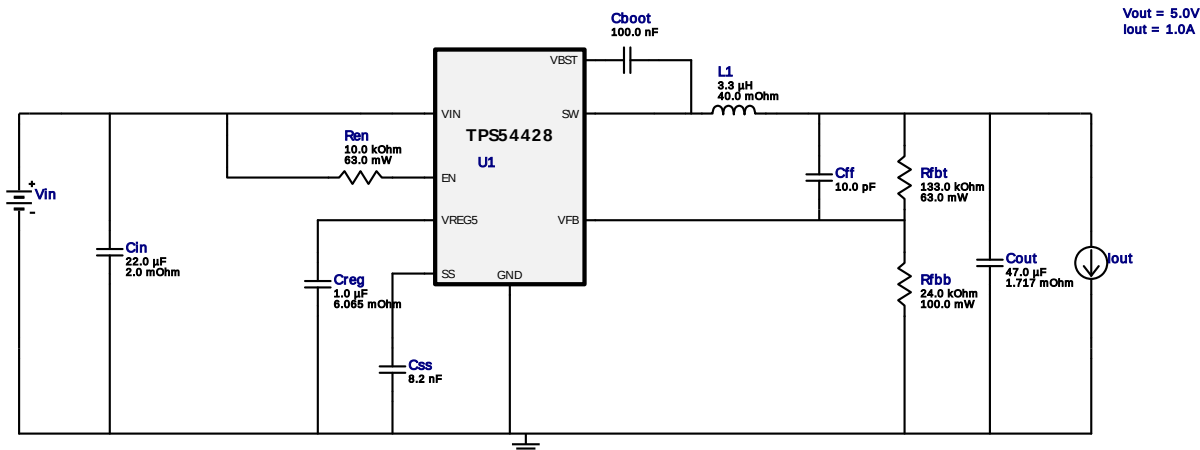


WEBENCH® Design Report

Design : 4742013/74 TPS54428DDAR
TPS54428DDAR 12.0V-13.0V to 5.00V @ 1.0A



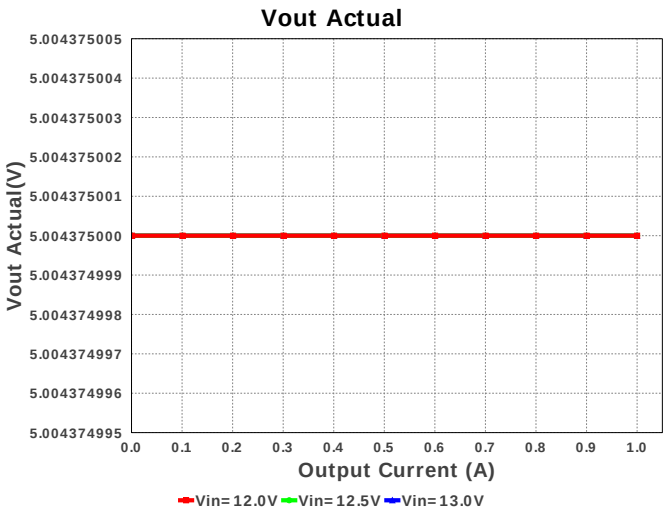
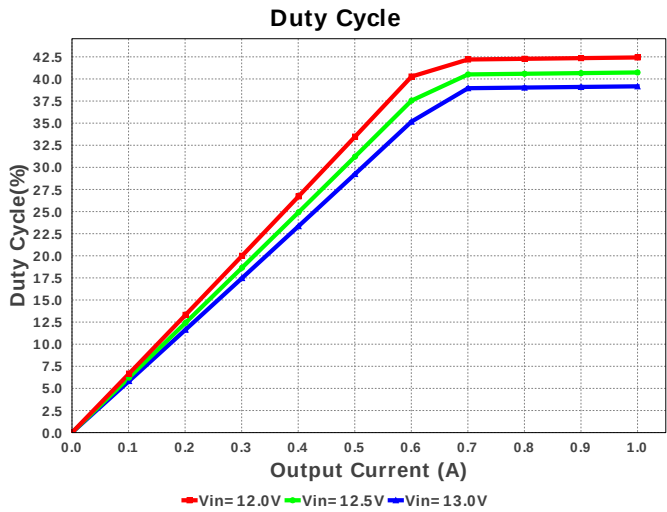
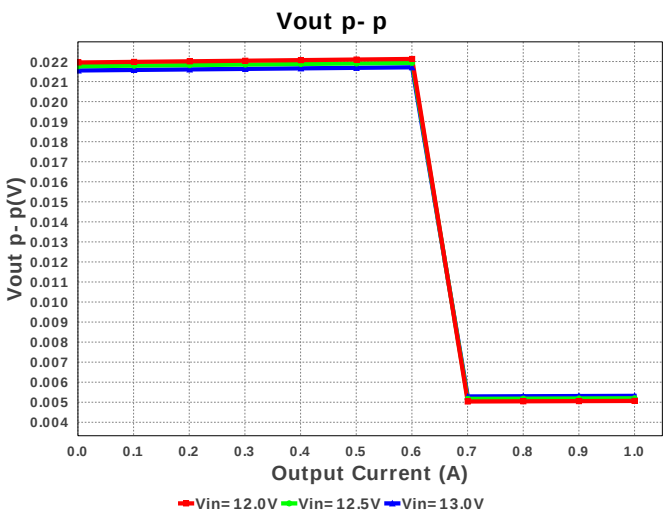
