

3A, 5.5V, 1.2MHz, 40μA IQ, COT
Synchronous Step Down Switcher

DESCRIPTION

The CFP2143 is a monolithic, step-down, switch-mode converter with internal power MOSFETs. It can achieve up to 3A continuous output current from a 2.5V-to-5.5V input voltage with excellent load and line regulation. The output voltage can be regulated as low as 0.6V.

Constant-on-time control provides fast transient response and eases loop stabilization. Fault-condition protections include cycle-by-cycle current limiting and thermal shutdown.

The CFP2143 is available in small TSOT23-8 package and requires only a minimal number of readily-available standard external components.

The CFP2143 is ideal for a wide range of applications including high-performance DSPs, FPGAs, smartphones, portable instruments, and DVD drivers.

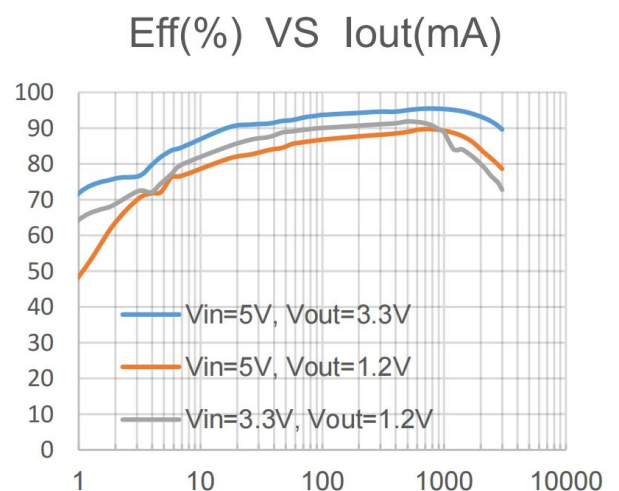
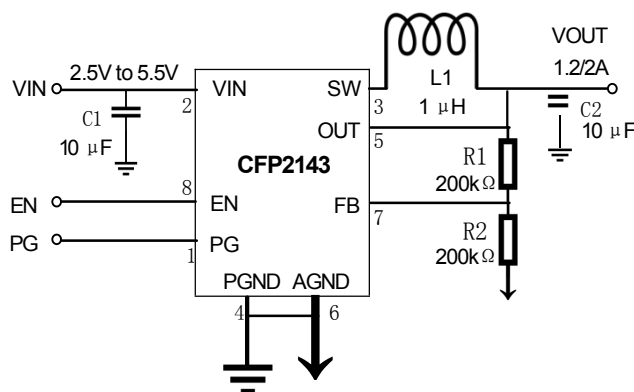
FEATURES

- Wide 2.5V-to-5.5V Operating Input Range
- Output Voltage as Low as 0.6V
- 100% Duty Cycle in Dropout
- Up to 3A Output Current
- Low IQ: 40μA
- 80mΩ and 40mΩ Internal Power MOSFET Switches
- Default 1.2MHz Switching Frequency
- EN and Power-Good for Power Sequencing
- Cycle-by-Cycle Over-Current Protection
- Auto Discharge at Power Off
- Short-Circuit Protect with Hiccup Mode
- Stable with Low-ESR Output Ceramic Capacitors
- Available in a TSOT23-8 Package

Applications

- Low Voltage I/O System Power
- Handheld/Battery-powered Systems
- Wireless/Networking Cards

Typical Application and Recommended Components

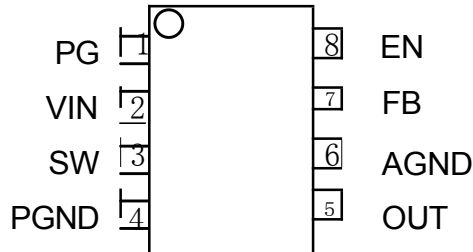


Order Information

Part No.	Package Type	Top Mark	Pcs/Reel
CFP2143	SOT23-8	P102133/TYWW	3000

Mark Note: Y=Year, WW=Week

Pin Description



SOT23-8 Top view

Pin	Name	Description
1	PG	Power-Good Indicator. The pin output is an open drain that connects to VIN by an internal pull-up resistor. PG is pulled up to VIN when the FB voltage is within $\pm 10\%$ of the regulation level. If FB voltage is out of that regulation range, it is LOW.
2	VIN	Supply Voltage. The CFP2143 operates from a 2.5V-to-5.5V unregulated input. C1 prevents large voltage spikes from appearing at the input.
3	SW	Switch Output
4	PGND	Power Ground
5	OUT	Input Sense. For output voltage feedback
6	AGND	Analog ground. Reference for the internal control circuit.
7	FB	Feedback pin. Connect an external resistor divider from the output to AGND to set the output voltage.
8	EN	On/Off Control

Absolute Maximum Ratings

Parameter	Rating	Unit	Remarks
VIN Voltage	-0.3 ~ 6	V	
SW Voltage	-0.3 ~ VIN+0.3	V	
All Other Pins Voltage	-0.3 ~ 6	V	
Operational temperature range	-40 ~ 85	°C	
Junction Temperature	150	°C	
Lead Temperature	260	°C	
Continuous Power Dissipation (TA = 25°C)	1.25	W	
Storage temperature range	-65 ~ 150	°C	
Thermal Resistance (θ_{JA})		°C/W	Junction to Ambient
ESD HBM		KV	
ESD CDM		KV	

