1.3µA, High PSRR, 350mA Low-Dropout Linear Regulator

FUNCTIONAL DESCRIPTION

The ZCC8807 is an ultra-small, ultra-low quiescent current low-dropout linear regulator (LDO) that can source 350 mA with excellent transient performance.

The ZCC8807, with an ultra-low IQ of 1.3µA, is designed specifically for applications where very-low quiescent current is a critical parameter. This device maintains low IQ consumption even in dropout mode to further increase the battery life.

The feature of 1.3 µA low quiescent current and 0.05µA 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.

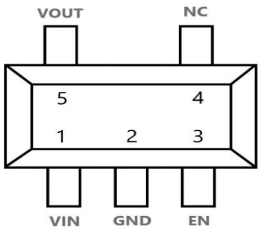
MAIN FEATURES

- Input Voltage Range: 1.2V to 5.5V
- 1.3 µA Ground Current (IQ) at no Load
- PSRR = 80 dB at 1kHz
- Adjustable Output Voltage Range: 0.8V to 4.5V
- ±1% Output Accuracy
- Dropout Voltage: 150mV at 350mA when VOUT ≥ 3V
- Noise=30 µVrms
- Support Fixed Output Voltage 0.8V~4.5V, 0.05V step.
- Current Limit Protection
- Over Temperature Protection
- Output Active Discharge Function
- SOT-23-5, SOT-23, and DFN-1x1-4L, DFN-2x2-6 Packages Available

APPLICATIONS

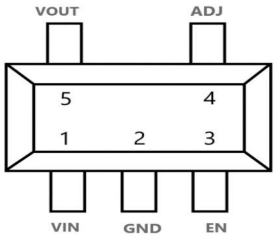
- Portable, Battery Powered Equipment
- Ultra Low Power Microcontrollers
- Notebook Computers

PACKAGE INFORMATION & PIN DESCRIPTION



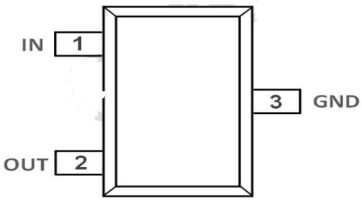
SOT-23-5 Pin Configuration (Fixed Mode)

PIN No	Symbol	Pin Description
1	VIN	Input Pin
2	GND	Ground Pin
3	EN	Chip Enable Pin
4	NC	No Connection
5	VOUT	Output Pin



SOT-23-5 Pin Configuration (ADJ Mode)

PIN No	Symbol	Pin Description
1	VIN	Input Pin
2	GND	Ground Pin
3	EN	Chip Enable Pin
4	ADJ	No Connection
5	VOUT	Output Pin



SOT23 Pin Configration

PIN No	Symbol	Pin Description
1	VIN	Input Pin
2	VOUT	Output Pin
3	GND	Ground Pin

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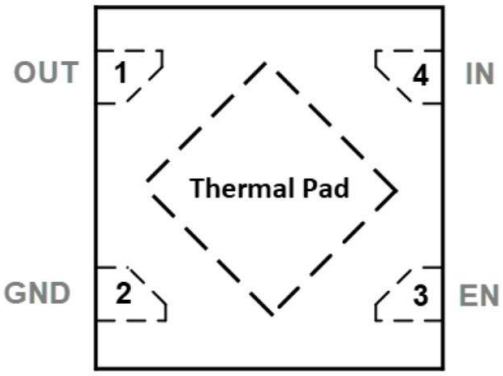
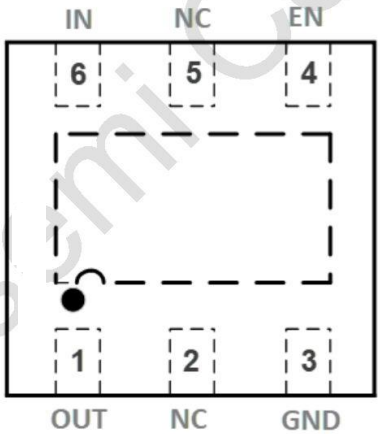


