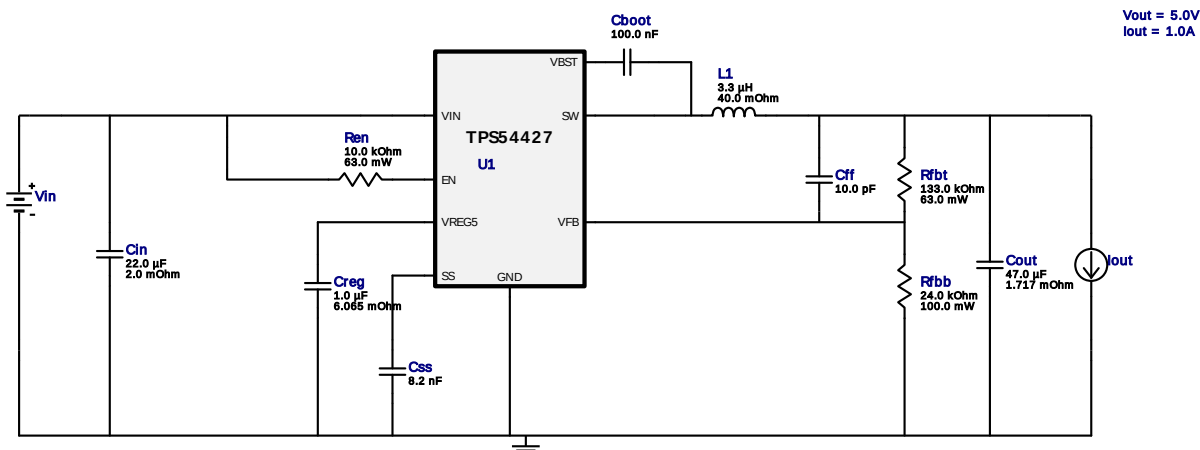


WEBENCH® Design Report

Design : 4742013/73 TPS54427DDAR
TPS54427DDAR 12.0V-13.0V to 5.00V @ 1.0A



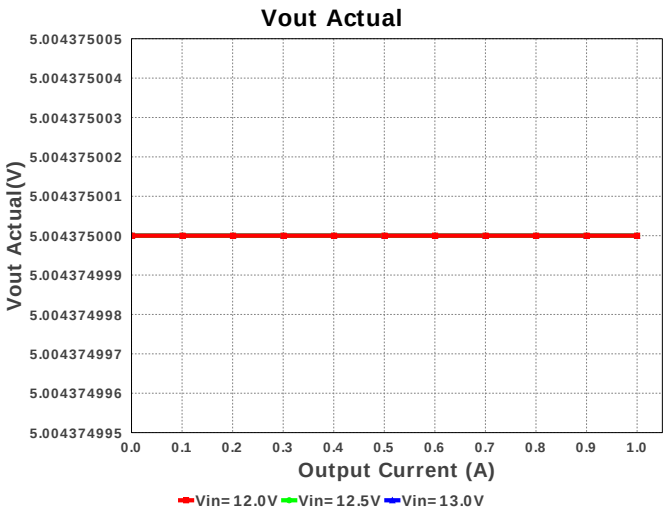
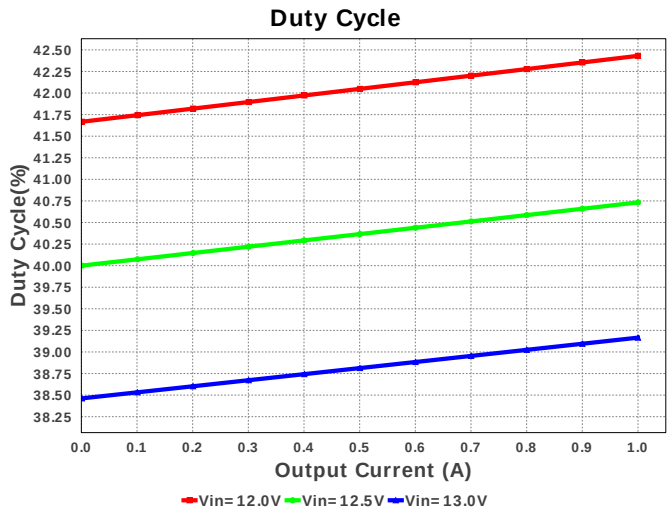
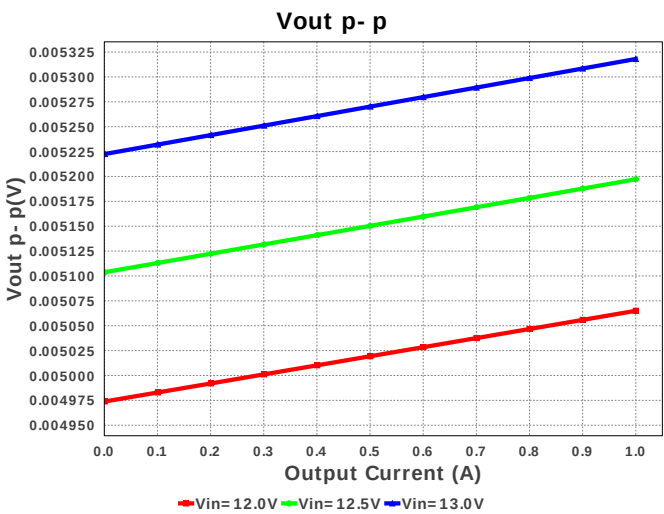
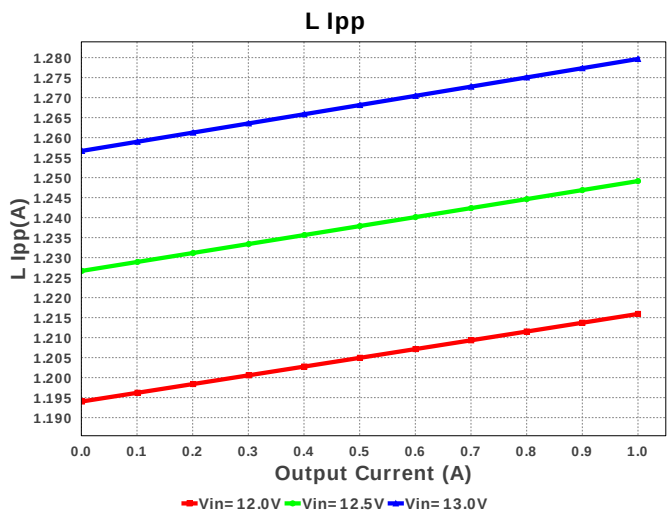
Electrical BOM

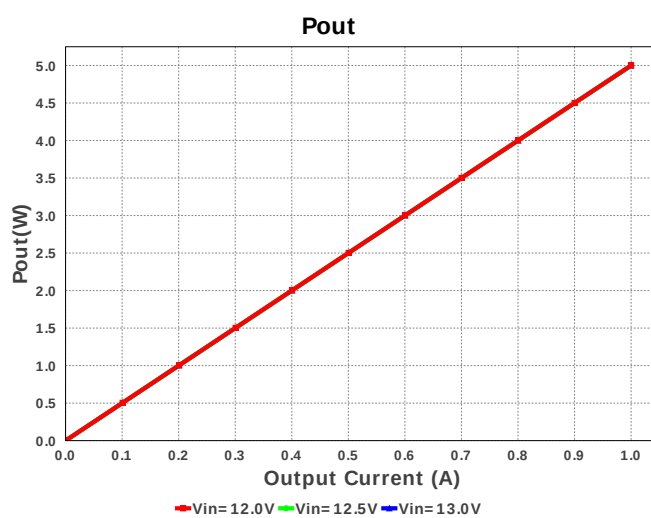
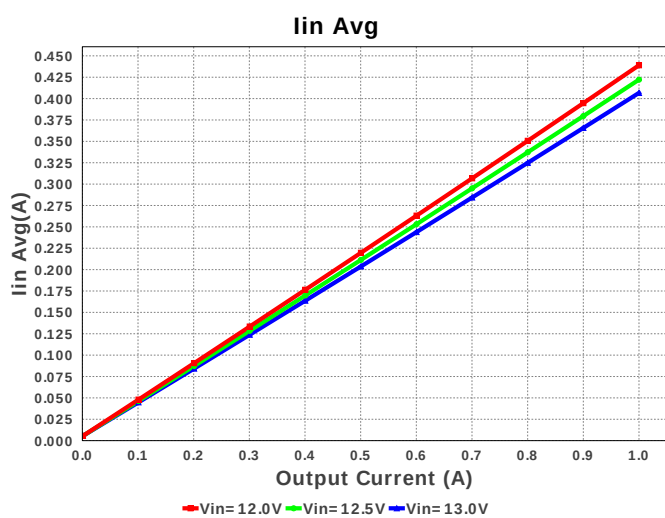
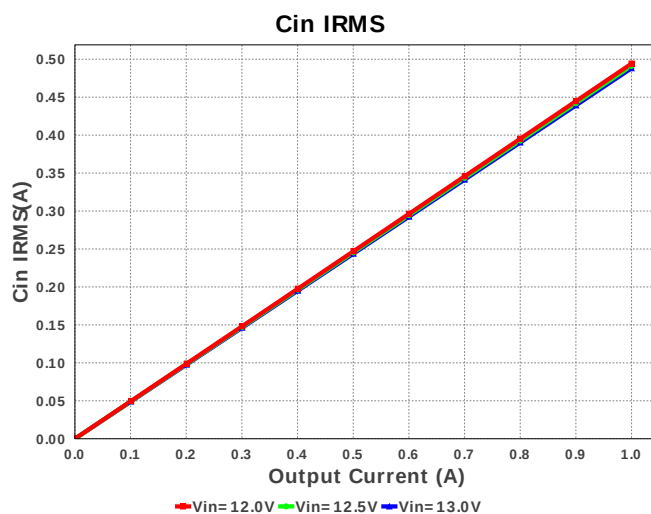
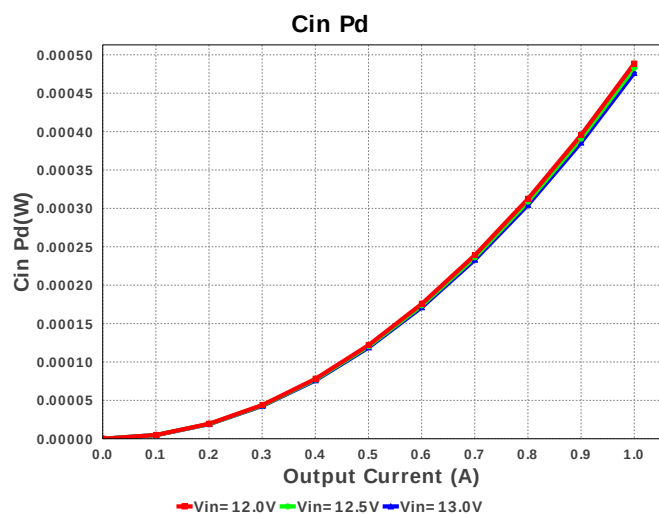
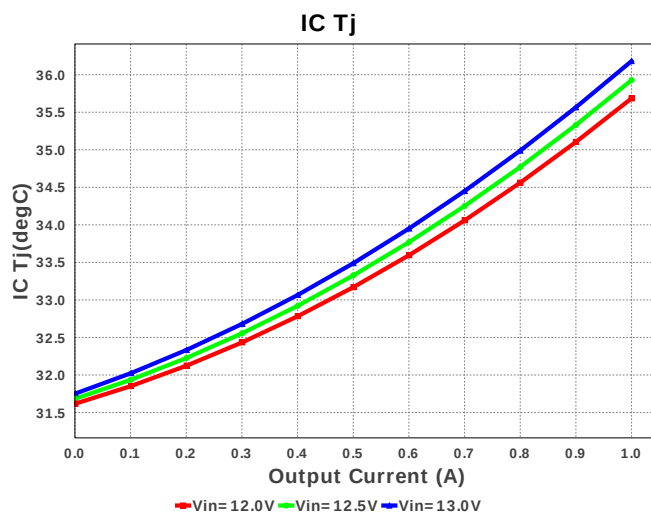