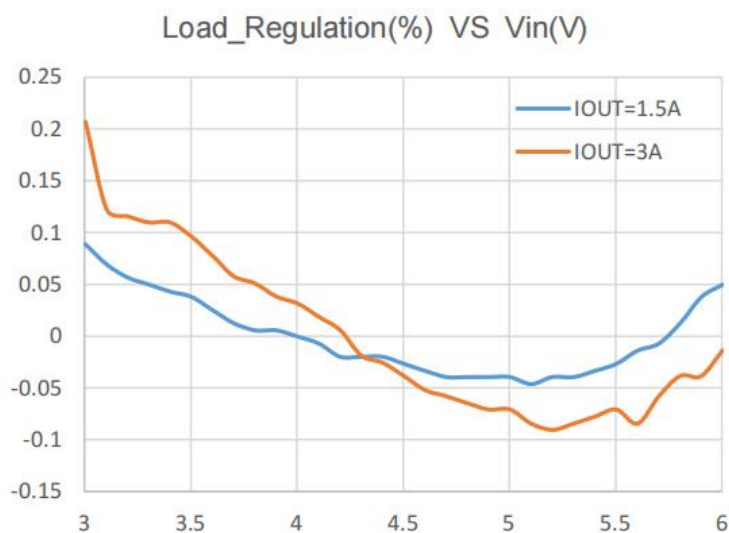
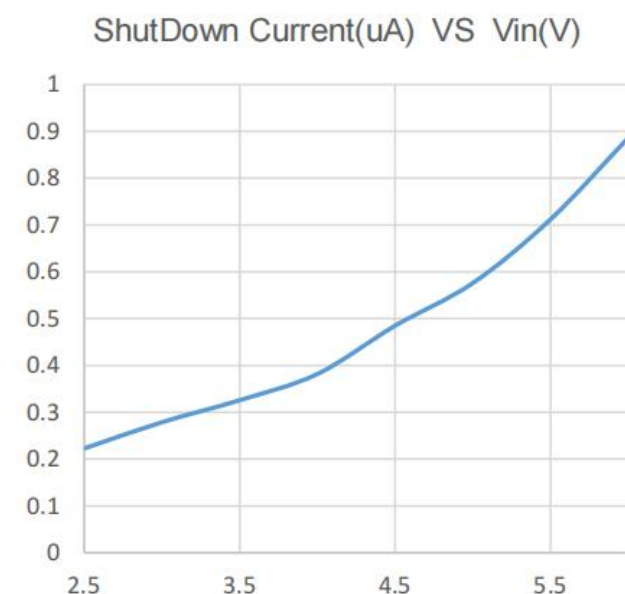
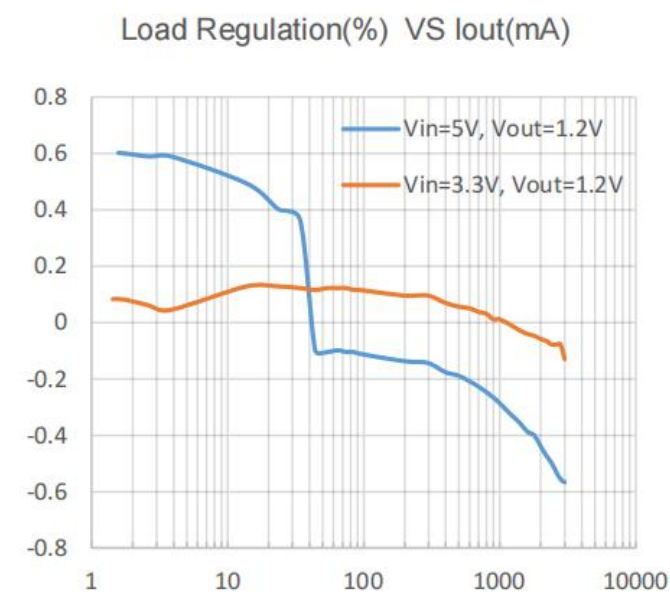
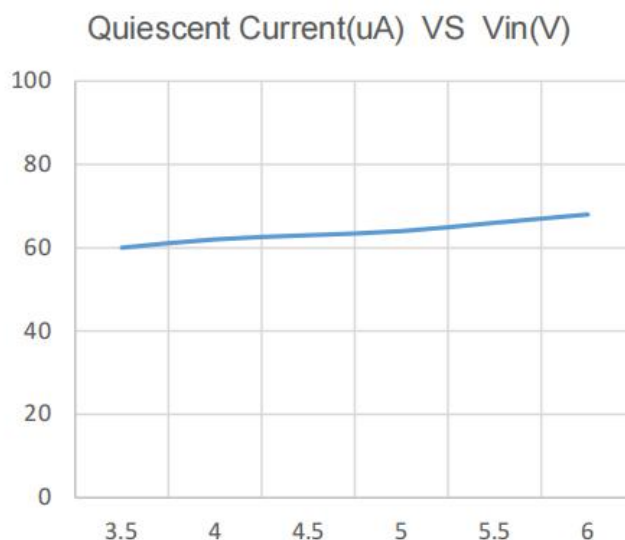
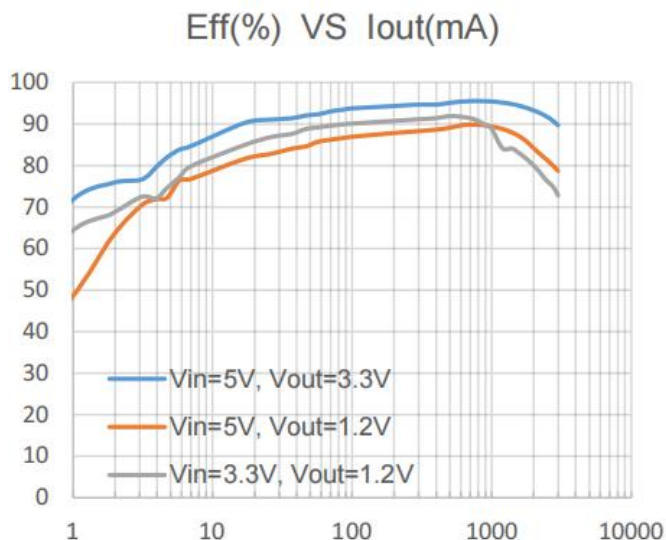
Electrical Characteristics

Test conditions: Tamb=25°C, VIN=5V unless otherwise noted.

