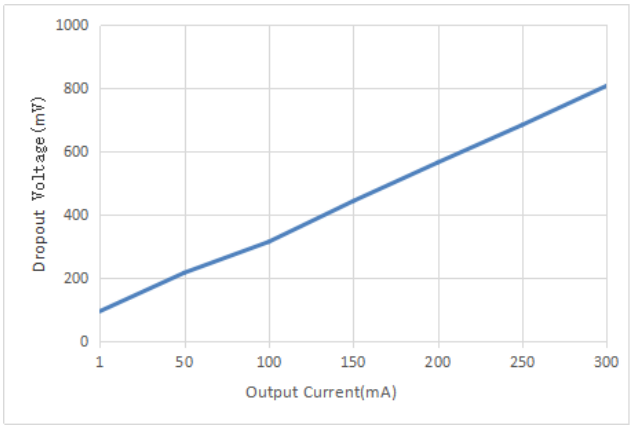
Output Voltage VS Temperature



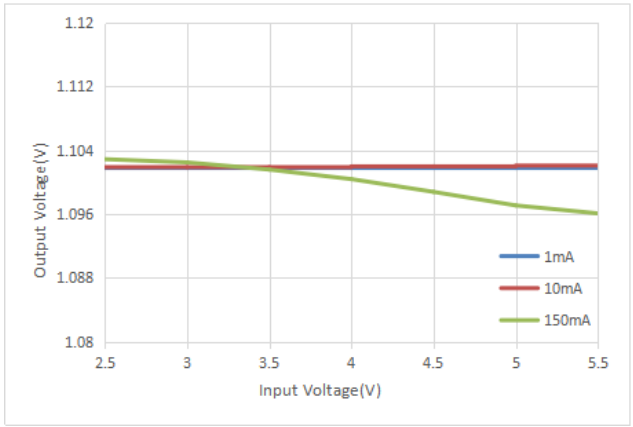
Supply Current VS Temperature



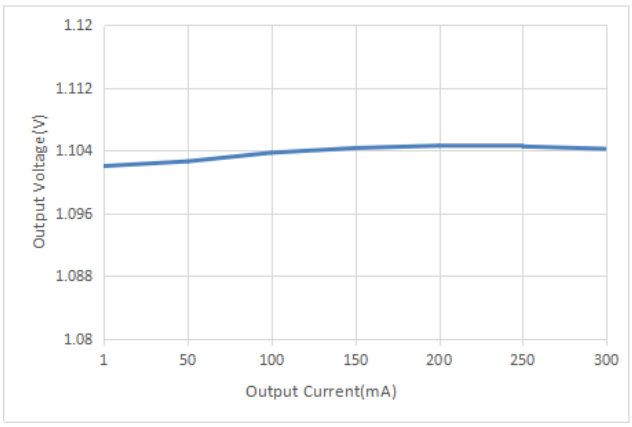
Shutdown Current VS Temperature



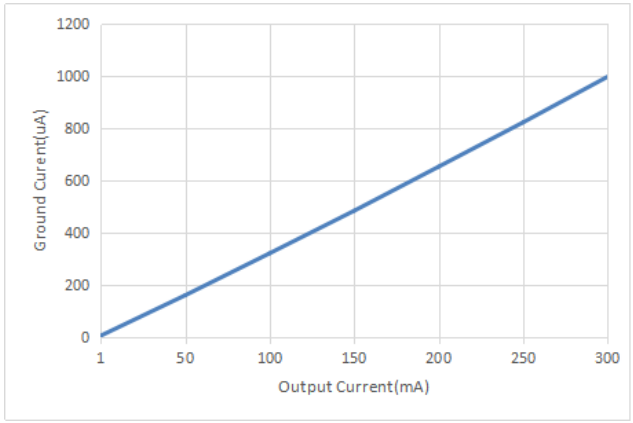
Dropout Voltage VS Output Current



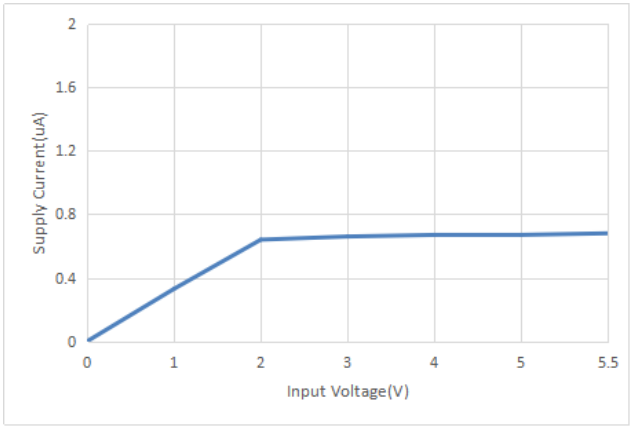
Output Voltage VS Input Voltage



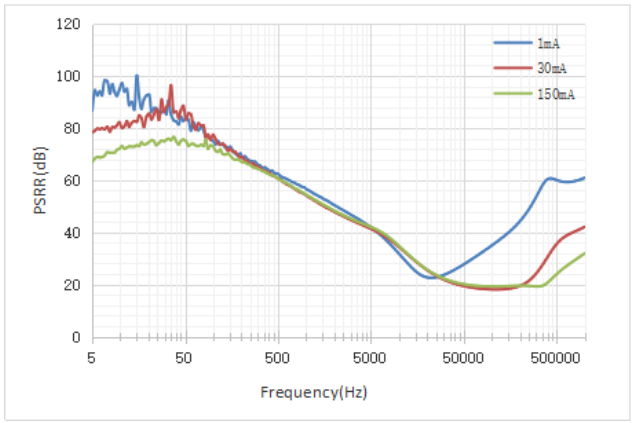
Output Voltage VS Output Current



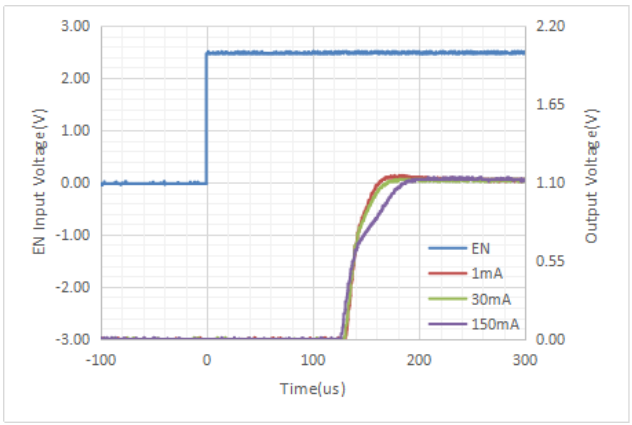
Ground Current VS Output Current



