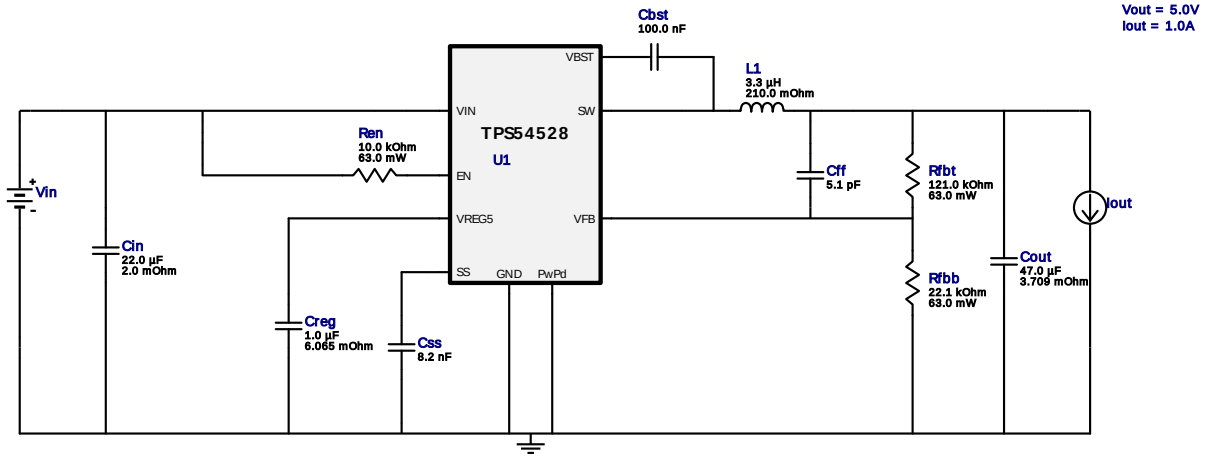
WEBENCH® Design Report

VinMin = 12.0V
VinMax = 13.0V
Vout = 5.0V
Iout = 1.0A

Device = TPS54528DDAR
Topology = Buck
Created = 7/15/16 9:36:00 PM
BOM Cost = $2.10
BOM Count = 11
Total Pd = 0.58W

