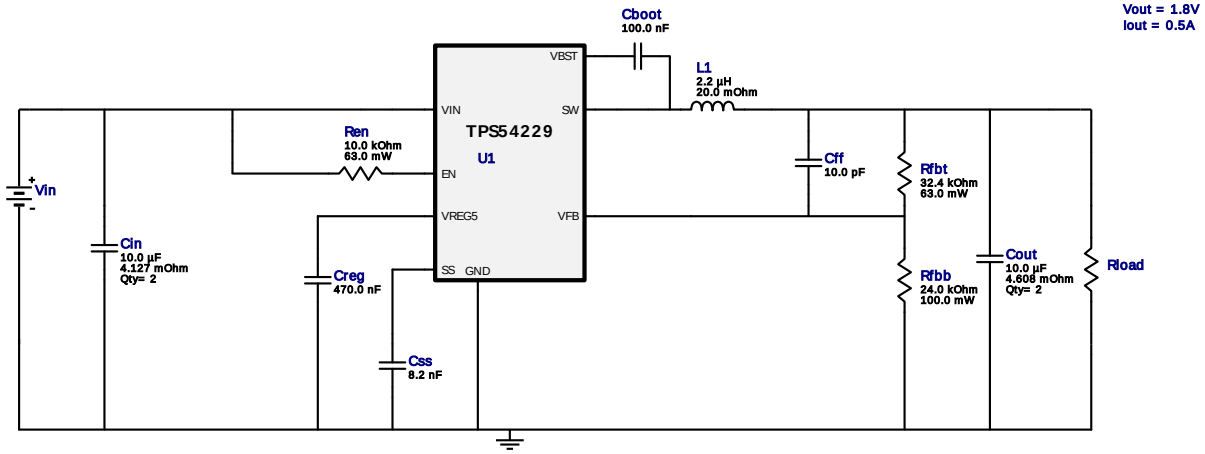
WEBENCH® Design Report

VinMin = 12.0V
VinMax = 12.0V
Vout = 1.8V
Iout = 0.5A

Device = TPS54229DDAR
Topology = Buck
Created = 5/3/16 4:37:14 AM
BOM Cost = $1.86
BOM Count = 13
Total Pd = 0.12W

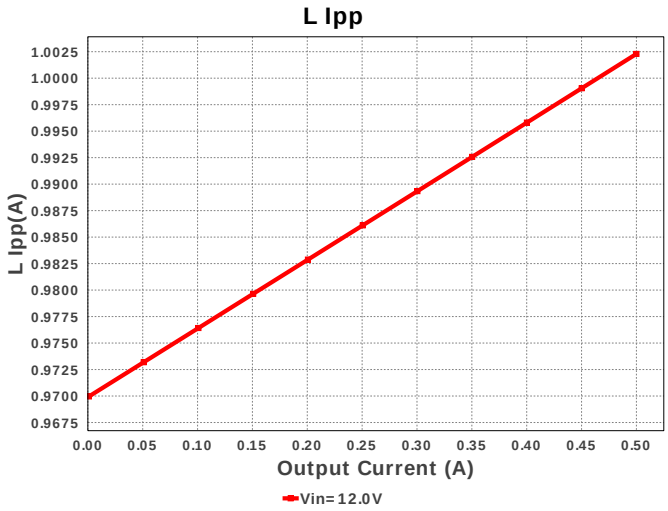
Design : 4618978/437 TPS54229DDAR
TPS54229DDAR 12.0V-12.0V to 1.80V @ 0.5A