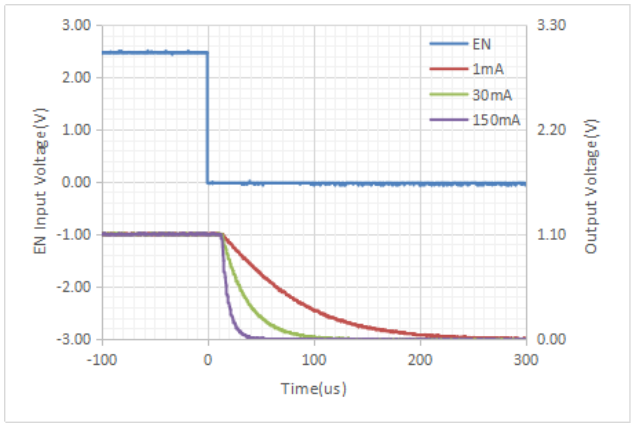
Supply Current VS Input Voltage



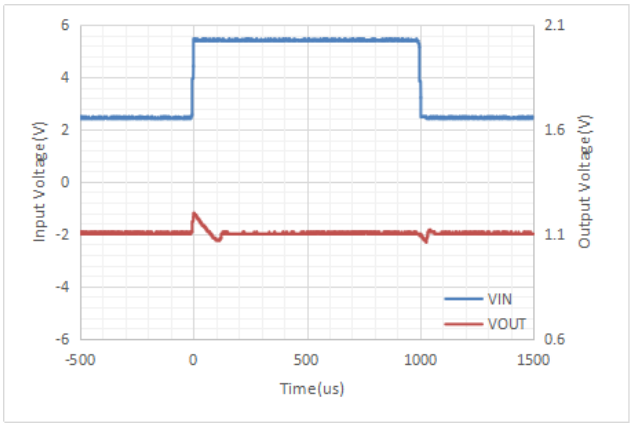
PSRR VS Output Current



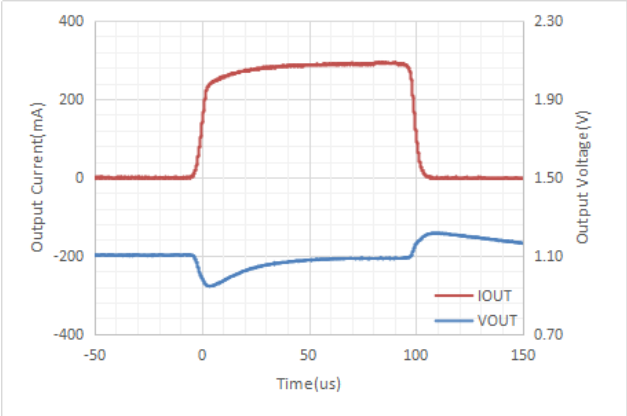
Turn On Speed VS EN Voltage



Turn Off Speed VS EN Voltage



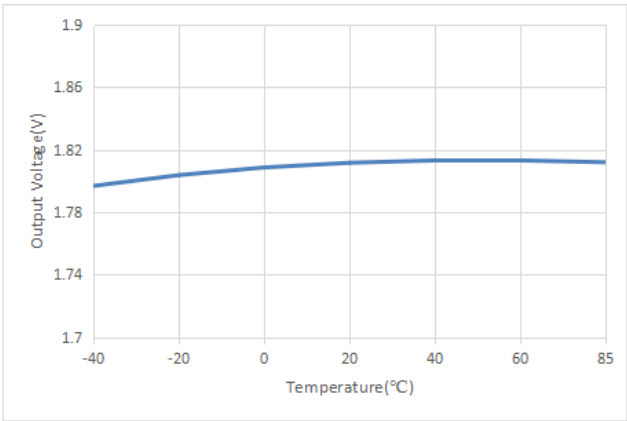
Line Transient Response



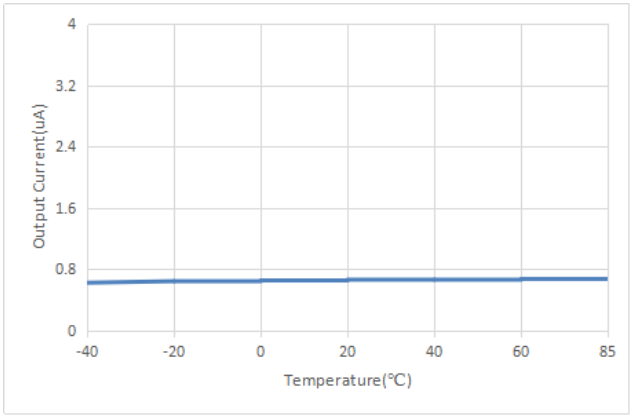
Load Transient Response

(2) VOLTAGE VERSION 1.8V

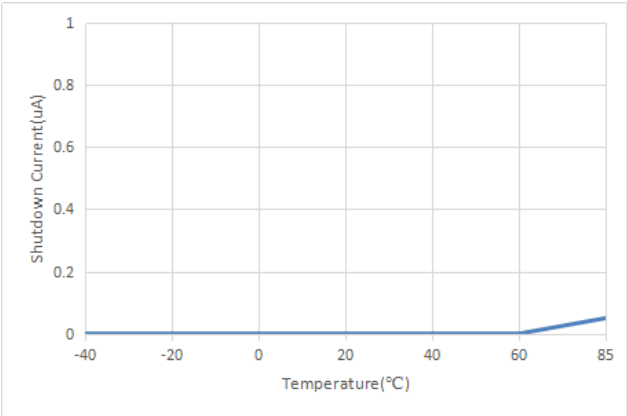
(V_{IN}=2.8V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.)