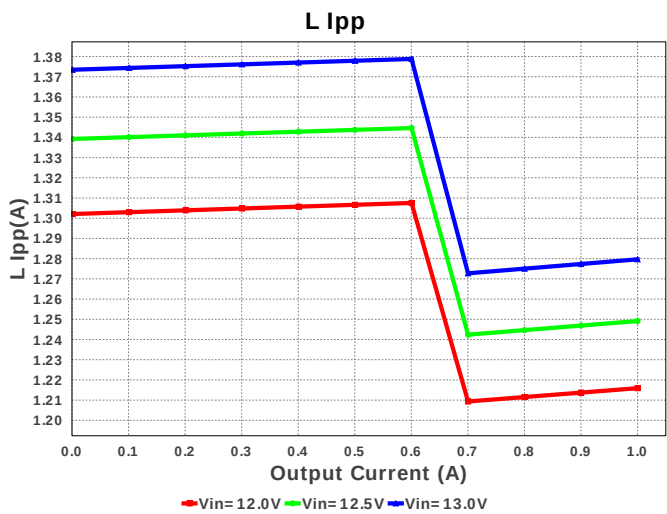
Electrical BOM

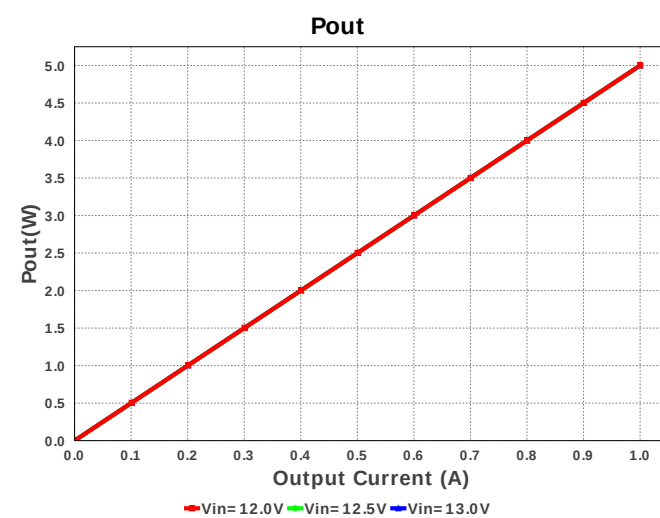
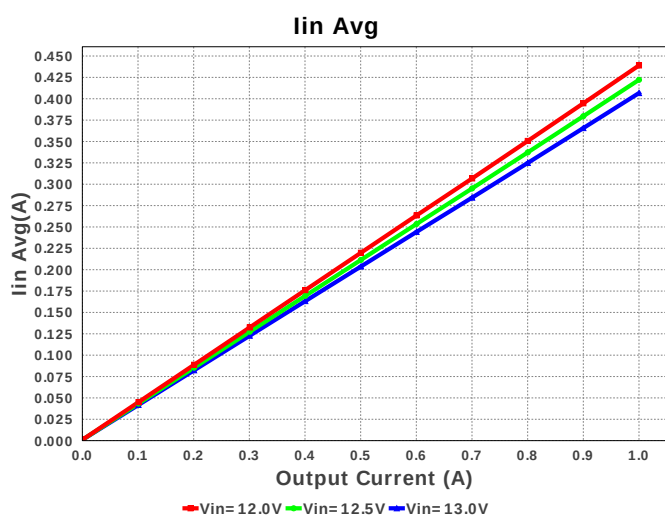
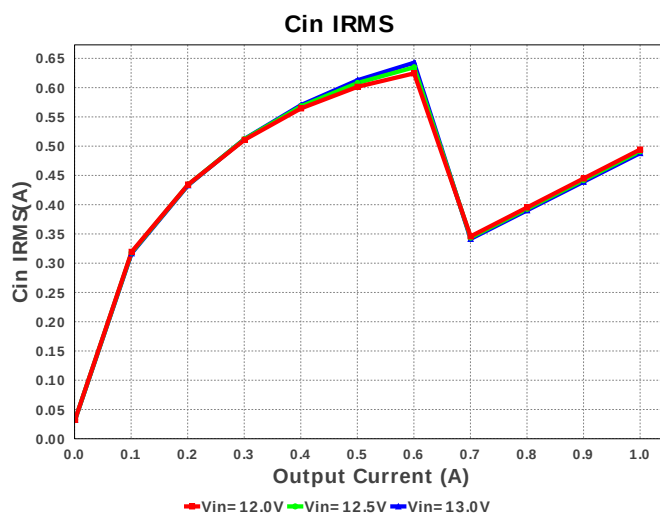
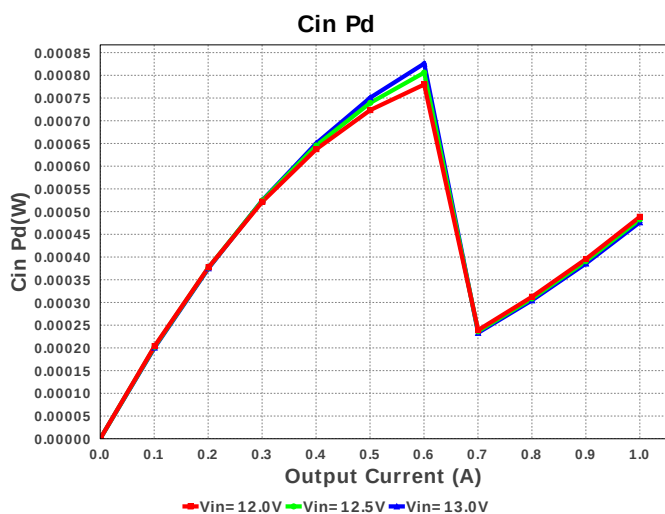
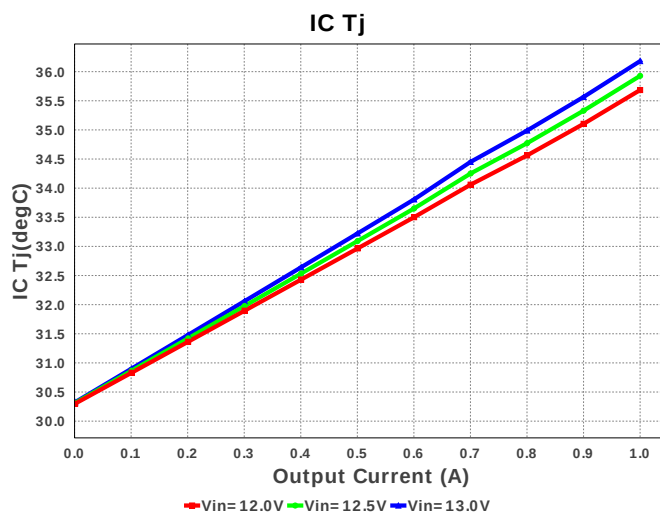