Design : 4742013/81 TPS54528DDAR
TPS54528DDAR 12.0V-13.0V to 5.00V @ 1.0A

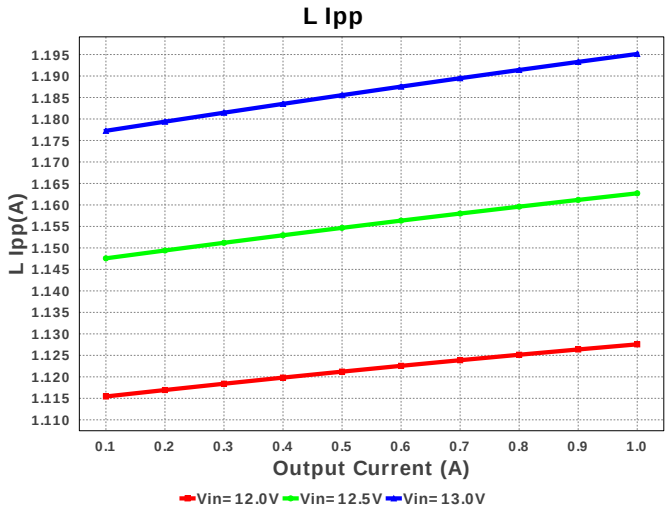


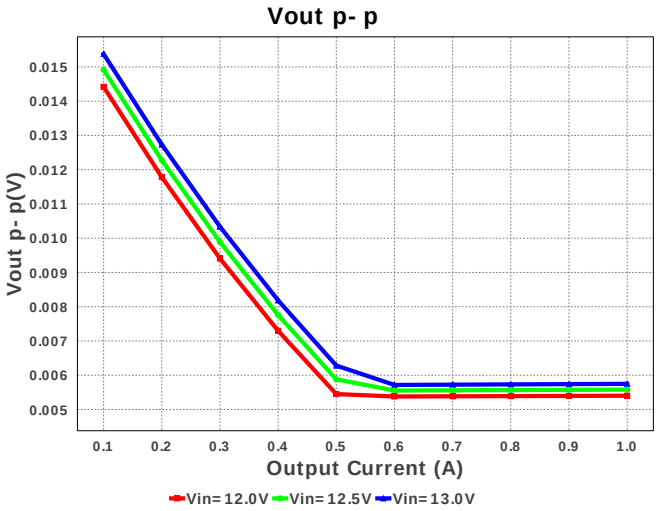
Electrical BOM

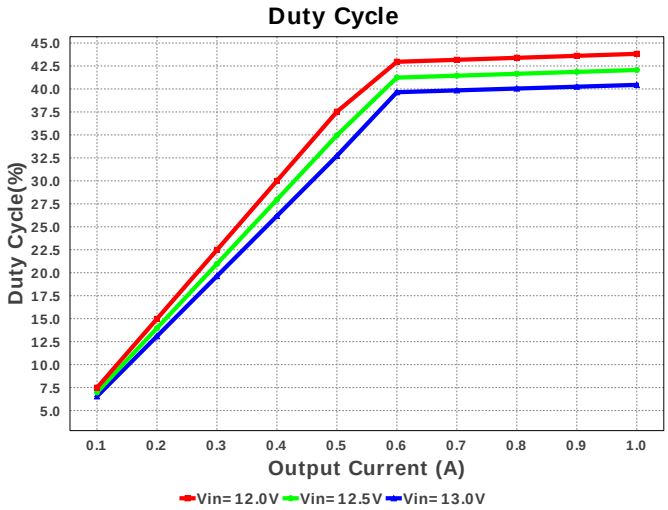
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	MuRata	GRM1555C1E5R1CA01D Series= C0G/NP0	Cap= 5.1 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.16	1210 15 mm²
4.	Cout	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	$0.15	1206_190 11 mm²
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 mm²
6.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
7.	L1	TDK	SPM3012T-3R3M	L= 3.3 µH DCR= 210.0 mOhm	1	$0.62	SPM3012 18 mm²
8.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW0402121KFKED Series= CRCW..e3	Res= 121.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

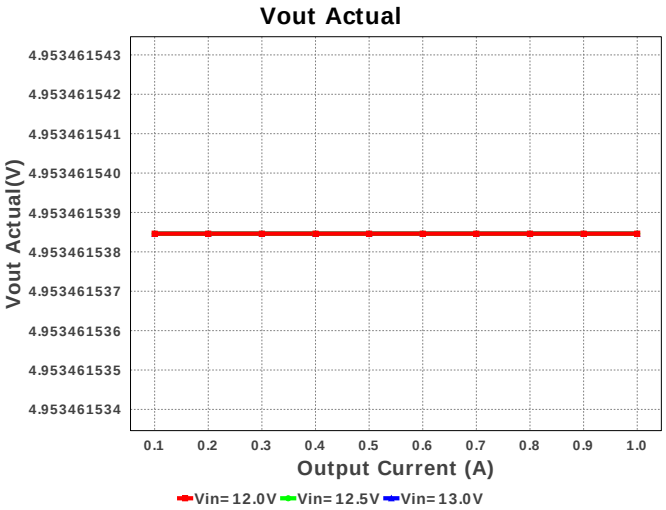
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54528DDAR	Switcher	1	$1.10	

