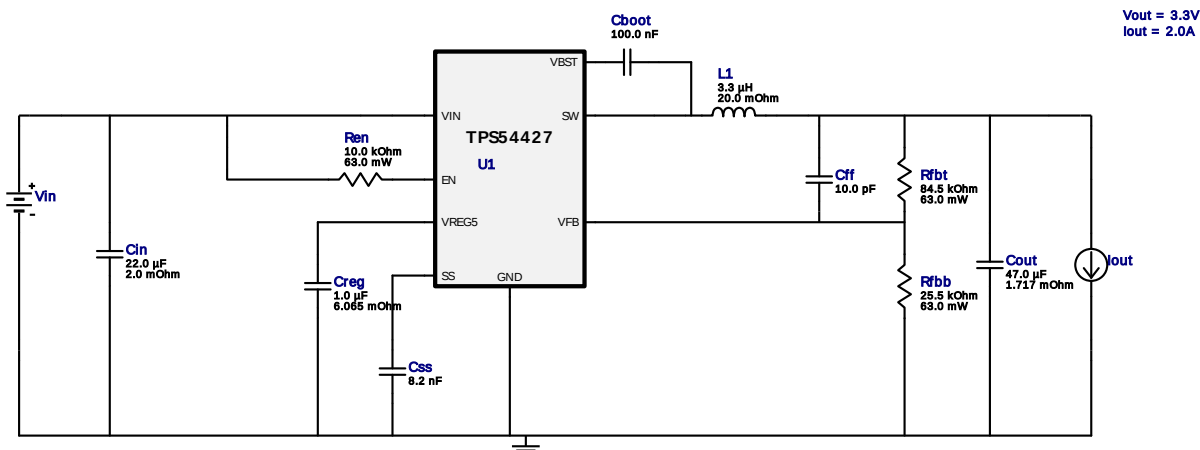


WEBENCH® Design Report

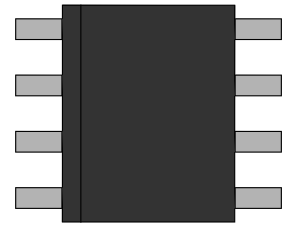
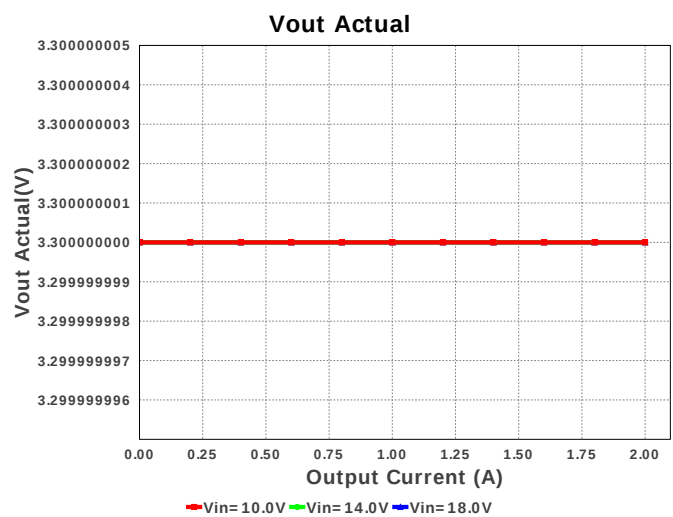
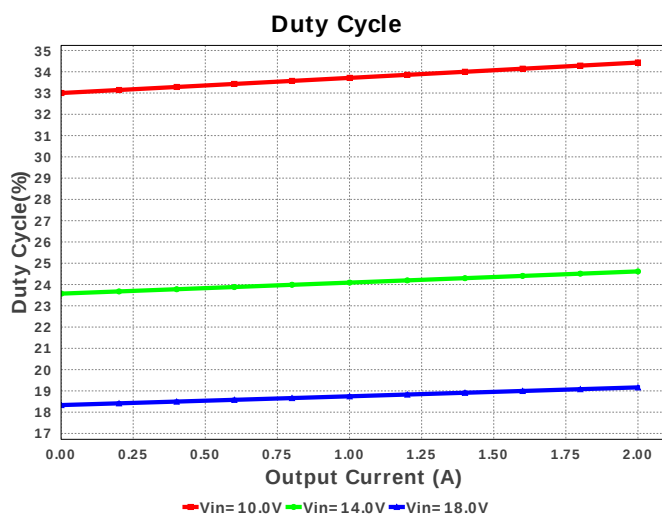
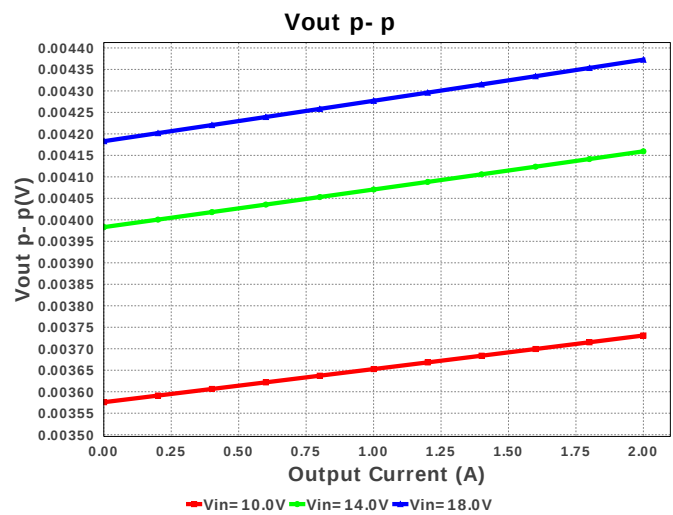
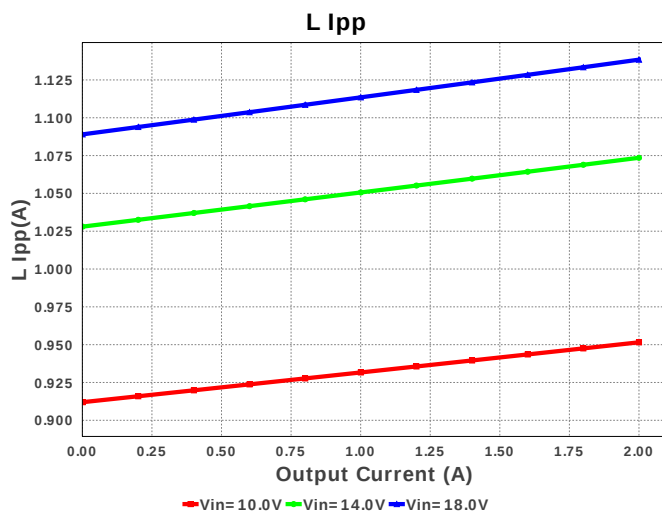
Design : 4728750/29 TPS54427DDAR
TPS54427DDAR 10.0V-18.0V to 3.30V @ 2.0A

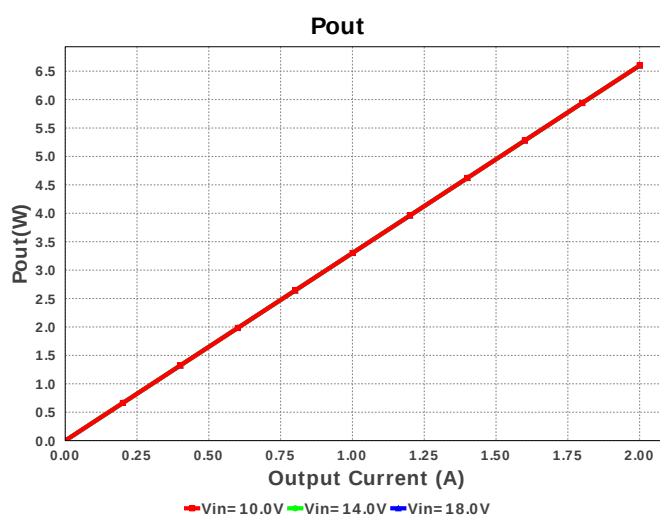
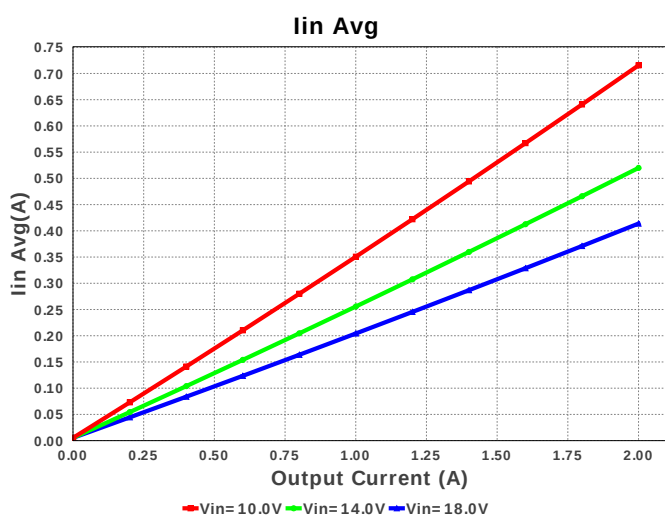
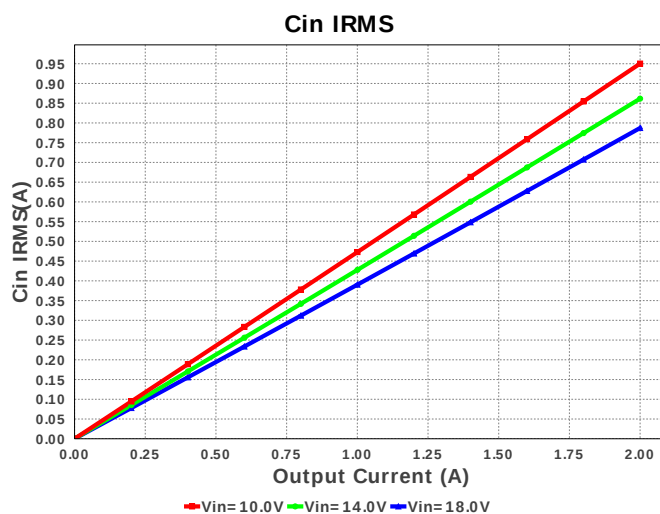
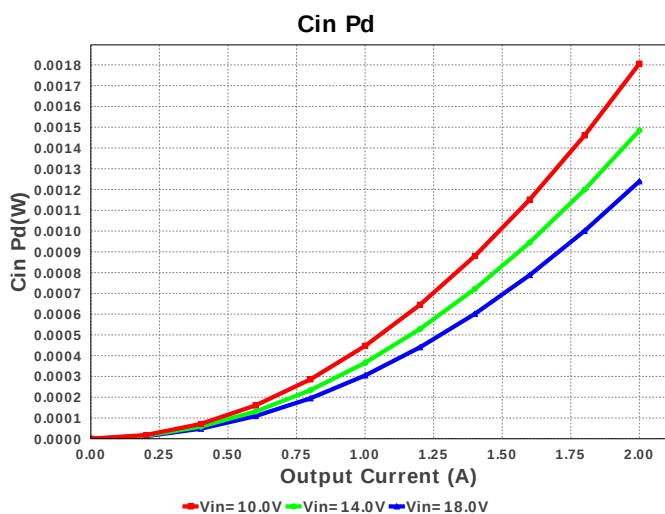
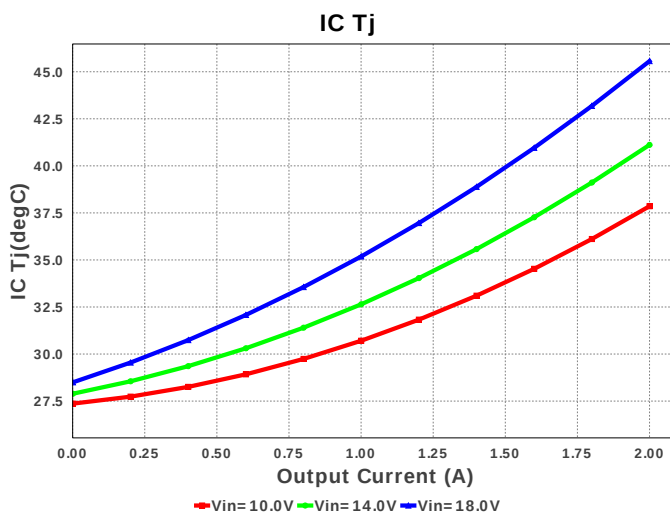
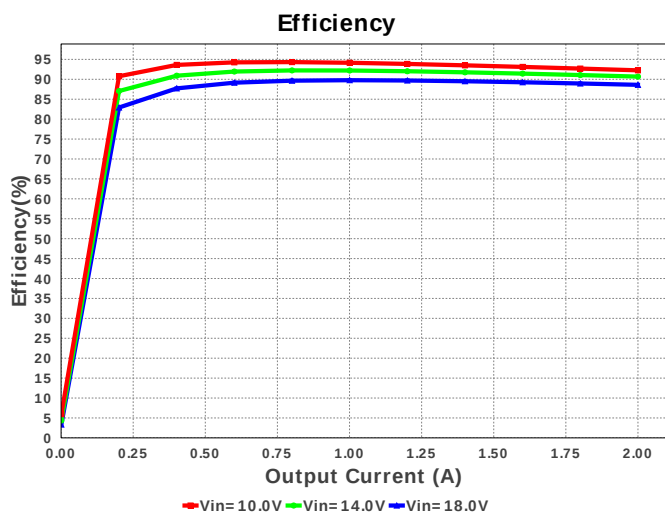