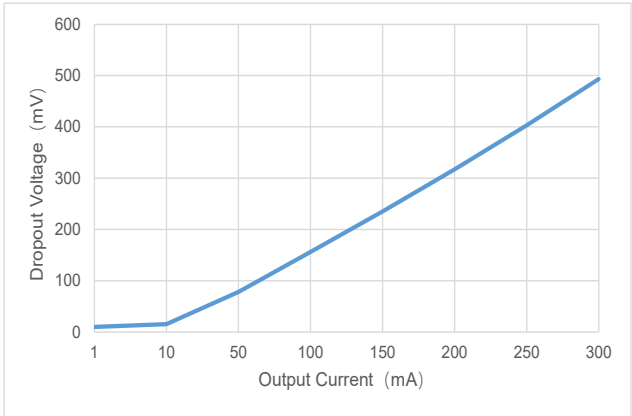
Output Voltage VS Temperature



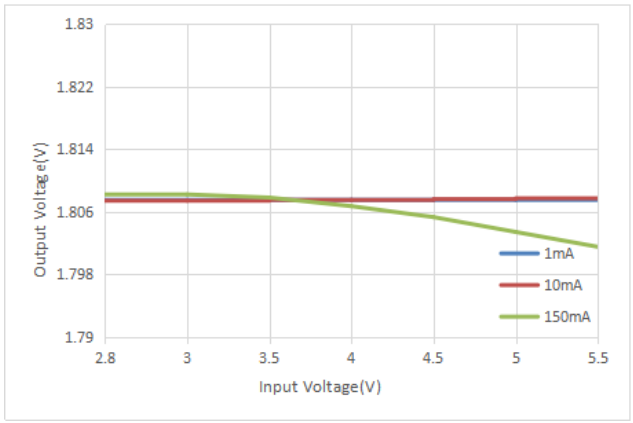
Supply Current VS Temperature



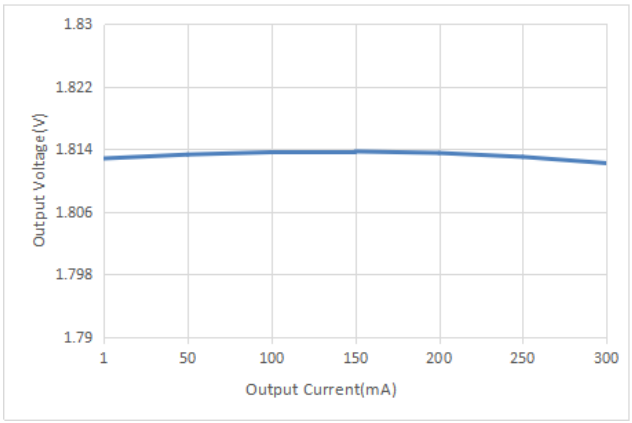
Shutdown Current VS Temperature



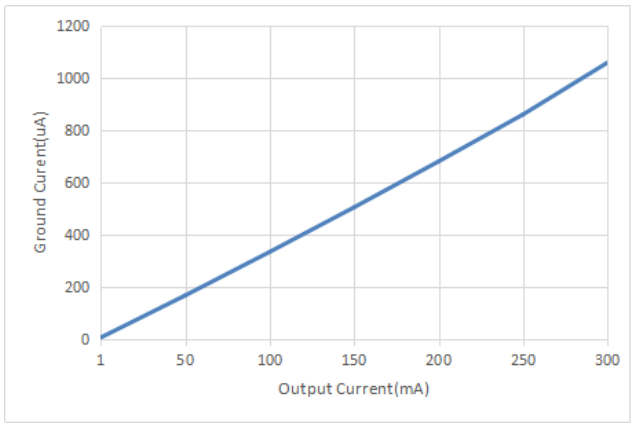
Dropout Voltage VS Output Current



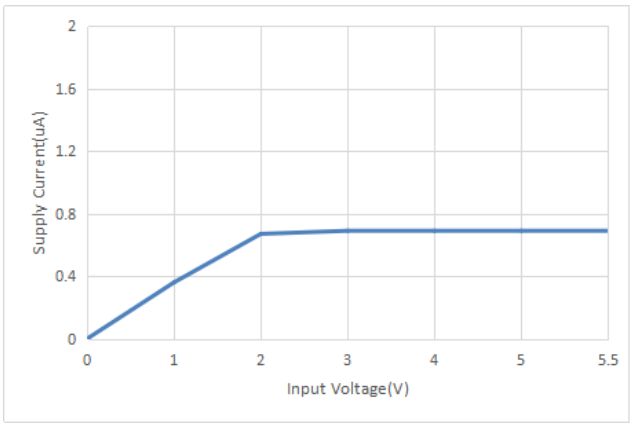
Output Voltage VS Input Voltage



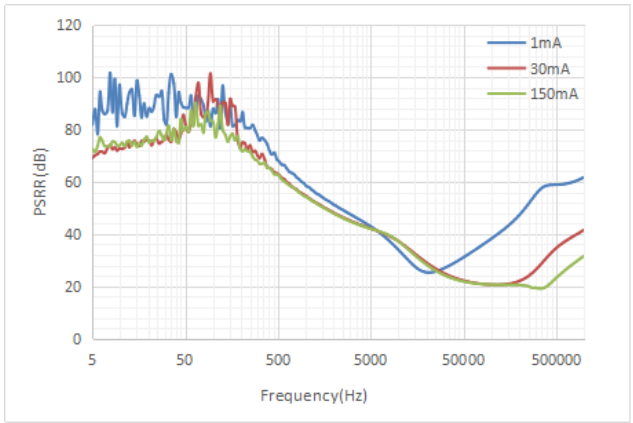
Output Voltage VS Output Current



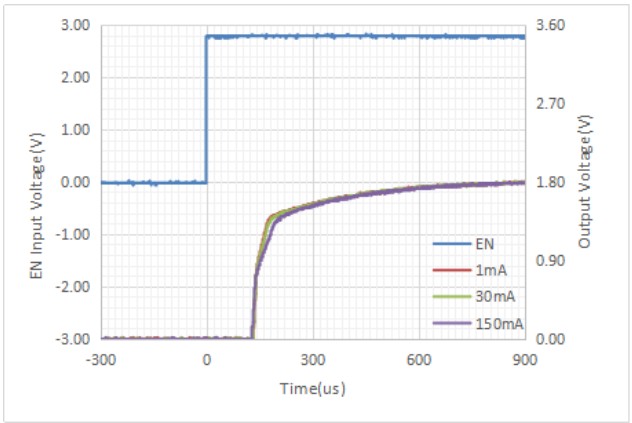
Ground Current VS Output Current



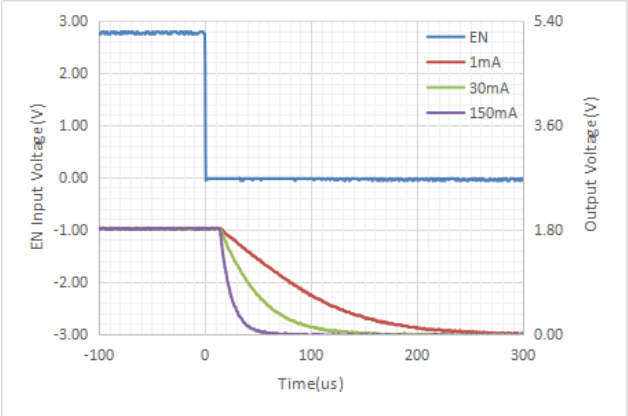
Supply Current VS Input Voltage



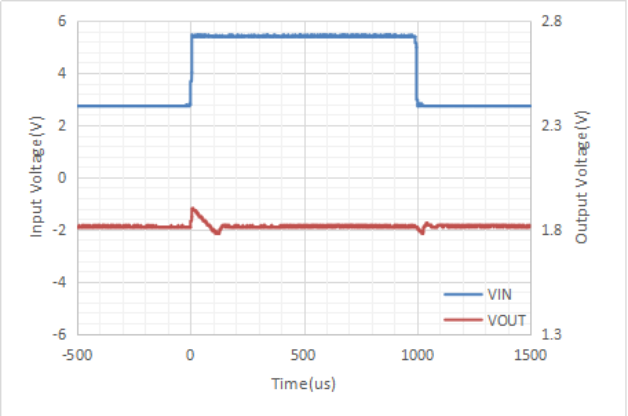
PSRR VS Output Current



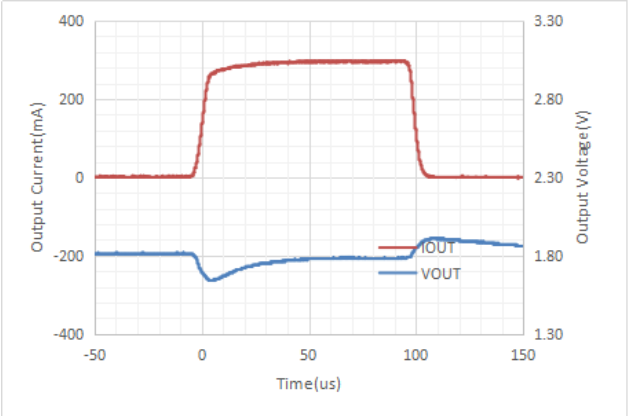
Turn On Speed VS EN Voltage



Turn Off Speed VS EN Voltage



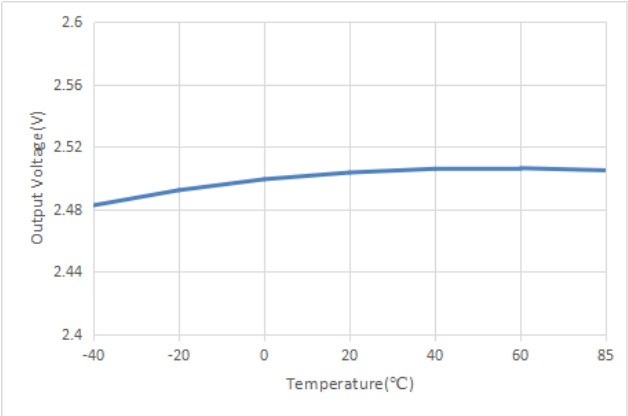
Line Transient Response



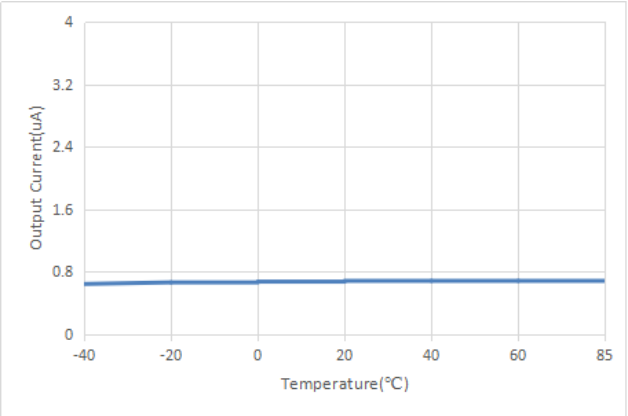
Load Transient Response

(3) VOLTAGE VERSION 2.5V

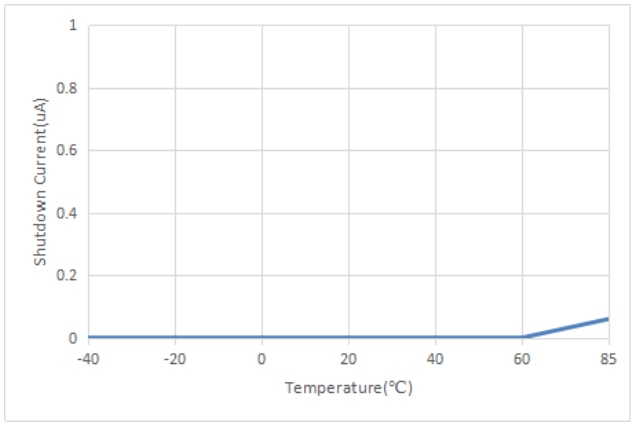
(V_{IN}=3.5V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.)



