

GENERAL DESCRIPTION

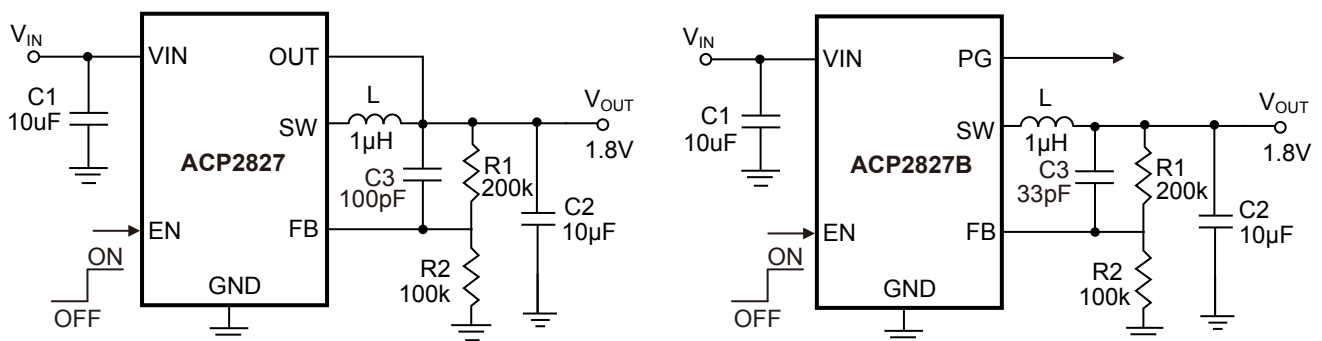
The ACP2827 and ACP2827B is a 1A, synchronous buck converter with a wide input voltage range of 2.3V to 5.5V. The device fully integrates a 110mΩ high-side power MOSFET and an 80mΩ low-side power MOSFET to provide high-efficiency step-down DC-DC conversion. The ACP2827 and ACP2827B device is easily used by minimizing the external component count due to its adoption of Constant On-Time (COT) control to achieve fast transient response, easy loop stabilization, and low output voltage ripple.

The device is available in a SOT563 package.

APPLICATION

- 5V Distributed Power Bus Supplies
- White Goods and Small Home Appliances
- FPGA, DSP, and ASIC Supplies
- Network Video Cameras
- Wireless Routers
- Consumer Electronics
- General Purpose Point of Load

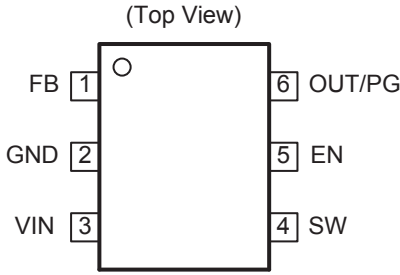
APPLICATION CIRCUIT



ORDERING INFORMATION

Standard Part NO.	Package	Packing	Min. Quantity
ACP2827-AQAA	SOT563	Tape & Reel	3000PCS
ACP2827B-AQAA	SOT563	Tape & Reel	3000PCS

▼ PIN CONFIGURATION

Pin Configuration	Pin Description		
SOT563	Pin#	Symbol	Function
 <p>(Top View)</p>	1	FB	Feedback Input.
	2	GND	Ground Pin.
	3	VIN	Voltage Supply Input.
	4	SW	Power Switching Output.
	5	EN	Enable Input(Note 1)
	6	OUT PG	Output Voltage Power Rail(ACP2827) Power-Good Pin(ACP2827B)

Note 1: The device operates in PFM when a logic high voltage is applied to the EN pin greater than $V_{IN} - 200\text{mV}$. The device operates in PWM regardless of output load when a logic high voltage is applied to the EN pin less than $V_{IN} - 200\text{mV}$.

▼ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{IN}	2.3 to 5.5	V
Operating Ambient Temperature	T_A	-40 to +85	°C

▼ ABSOLUTE MAXIMUM RATINGS

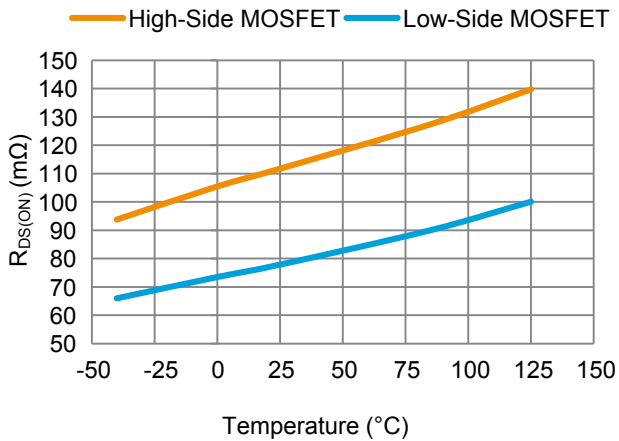
Parameter	Symbol	Rating	Unit
Supply Pin Voltage	V_{IN}	-0.3 to 6.5	V
Feedback Pin Voltage	V_{FB}	-0.3 to 7 (400ms)	
Switch Pin Voltage	V_{SW}	-0.3 to $V_{IN} + 0.3$	
		-2.5 to $V_{IN} + 2.0$ (20ns)	
Enable Pin Voltage	V_{EN}	-0.3 to $V_{IN} + 0.3$	
Output Pin Voltage(ACP2827)	V_{OUT}	-0.3 to 6.0	
Power-Good Pin Voltage(ACP2827B)	V_{PG}		
Storage Temperature	T_S	-65 to 150	°C
Junction Temperature	T_J	+160	
Lead Temperature	T_L	+260	
Human Body Model	HBM	±6000	V
Charged Device Model	CDM	±1500	
Junction to Ambient	θ_{JA}	141	°C/W
Junction to Case	θ_{JC}	33	