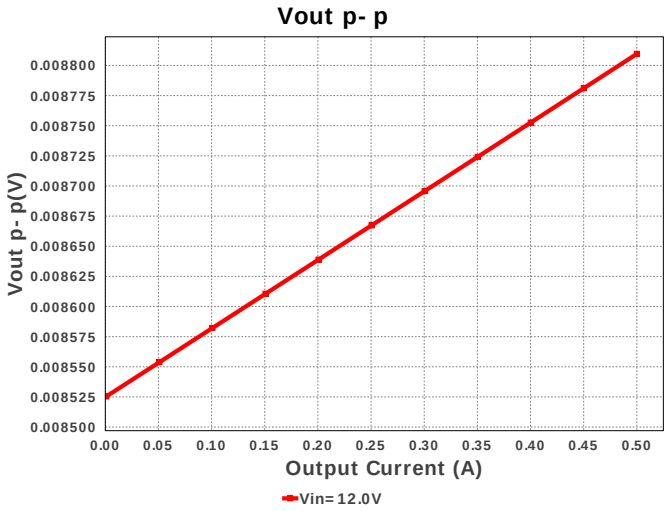


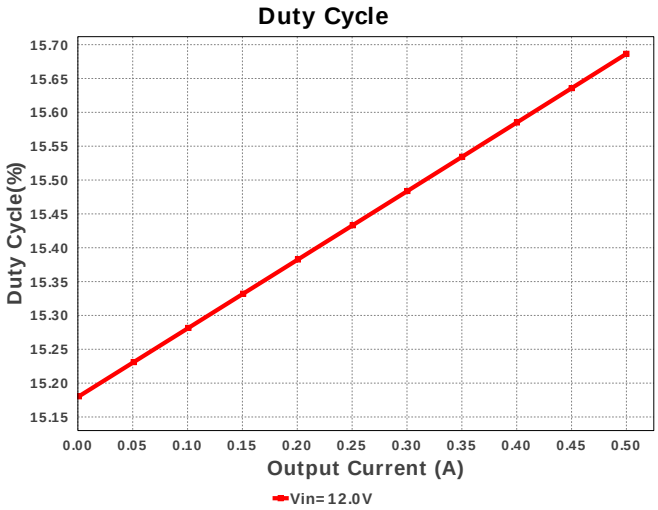
Electrical BOM

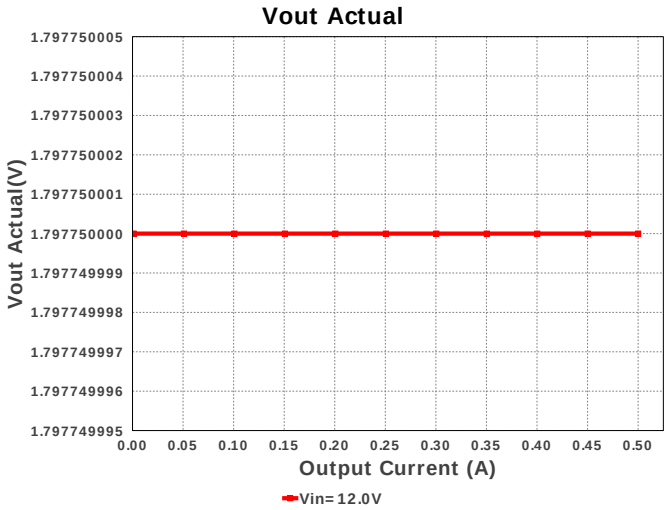
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	2	$0.03	0805 7 mm²
4.	Cout	MuRata	GRM319R61C106KE15D Series= X5R	Cap= 10.0 uF ESR= 4.608 mOhm VDC= 16.0 V IRMS= 2.54841 A	2	$0.04	1206 11 mm²
5.	Creg	MuRata	GRM155R61A474KE15D Series= X5R	Cap= 470.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 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	Coilcraft	MSS5131-222MLB	L= 2.2 µH DCR= 20.0 mOhm	1	$0.48	MSS5131 50 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	Yageo America	RC0603FR-0724KL Series= ?	Res= 24.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
10.	Rfbt	Vishay-Dale	CRCW040232K4FKED Series= CRCW..e3	Res= 32.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