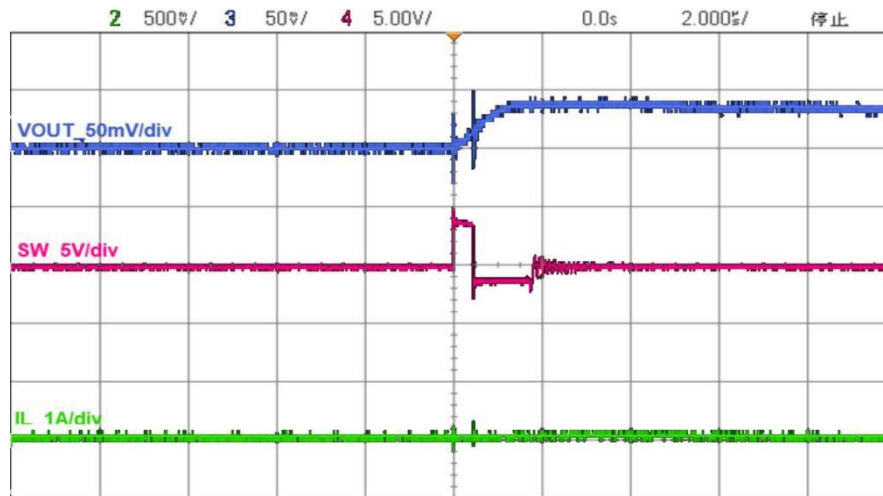
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Feedback Voltage	V _{FB}	2.5V ≤ VIN ≤ 5.5V	-1.5%	0.6	1.5%	V/%
		T _A = -40°C to +85°C	-2%		2%	
Feedback Current	I _{FB}	V _{FB} = 0.63V		0.3		nA
PFET Switch ON Resistance	RDSON_P			52		mΩ
NFET Switch ON Resistance	RDSON_N			40		mΩ
Switch Leakage		V _{EN} = 0V, V _{IN} = 5V, V _{SW} = 0V and 5V		0.1	2	uA
PFET Current Limit			4.2	4.8		A
NFET Switch Sinking Current	I _{NSW}	V _{OUT} =1.2V, V _{FB} =0.7V		20		uA
ON Time	t _{ON}	V _{IN} =5V, V _{OUT} =1.2V;		200		ns
		V _{IN} =3.6V, V _{OUT} =1.2V		277		
Switching frequency	f _s	V _{IN} =5V, V _{OUT} =1.2V, I _{OUT} =1A	-25%	1200	+25%	kHz
Minimum OFF Time	t _{MIN-OFF}			50		ns
Soft-Start Time	t _{SS-ON}	VIN = 5V, VOUT = 1.2V		1.3		ms
Soft-Stop Time	t _{SS-OFF}	VIN = 5V, VOUT = 1.2V		1		ms
Power-Good Upper Trip Threshold	PG _H	FB voltage respect to the regulation		+10%		
Power-Good Lower Trip Threshold	PG _L			-10%		
Power-Good Delay	PG _D			110		us
Power-Good Sink Current Capability	V _{PG-L}	Sink 1mA			0.4	V
Power-Good Logic High Voltage	V _{PG-H}	V _{IN} =5V, V _{FB} =0.6V	4.9			V
Power-Good Internal Pull-Up Resistor	R _{PG}			500		kΩ
Under-Voltage Lockout Threshold Rising			2.0	2.2	2.4	V
Under-Voltage Lockout Threshold Hysteresis				150		mV
EN Input Logic Low Voltage					0.4	V
EN Input Logic High Voltage			1.2			V
EN Input Current		V _{EN} =2V		2		uA
		V _{EN} =0V		0.1		
Supply Current (Shutdown)		V _{EN} =0V, PG Floating		0.1		uA
Supply Current (Quiescent)		V _{EN} =2V, V _{FB} =0.63V, V _{IN} =3.6V		40		uA
Thermal Shutdown				150		°C
Thermal Hysteresis				30		°C