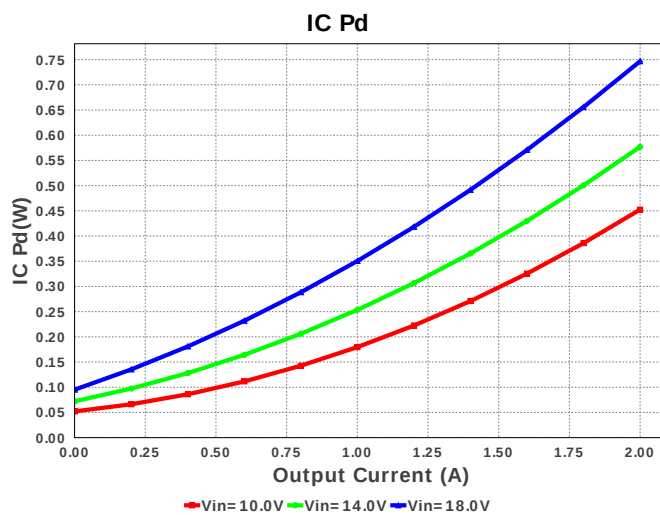
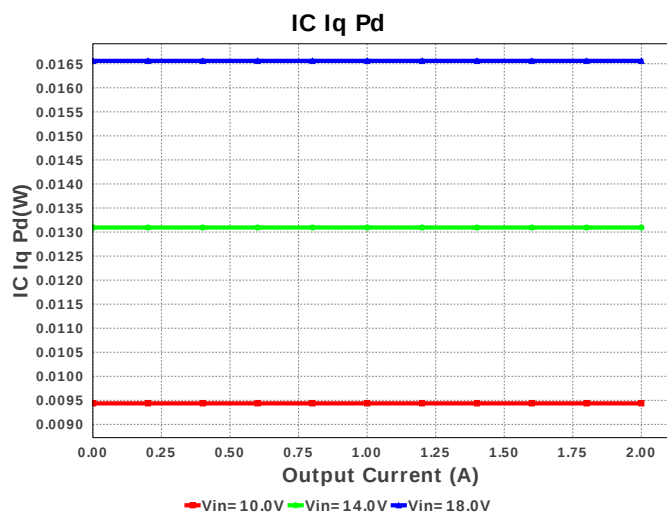
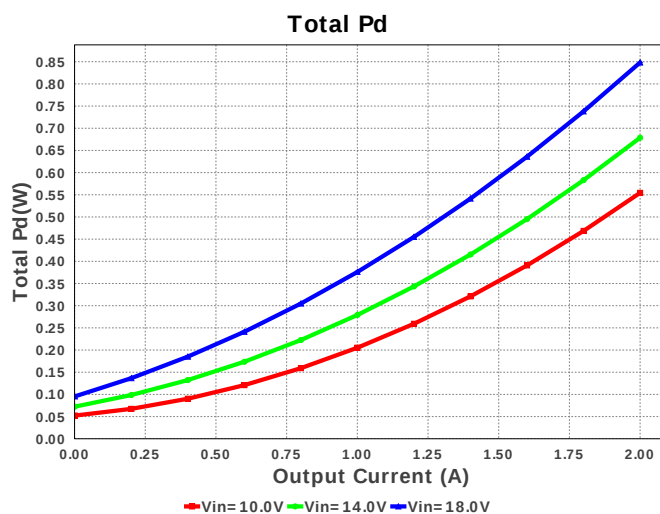
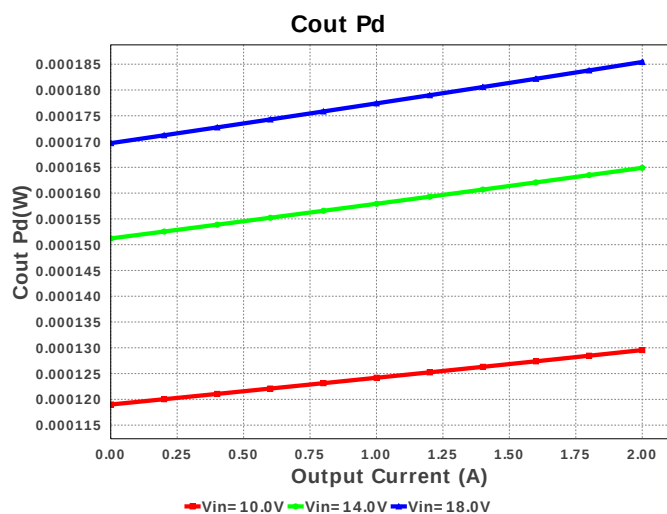
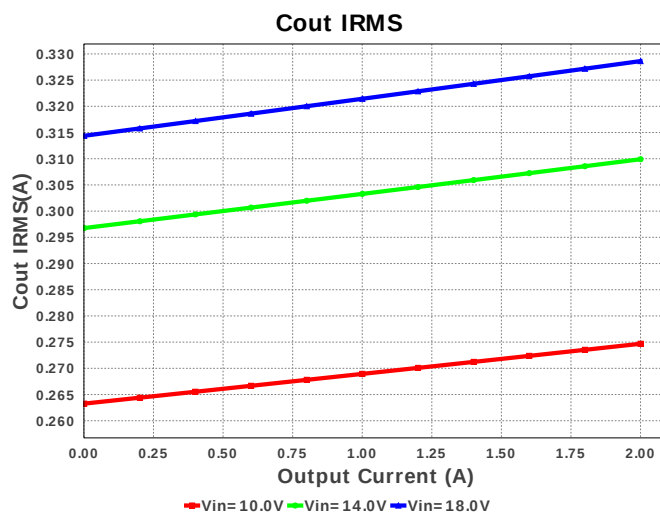
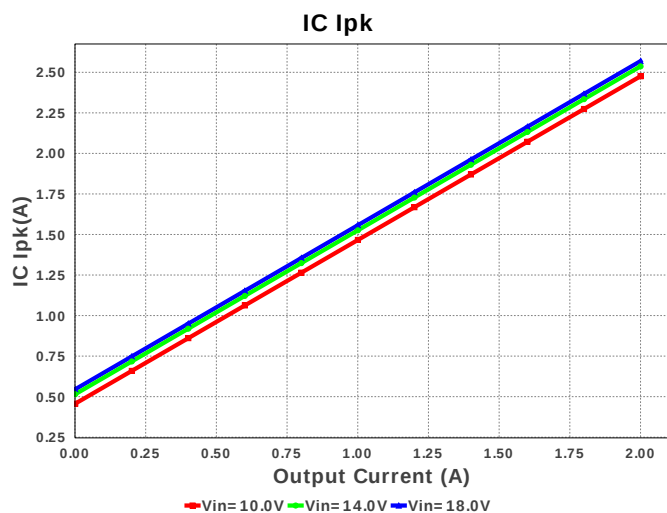
Electrical BOM

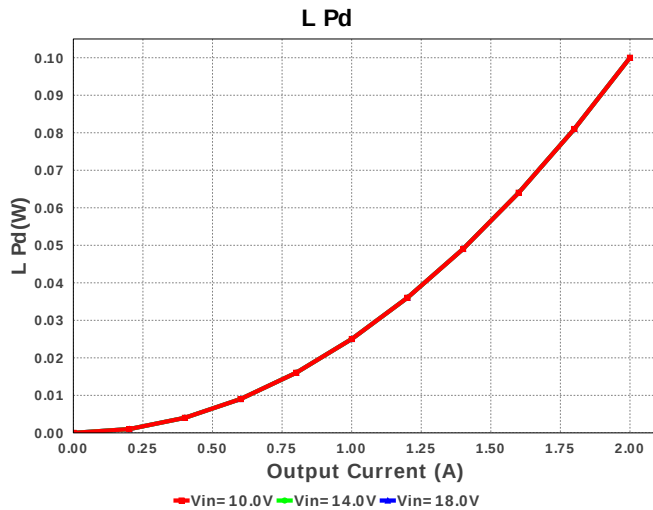
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	\$0.16	 1210 15 mm ²
4.	Cout	TDK	C3216JB1A476M Series= JB	Cap= 47.0 uF ESR= 1.717 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.34	 1206 11 mm ²
