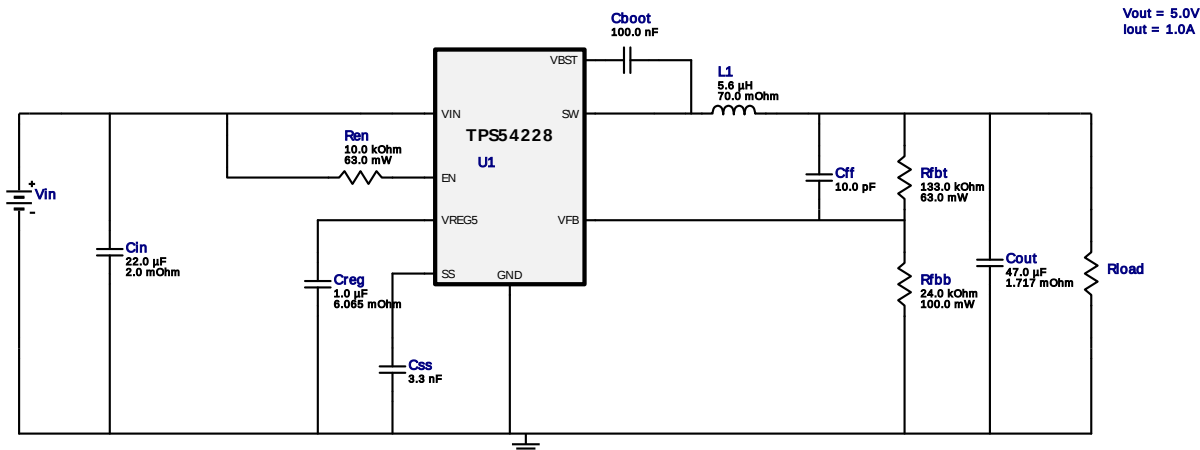


WEBENCH® Design Report

Design : 4742013/70 TPS54228DDAR
TPS54228DDAR 12.0V-13.0V to 5.00V @ 1.0A



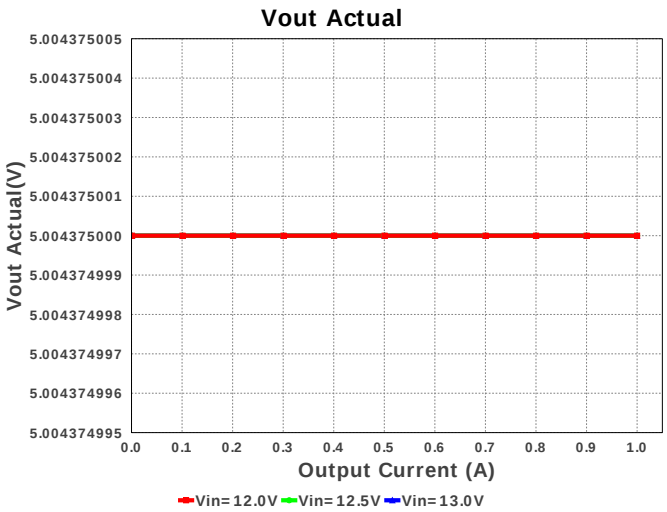
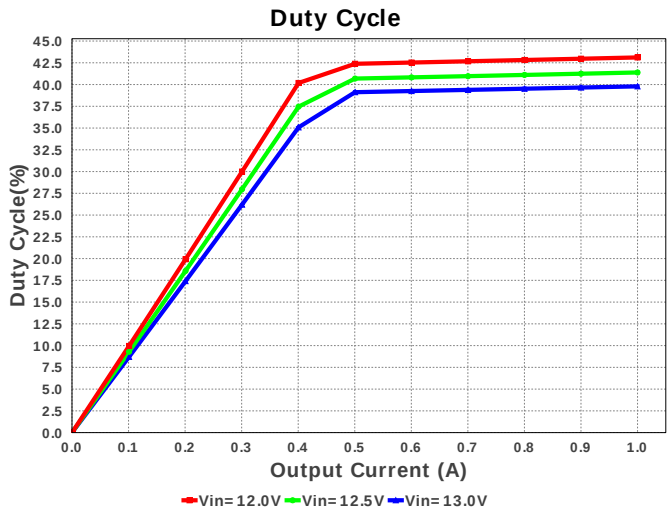
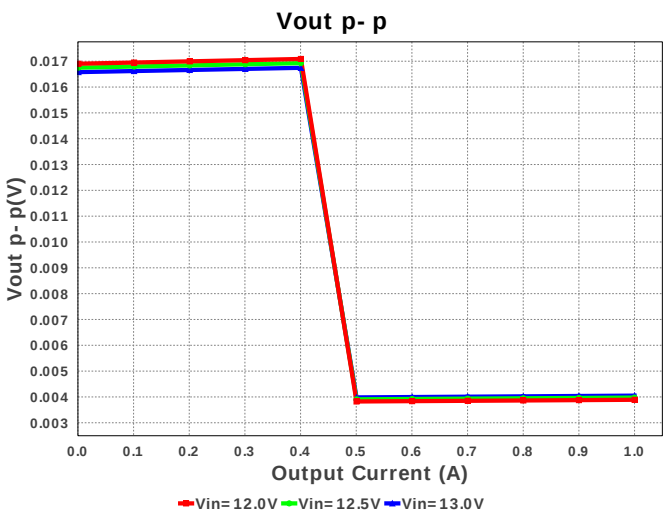
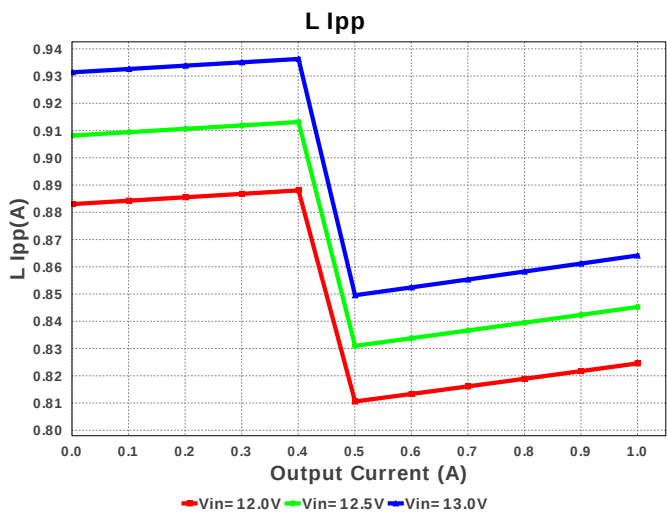
Electrical BOM

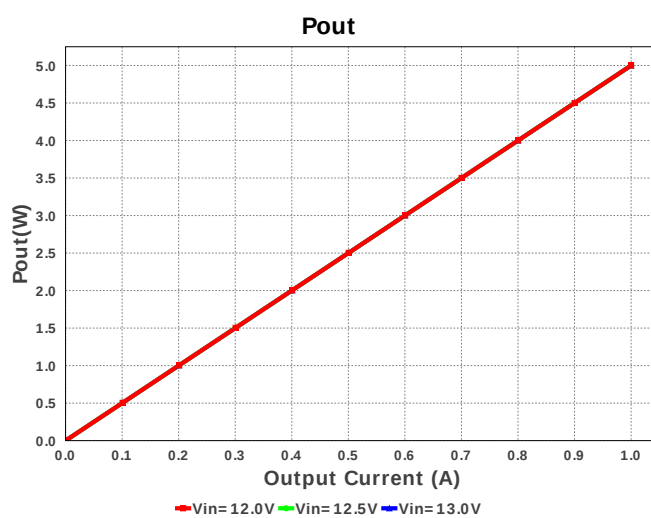
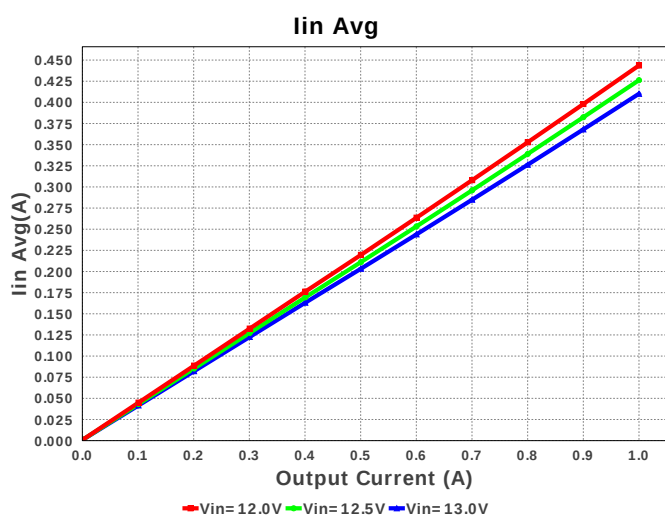
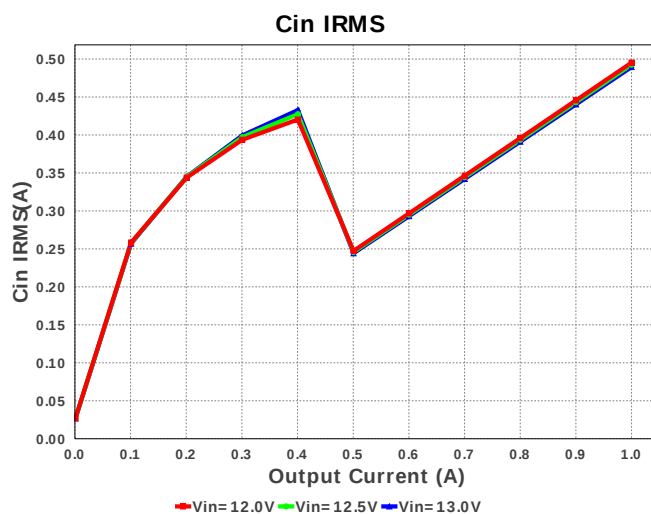