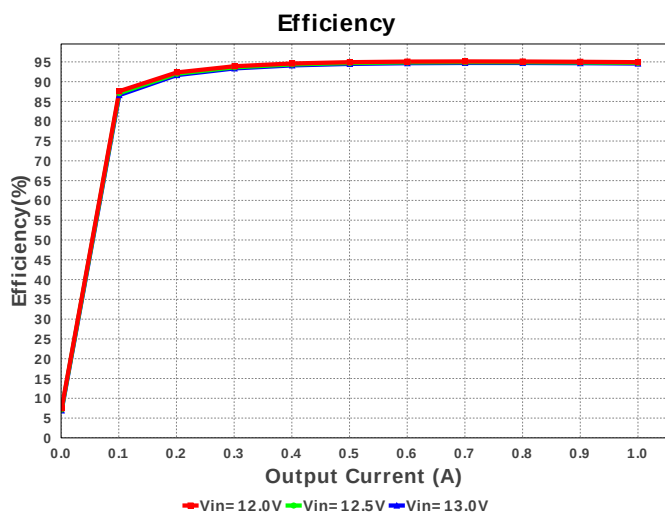
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Cin	MuRata	GRM32ER61E226KE15L 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	NIC Components	NPI54C3R3MTRF	L= 3.3 uH DCR= 40.0 mOhm	1	\$0.09	IND_NPI54C 61 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	Yageo America	RC0603FR-0724KL Series= ?	Res= 24.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	0603 5 mm ²
10.	Rfbt	Vishay-Dale	CRCW0402133KFKED Series= CRCW..e3	Res= 133.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