Typical Characteristics

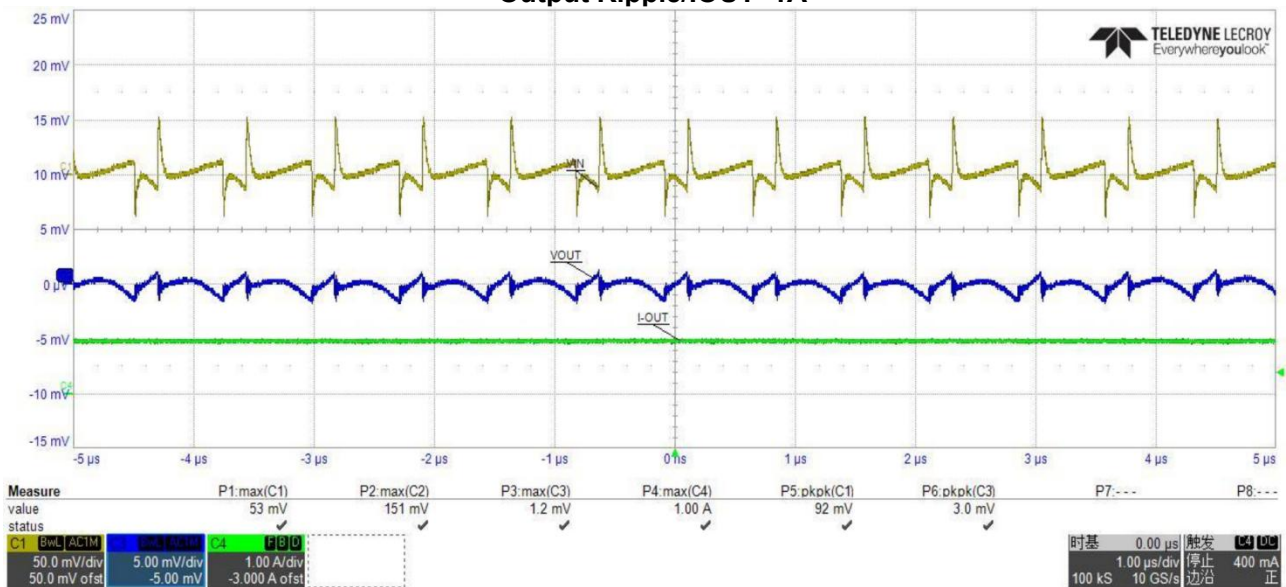
Test conditions: $T_{amb}=25^{\circ}\text{C}$, $V_{IN}=5\text{V}$, $V_{OUT}=1.2\text{V}$, unless otherwise noted.