▼ ELECTRICAL CHARACTERISTICS

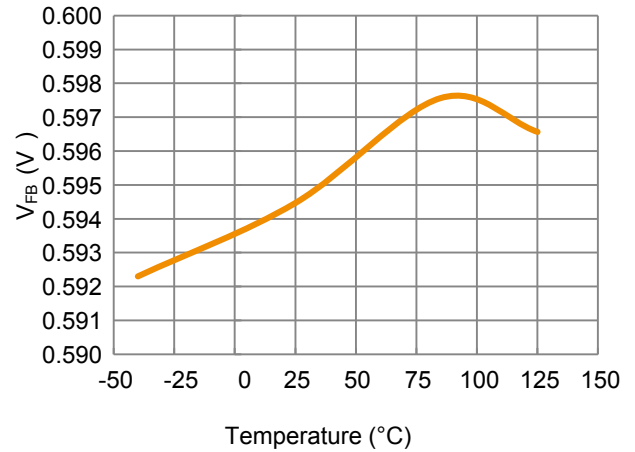
 ($V_{IN} = 5V$, $T_A = 25^\circ C$, Unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Shutdown Supply Current	I_{SHDN}	$V_{EN} = 0V$		0.1		μA
Input Quiescent Current	I_Q	PFM, $V_{FB} = 0.65V$		1.5		
		PWM, $V_{FB} = 0.65V$		620		
VIN Power-on Reset Rising Threshold	POR			2	2.25	V
VIN Undervoltage Lockout Falling Threshold	UVLO			1.84		
VIN Overvoltage Rising Threshold	OVP_{VIN}			6.3		
VIN Overvoltage Hysteresis	OVP_{VIN_HYS}			300		mV
High-Side Power MOSFET On-Resistance	$R_{DS(ON)1}$			110		m Ω
Low-Side Power MOSFET On-Resistance	$R_{DS(ON)2}$			80		
HS Peak Current Limit	I_{PEAK_LIMIT}	From Source to Drain	1.7	2.5		A
LS Valley Current Limit	I_{VALLEY_LIMIT}	From Source to Drain		1.9		
Oscillator Frequency	f_{SW}	$V_{OUT} = 1.8V$, CCM	1.7	2.2	2.7	MHz
Minimum On-Time	t_{ON_MIN}			70	1	ns
Minimum Off-Time	t_{OFF_MIN}			70		
Feedback Voltage	V_{FB}	CCM	0.588	0.6	0.612	V
EN Logic High Threshold	V_{EN_H}			0.91		
EN Logic Low Threshold	V_{EN_L}			0.83	10	
Soft-Start Time	t_S			0.5		ms
Undervoltage Falling Threshold(ACP2827B)	PG_{UV_FALL}	Percent of Output Regulation, Fault		90		%
Undervoltage Rising Threshold(ACP2827B)	PG_{UV_RISE}	Percent of Output Regulation, Good		95		
Overvoltage Rising Threshold(ACP2827B)	PG_{OV_RISE}	Percent of Output Regulation, Fault		110		
Overvoltage Falling Threshold(ACP2827B)	PG_{OV_FALL}	Percent of Output Regulation, Good		105		
Power-Good Rise Delay Time	t_{PG_RD}	ACP2827B		55		μs
Power-Good Output Logic Low	V_{PG_OL}	ACP2827B, $I_{PG} = -1mA$			0.4	V
Power-Good Pull-Up Resistor	R_{PG}	ACP2827B		5		m Ω
Thermal Shutdown	T_{SD}			+160		$^\circ C$
Thermal Shutdown Hysteresis	T_{Hys}			+30		

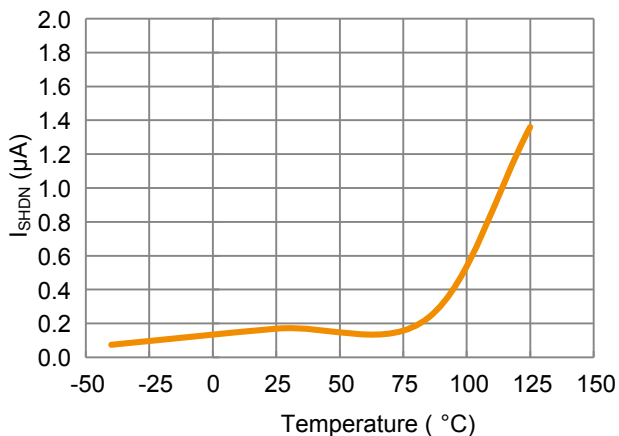
PERFORMANCE CHARACTERISTICS



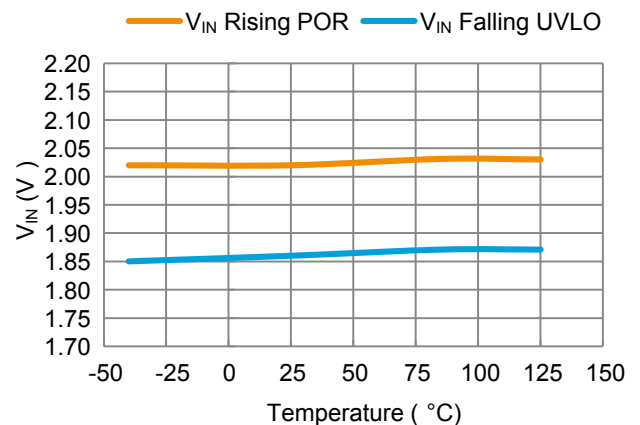
Power MOSFET $R_{DS(ON)}$ vs. Temperature