DFN1×1-4L Pin Configration

PIN No	Symbol	Pin Description
1	VOUT	Output Pin
2	GND	Ground Pin
3	EN	Chip Enable Pin
4	VIN	Input Pin



DFN2×2-6 Pin Configration

PIN No	Symbol	Pin Description
1	VOUT	Output Pin
2	NC	No Connection
3	GND	Ground Pin
4	EN	Chip Enable Pin
5	NC	No Connection
6	VIN	Input Pin

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ABSOLUTE MAXIMUM RATINGS

ABSOLUTE MAXIMUM RATINGS

Symbol	Item	Rating		Unit
V_{IN}	Input Voltage	6.0		V
V_{CE}	Input Voltage (CE Pin)	-0.3 to 6.0		V
V_{OUT}	Output Voltage	-0.3 to 6.0		V
P_D	Power Dissipation (Standard Land Pattern)	SOT23-5	400	mW
T_{OP}	Junction Temperature Range	−40 to 125		°C
T_{STG}	Storage Temperature Range	−55 to 125		°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Item	Rating	Unit
V_{IN}	Input Voltage	1.2 to 5.5	V
V_{OUT}	Output Voltage	0.8 to 4.5	V
Ta	Operating Temperature Range	-40 to 85	°C
C_{IN}/C_{OUT}	Input/Output Capacitance	1/1	uF

ELECTROSTATIC DISCHARGE

Symbol	Parameter	Value	Unit
ESD	Human Body Mode	±2	kV
	Machine Mode	±250	V
	Charge Device Mode	±1000	V

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THERMAL DATA

Symbol	Parameter	Value	Unit
θ_{JA}	Thermal resistance junction-ambient	260	°C/W

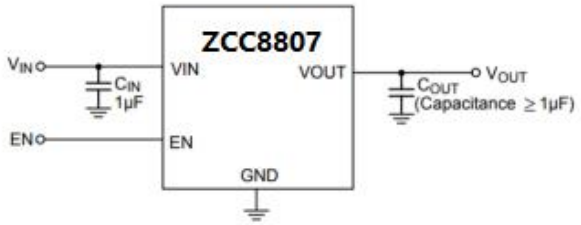
Electrical Characteristics

(V_{OUT} + 1 < V_{IN} < 5.5V, T_A=25℃, unless otherwise specified)