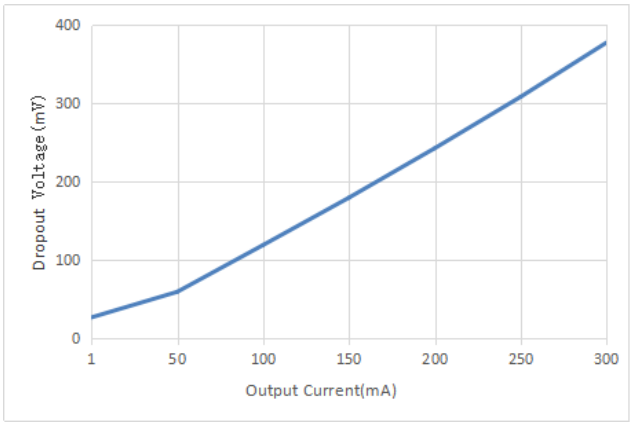
Output Voltage VS Temperature



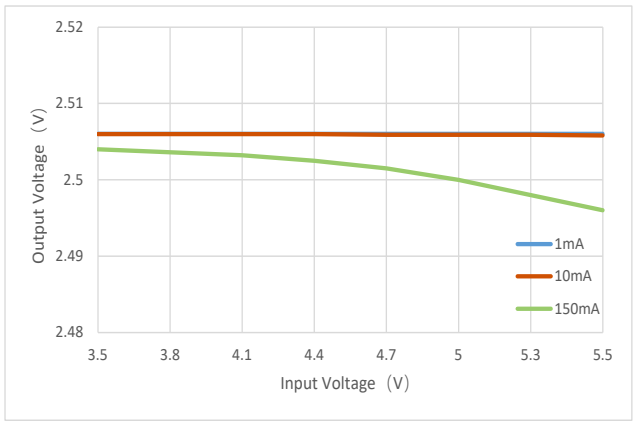
Supply Current VS Temperature



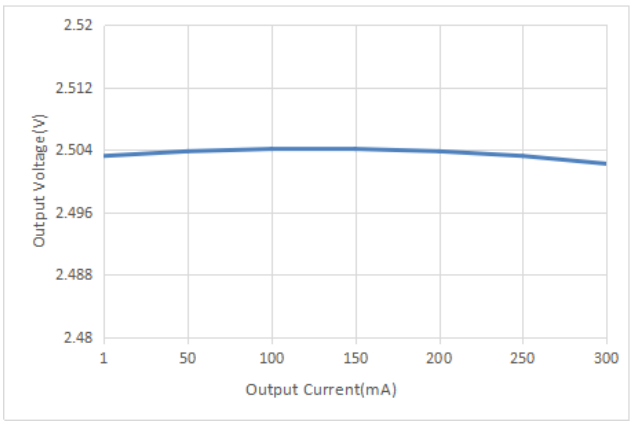
Shutdown Current VS Temperature



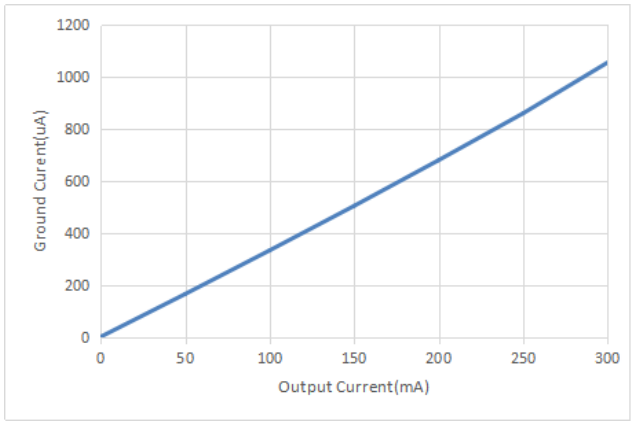
Dropout Voltage VS Output Current



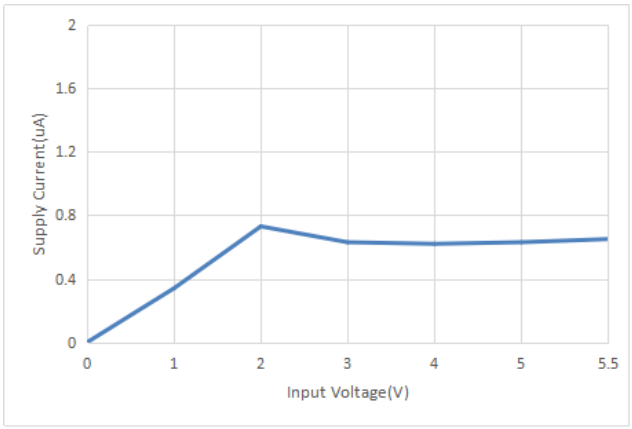
Output Voltage VS Input Voltage



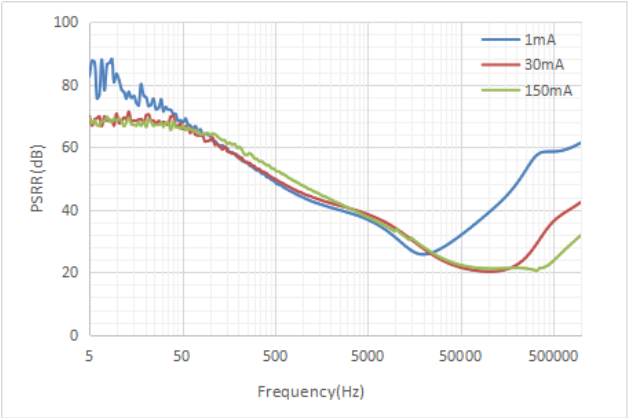
Output Voltage VS Output Current



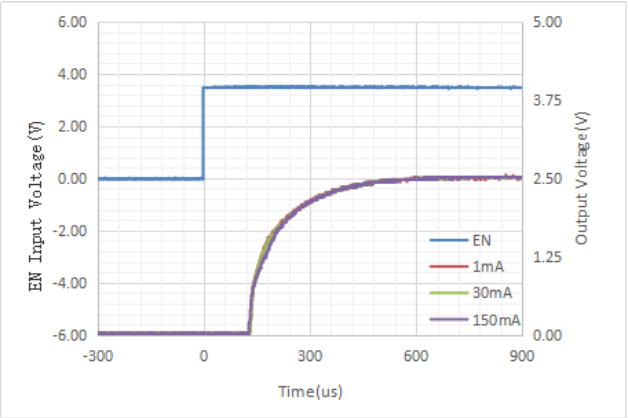
Ground Current VS Output Current



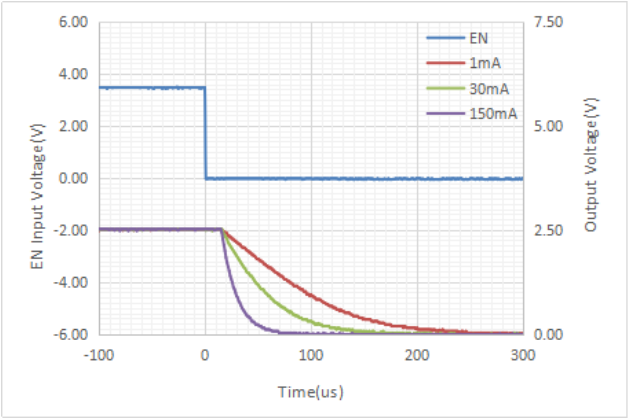
Supply Current VS Input Voltage



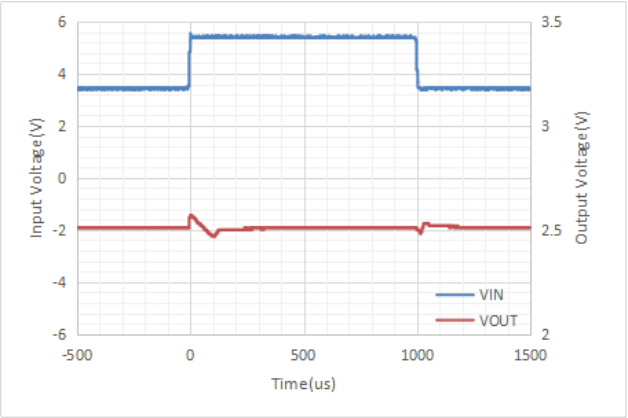
PSRR VS Output Current



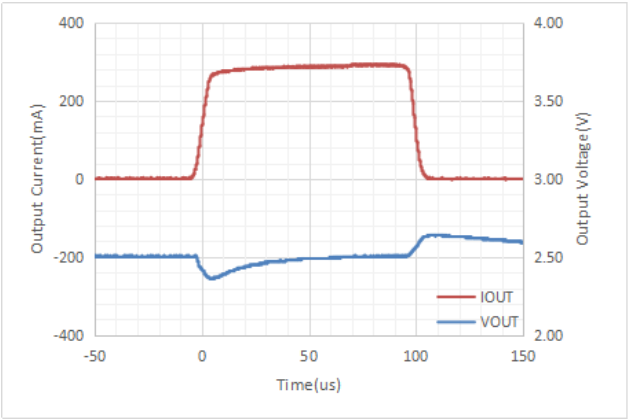
Turn On Speed VS EN Voltage



Turn Off Speed VS EN Voltage



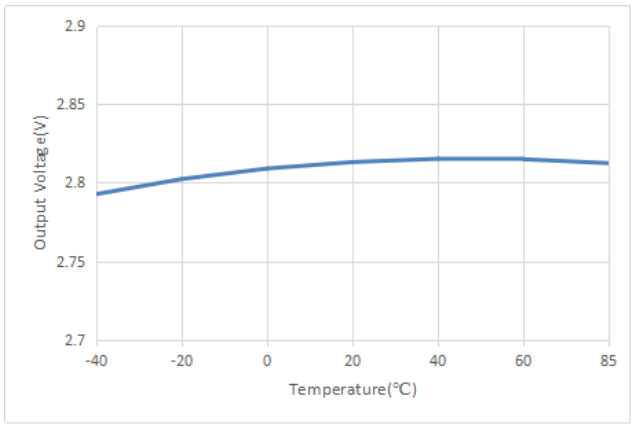
Line Transient Response



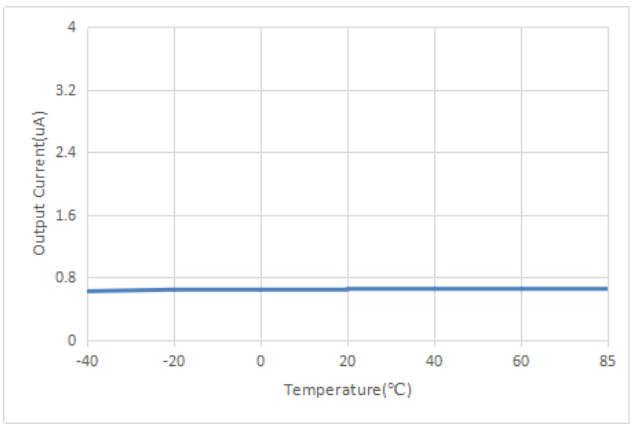
Load Transient Response

(4) VOLTAGE VERSION 2.8V

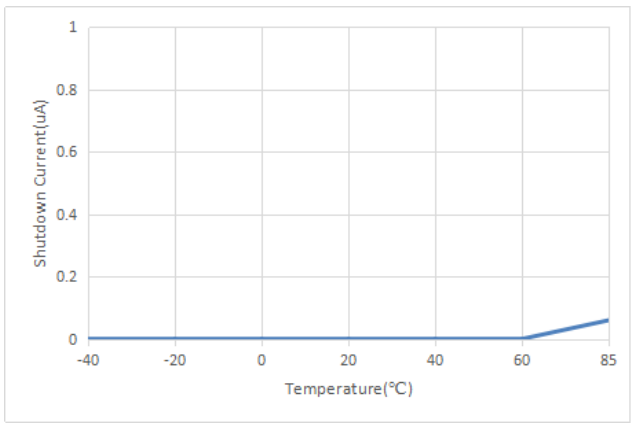
(V_{IN}=3.8V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.)



