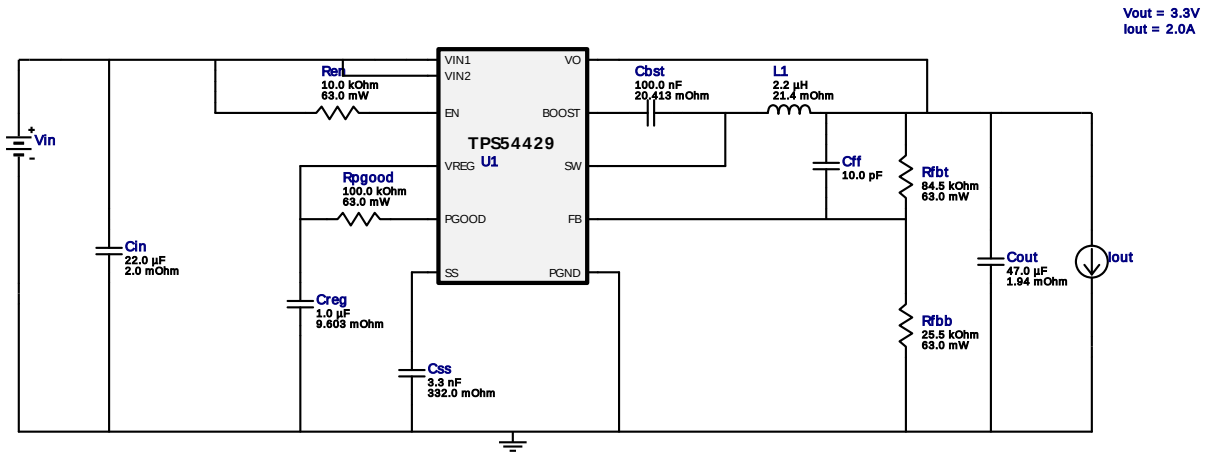
WEBENCH® Design Report

VinMin = 14.0V
VinMax = 18.0V
Vout = 3.3V
Iout = 2.0A

Device = TPS54429PWPR
Topology = Buck
Created = 12/2/15 6:17:11 AM
BOM Cost = $1.98
BOM Count = 12
Total Pd = 0.98W

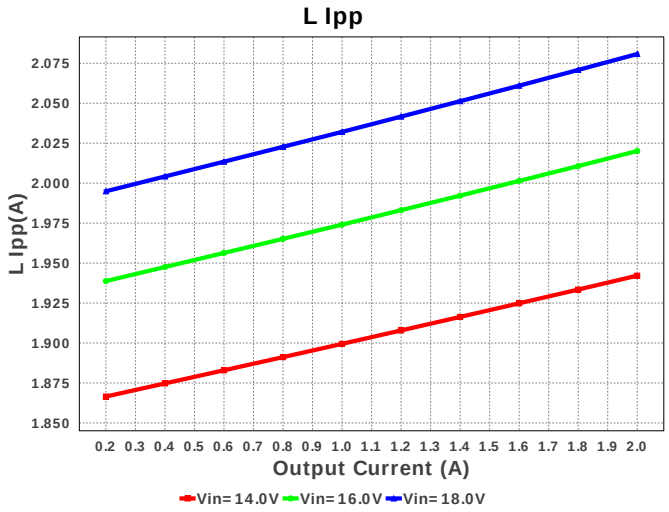
Design : 4079392/6 TPS54429PWPR
TPS54429PWPR 14.0V-18.0V to 3.30V @ 2.0A