5.	Creg	MuRata	GRM188R61A105KA61D Series= X5R	Cap= 1.0 uF ESR= 6.065 mOhm VDC= 10.0 V IRMS= 1.30675 A	1	\$0.01	 0603 5 mm ²
6.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
7.	L1	Bourns	SDR0805-3R3ML	L= 3.3 µH DCR= 20.0 mOhm	1	\$0.22	 SDR0805 96 mm ²
8.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rfbb	Vishay-Dale	CRCW040225K5FKED Series= CRCW..e3	Res= 25.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	Rfbb	Vishay-Dale	CRCW040284K5FKED Series= CRCW..e3	Res= 84.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54427DDAR	Switcher	1	\$0.80	

R-PDSO-G8 55 mm²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	787.199 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	328.627 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.569 A	Current	Peak switch current in IC
4.	Iin Avg	413.79 mA	Current	Average input current
5.	L Ipp	1.138 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	11	General	Total Design BOM count
7.	FootPrint	202.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	749.927 kHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	6.6 W	General	Total output power
11.	Total BOM	\$1.59	General	Total BOM Cost
12.	ICThetaJA Effective	26.2 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Vout Actual	3.3 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
15.	Duty Cycle	19.165 %	Op_point	Duty cycle
16.	Efficiency	88.612 %	Op_point	Steady state efficiency
17.	IC Tj	45.566 degC	Op_point	IC junction temperature
18.	IOUT_OP	2.0 A	Op_point	Iout operating point
19.	VIN_OP	18.0 V	Op_point	Vin operating point
20.	Vout p-p	4.373 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	1.239 mW	Power	Input capacitor power dissipation
22.	Cout Pd	185.429 μ W	Power	Output capacitor power dissipation
23.	IC Iq Pd	16.56 mW	Power	IC Iq Pd
24.	IC Pd	746.786 mW	Power	IC power dissipation
25.	L Pd	100.0 mW	Power	Inductor power dissipation
26.	Total Pd	848.203 mW	Power	Total Power Dissipation
27.	Vout Tolerance	3.41 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	18.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS54427	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	26.0	Ambient temperature

Design Assistance

1. **TPS54427** Product Folder : <http://www.ti.com/product/TPS54427> : contains the data sheet and other resources.

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