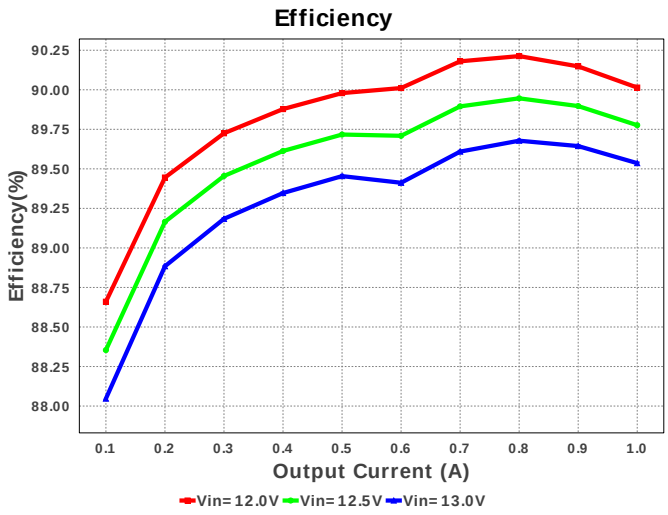
R-PDSO-G8 57 mm^2

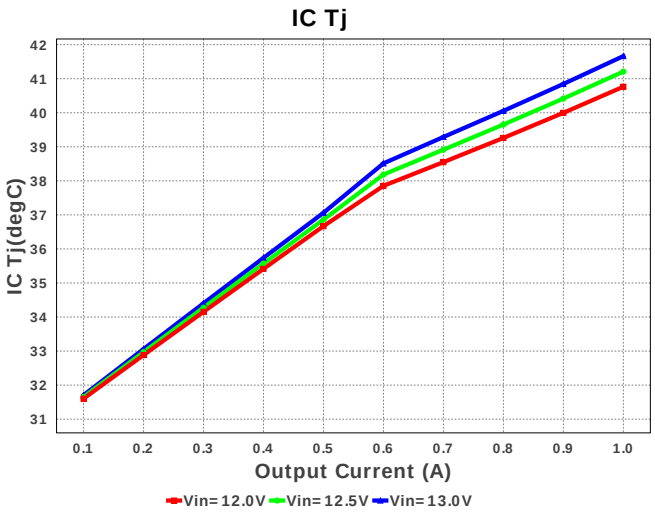


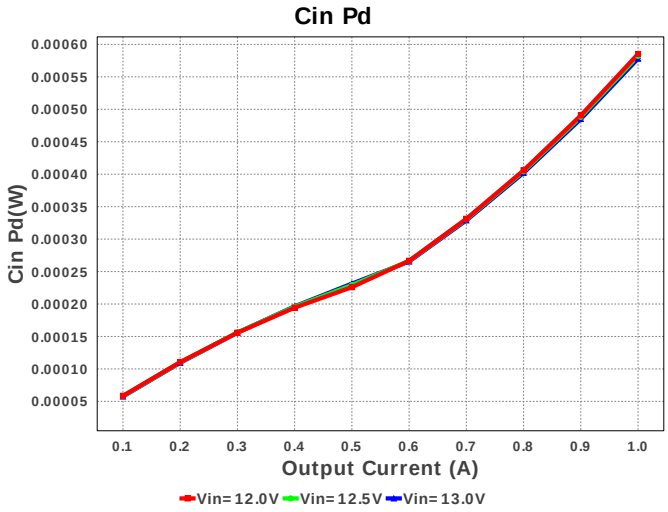


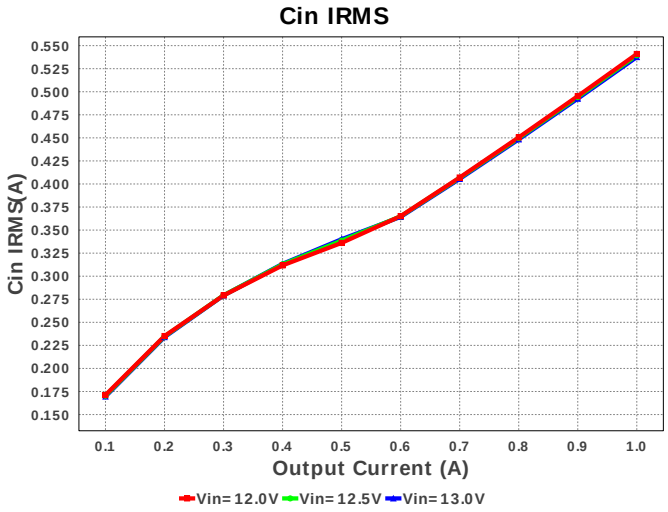


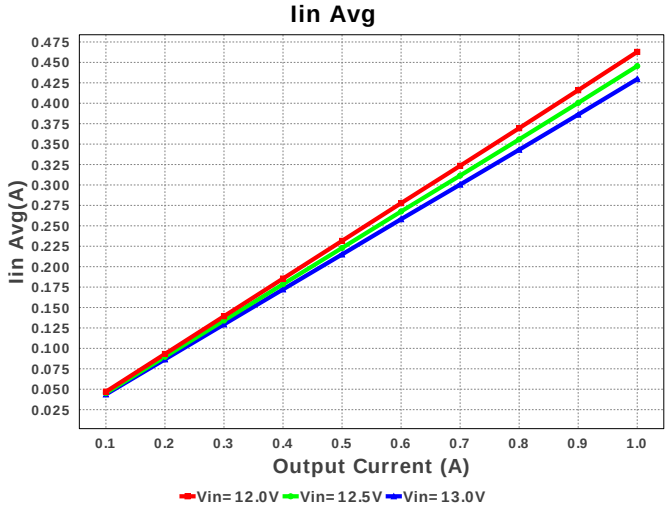


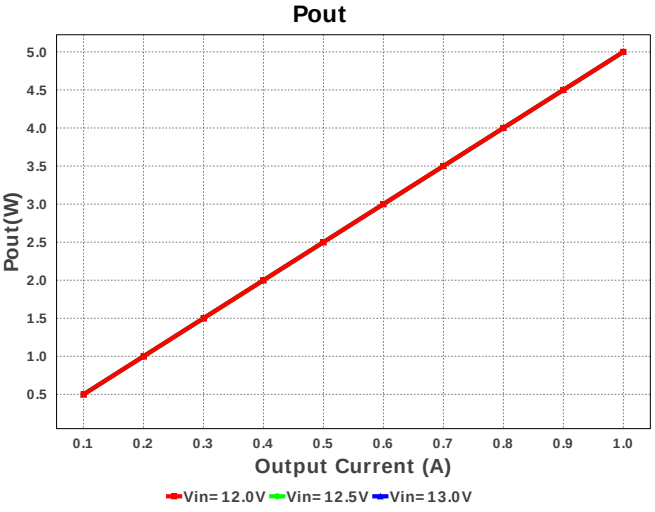


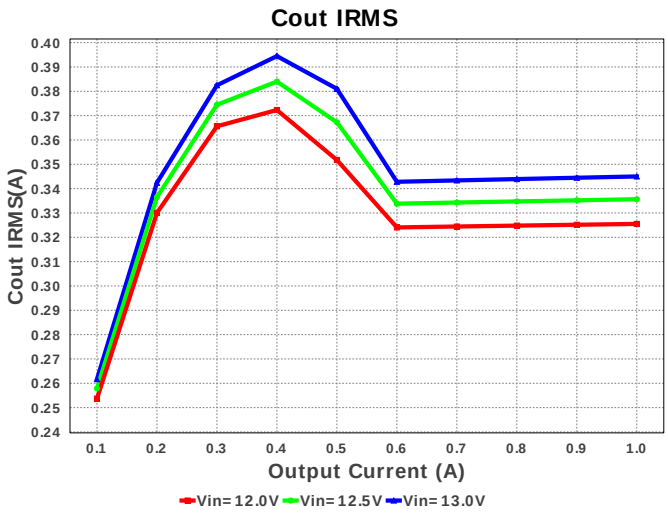


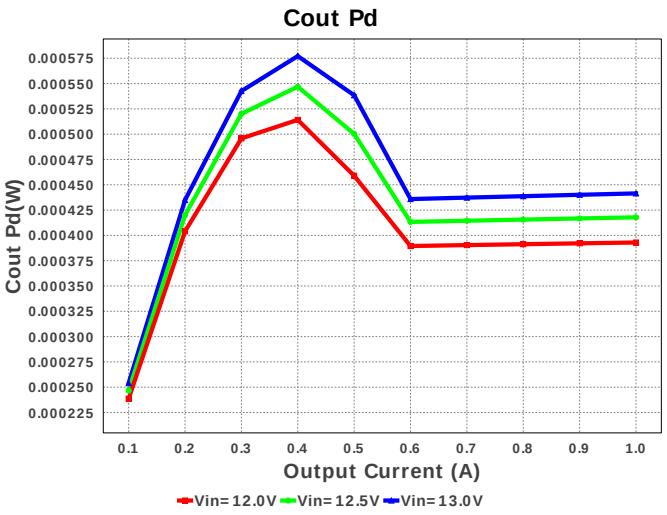


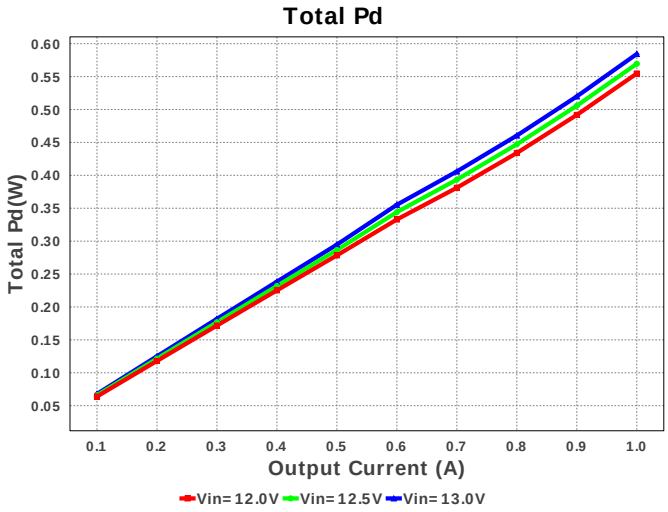


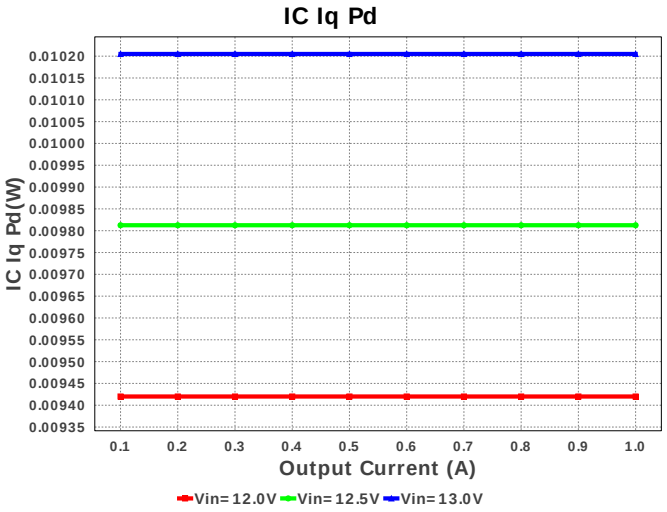


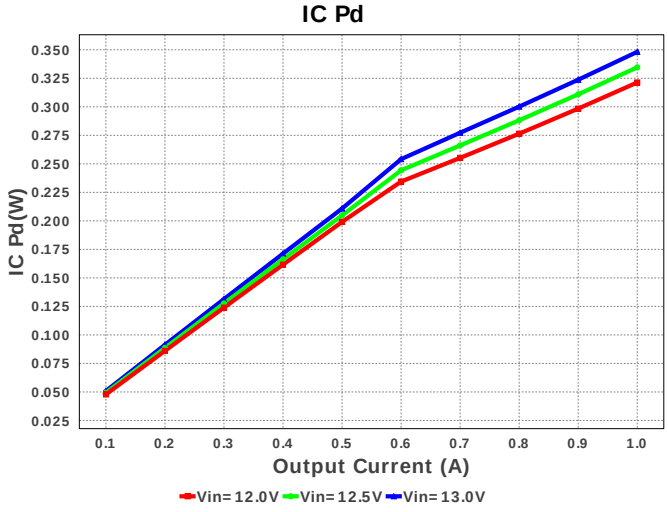


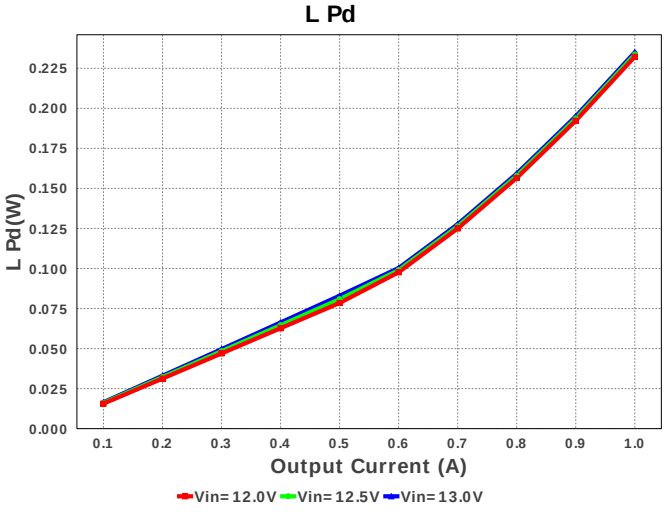