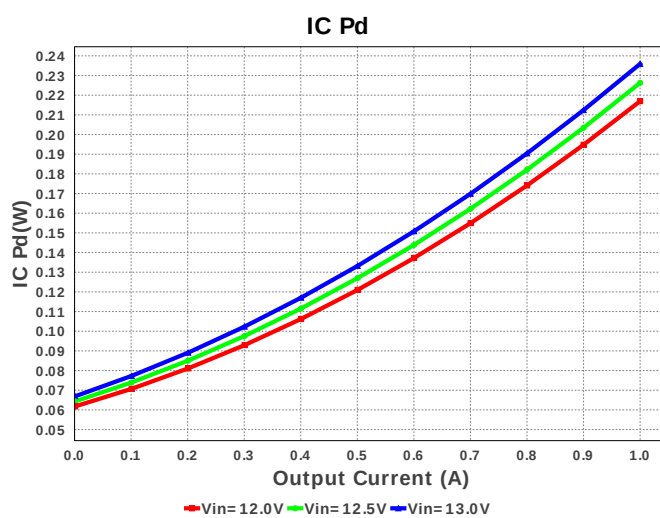
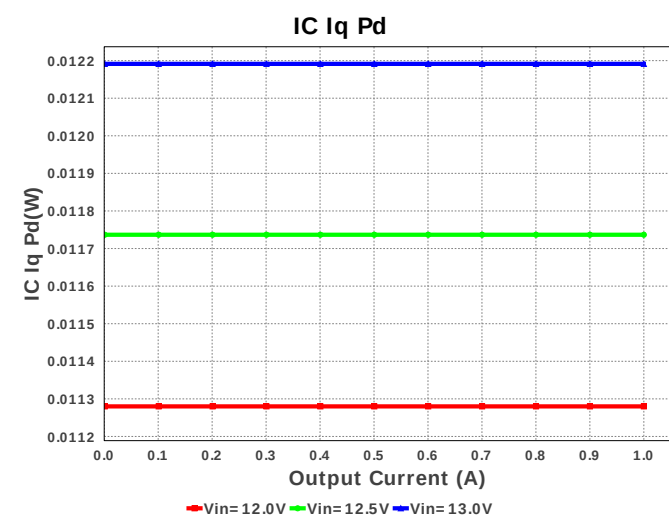
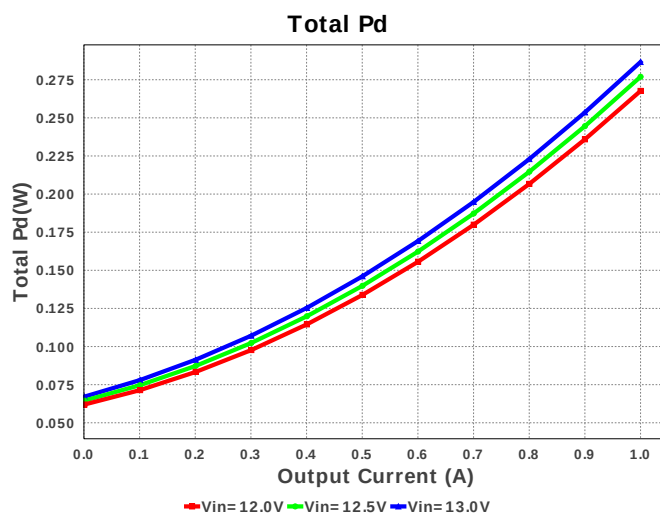
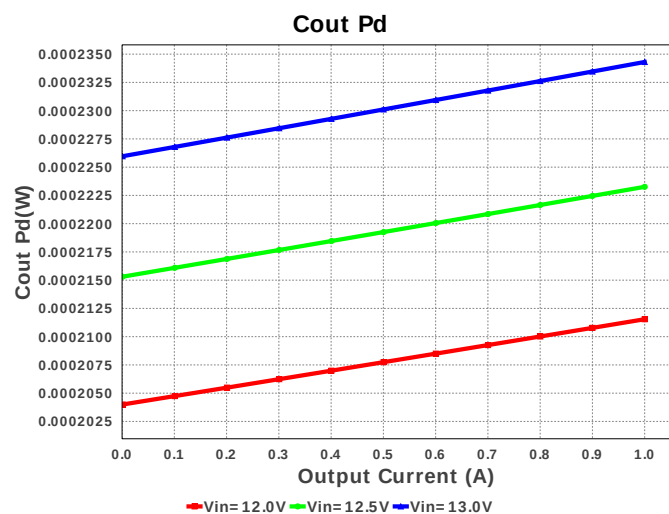
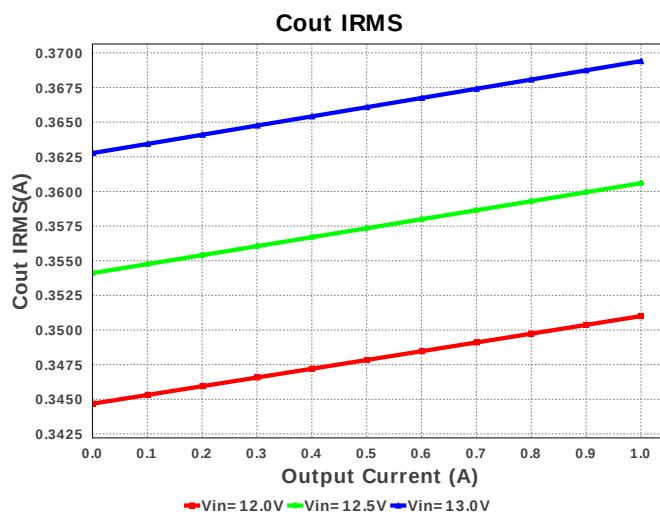
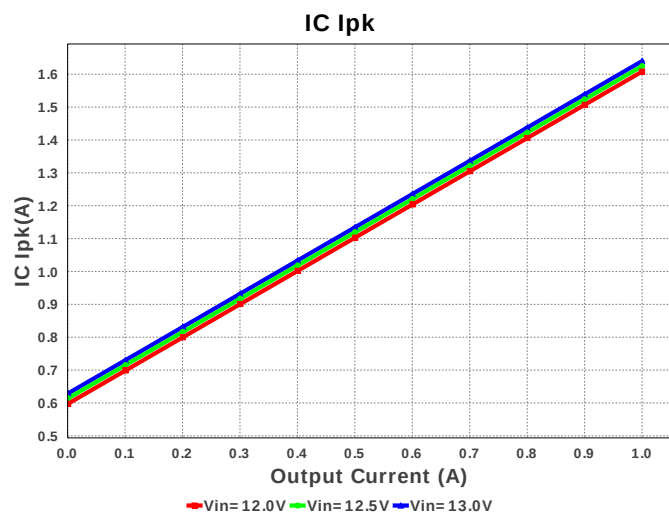
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54427DDAR	Switcher	1	\$0.80	

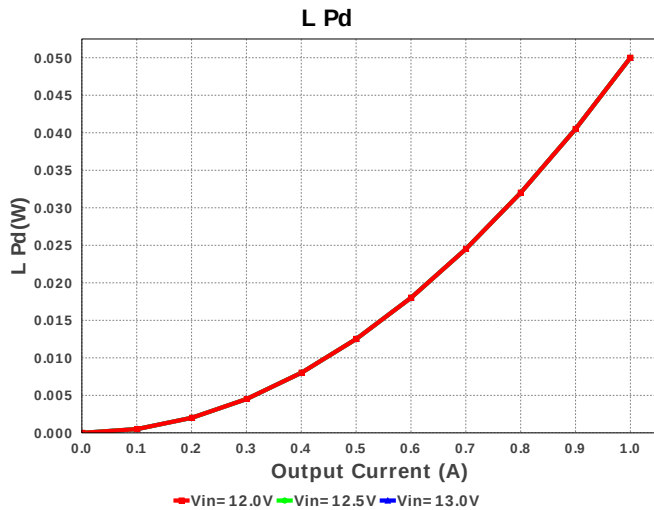


R-PDSO-G8 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	488.121 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	