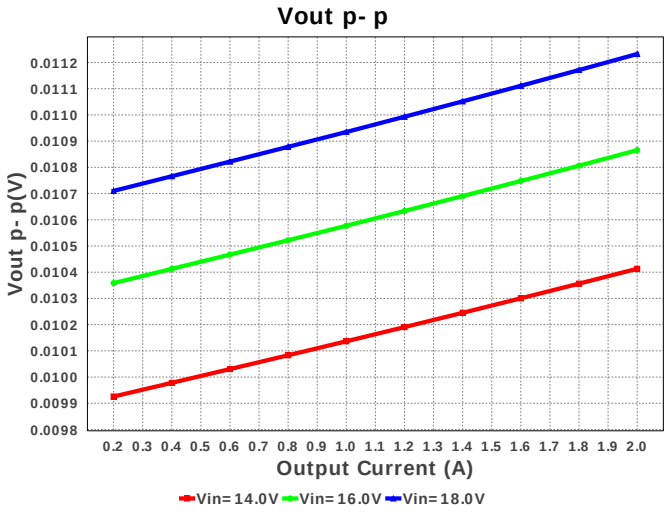


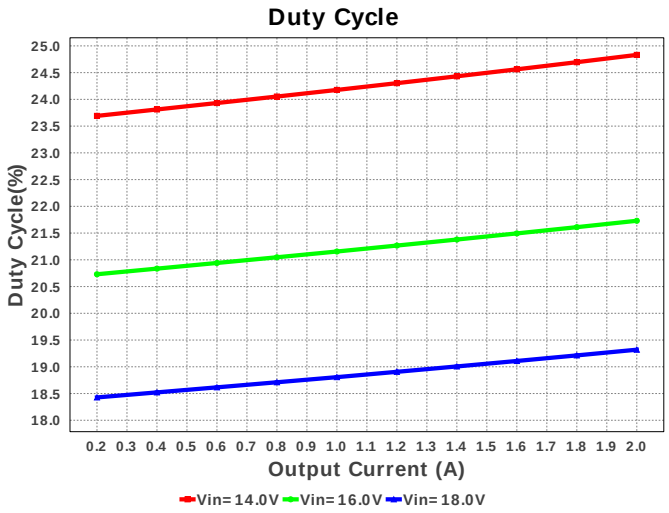
Electrical BOM

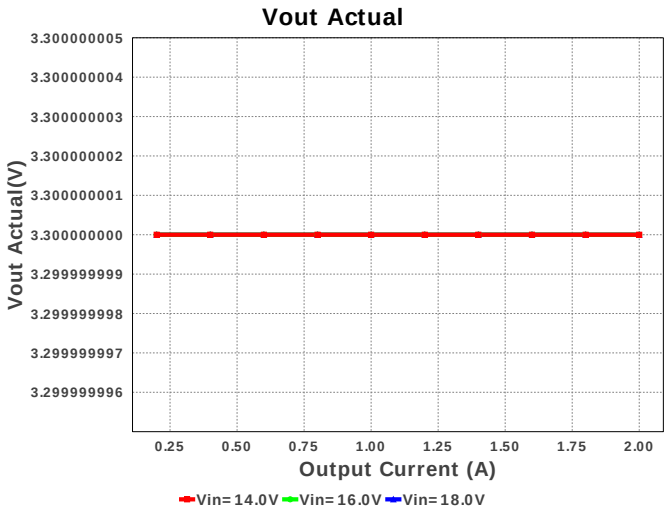
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	TDK	C1005X5R1A104K Series= X5R	Cap= 100.0 nF ESR= 20.413 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	1005 3 mm^2
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
3.	Cin	MuRata	GRM32ER61E226KE15L 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	C3216X5R0J476M Series= X5R	Cap= 47.0 uF ESR= 1.94 mOhm VDC= 6.3 V IRMS= 0.0 A	1	$0.12	1206 11 mm^2
5.	Creg	TDK	C1608X5R1A105K Series= X5R	Cap= 1.0 uF ESR= 9.603 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	1608 5 mm^2
6.	Css	Kemet	C0805C332K5RACTU Series= X7R	Cap= 3.3 nF ESR= 332.0 mOhm VDC= 50.0 V IRMS= 319.0 mA	1	$0.01	0805 7 mm^2
7.	L1	Coilcraft	XFL4020-222MEB	L= 2.2 µH DCR= 21.4 mOhm	1	$0.55	XFL4020 25 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	Vishay-Dale	CRCW040225K5FKED Series= CRCW..e3	Res= 25.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
10.	Rfbt	Vishay-Dale	CRCW040284K5FKED Series= CRCW..e3	Res= 84.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