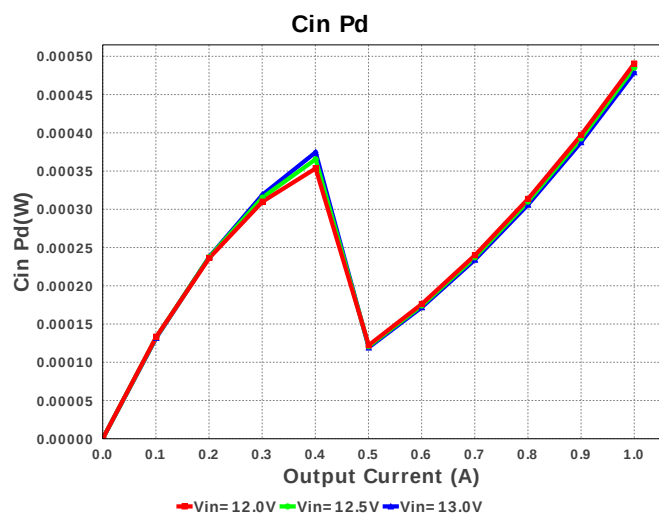
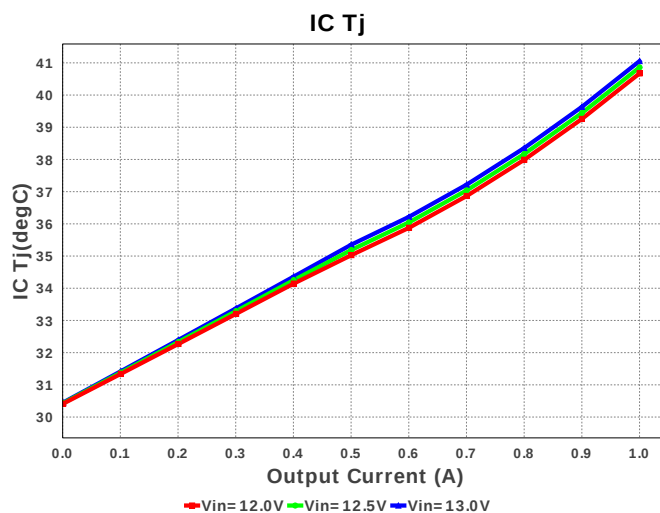
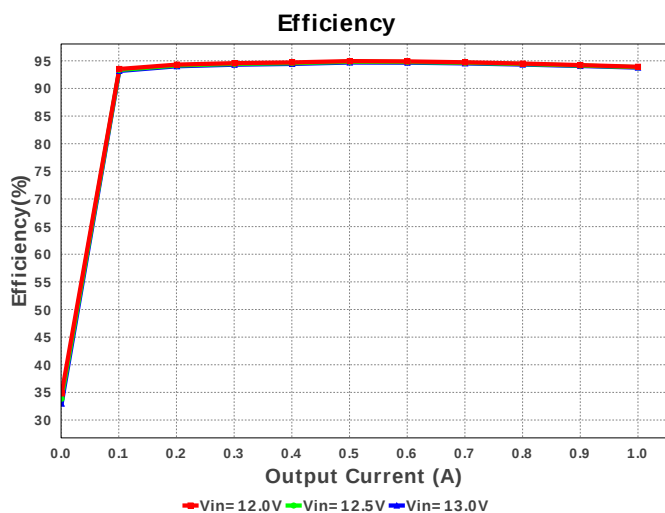
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Cin	MuRata	GRM32ER61E226KE15L 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	GRM216R71E332KA01D Series= X7R	Cap= 3.3 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
7.	L1	NIC Components	NPI54C5R6MTRF	L= 5.6 uH DCR= 70.0 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

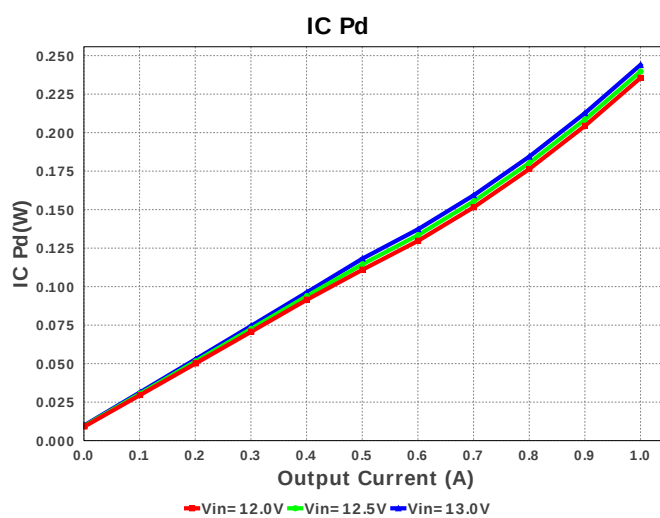