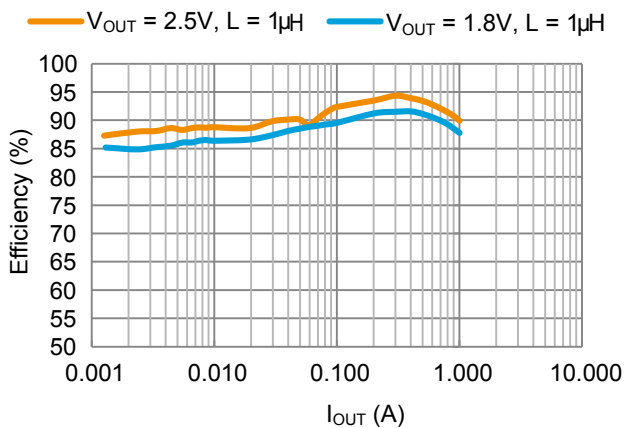
V_{FB} vs. Temperature



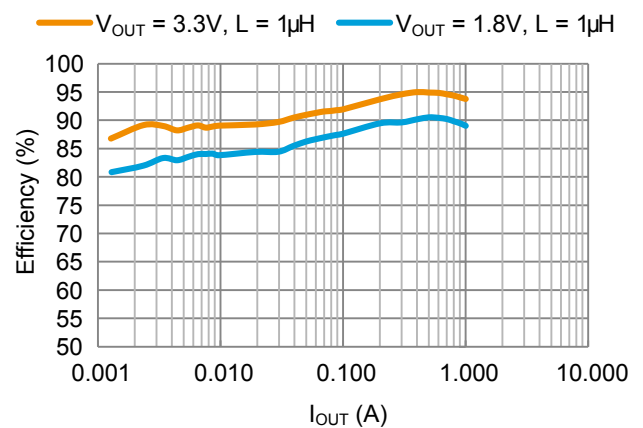
I_{SHDN} vs. Temperature



V_{IN} Power-On Reset and UVLO vs. Temperature

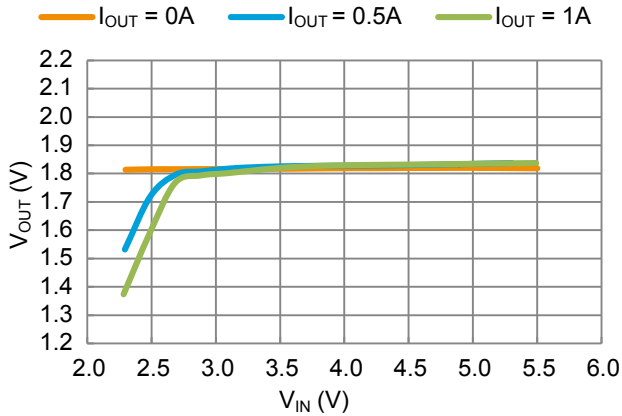


Efficiency vs. Output Current, $V_{IN} = 3.3V$

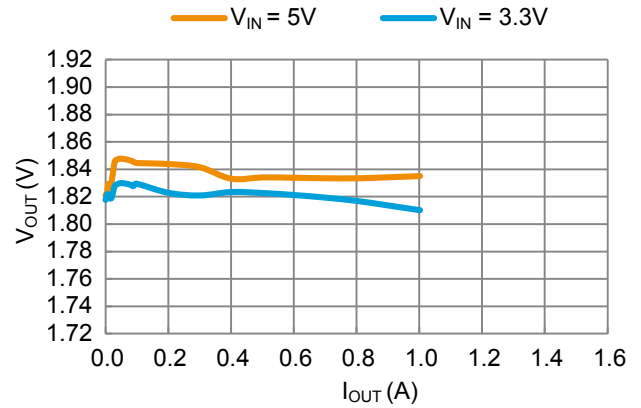


Efficiency vs. Output Current, $V_{IN} = 5V$

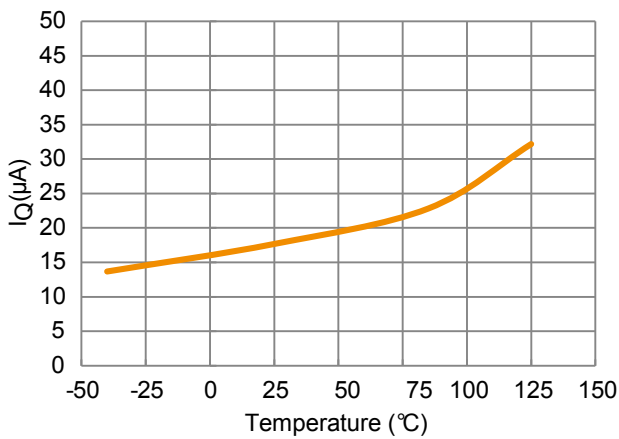
PERFORMANCE CHARACTERISTICS(Continued)