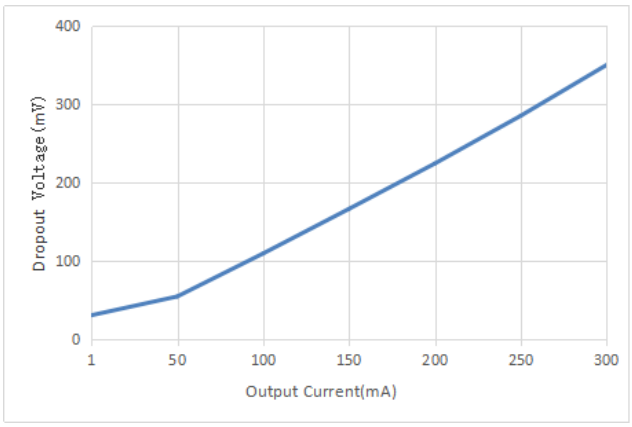
Output Voltage VS Temperature



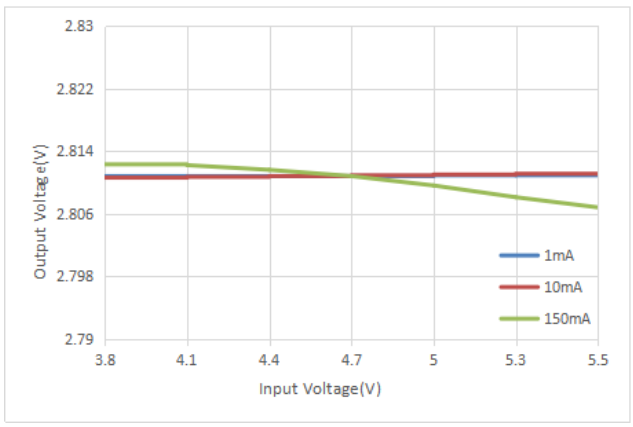
Supply Current VS Temperature



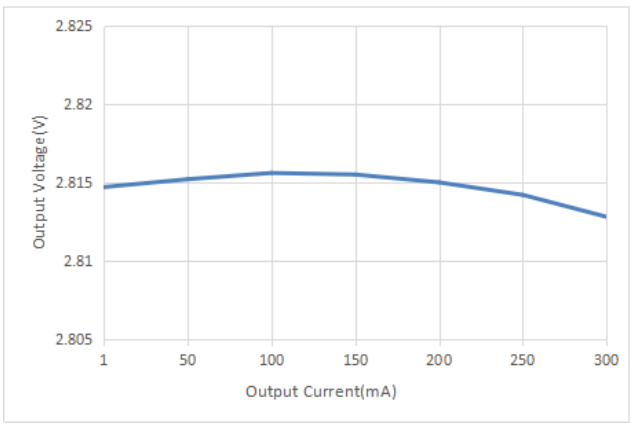
Shutdown Current VS Temperature



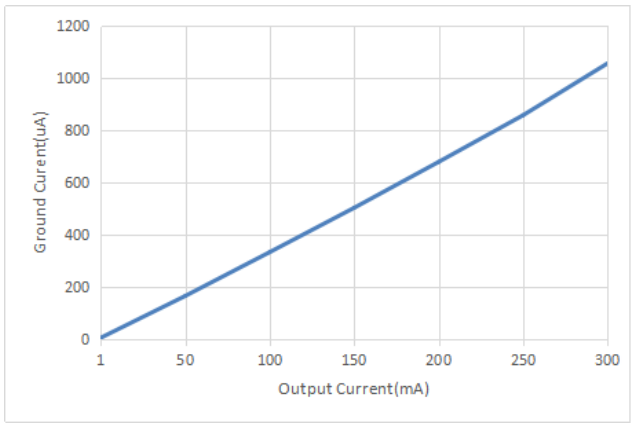
Dropout Voltage VS Output Current



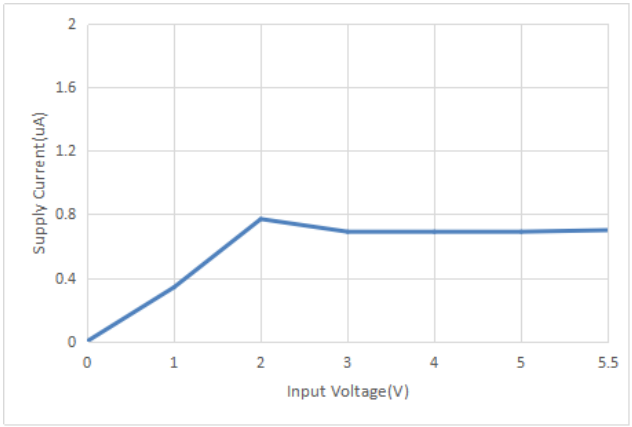
Output Voltage VS Input Voltage



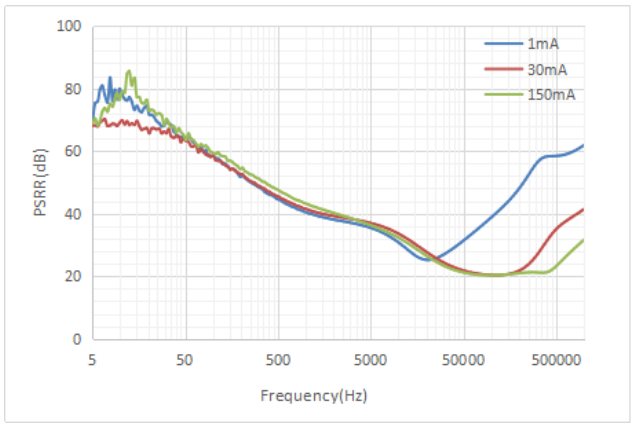
Output Voltage VS Output Current



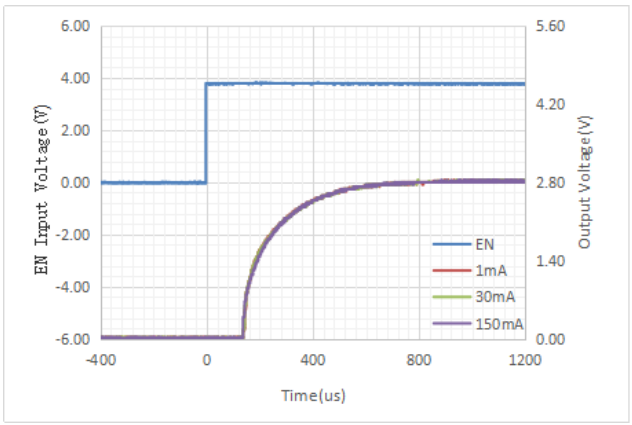
Ground Current VS Output Current



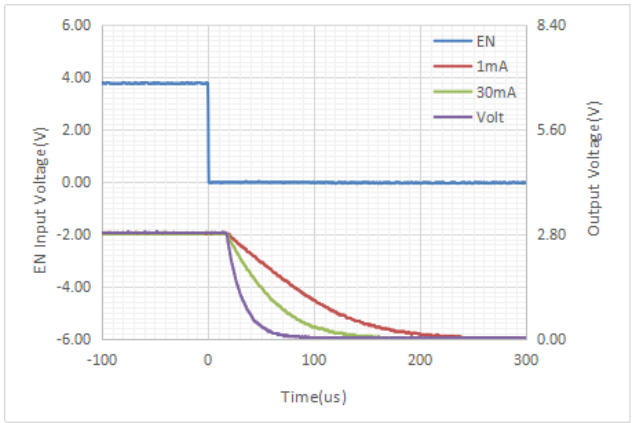
Supply Current VS Input Voltage



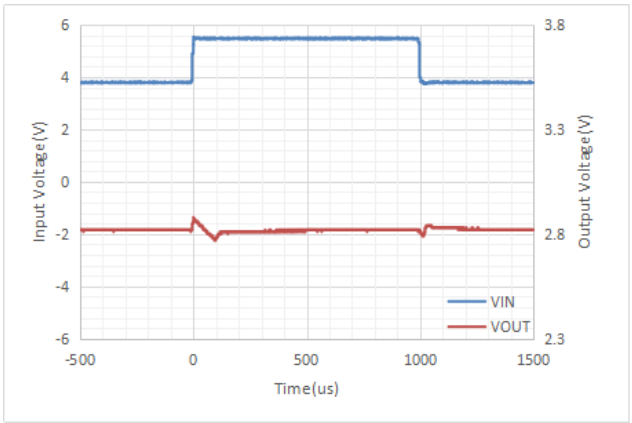
PSRR VS Output Current



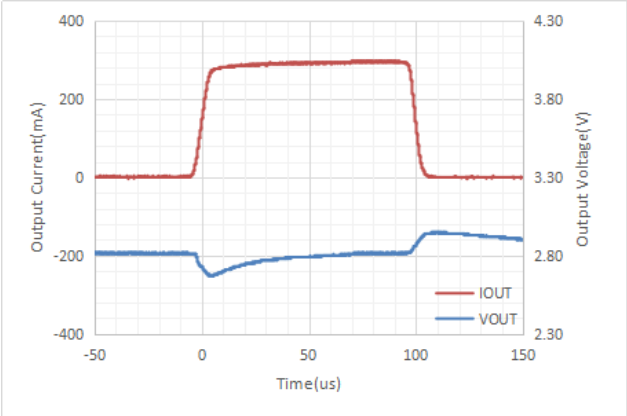
Turn On Speed VS EN Voltage



Turn Off Speed VS EN Voltage



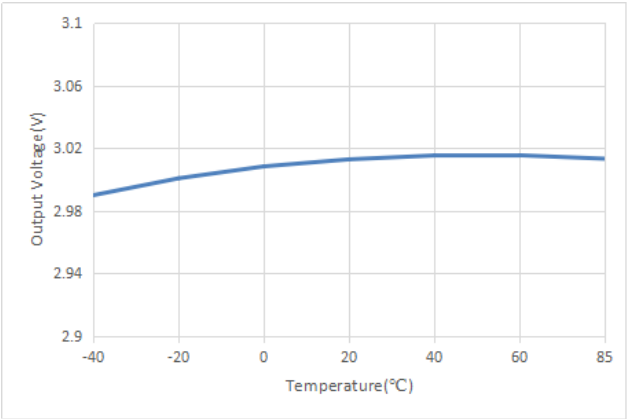
Line Transient Response



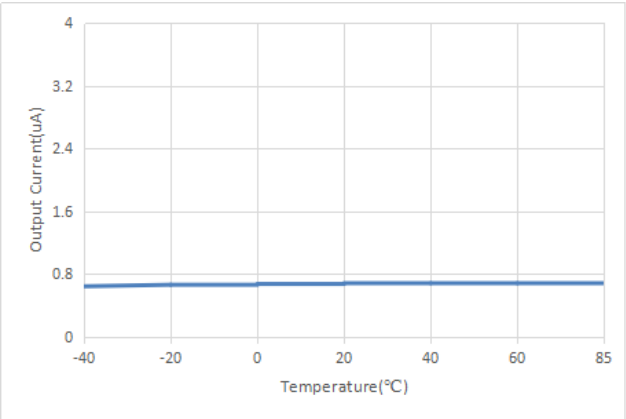
Load Transient Response

(5) VOLTAGE VERSION 3.0V

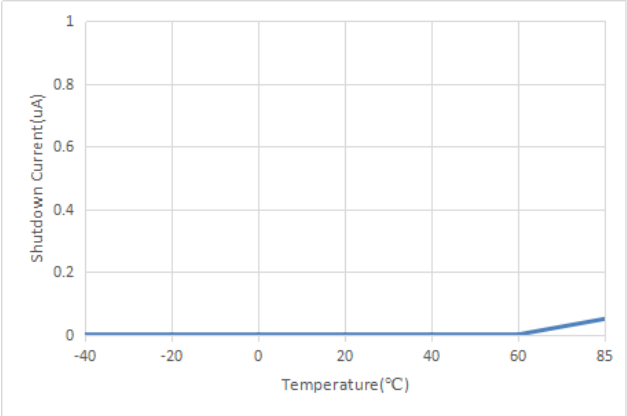
(V_{IN}=4.0V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.)