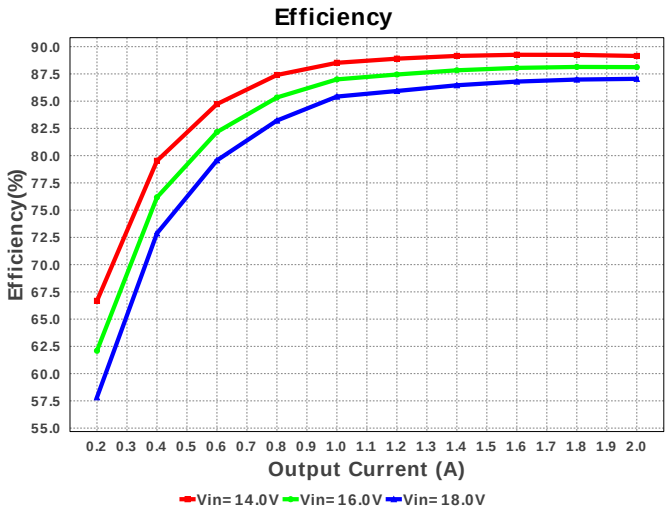
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	TPS54429PWPR	Switcher	1	$1.07	R-PDSO-G14 61 mm^2

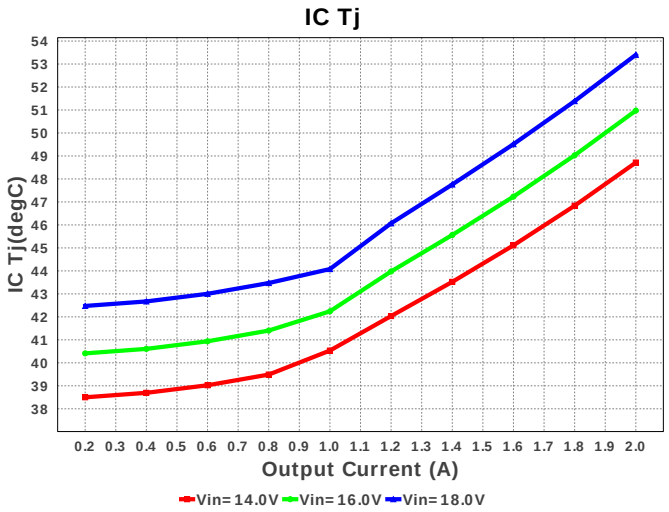


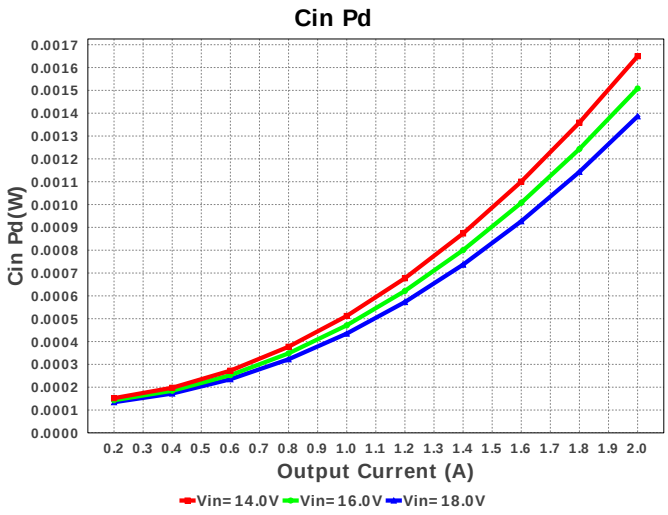


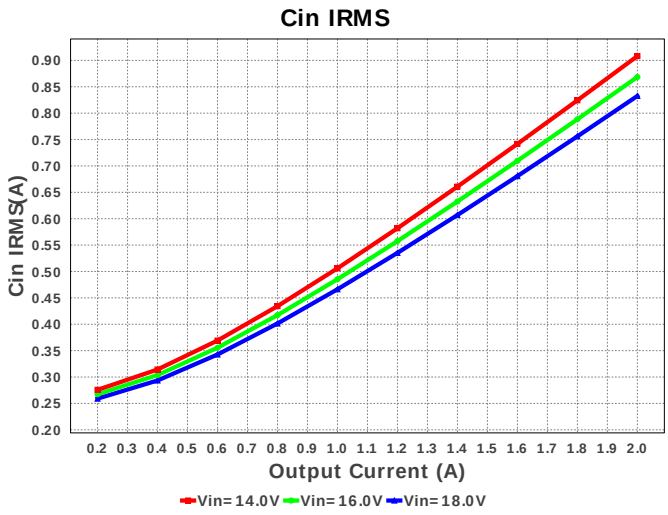


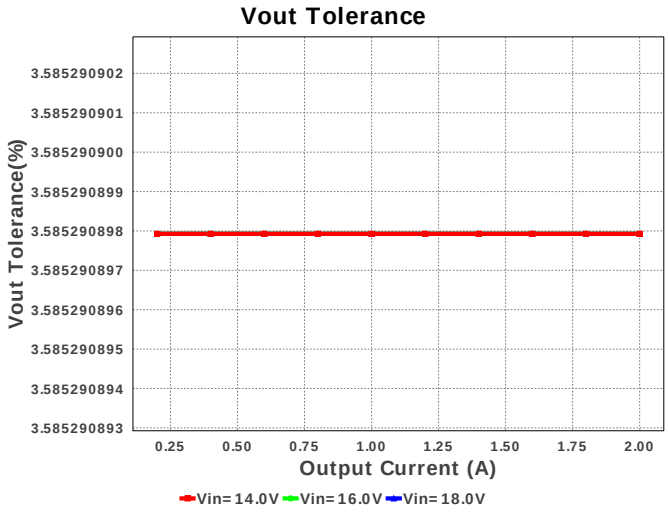


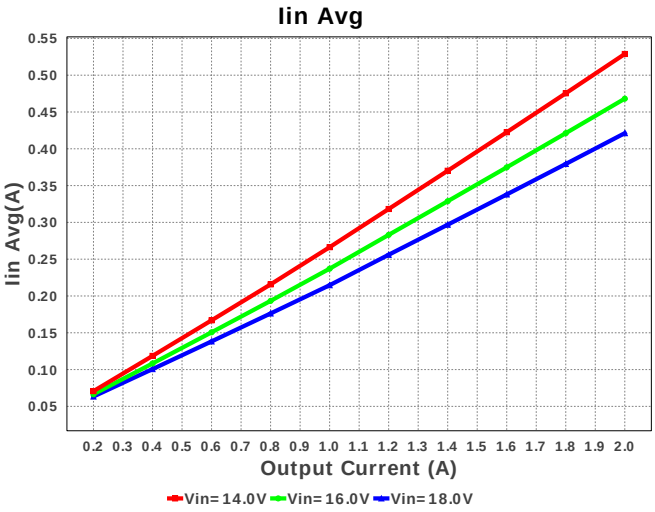


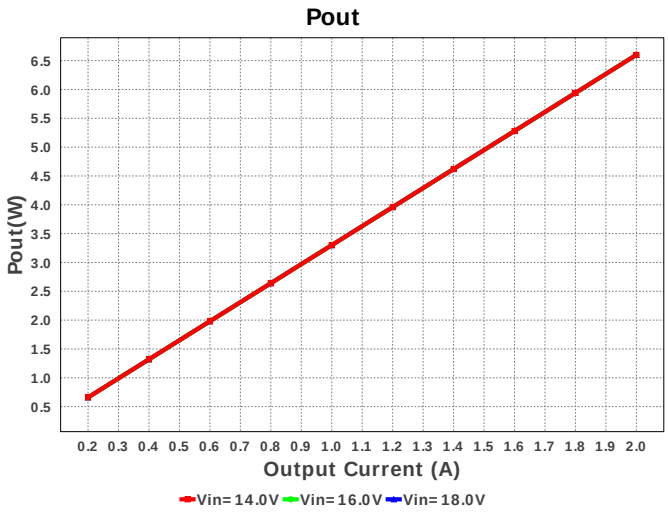


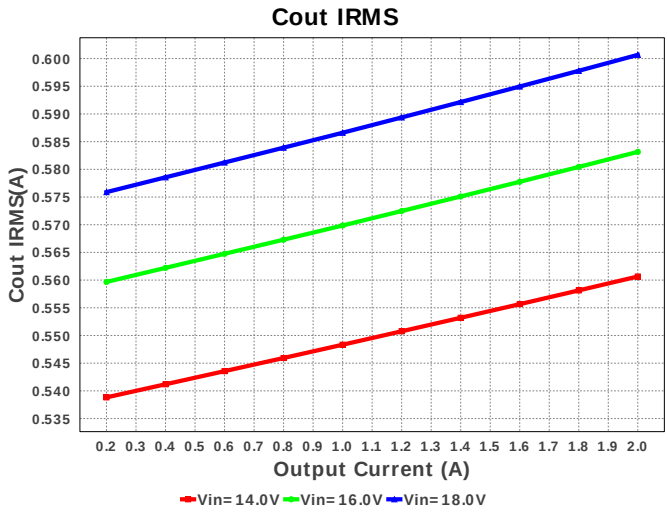


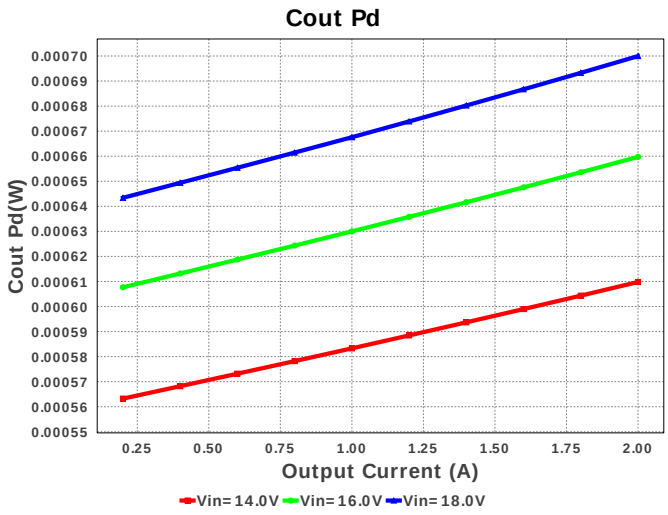


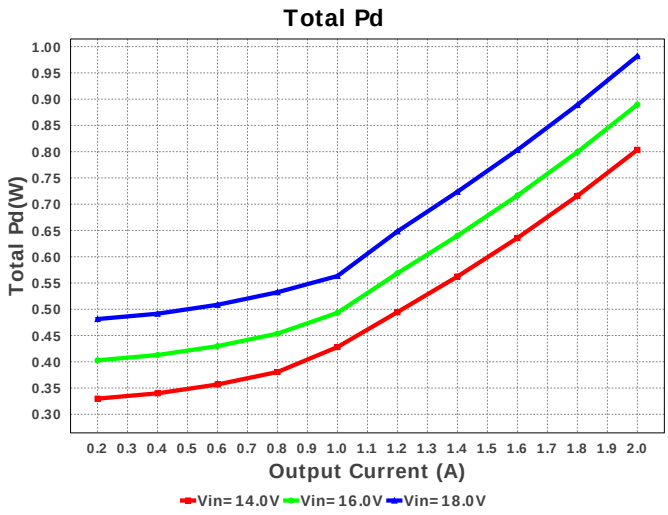


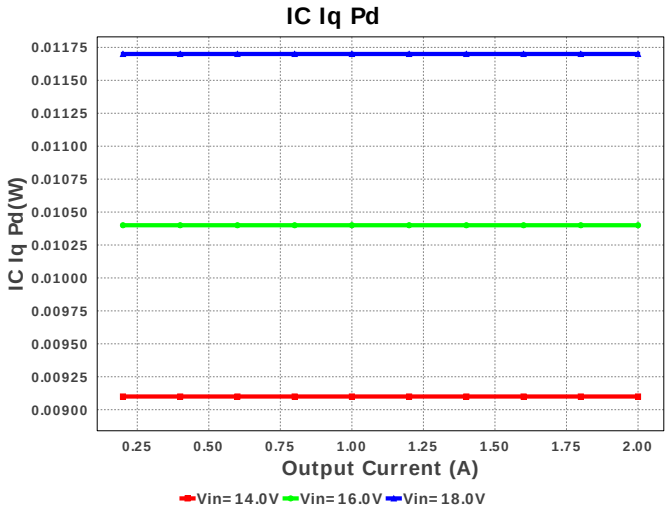