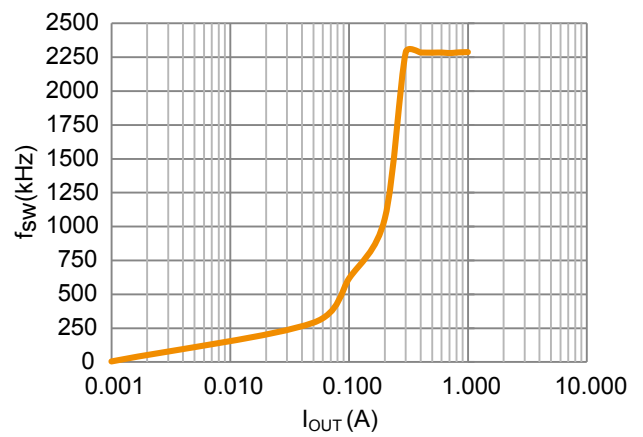
Line Regulation



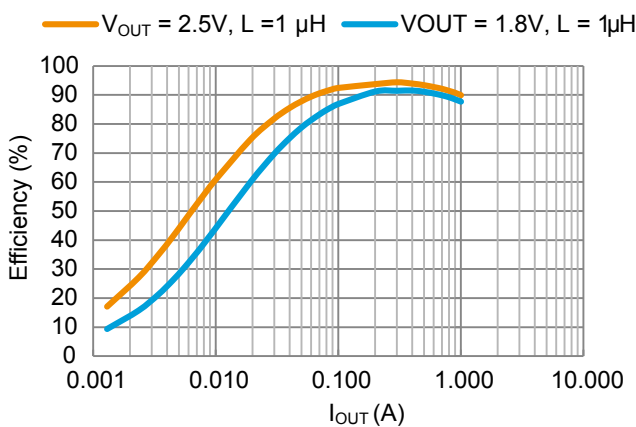
Load Regulation



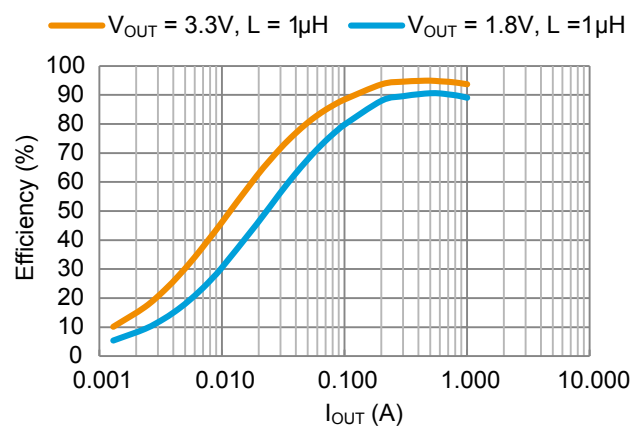
I_Q vs. Temperature



f_{sw} vs. Load

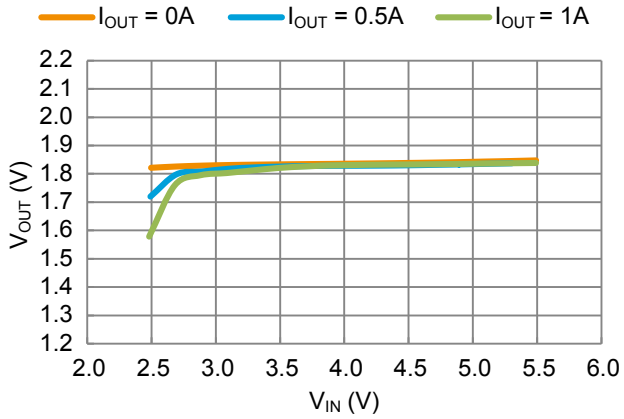


Efficiency vs. Output Current, $V_{IN} = 3.3V$

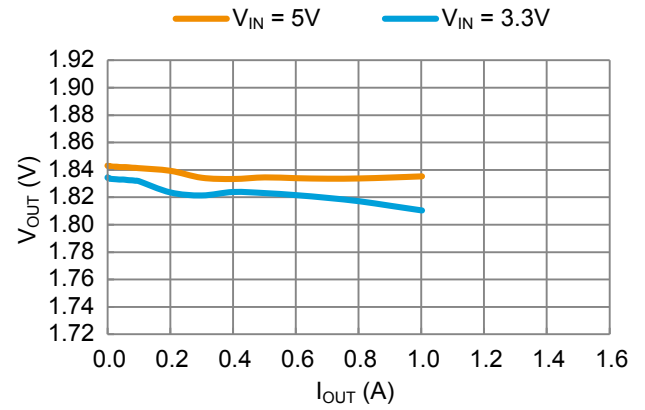


Efficiency vs. Output Current, $V_{IN} = 5V$

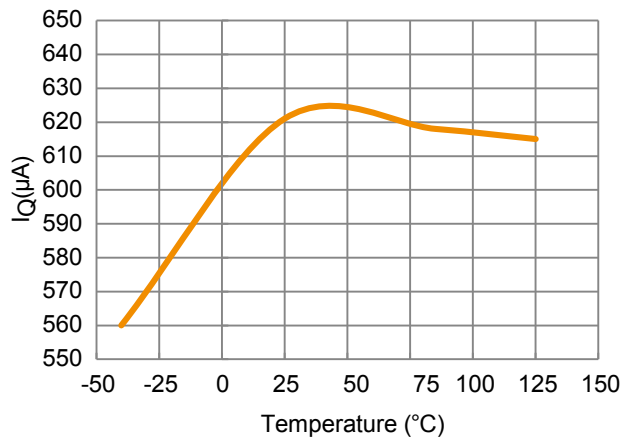
PERFORMANCE CHARACTERISTICS(Continued)



