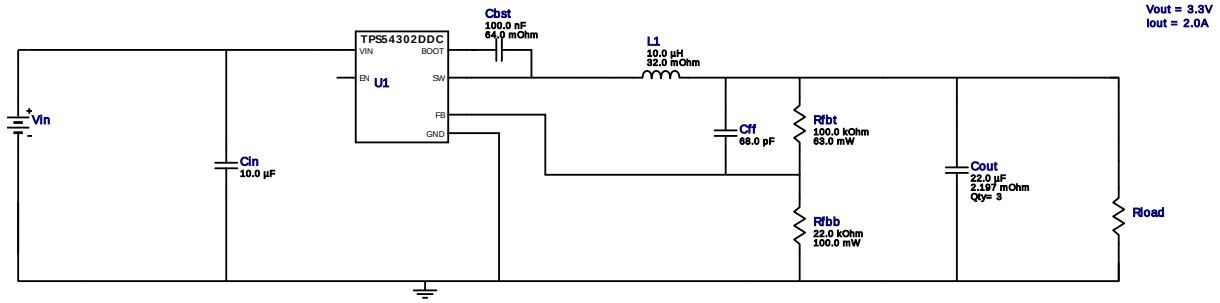
WEBENCH® Design Report

VinMin = 15.0V
VinMax = 25.0V
Vout = 3.3V
Iout = 2.0A

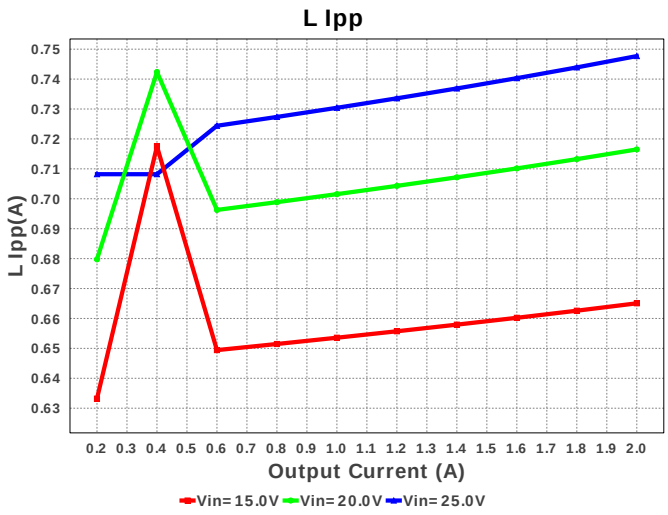
Device = TPS54302DDCR
Topology = Buck
Created = 8/12/16 12:52:46 AM
BOM Cost = $2.82
BOM Count = 10
Total Pd = 0.97W

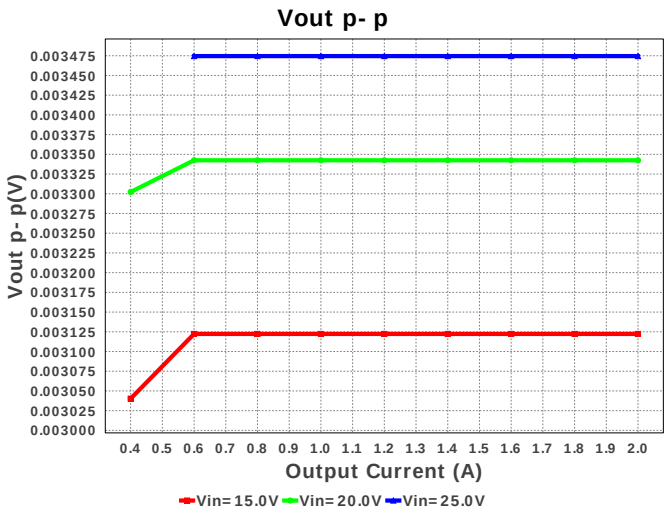
Design : 4766207/6 TPS54302DDCR
TPS54302DDCR 15.0V-25.0V to 3.30V @ 2.0A