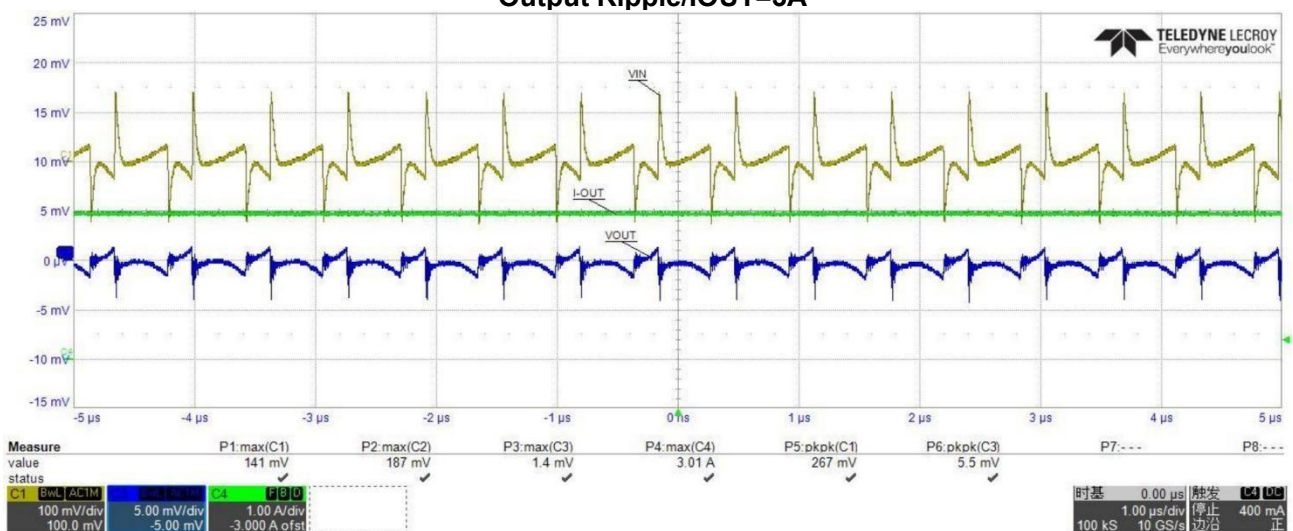
Output Ripple/IOUT=0A



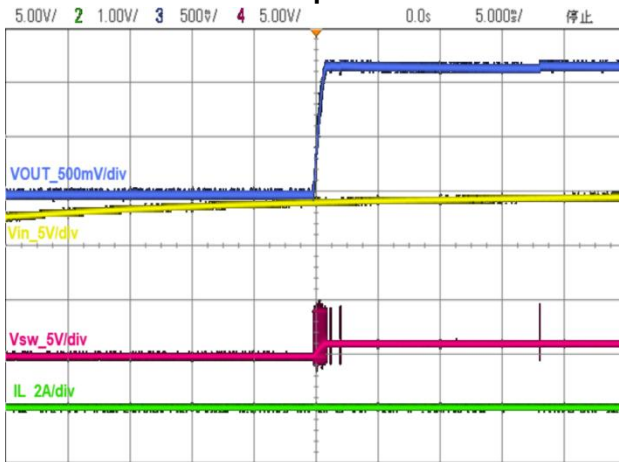
Output Ripple/IOUT=1A



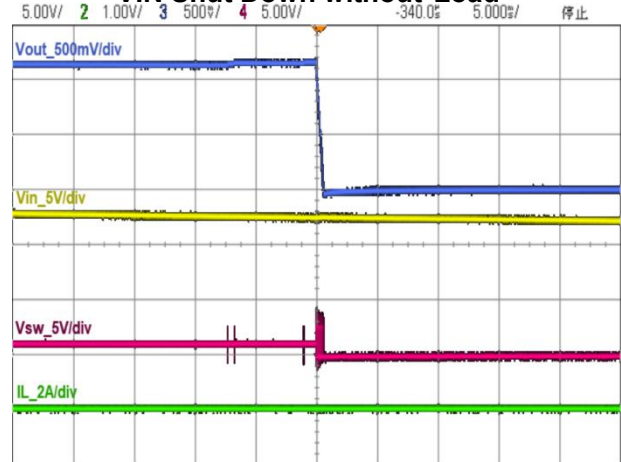
Output Ripple/IOUT=3A



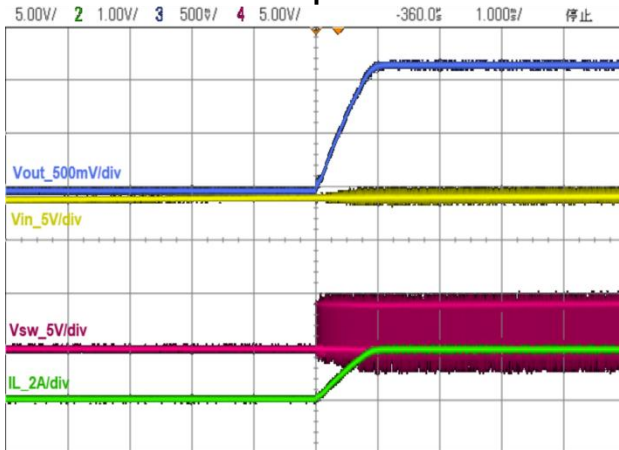