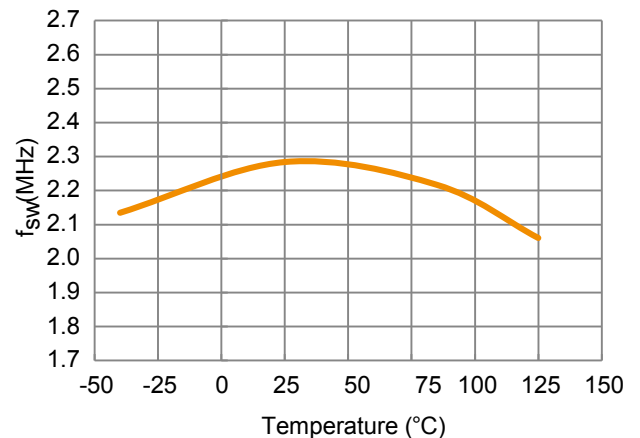
Line Regulation



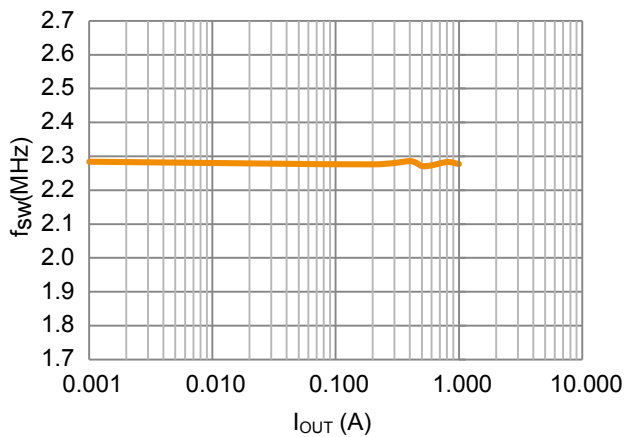
Load Regulation



I_Q vs. Temperature

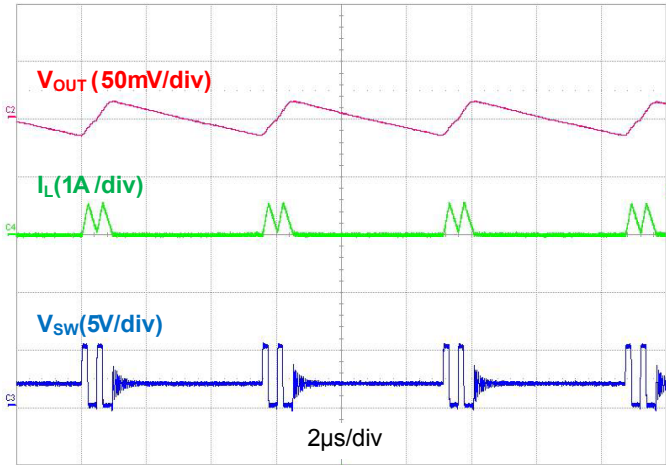


f_{sw} vs. Temperature, $I_{OUT} = 0A$

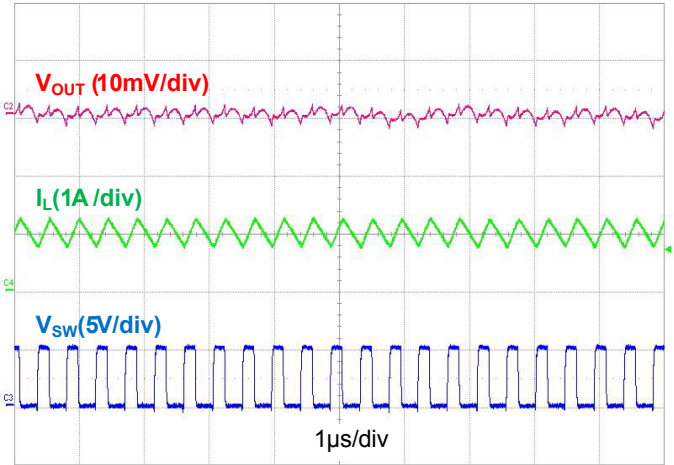


f_{sw} vs. Load

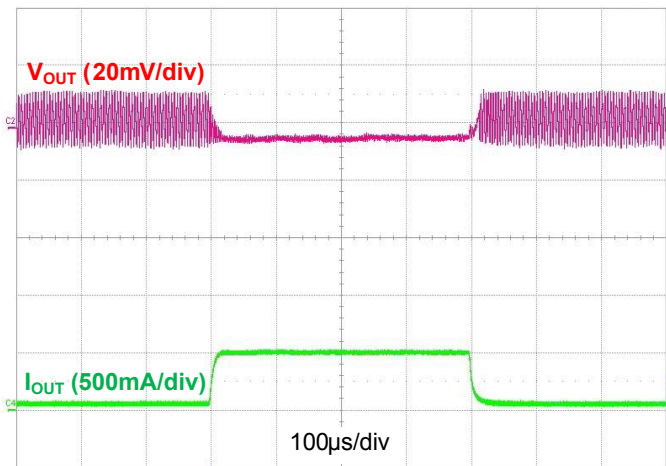
PERFORMANCE CHARACTERISTICS(Continued)



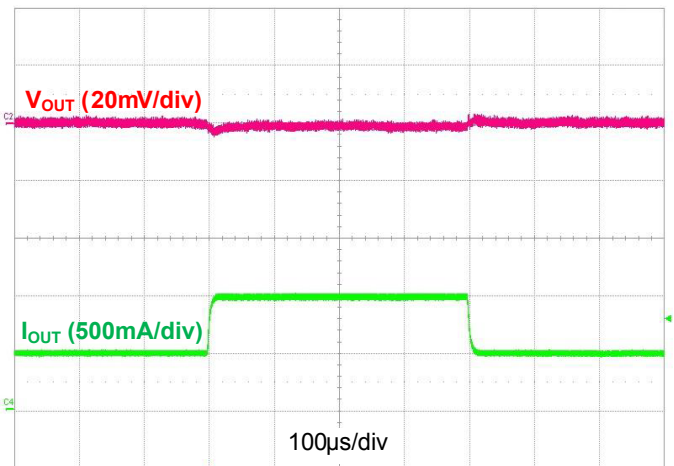
Output Voltage Ripple, $I_{OUT} = 50\text{mA}$



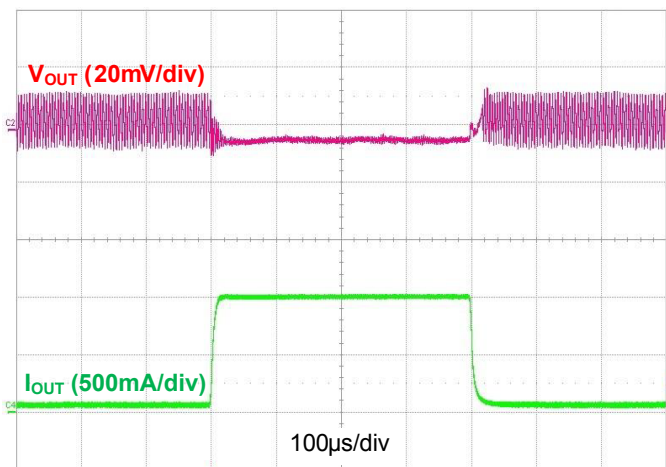
Output Voltage Ripple, $I_{OUT} = 1\text{A}$