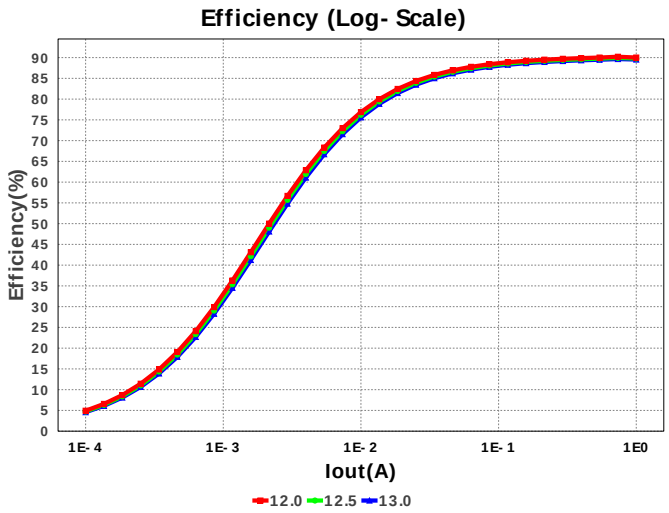












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	537.595 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	345.005 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	429.57 mA	Current	Average input current
4.	L Ipp	1.195 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	11	General	Total Design BOM count
6.	FootPrint	122.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	792.026 kHz	General	Switching frequency
8.	Pout	5.0 W	General	Total output power
9.	Total BOM	$2.1	General	Total BOM Cost
10.	ICThetaJA Effective	33.5 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Vout Actual	4.953 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	40.444 %	Op_point	Duty cycle
14.	Efficiency	89.536 %	Op_point	Steady state efficiency
15.	IC Tj	41.664 degC	Op_point	IC junction temperature
16.	IOUT_OP	1.0 A	Op_point	Iout operating point
17.	VIN_OP	13.0 V	Op_point	Vin operating point
18.	Vout p-p	5.749 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	578.016 µW	Power	Input capacitor power dissipation
20.	Cout Pd	441.475 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	10.205 mW	Power	IC Iq Pd
22.	IC Pd	348.173 mW	Power	IC power dissipation
23.	L Pd	234.996 mW	Power	Inductor power dissipation
24.	Total Pd	584.353 mW	Power	Total Power Dissipation
25.	Vout Tolerance	3.57 %		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	TPS54528	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54528** Product Folder : http://www.ti.com/product/TPS54528 : contains the data sheet and other resources.