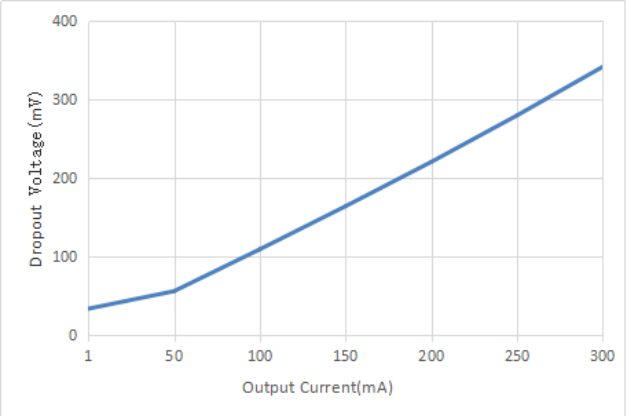
Output Voltage VS Temperature



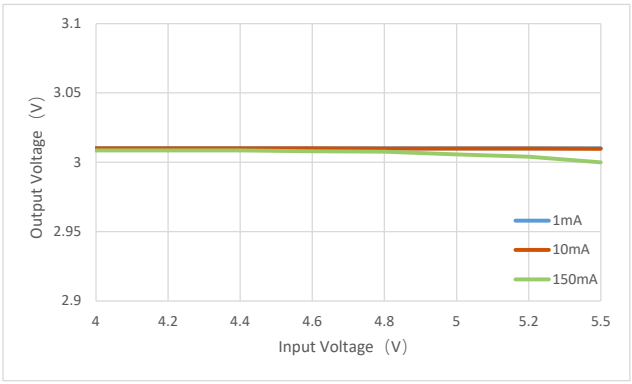
Supply Current VS Temperature



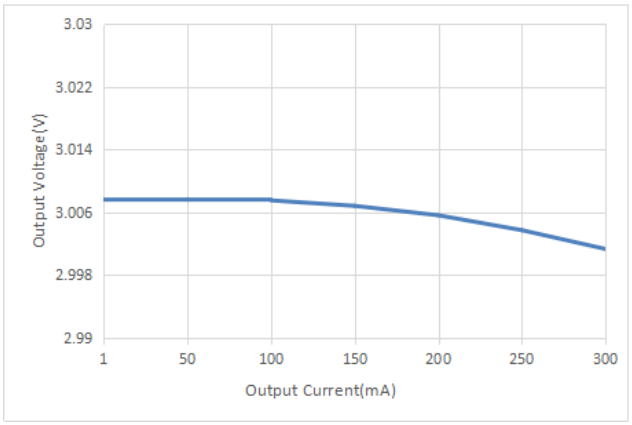
Shutdown Current VS Temperature



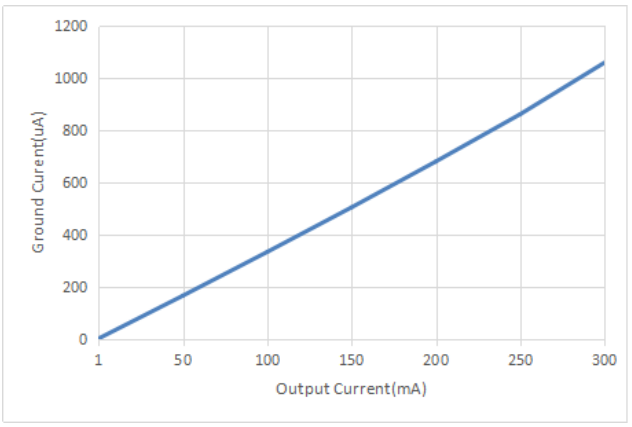
Dropout Voltage VS Output Current



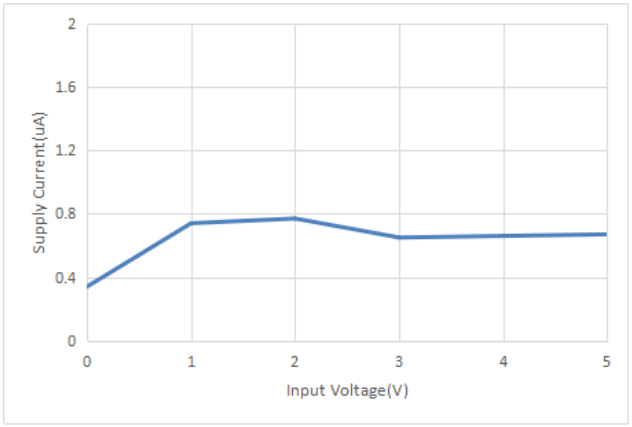
Output Voltage VS Input Voltage



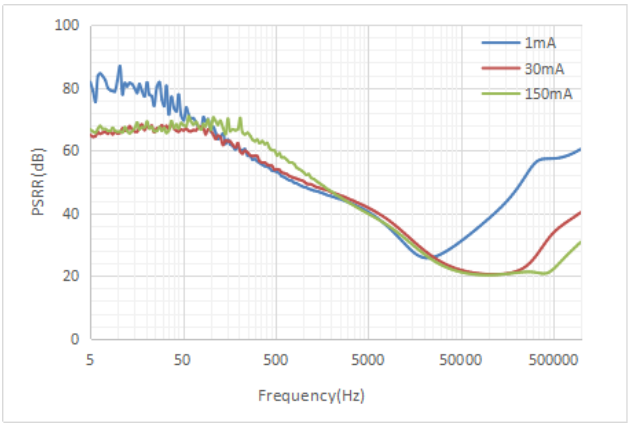
Output Voltage VS Output Current



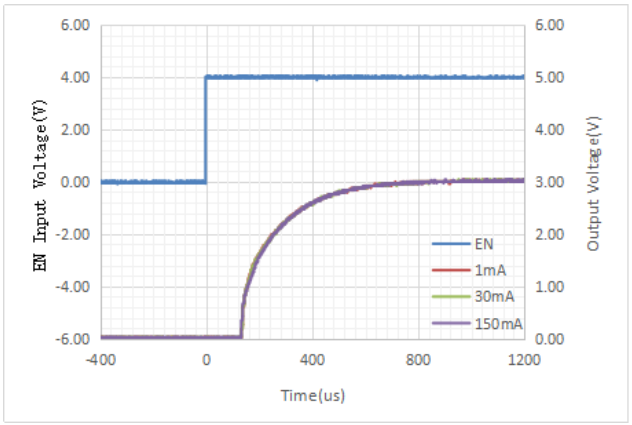
Ground Current VS Output Current



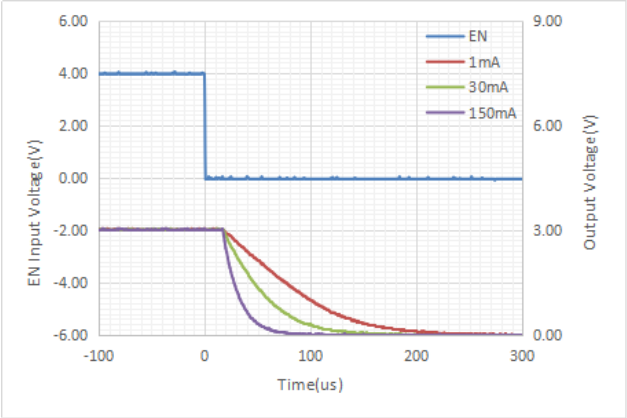
Supply Current VS Input Voltage



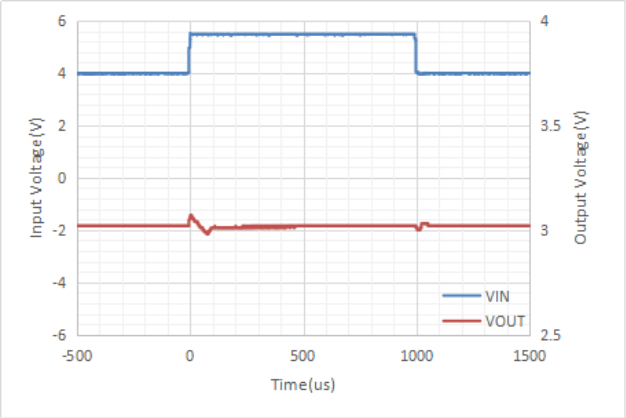
PSRR VS Output Current



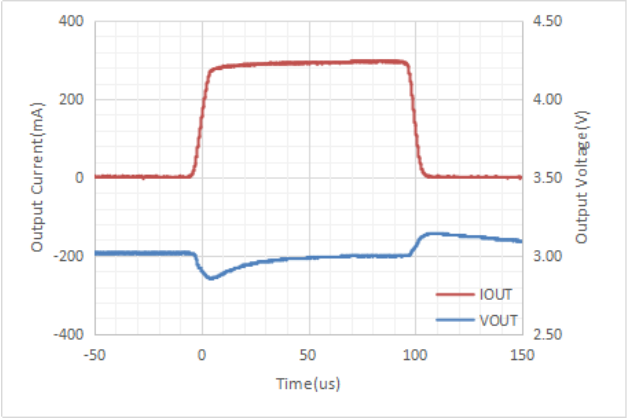
Turn On Speed VS EN Voltage



Turn Off Speed VS EN Voltage



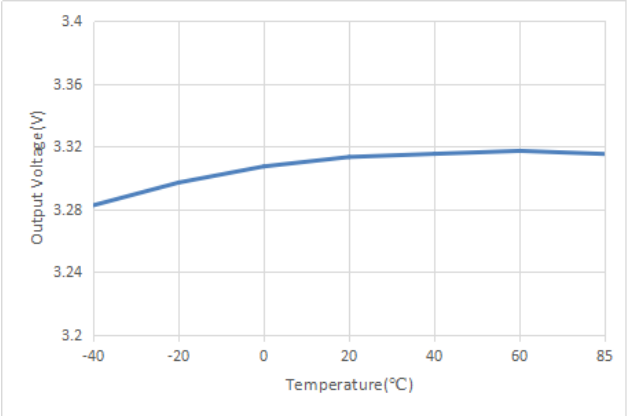
Line Transient Response



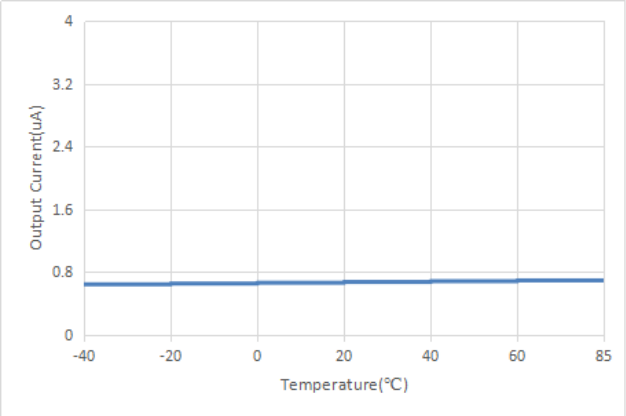
Load Transient Response

(6) VOLTAGE VERSION 3.3V

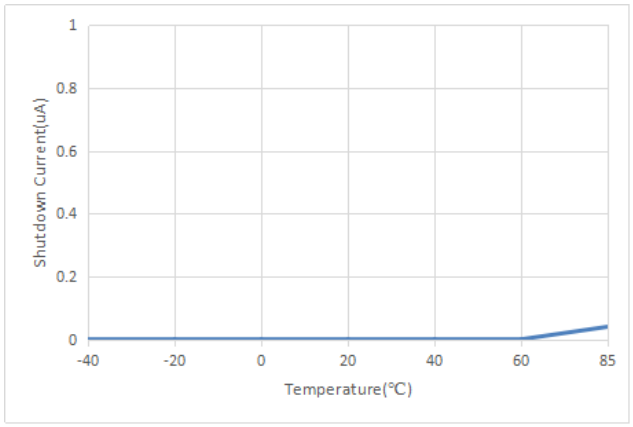
(V_{IN}=4.3V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1.0μF, unless otherwise noted. Typical values are at T_A=+25°C.)