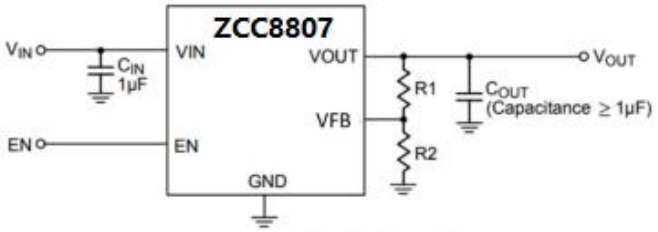
Parameter		Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Fixed Output Voltage Range		V_{OUT}			0.8	--	4.5	V
DC Output Accuracy		V_{OUT_ACC}	I_{LOAD} = 1mA	$V_{OUT} \geq 1.8V$	-1	--	1	%
				$V_{OUT} < 1.8V$	-1.5	--	1.5	%
Reference Voltage		V_{REF}	I_{LOAD} = 1mA		0.792	0.8	0.808	V
Dropout Voltage (ILOAD = 350mA)		V_{DROP}	$0.8V \leq V_{OUT} < 1.05V$		--	0.58	0.75	V
			$1.05V \leq V_{OUT} < 1.2V$		--	0.4	0.56	
			$1.2V \leq V_{OUT} < 1.5V$		--	0.33	0.45	
			$1.5V \leq V_{OUT} < 1.8V$		--	0.24	0.35	
			$1.8V \leq V_{OUT} < 2.1V$		--	0.2	0.3	
			$2.1V \leq V_{OUT} < 2.5V$		--	0.17	0.25	
			$2.5V \leq V_{OUT} < 3V$		--	0.16	0.23	
			$3V \leq V_{OUT}$		--	0.15	0.2	
Current Limit		I_{LIM}	V_{OUT} = 90% of $V_{OUT(NOM)}$		450			mA
Short Circuit Current		I_{SC}	V_{OUT} = 0V			45		mA
Quiescent Current		I_Q	I_{LOAD} = 0mA, $V_{OUT} \leq 4.5V$ $V_{IN} \geq V_{OUT} + V_{DROP}$		--	1.3	2.5	μA
Shutdown Current		I_{SHDN}	V_{EN} = 0V, V_{IN} = 5V		--	0.08	0.5	μA
EN Threshold Voltage	H-Level	V_{ENH}	V_{IN} = 5V		0.9			V
	L-Level	V_{ENL}	V_{IN} = 5V				0.4	V
EN Input Current		I_{EN}	V_{EN} = 5.5V		--	0.1	0.5	μA
Line Regulation		ΔLINE	I_{LOAD} = 1mA		--	0.02	0.5	%
Load Regulation		ΔLOAD	I_{LOAD} = 1mA to 350mA		--	20	50	mV
Power Supply Ripple Rejection		PSRR	V_{IN}=3V, I_{LOAD} = 60mA, V_{OUT} = 1.8V C_{OUT} = 1uF, f=1kHz		--	80	--	dB
Output Voltage Noise		eN	V_{IN}=2.8V, I_{LOAD} = 30mA, V_{OUT} = 1.8V BW= 10Hz to 100 kHz			30		uVrms
Thermal Shutdown Temperature		T_{SD}	I_{LOAD} = 5mA, $V_{IN} \geq 1.5V$		--	160	--	℃
Thermal Shutdown Hysteresis		ΔT_{SD}			--	30	--	℃
Discharge Resistance		R_{Dis}	EN = 0V, V_{OUT} = 0.1V		--	10	--	Ω