VIN Power Up without Load



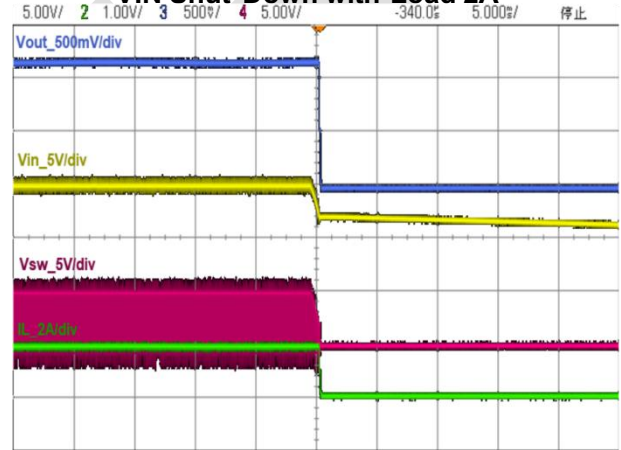
VIN Shut Down without Load



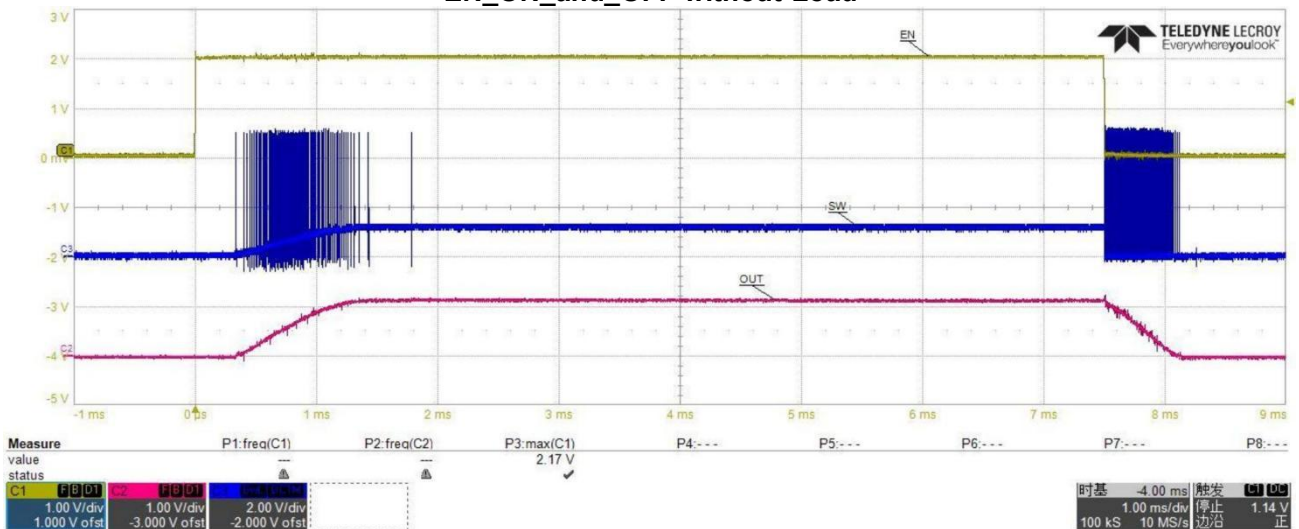
VIN Power Up with Load 2A



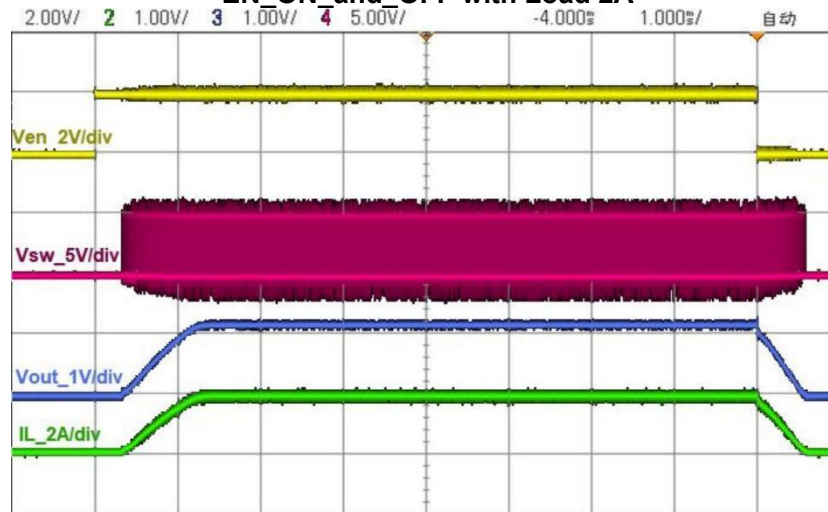
VIN Shut Down with Load 2A