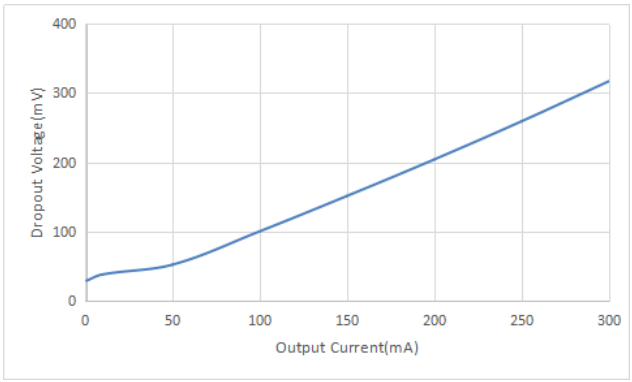
Output Voltage VS Temperature



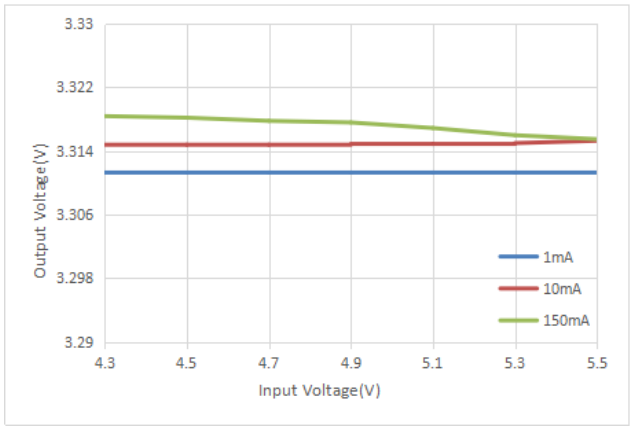
Supply Current VS Temperature



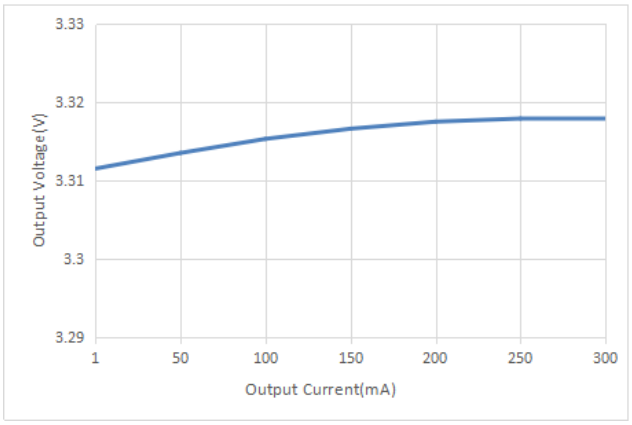
Shutdown Current VS Temperature



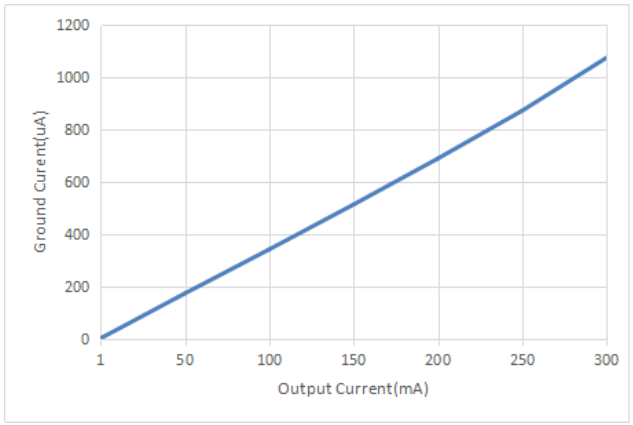
Dropout Voltage VS Output Current



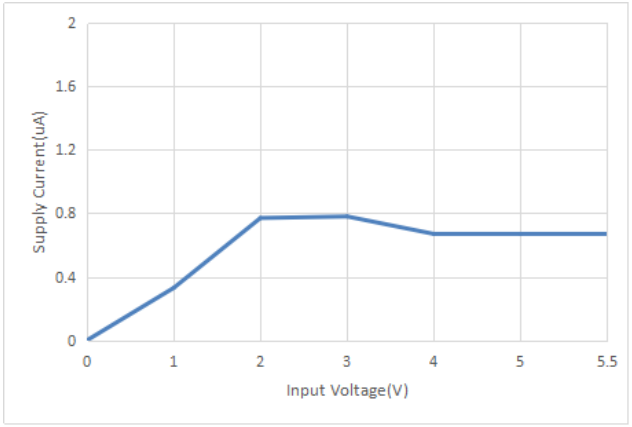
Output Voltage VS Input Voltage



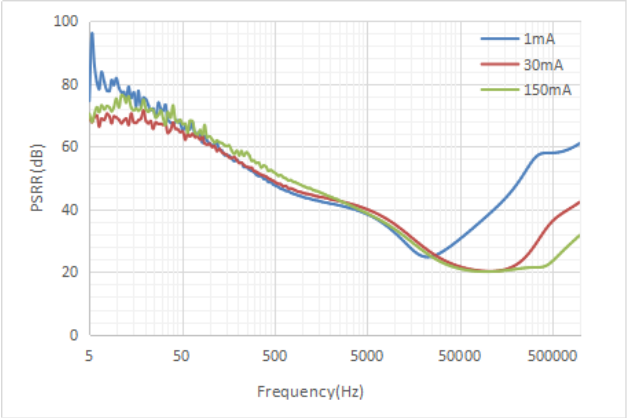
Output Voltage VS Output Current



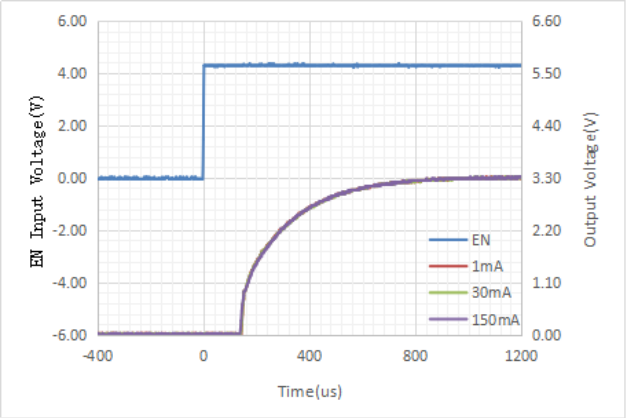
Ground Current VS Output Current



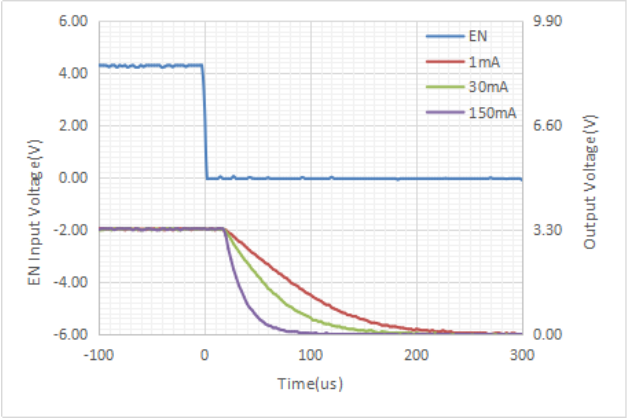
Supply Current VS Input Voltage



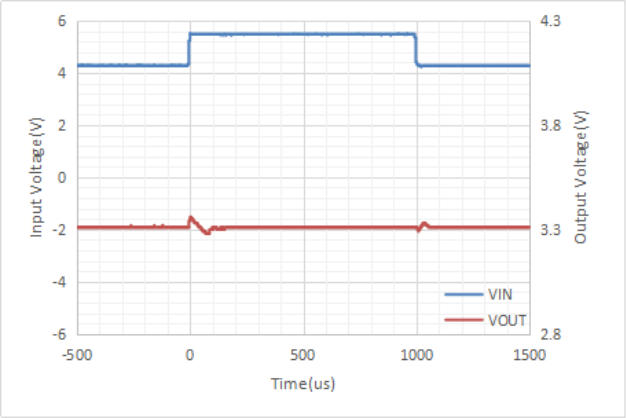
PSRR VS Output Current



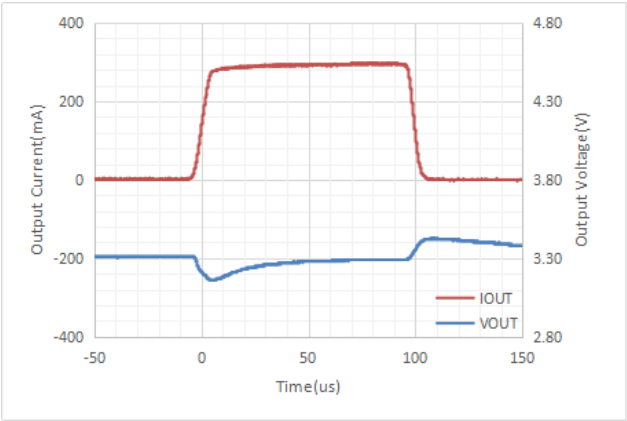
Turn On Speed VS EN Voltage



Turn Off Speed VS EN Voltage

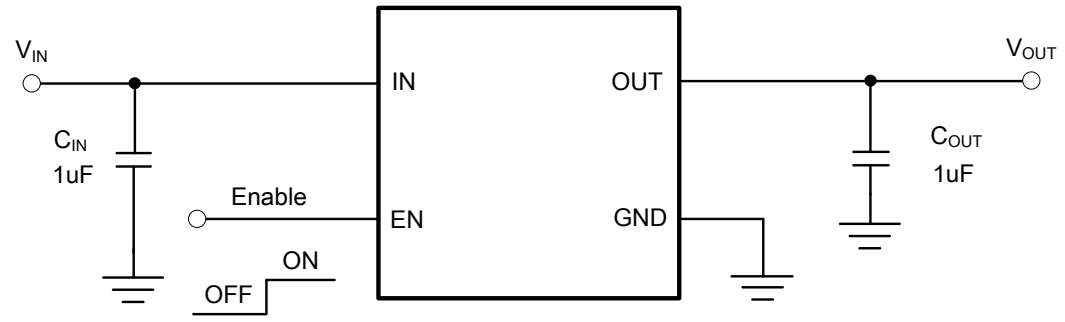


Line Transient Response

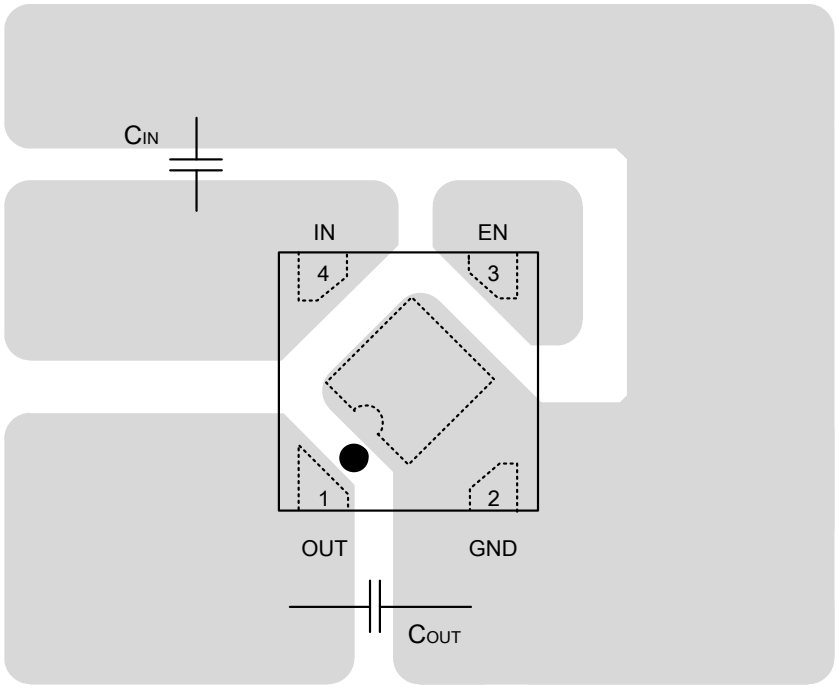


Load Transient Response

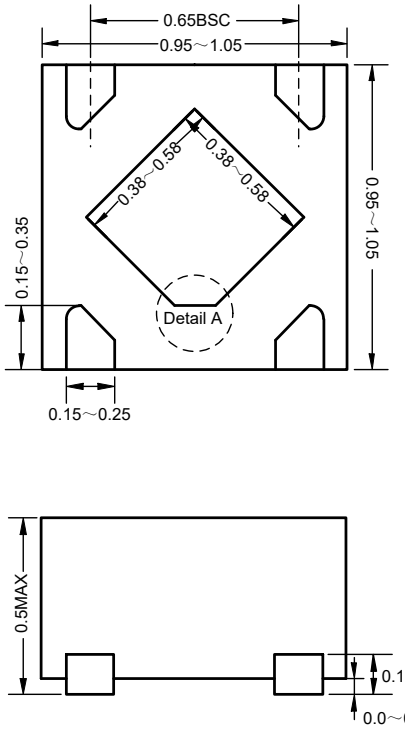
Application Circuits

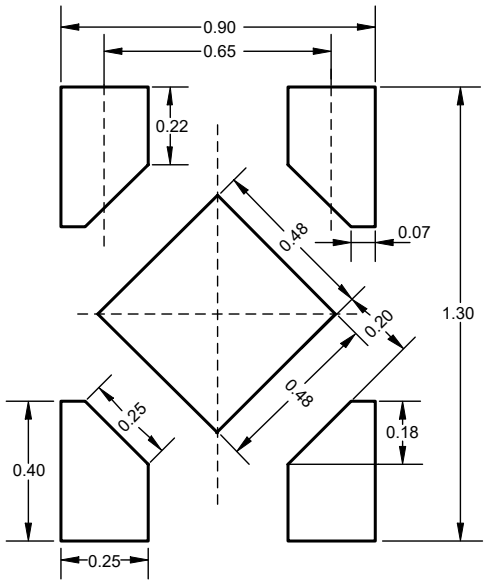


PCB Layout Guide



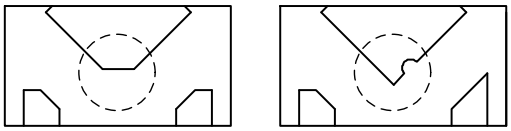