Load Transient, $I_{OUT} = 50\text{mA}$ to 500mA to 50mA

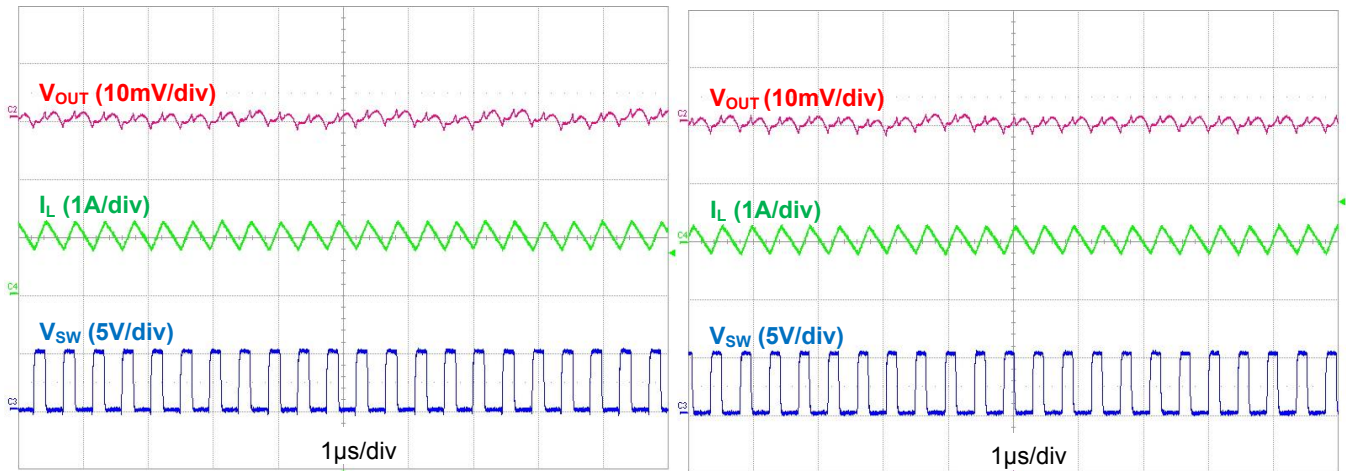


Load Transient, $I_{OUT} = 500\text{mA}$ to 1A to 500mA



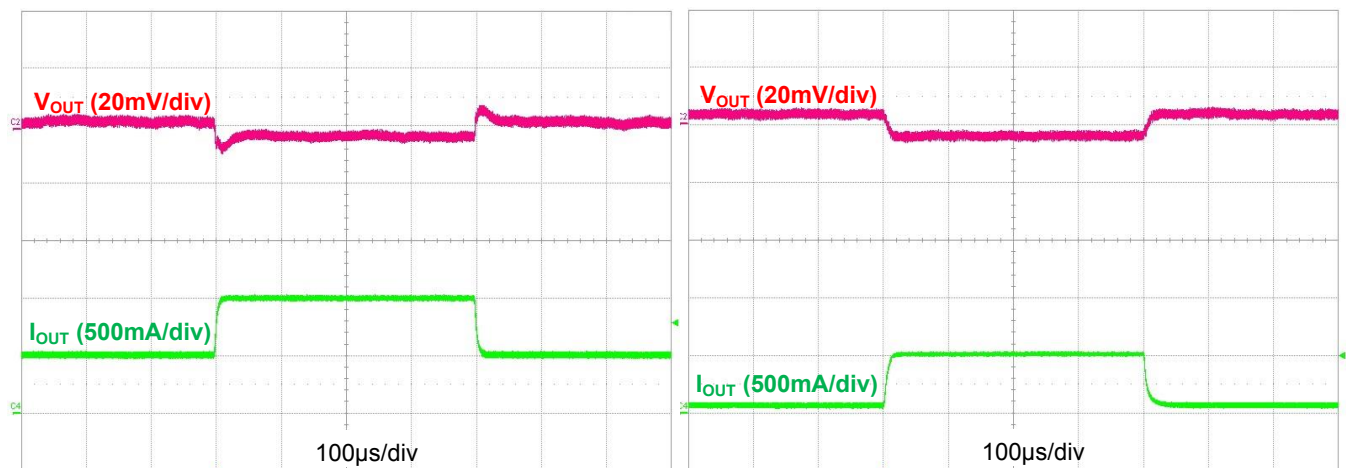
Load Transient, $I_{OUT} = 50\text{mA}$ to 1A to 50mA

PERFORMANCE CHARACTERISTICS(Continued)



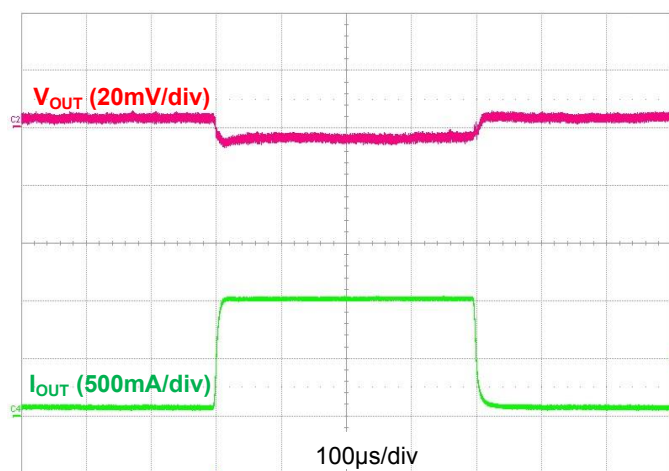
Output Voltage Ripple, $I_{OUT} = 1A$

Output Voltage Ripple, $I_{OUT} = 50mA$



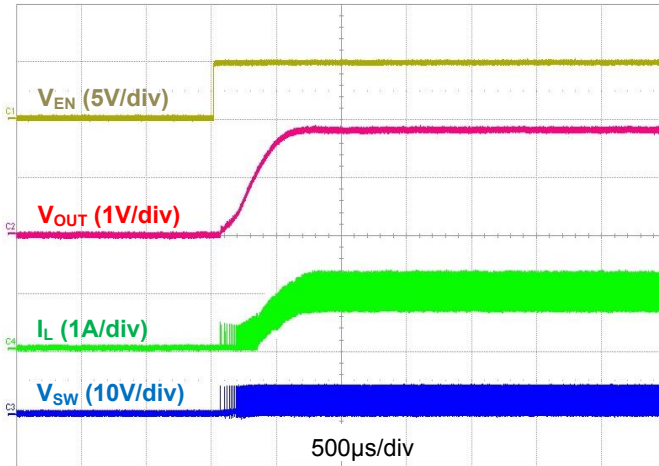
Load Transient, $I_{OUT} = 500mA$ to 1A to 500mA

