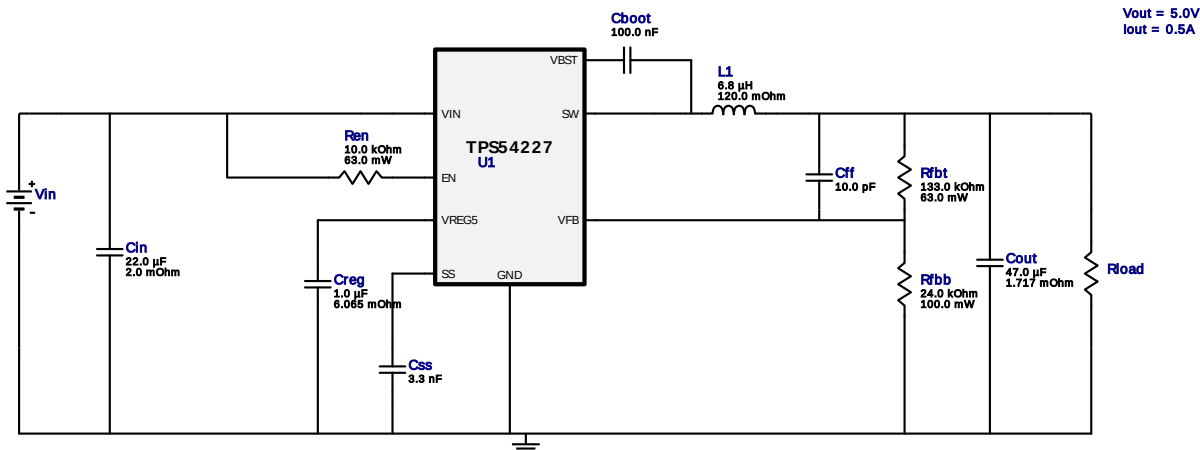


WEBENCH® Design Report

Design : 4742013/245 TPS54227DDAR
TPS54227DDAR 10.0V-12.0V to 5.00V @ 0.5A



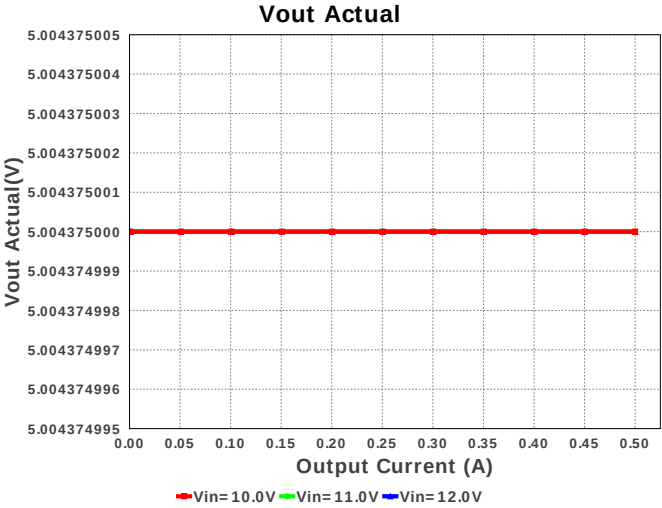
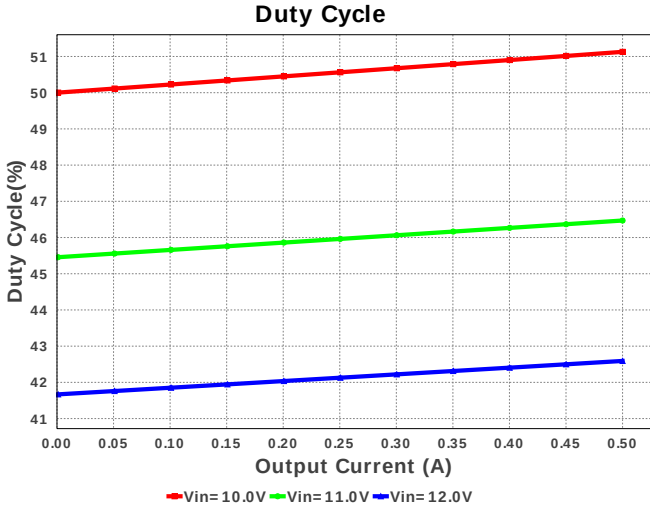
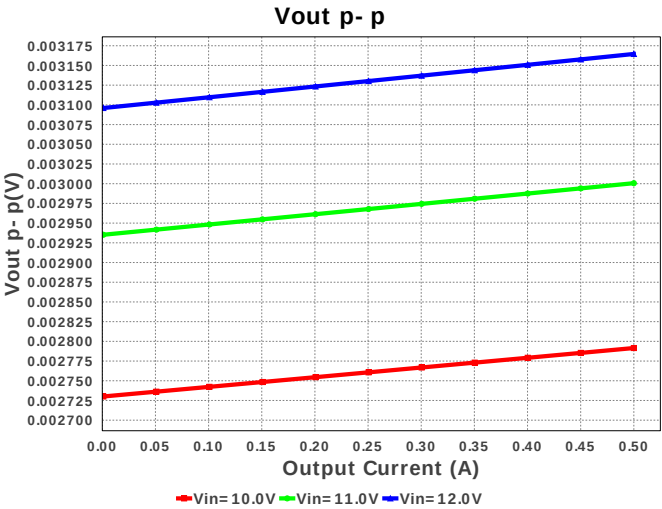
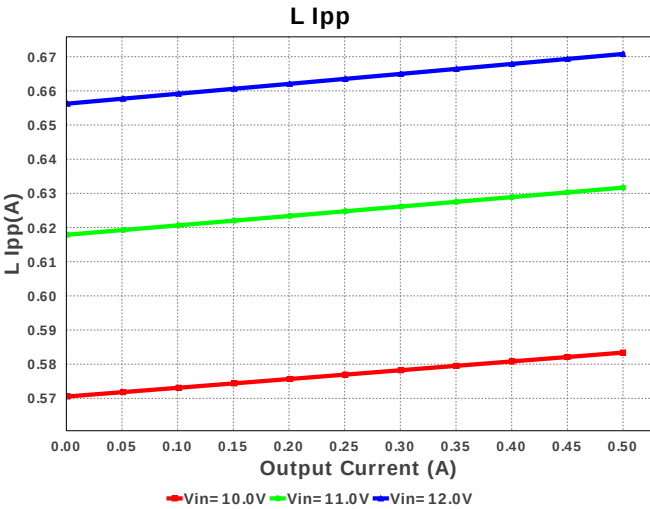
Electrical BOM

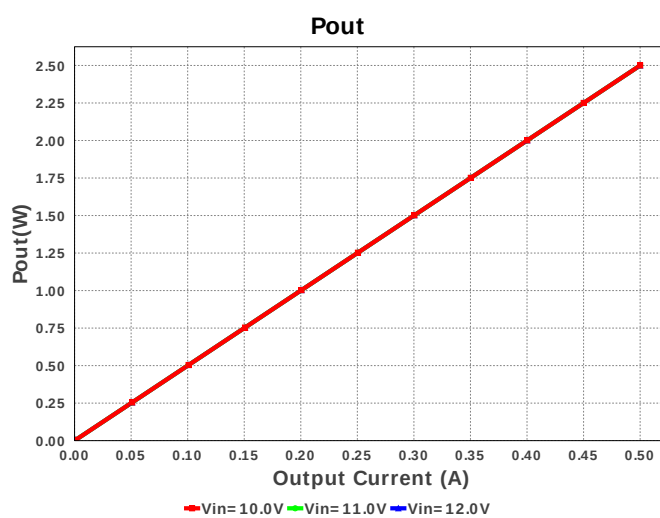
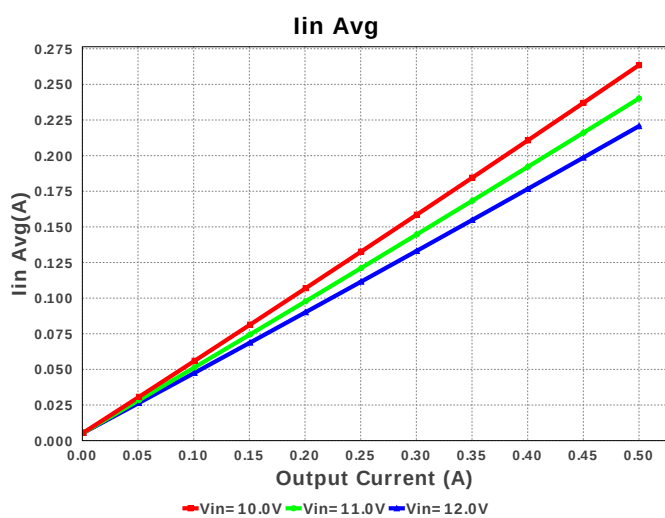
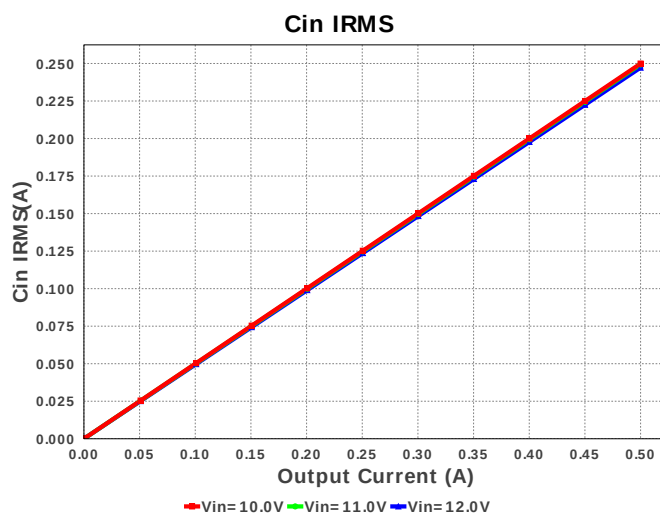
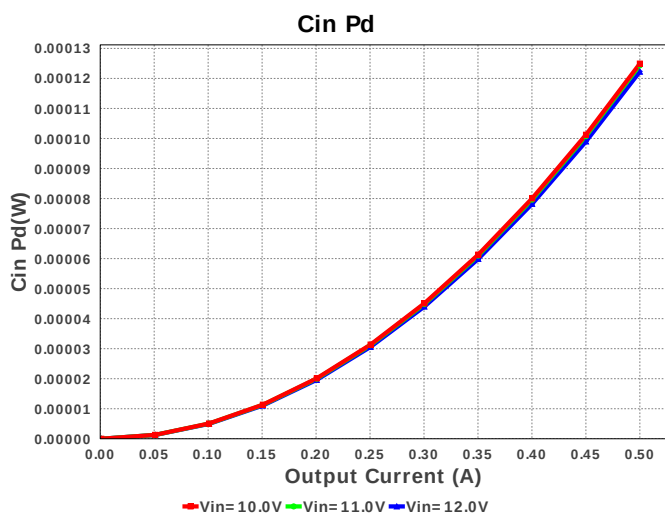