Package Dimension





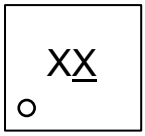
Recommended Land Pattern

Detail A: (PIN1 shape)



Unit: mm

Marking



X=V_{OUT} Version

X=Tracking Number

Part No.	Marking	V_{OUT}	Auto Discharge Function
ET63111YB	IX	1.1V	Y
ET63112YB	AX	1.2V	Y
ET63113YB	LX	1.3V	Y
ET631135YB	MX	1.35V	Y
ET63115YB	BX	1.5V	Y
ET63116YB	NX	1.6V	Y
ET63117YB	JX	1.7V	Y
ET631175YB	KX	1.75V	Y
ET63118YB	CX	1.8V	Y
ET63125YB	FX	2.5V	Y
ET63127YB	PX	2.7V	Y
ET63128YB	DX	2.8V	Y
ET63129YB	SX	2.9V	Y
ET63130YB	GX	3.0V	Y
ET63133YB	EX	3.3V	Y
ET63136YB	RX	3.6V	Y
ET63140YB	4X	4.0V	Y

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2019-01-11	Original Version	Liuxm	Liuxm	Zhujl
1.1	2019-09-26	Add the upper and lower limit of some parameters in EC table	Liuxm	Liuxm	Zhujl
1.2	2019-10-22	Add PSRR and typical characteristic graph	Liuxm	Liuxm	Liujy
1.3	2020-03-13	Document check and formalize	Liuxm	Liuxm	Liujy
1.4	2020-03-30	Update dropout voltage graph	Liuxm	Liuxm	Liujy
1.5	2022-10-19	Update Typeset	Yang Xiao Xu	Liuxm	Yang Xiao Xu
1.6	2023-10-10	Update package picture	Shibo	Liuxm	Liujy