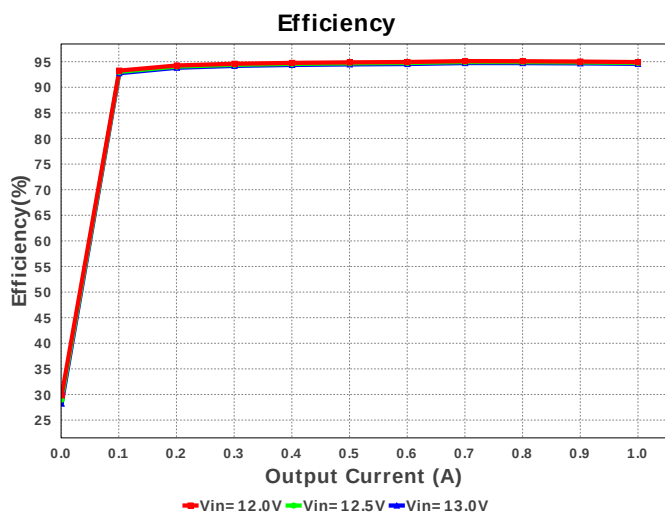
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Cin	MuRata	GRM32ER61E226KE15L 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 µH 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

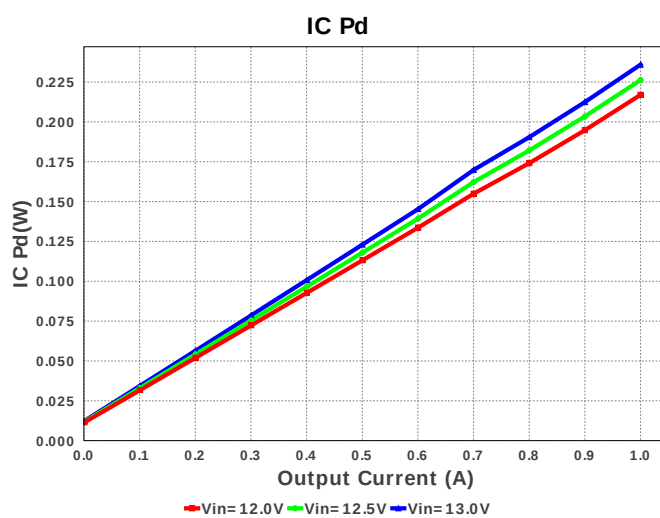