Typical Application Circuit

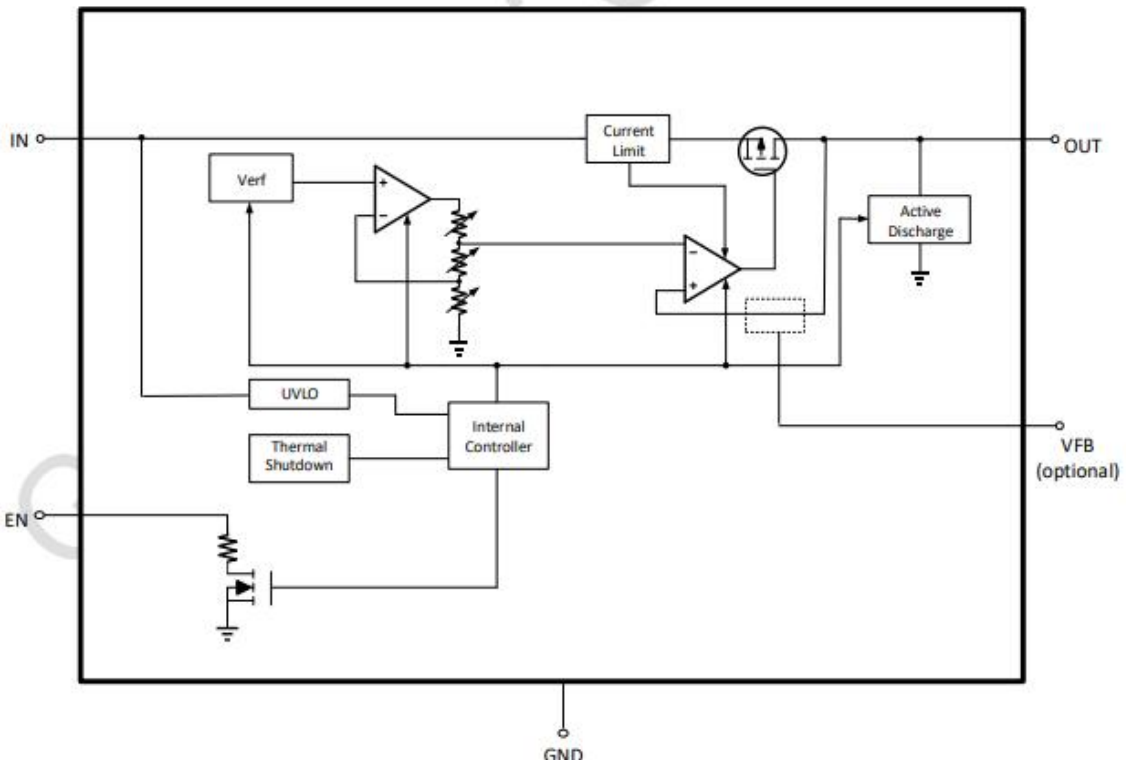
Fixed Mode



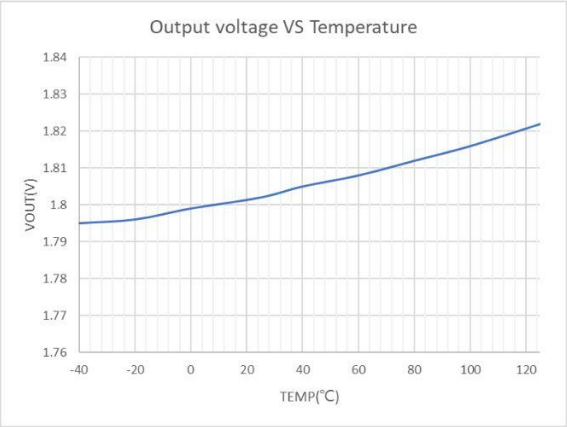
ADJ Mode



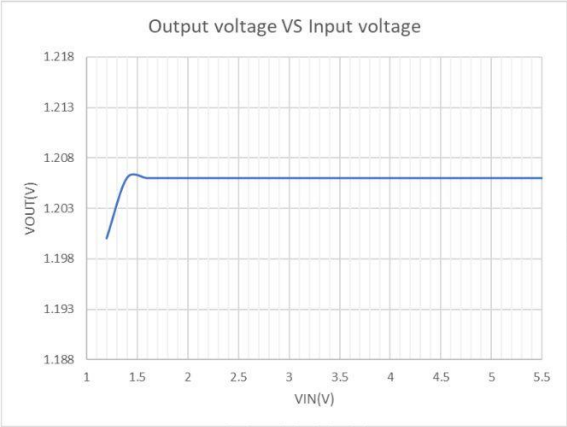
Functional Block Diagram



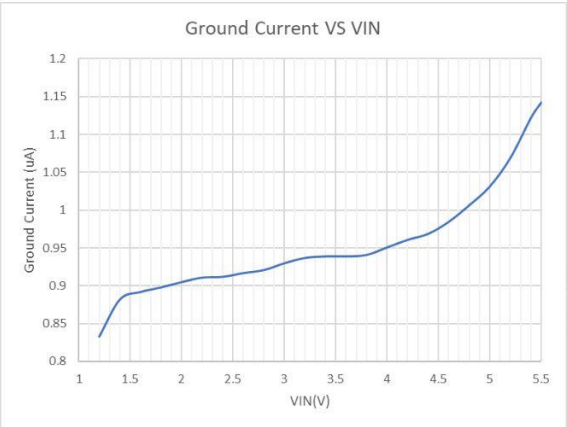
TYPICAL CHARACTERISTICS



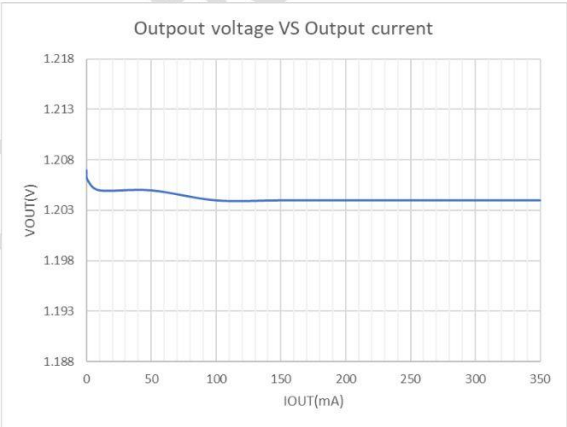
VOUT=1.8V, IOUT=1mA



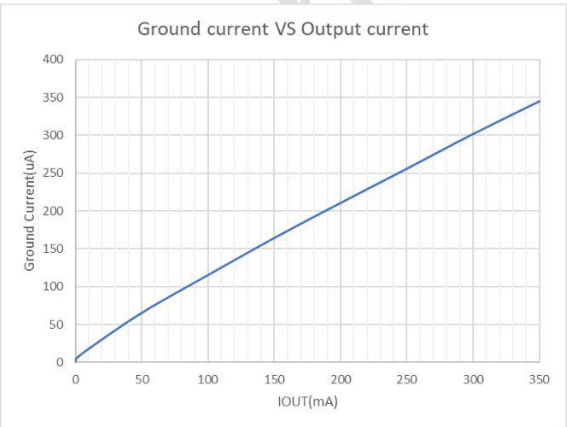