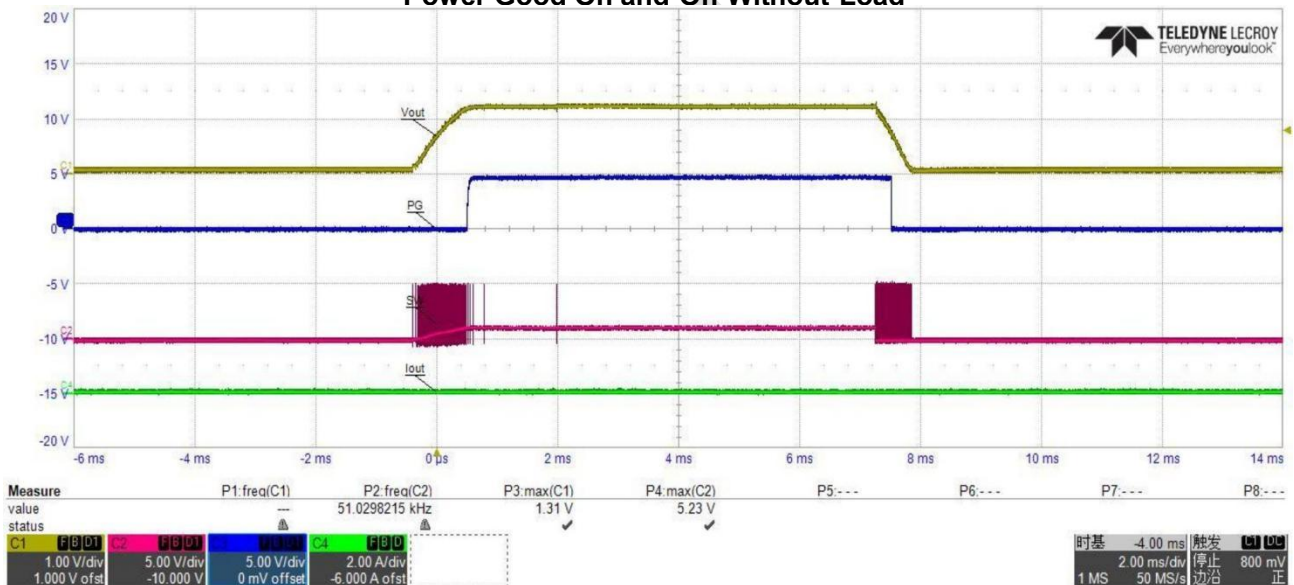
EN_ON_and_OFF without Load



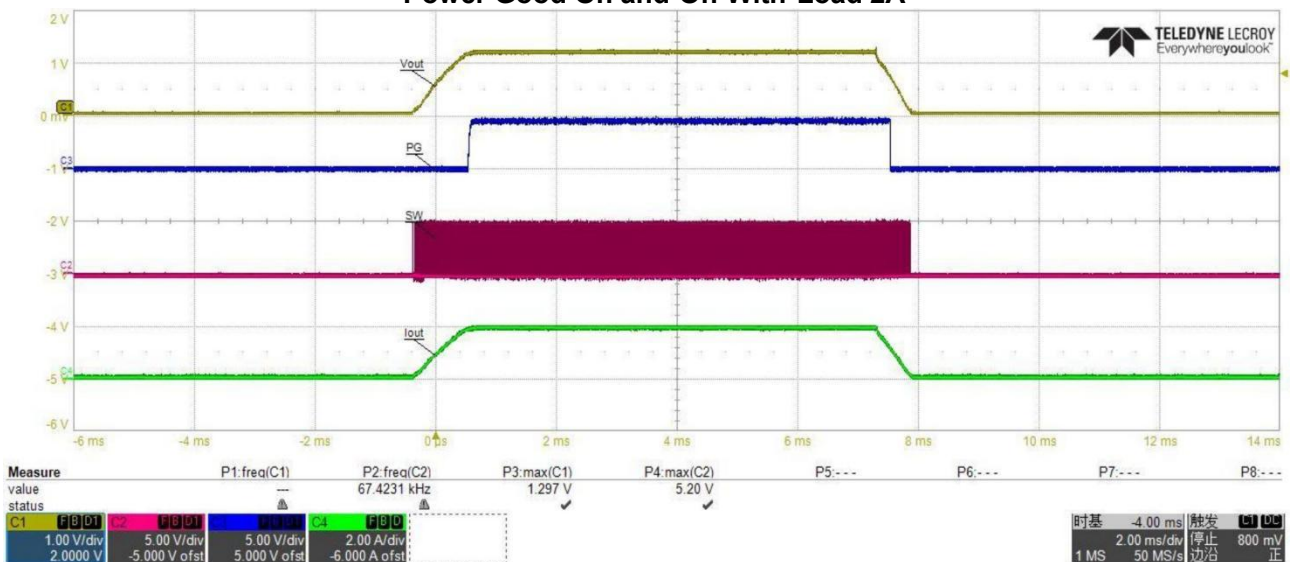
EN_ON and OFF with Load 2A

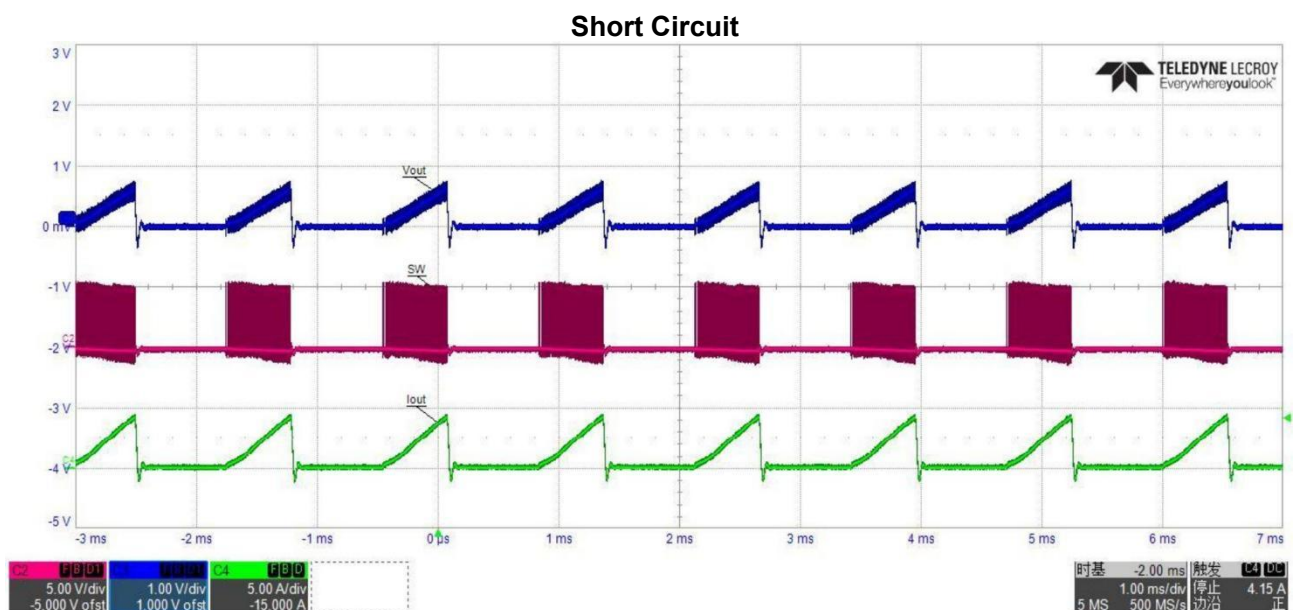
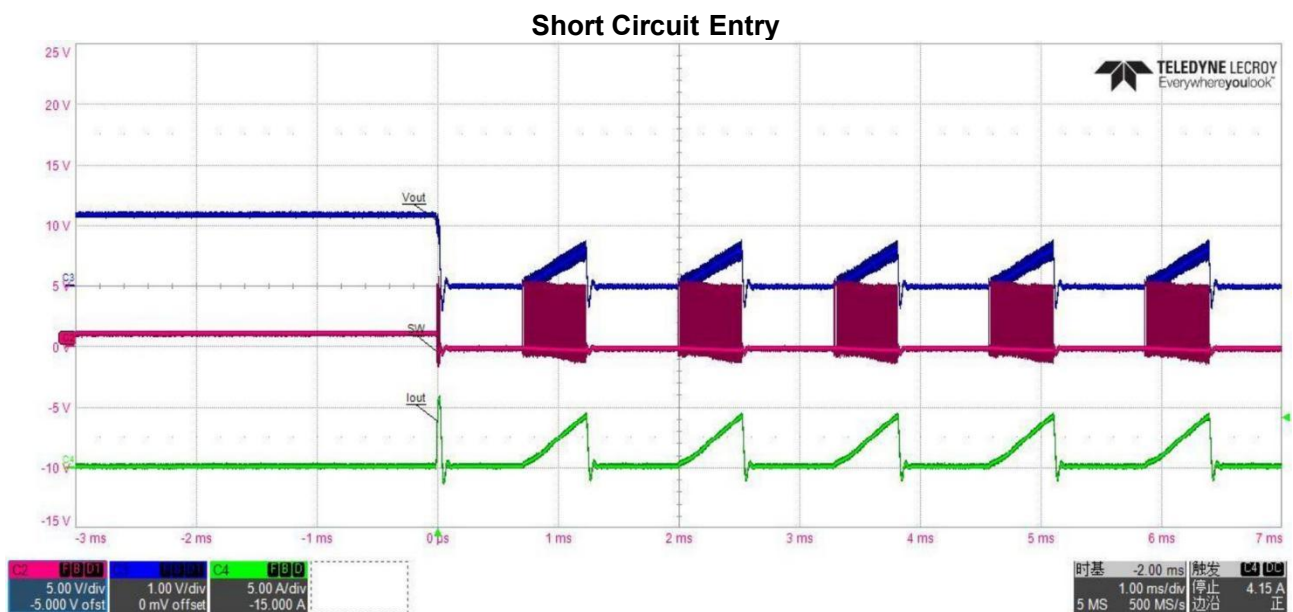
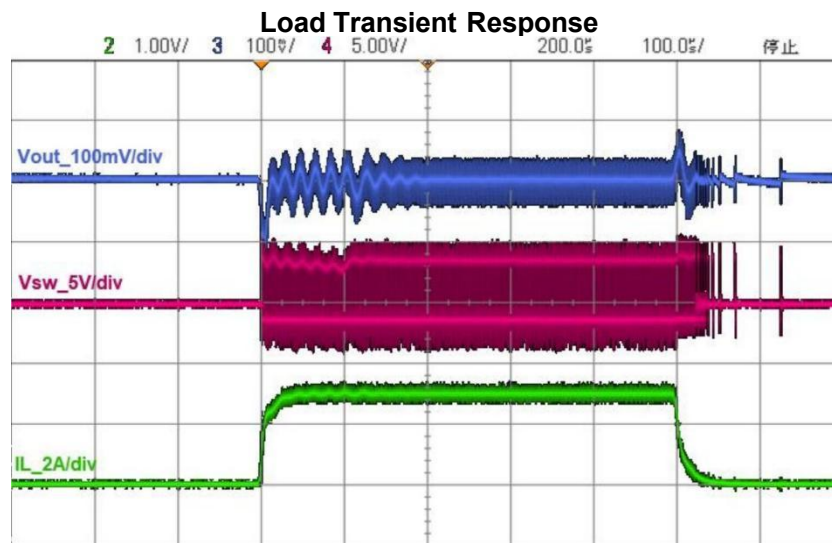