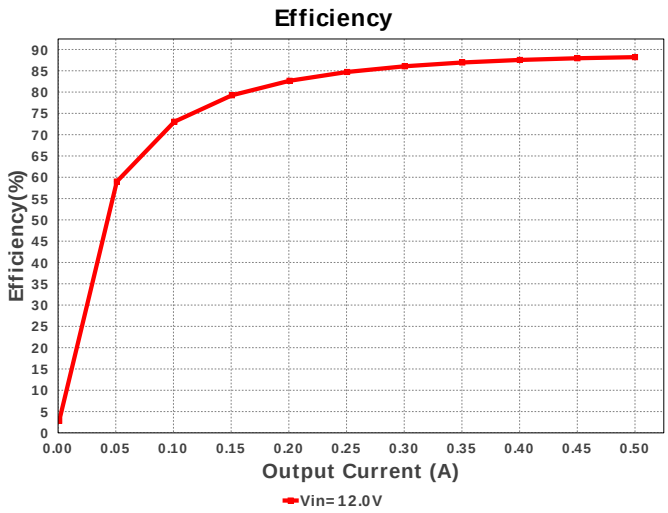
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54229DDAR	Switcher	1	$1.17	DDA0008E 57 mm^2

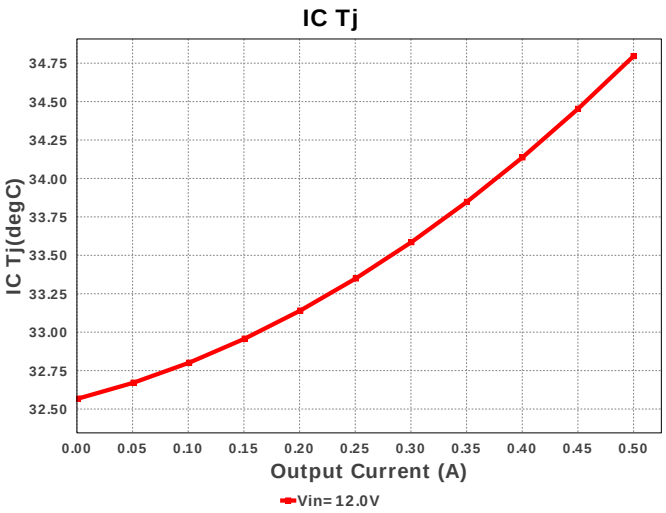


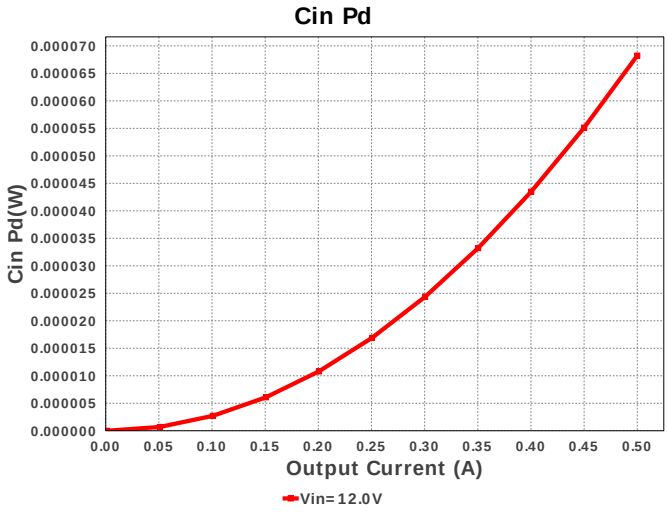


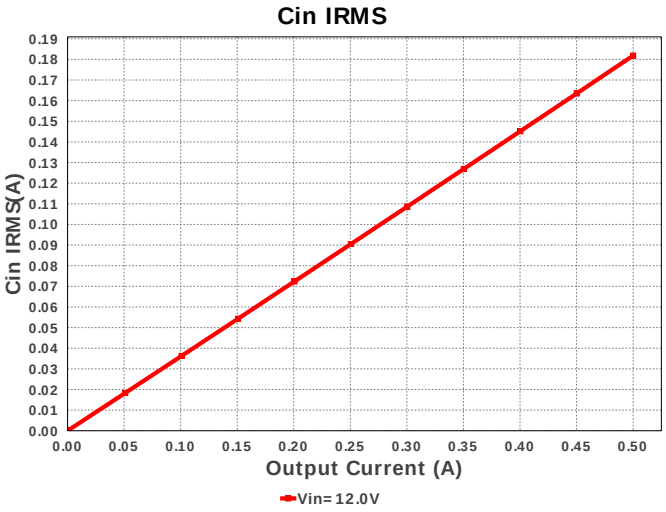


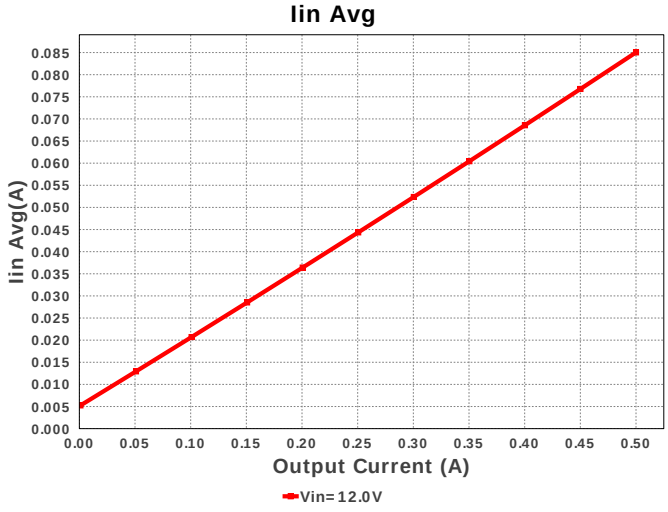


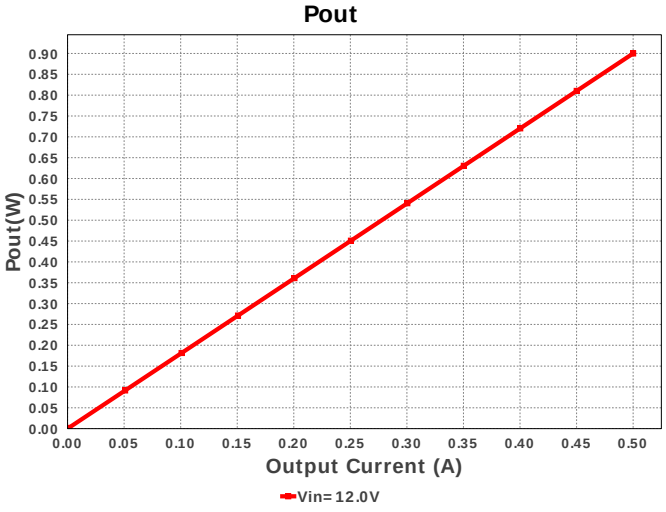


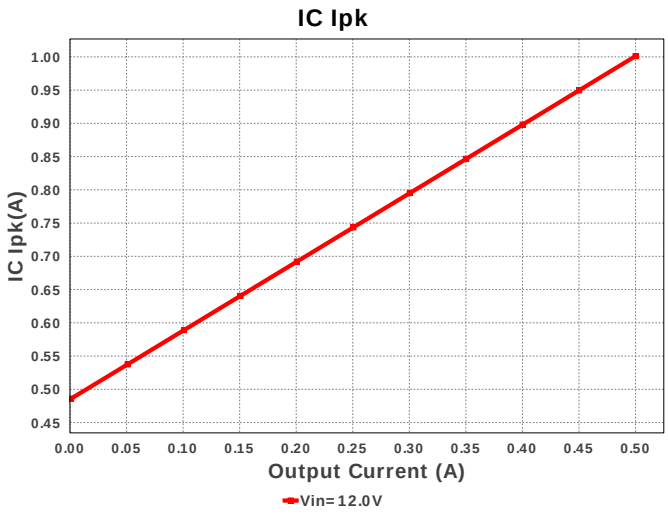


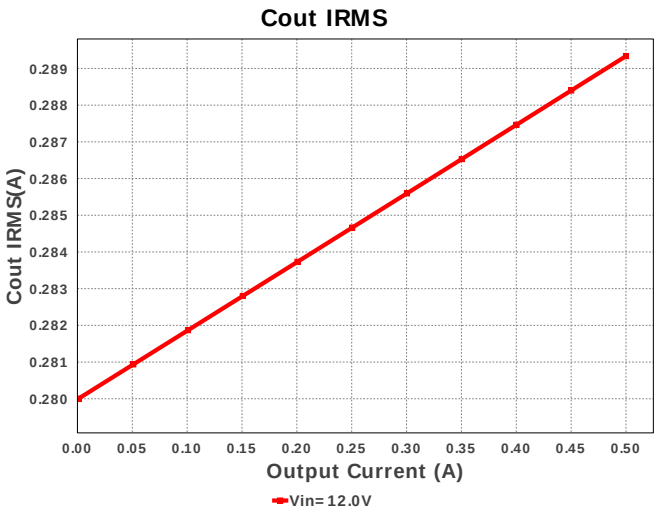


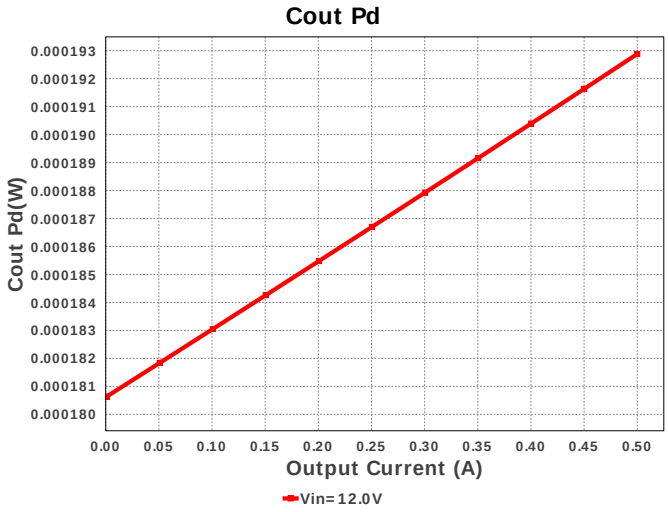


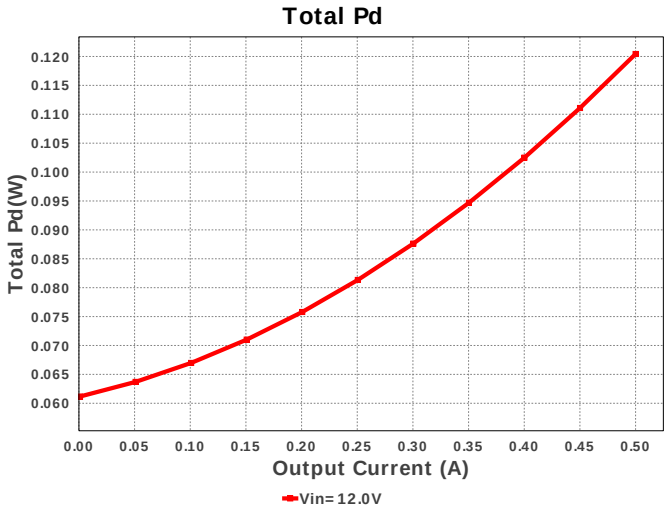


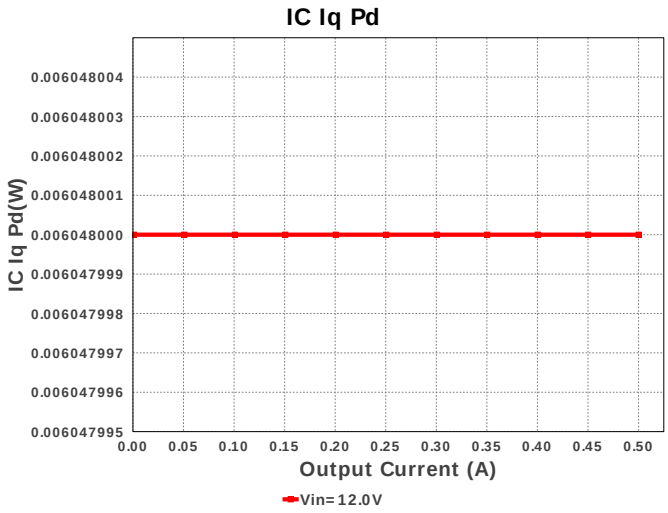