VOUT=1.2V, IOUT=1mA



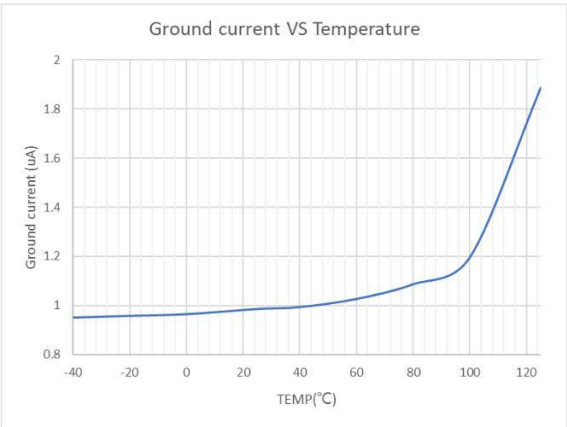
VOUT=0.8V



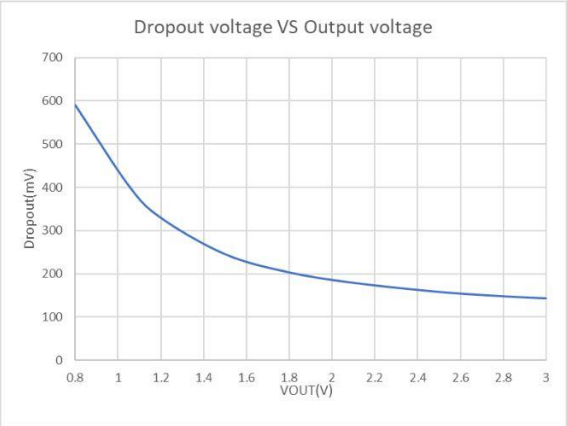
VOUT=1.2V



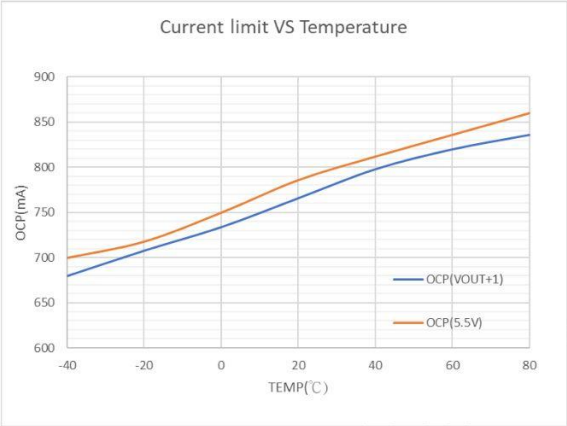
VOUT=1.2V



VOUT=1.2V



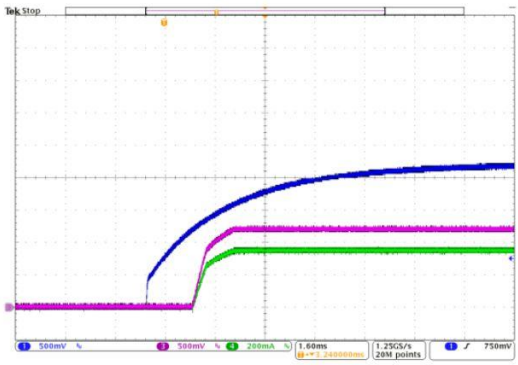
IOUT=300mA



VOUT=1.2V

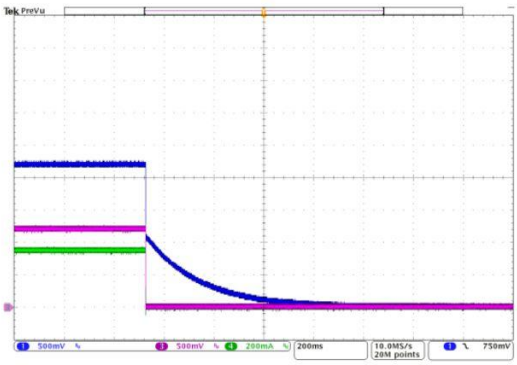
Power On From VIN

Ch1:VIN Ch3:VOUT Ch4:IOUT



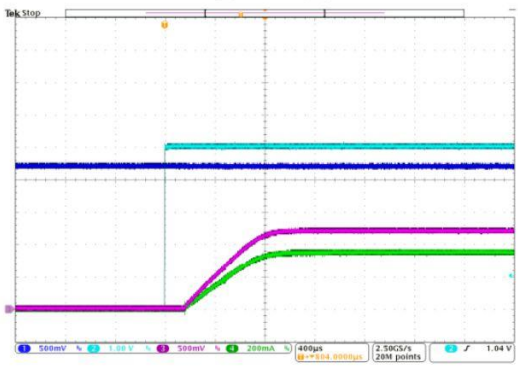