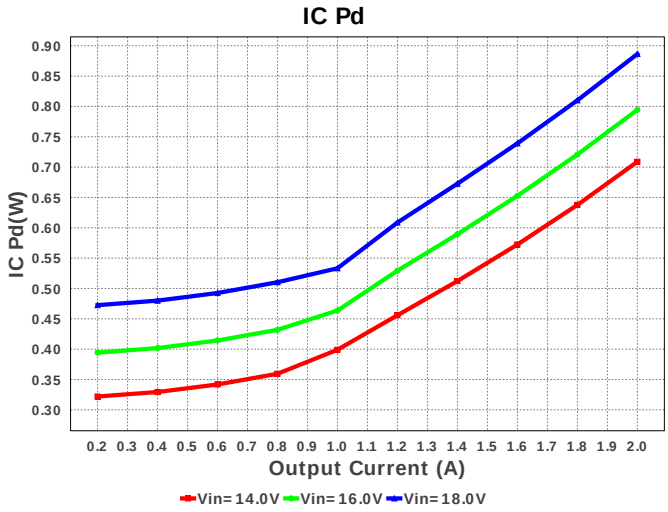


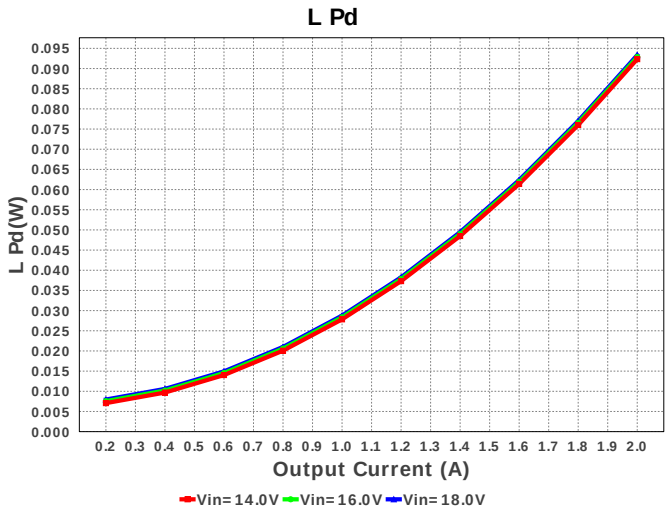












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	832.577 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	600.668 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	421.22 mA	Current	Average input current
4.	L Ipp	2.081 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	145.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	611.167 kHz	General	Switching frequency
8.	Pout	6.6 W	General	Total output power
9.	Total BOM	$1.98	General	Total BOM Cost
10.	ICThetaJA Effective	26.4 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Vout Actual	3.3 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors

#	Name	Value	Category	Description
12.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	19.319 %	Op_point	Duty cycle
14.	Efficiency	87.049 %	Op_point	Steady state efficiency
15.	IC Tj	53.402 degC	Op_point	IC junction temperature
16.	IOUT_OP	2.0 A	Op_point	Iout operating point
17.	VIN_OP	18.0 V	Op_point	Vin operating point
18.	Vout p-p	11.232 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	1.386 mW	Power	Input capacitor power dissipation
20.	Cout Pd	699.957 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	11.7 mW	Power	IC Iq Pd
22.	IC Pd	886.45 mW	Power	IC power dissipation
23.	L Pd	93.321 mW	Power	Inductor power dissipation
24.	Total Pd	981.94 mW	Power	Total Power Dissipation
25.	Vout Tolerance	3.585 %	Unknown	Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	18.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS54429	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54429** Product Folder : http://www.ti.com/product/TPS54429 : contains the data sheet and other resources.