Load Transient, $I_{OUT} = 50mA$ to 500mA to 50mA

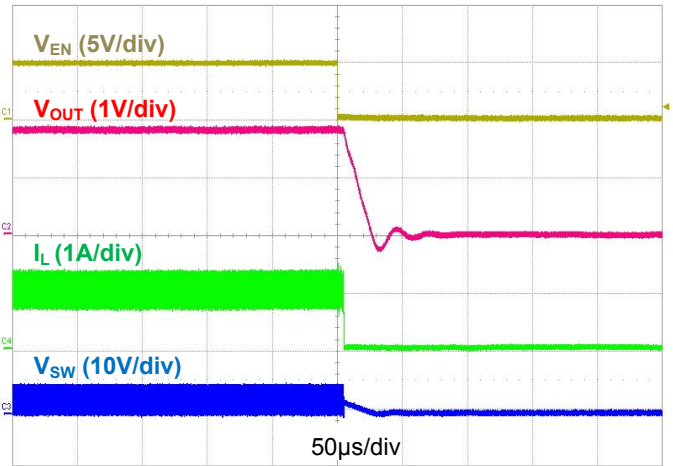


Load Transient, $I_{OUT} = 50mA$ to 1A to 50mA

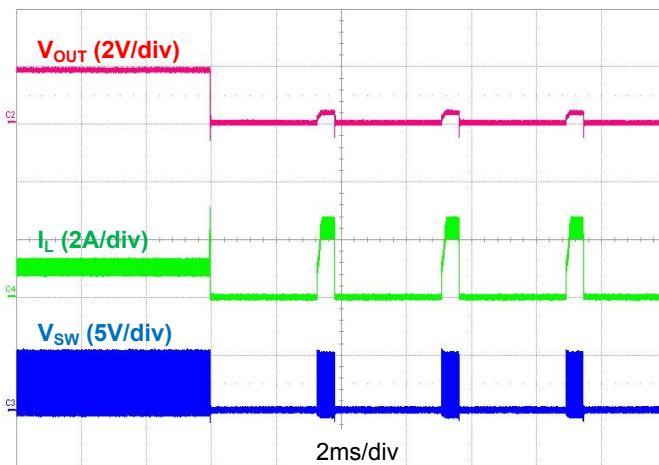
PERFORMANCE CHARACTERISTICS(Continued)