Power Off From VIN

Ch1:VIN Ch3:VOUT Ch4:IOUT



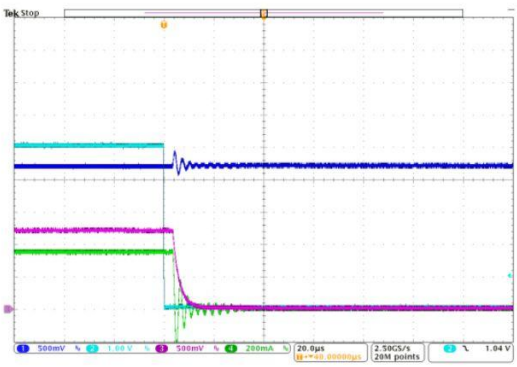
Power On From EN

Ch1:VIN Ch2:EN Ch3:VOUT Ch4:IOUT



Power Off From EN

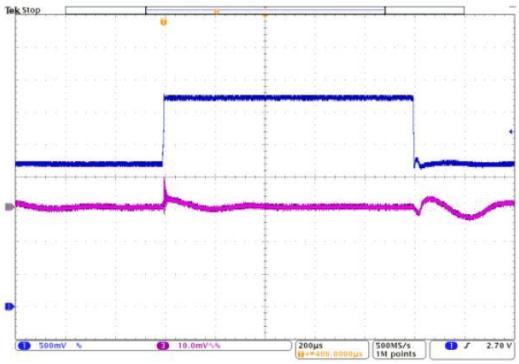
Ch1:VIN Ch2:EN Ch3:VOUT Ch4:IOUT



Line Transient Response

VIN=2.2V to 3.2V, IOUT=1mA

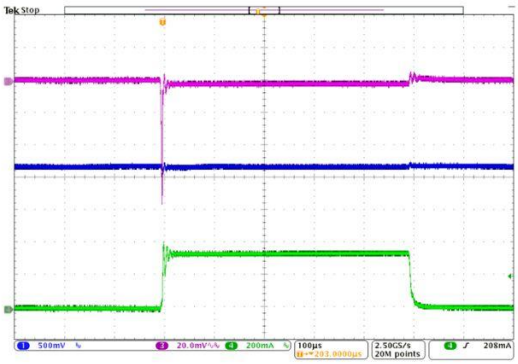
Ch1:VIN Ch3:VOUT