369.408 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.64 A	Current	Peak switch current in IC
4.	Iin Avg	406.66 mA	Current	Average input current
5.	L Ipp	1.28 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	11	General	Total Design BOM count
7.	FootPrint	171.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	741.966 kHz	General	Switching frequency
9.	Pout	5.0 W	General	Total output power
10.	Total BOM	\$1.46	General	Total BOM Cost
11.	ICThetaJA Effective	26.2 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Vout Actual	5.004 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
14.	Duty Cycle	39.166 %	Op_point	Duty cycle
15.	Efficiency	94.578 %	Op_point	Steady state efficiency
16.	IC Tj	36.181 degC	Op_point	IC junction temperature
17.	IOUT_OP	1.0 A	Op_point	Iout operating point
18.	VIN_OP	13.0 V	Op_point	Vin operating point
19.	Vout p-p	5.318 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	476.523 μ W	Power	Input capacitor power dissipation
21.	Cout Pd	234.306 μ W	Power	Output capacitor power dissipation
22.	IC Iq Pd	12.191 mW	Power	IC Iq Pd
23.	IC Pd	235.925 mW	Power	IC power dissipation
24.	L Pd	50.0 mW	Power	Inductor power dissipation
25.	Total Pd	286.638 mW	Power	Total Power Dissipation
26.	Vout Tolerance	3.573 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	13.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54427	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	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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