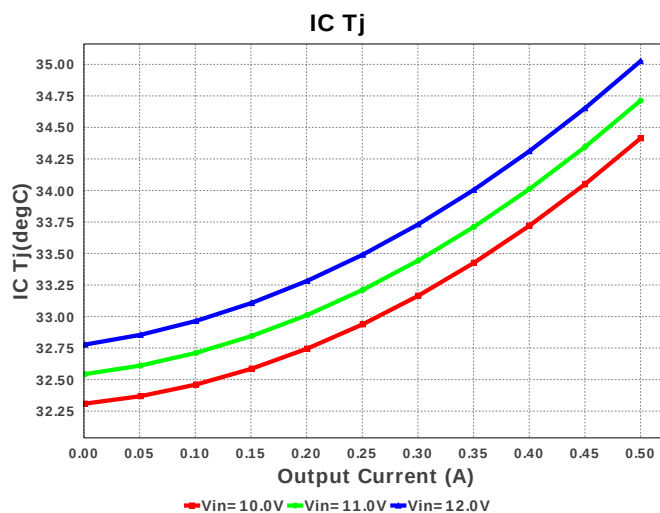
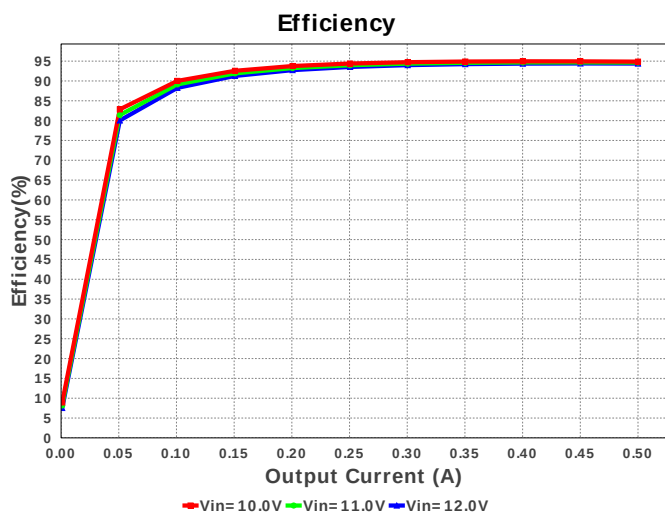
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Cin	MuRata	GRM32ER61C226ME20L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 16.0 V IRMS= 3.68 A	1	\$0.12	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	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	L1	Bourns	SDR0403-6R8ML	L= 6.8 µH DCR= 120.0 mOhm	1	\$0.18	SDR0403 28 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

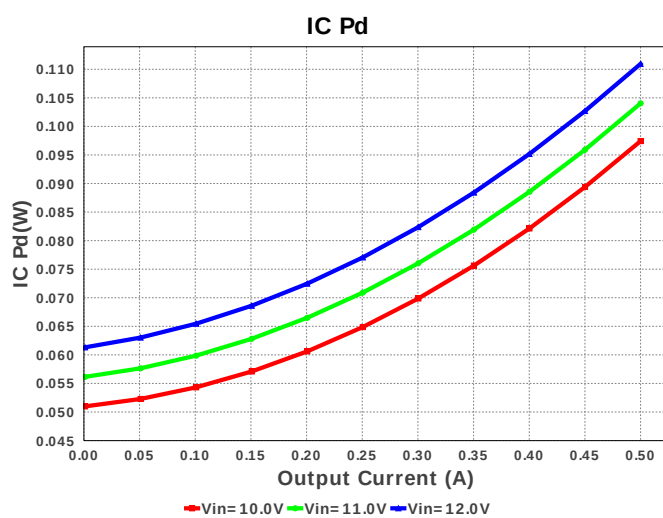