Load Transient Response

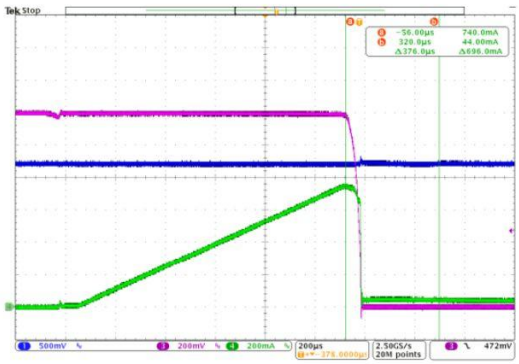
IOUT=1mA to 350mA

Ch1:VIN Ch3:VOUT Ch4:IOUT



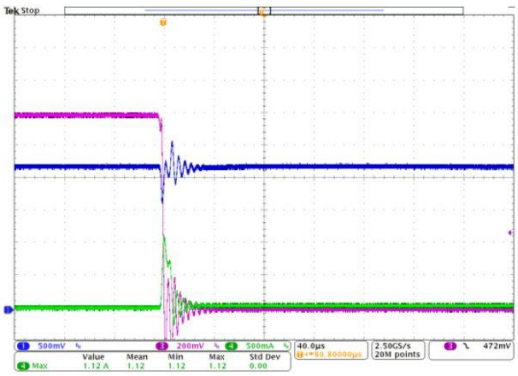
Over Current Protection

Ch1:VIN Ch3:VOUT Ch4:IOUT

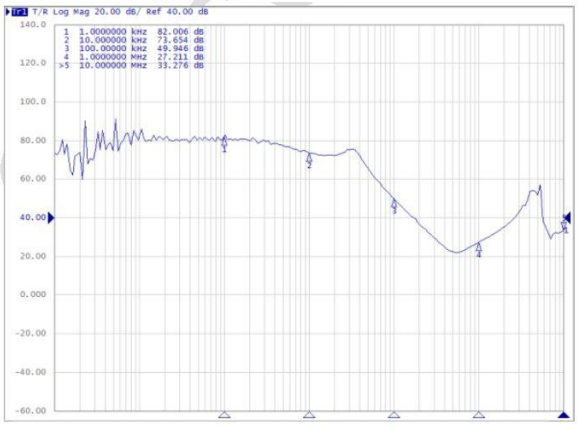
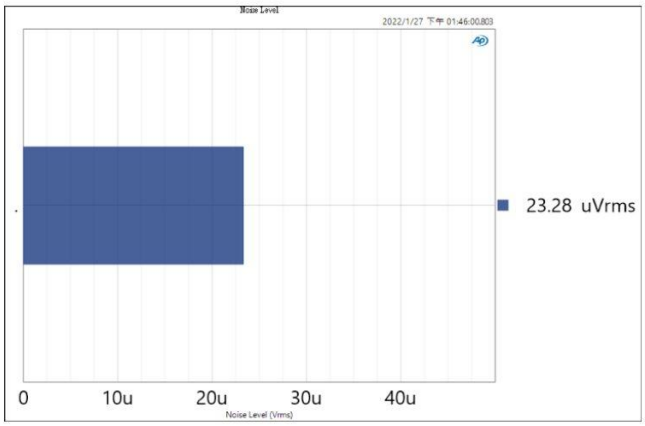


Output Short Protect

Ch1:VIN Ch3:VOUT Ch4:IOUT



PSRR uency



Output Noise vs. Frequency