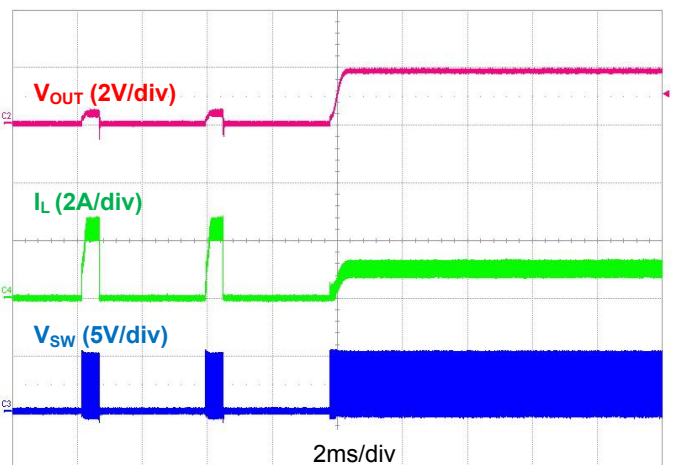
Startup Using EN, $I_{OUT} = 1A$



Shutdown Using EN, $I_{OUT} = 1A$

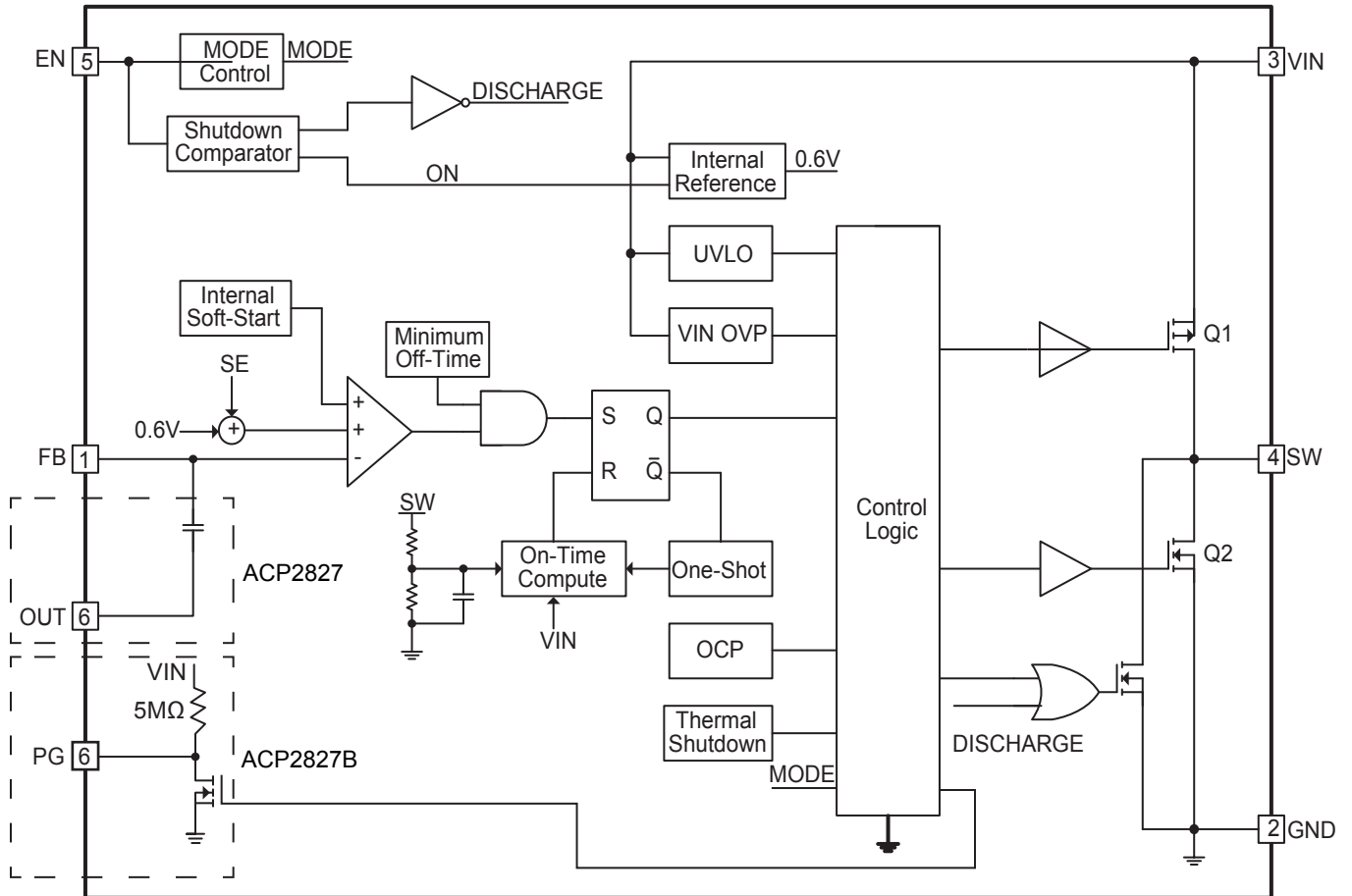


Output Short Protection, $I_{OUT} = 1A$



Output Short Recovery, $I_{OUT} = 1A$

FUNCTION BLOCK

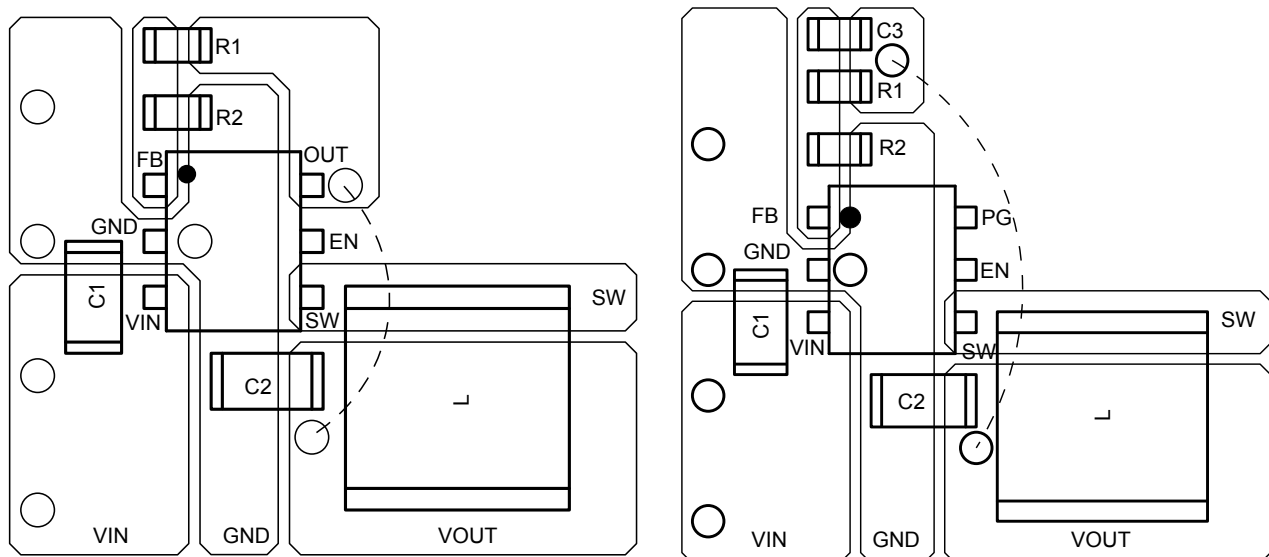


Functional Block Diagram

Layout Consideration

Follow the PCB layout guidelines for optimal performance of the ACP2827 and ACP2827B.

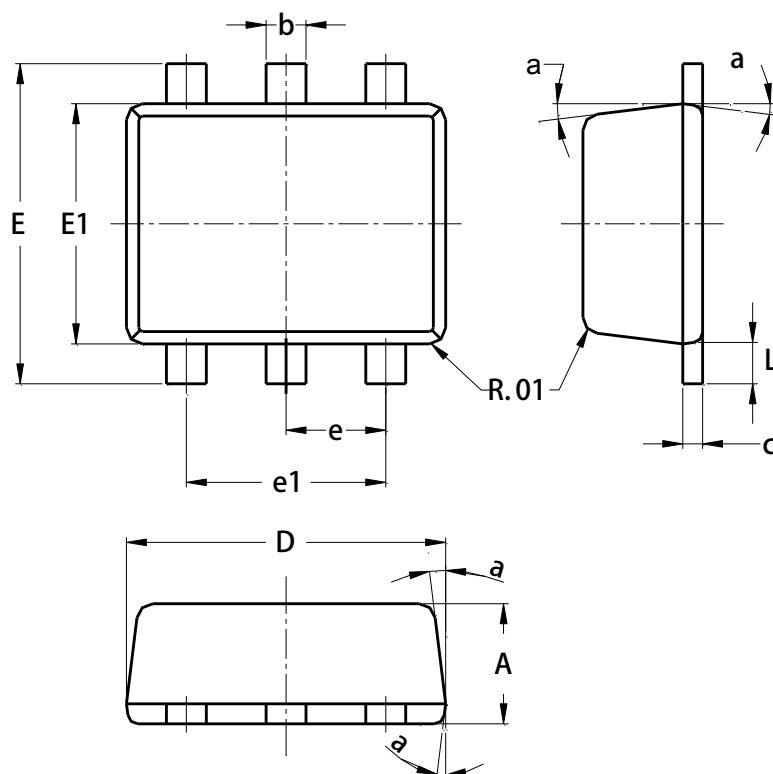
- The ACP2827/ACP2827B works at 1A load current, .2oz copper for both the top and bottom layers is recommended heat dissipation.
- Place the input capacitors as closely across VIN and GND as possible.
- Place the inductor as close to SW as possible.
- Place the output capacitors as close to GND as possible.
- Place the feedback components as close to FB as possible.
- If using four or more layers, use at least the 2nd and 3rd layers as GND to maximize thermal performance.
- Add as many vias as possible around both the GND pin and under the GND plane for all GND heat dissipation.
- Add as many vias as possible around both the VIN pin and under the VIN plane for all VIN heat dissipation.



ACP2827 and ACP2827B PCB Layout Guide

PACKAGE INFORMATION

- SOT563



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.550	0.600	0.021	0.023
b	0.150	0.300	0.005	0.011
c	0.100	0.180	0.003	0.007
D	1.500	1.700	0.059	0.066
E	1.550	1.700	0.061	0.066
E1	1.100	1.250	0.043	0.049
e	0.000	0.500	0.000	0.019
e1	0.900	1.100	0.035	0.043
L	0.100	0.300	0.003	0.011
a	8°	9°	8°	9°