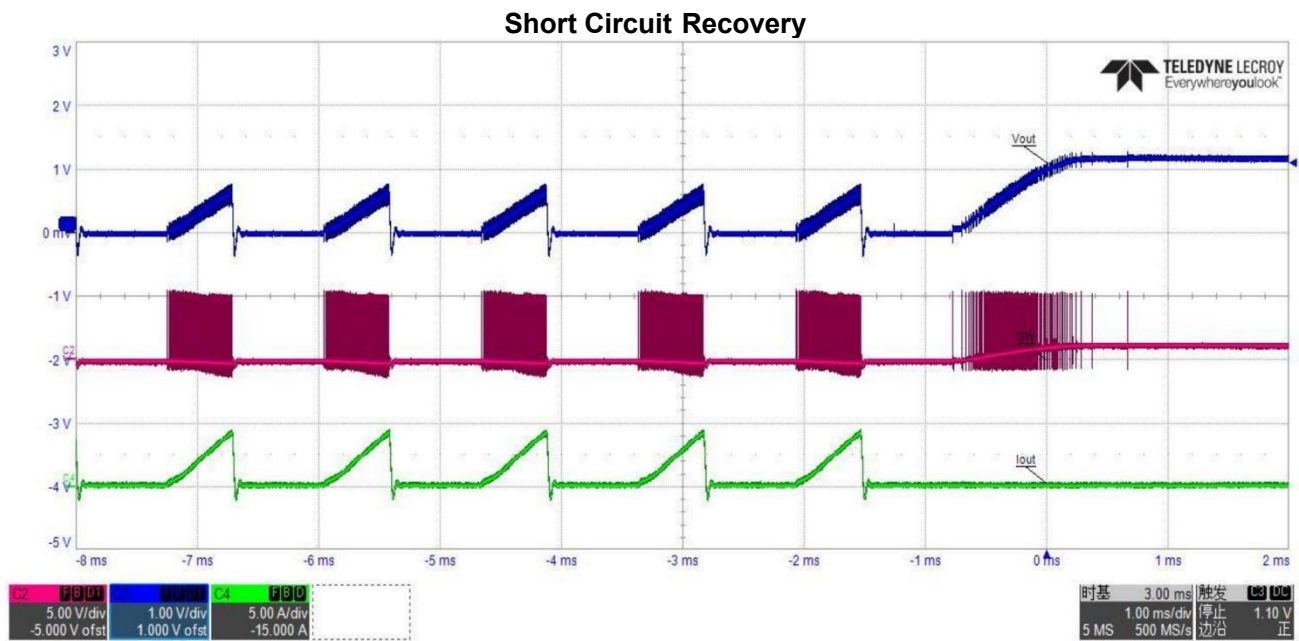
Power Good On and Off Without Load



Power Good On and Off With Load 2A

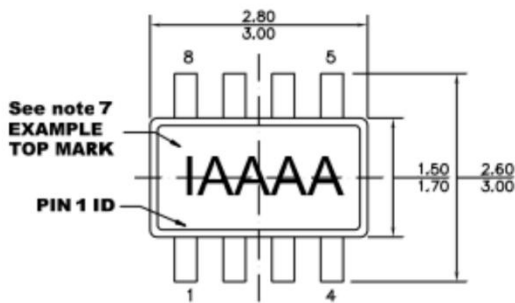




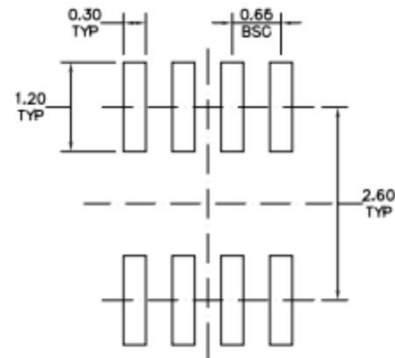


Package Outline

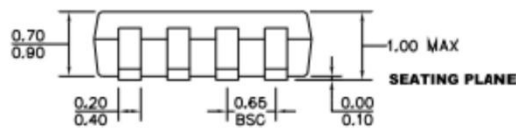
SOT23-8



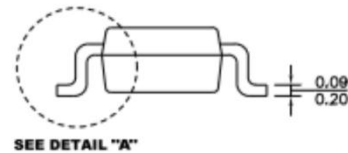
TOP VIEW



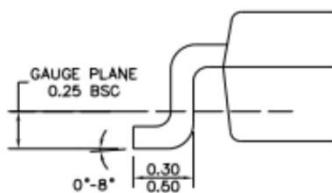
RECOMMENDED LAND PATTERN



FRONT VIEW



SIDE VIEW



DETAIL "A"

NOTE:

- 1) ALL DIMENSIONS ARE IN MILLIMETERS.
- 2) PACKAGE LENGTH DOES NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURR.
- 3) PACKAGE WIDTH DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION.
- 4) LEAD COPLANARITY (BOTTOM OF LEADS AFTER FORMING) SHALL BE 0.10 MILLIMETERS MAX.
- 5) JEDEC REFERENCE IS MO-193, VARIATION BA.
- 6) DRAWING IS NOT TO SCALE.
- 7) PIN 1 IS LOWER LEFT PIN WHEN READING TOP MARK FROM LEFT TO RIGHT, (SEE EXAMPLE TOP MARK)