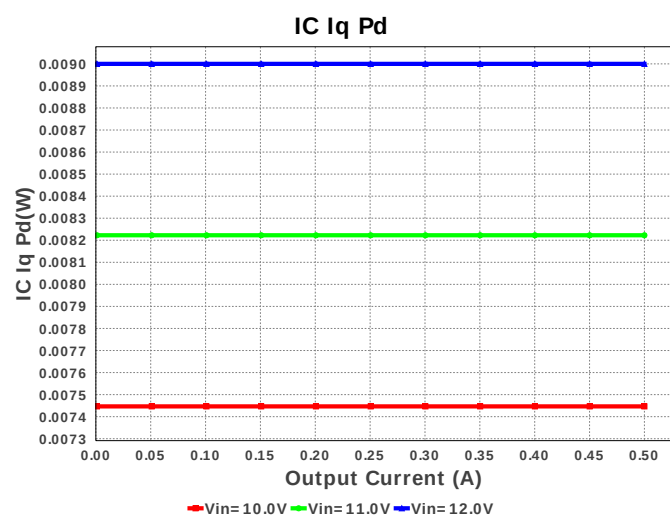
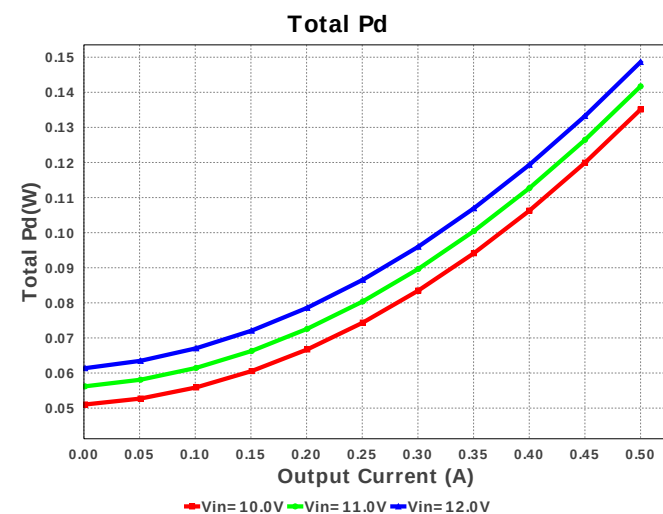
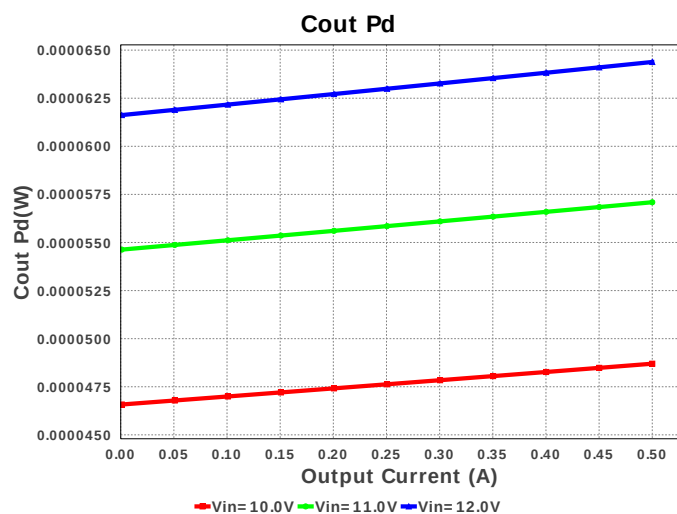
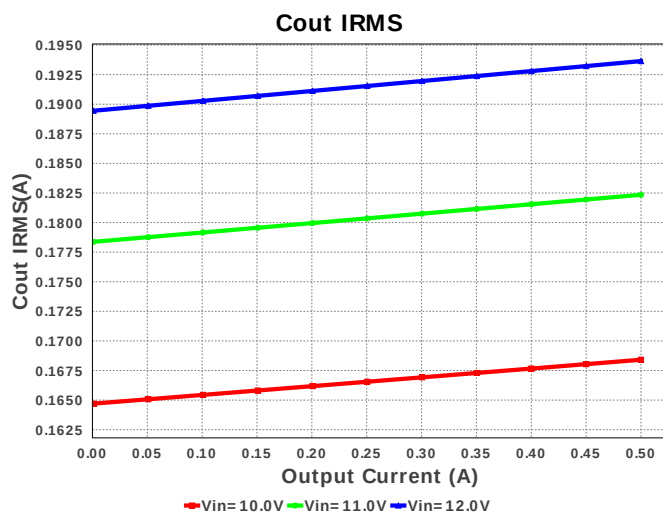
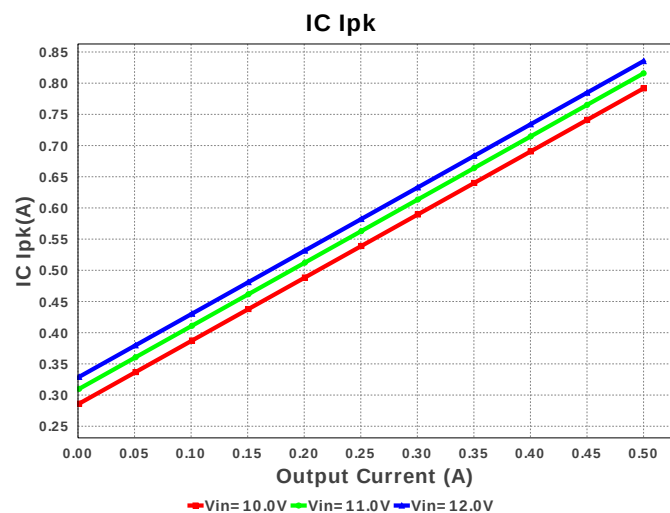
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54227DDAR	Switcher	1	\$0.61	

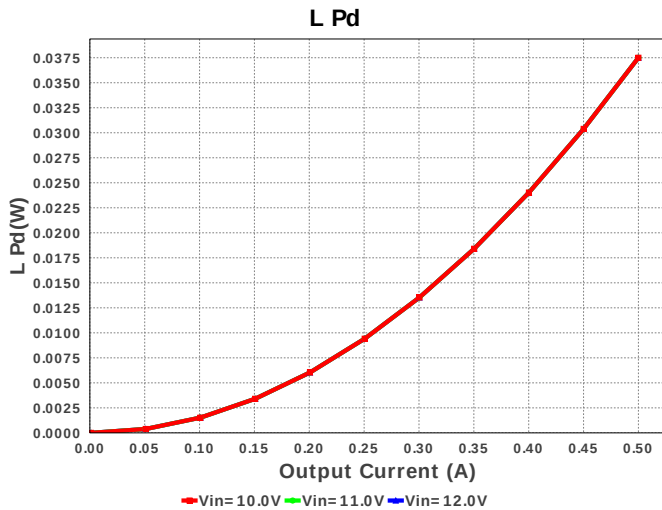


R-PDSO-G8 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	247.24 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	193.643 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	835.4 mA	Current	Peak switch current in IC