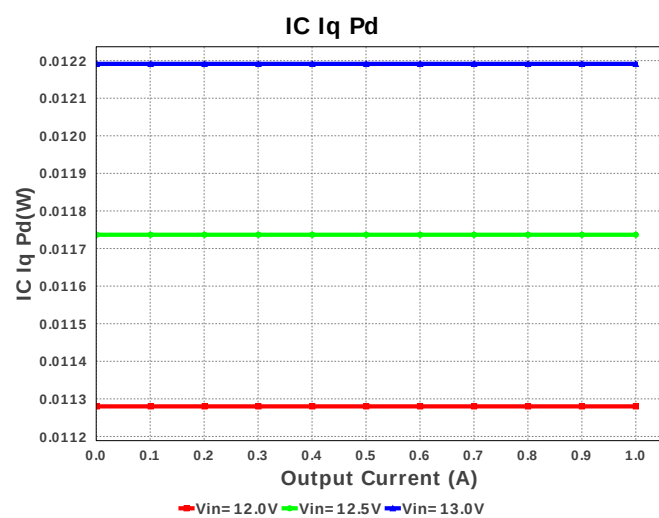
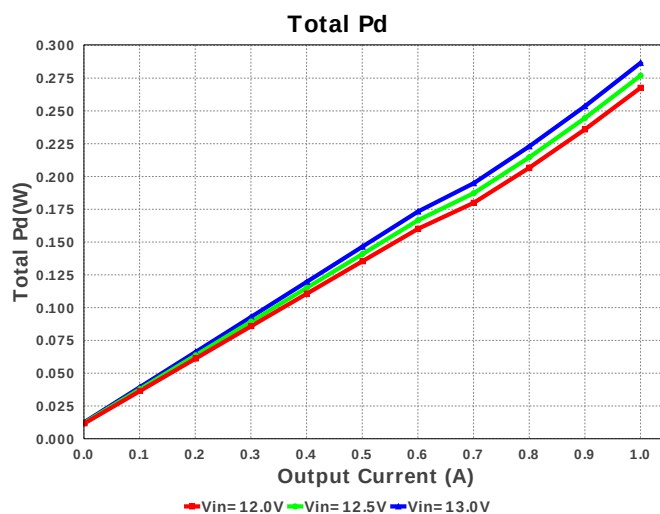
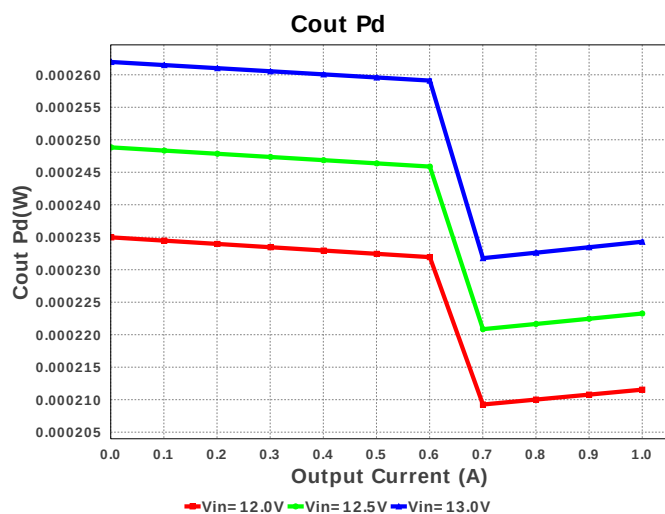
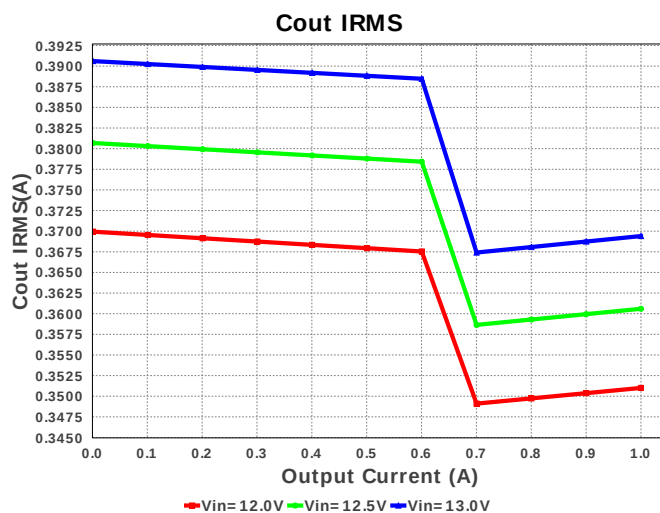
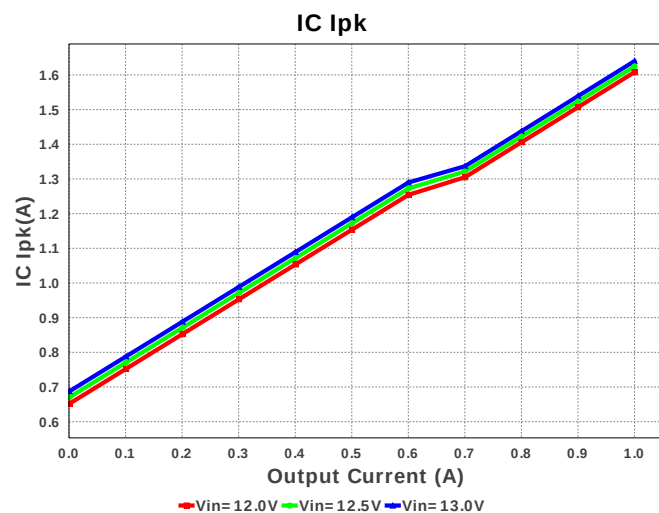
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11. U1		