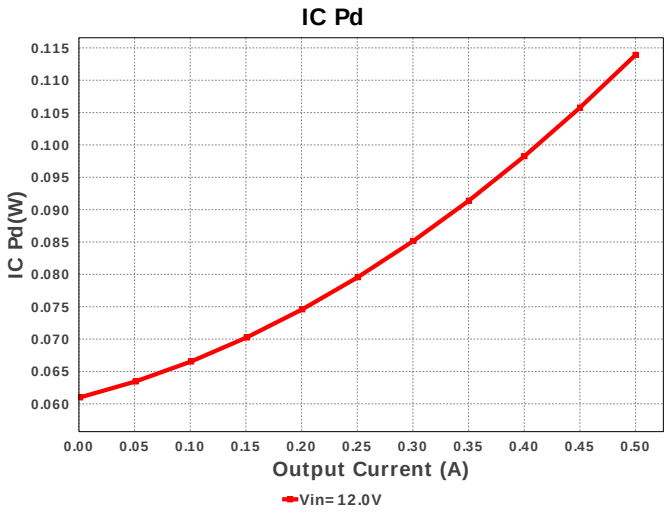


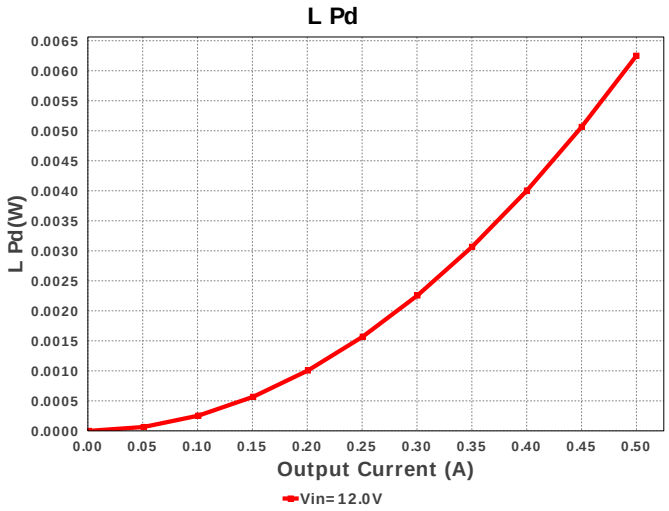












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	181.837 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	289.336 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.001 A	Current	Peak switch current in IC
4.	Iin Avg	85.036 mA	Current	Average input current
5.	L Ipp	1.002 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	13	General	Total Design BOM count
7.	FootPrint	169.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	725.621 kHz	General	Switching frequency
9.	Pout	900.0 mW	General	Total output power
10.	Total BOM	$1.86	General	Total BOM Cost
11.	Vout Actual	1.798 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
12.	Vout OP	1.8 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	15.687 %	Op_point	Duty cycle
14.	Efficiency	88.198 %	Op_point	Steady state efficiency
15.	IC Tj	34.796 degC	Op_point	IC junction temperature
16.	ICThetaJA	42.1 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	8.81 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	68.229 µW	Power	Input capacitor power dissipation
21.	Cout Pd	192.881 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	6.048 mW	Power	IC Iq Pd
23.	IC Pd	113.919 mW	Power	IC power dissipation
24.	L Pd	6.25 mW	Power	Inductor power dissipation
25.	Total Pd	120.431 mW	Power	Total Power Dissipation
26.	Vout Tolerance	3.012 %		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	12.0	Minimum input voltage
4.	Vout	1.8	Output Voltage
5.	base_pn	TPS54229	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54229** Product Folder : http://www.ti.com/product/TPS54229 : contains the data sheet and other resources.