4.	Iin Avg	220.72 mA	Current	Average input current
5.	L Ipp	670.8 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	11	General	Total Design BOM count
7.	FootPrint	142.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	653.609 kHz	General	Switching frequency
9.	Pout	2.5 W	General	Total output power
10.	Total BOM	\$1.32	General	Total BOM Cost
11.	Vout Actual	5.004 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
12.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	42.591 %	Op_point	Duty cycle
14.	Efficiency	94.388 %	Op_point	Steady state efficiency
15.	IC Tj	35.026 degC	Op_point	IC junction temperature
16.	ICThetaJA	45.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	500.0 mA	Op_point	Iout operating point
18.	VIN_OP	12.0 V	Op_point	Vin operating point
19.	Vout p-p	3.165 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	122.256 μ W	Power	Input capacitor power dissipation
21.	Cout Pd	64.384 μ W	Power	Output capacitor power dissipation
22.	IC Iq Pd	9.0 mW	Power	IC Iq Pd
23.	IC Pd	110.947 mW	Power	IC power dissipation
24.	L Pd	37.5 mW	Power	Inductor power dissipation
25.	Total Pd	148.642 mW	Power	Total Power Dissipation
26.	Vout Tolerance	2.775 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54227	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54227** Product Folder : <http://www.ti.com/product/TPS54227> : contains the data sheet and other resources.

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