Texas Instruments	TPS54428DDAR	Switcher	1	\$0.80	

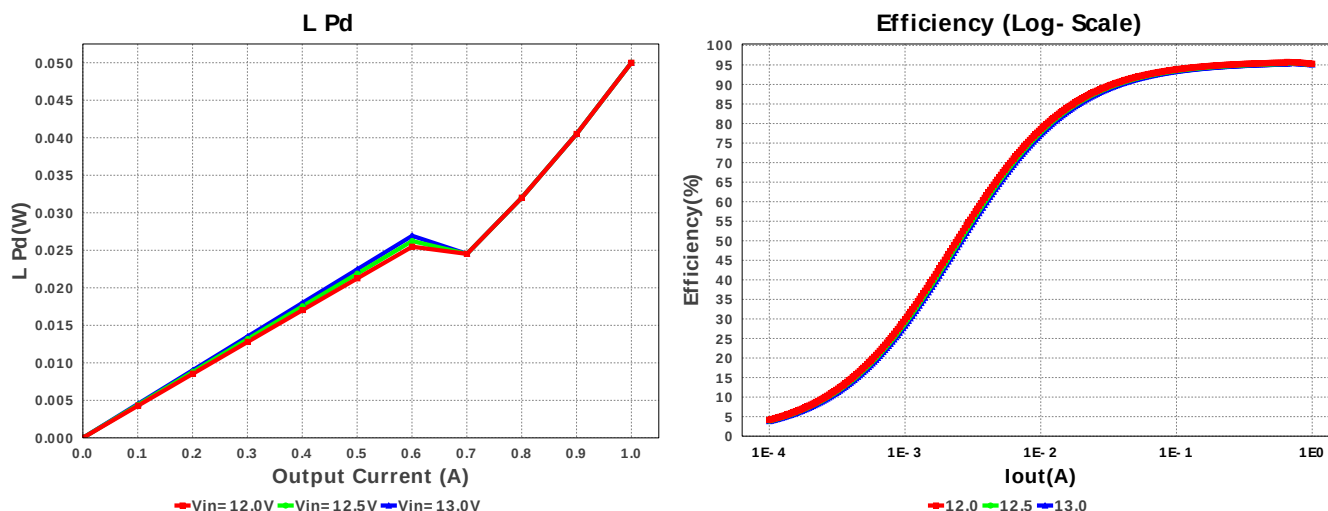


R-PDSO-G8 57 mm²









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 μW	Power	Input capacitor power dissipation
21.	Cout Pd	234.306 μW	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	TPS54428	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54428** Product Folder : <http://www.ti.com/product/TPS54428> : contains the data sheet and other resources.

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