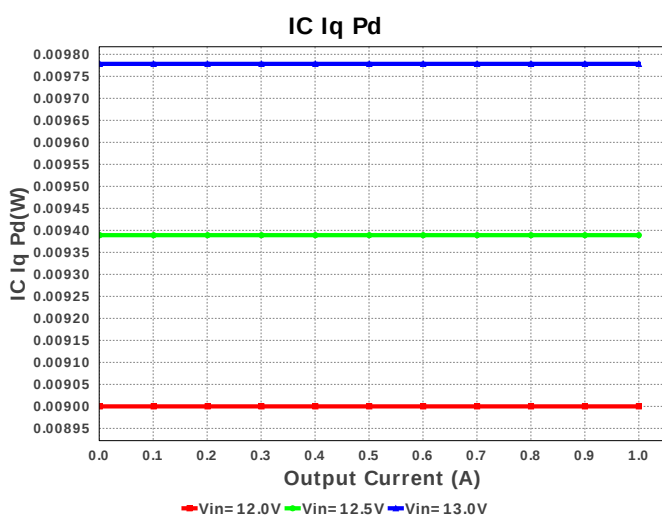
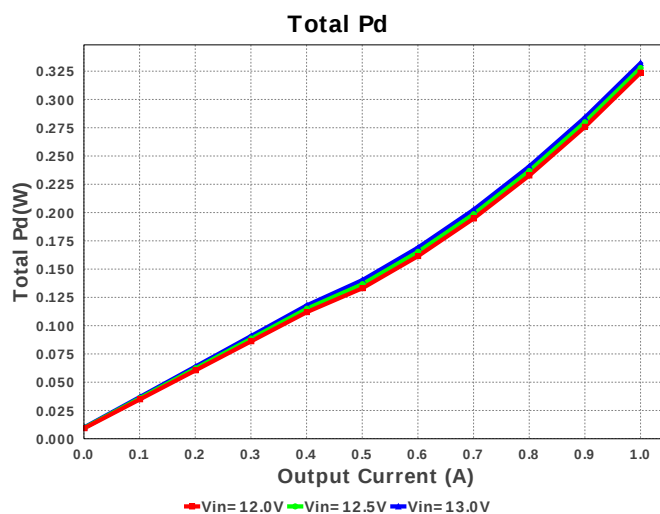
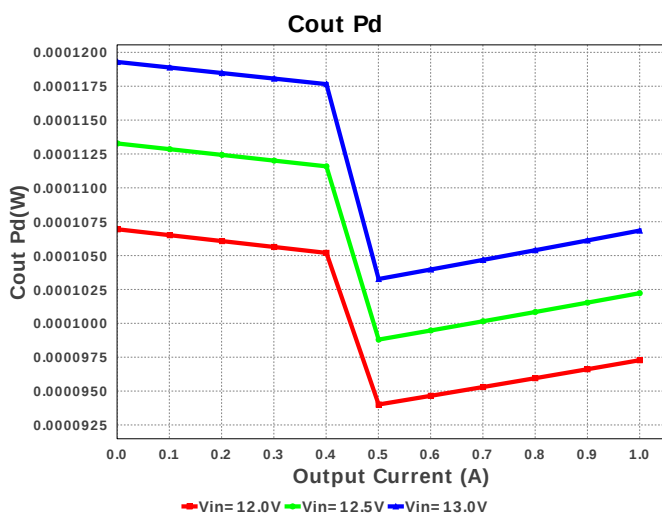
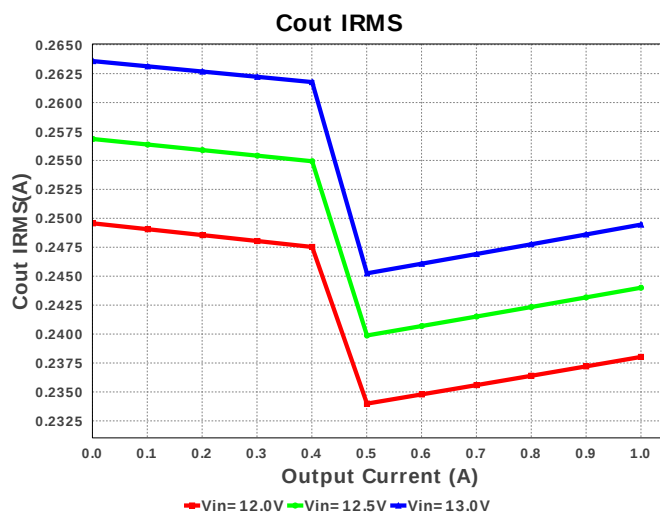
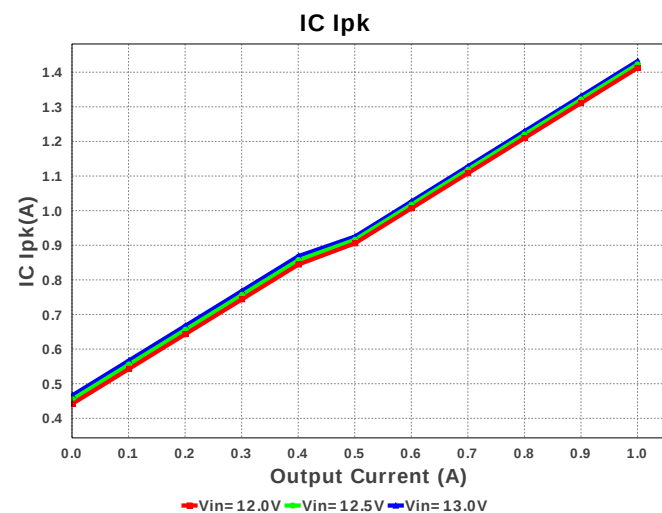
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11. U1		Texas Instruments	TPS54228DDAR	Switcher	1	\$0.63	

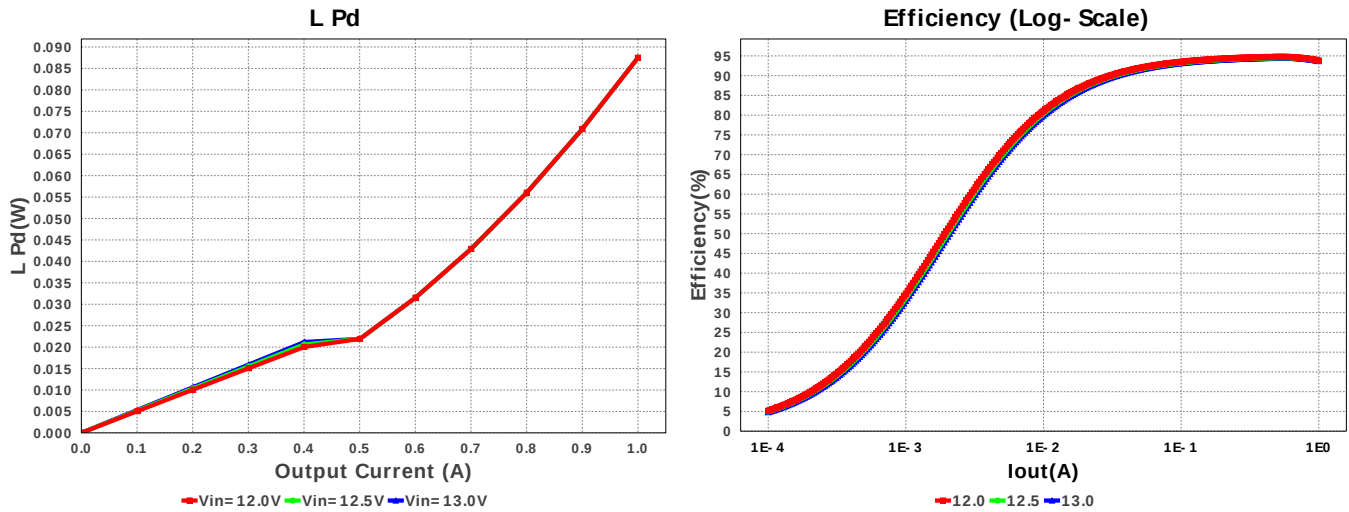


R-PDSO-G8 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	489.468 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	249.456 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.432 A	Current	Peak switch current in IC
4.	Iin Avg	410.16 mA	Current	Average input current
5.	L Ipp	864.14 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	11	General	Total Design BOM count
7.	FootPrint	176.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	657.826 kHz	General	Switching frequency
9.	Pout	5.0 W	General	Total output power
10.	Total BOM	\$1.29	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	39.792 %	Op_point	Duty cycle
14.	Efficiency	93.771 %	Op_point	Steady state efficiency
15.	IC Tj	41.055 degC	Op_point	IC junction temperature
16.	ICThetaJA	45.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
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	4.051 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	479.159 μW	Power	Input capacitor power dissipation
21.	Cout Pd	106.846 μW	Power	Output capacitor power dissipation
22.	IC Iq Pd	9.778 mW	Power	IC Iq Pd
23.	IC Pd	244.029 mW	Power	IC power dissipation
24.	L Pd	87.5 mW	Power	Inductor power dissipation
25.	Total Pd	332.135 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	TPS54228	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54228** Product Folder : <http://www.ti.com/product/TPS54228> : contains the data sheet and other resources.

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