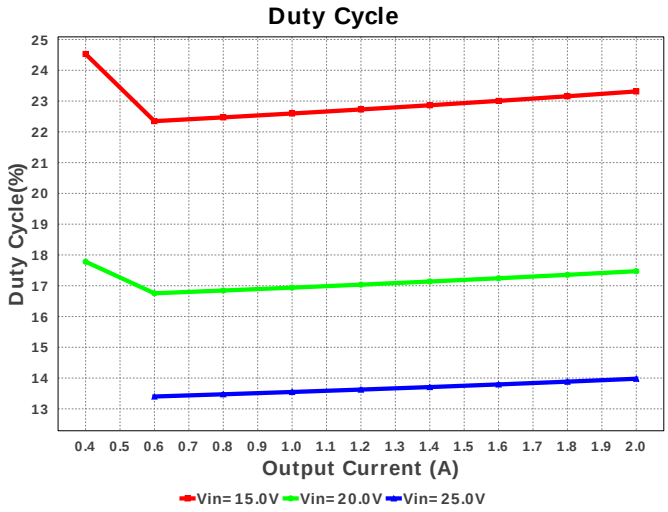


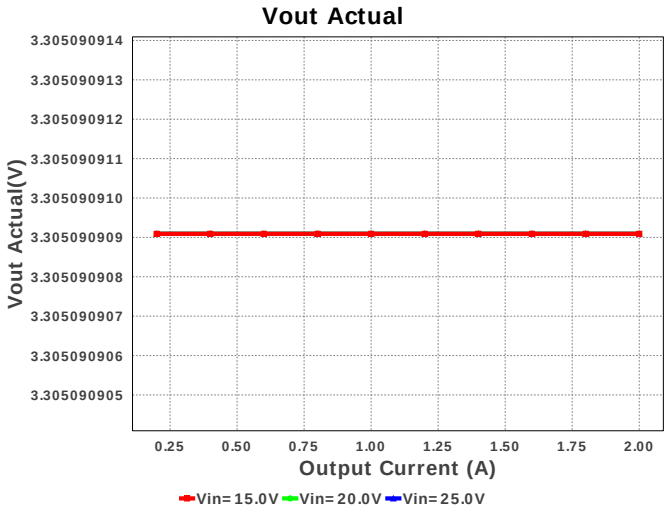
Electrical BOM

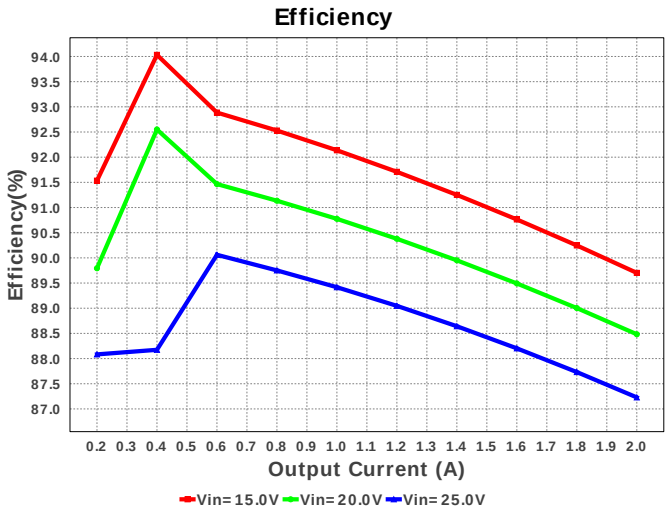
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Cff	TDK	C0603C0G1E680J030BA Series= C0G/NP0	Cap= 68.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
3.	Cin	MuRata	GRM32ER71J106KA12L Series= X7R	Cap= 10.0 uF VDC= 63.0 V IRMS= 0.0 A	1	$0.27	1210_280 15 mm²
4.	Cout	TDK	C4532X5R1E226M Series= X5R	Cap= 22.0 uF ESR= 2.197 mOhm VDC= 25.0 V IRMS= 0.0 A	3	$0.50	1812 23 mm²
5.	L1	Bourns	SRR1240-100M	L= 10.0 µH DCR= 32.0 mOhm	1	$0.41	SRR1240 210 mm²
6.	Rfbb	Yageo America	RC0603FR-0722KL Series= ?	Res= 22.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
7.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	U1	Texas Instruments	TPS54302DDCR	Switcher	1	$0.60	DDC0006A_N 10 mm²

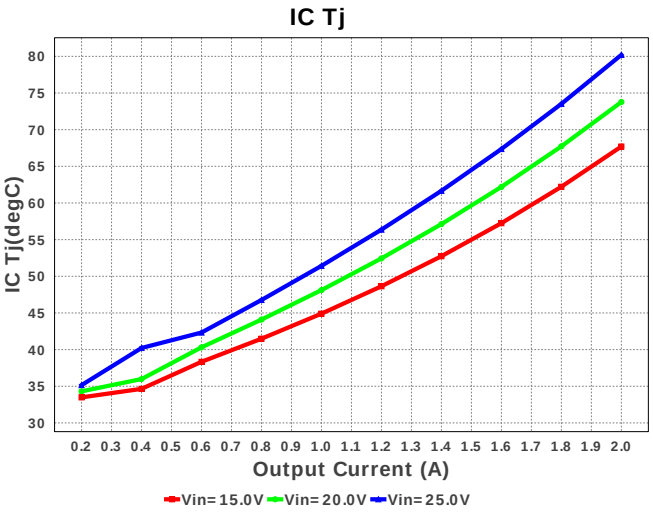


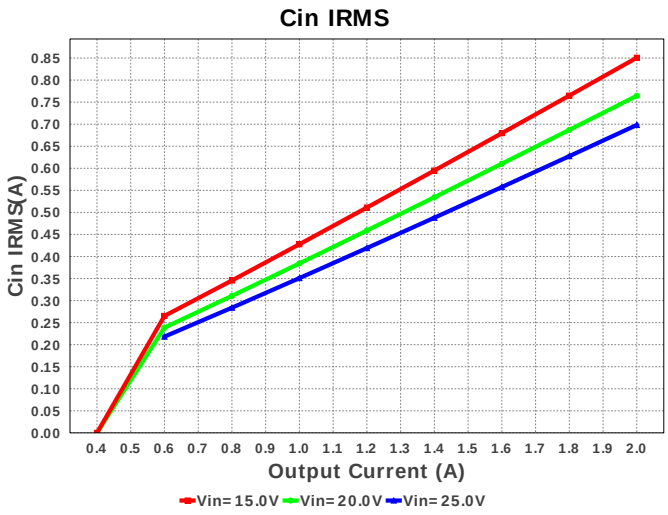


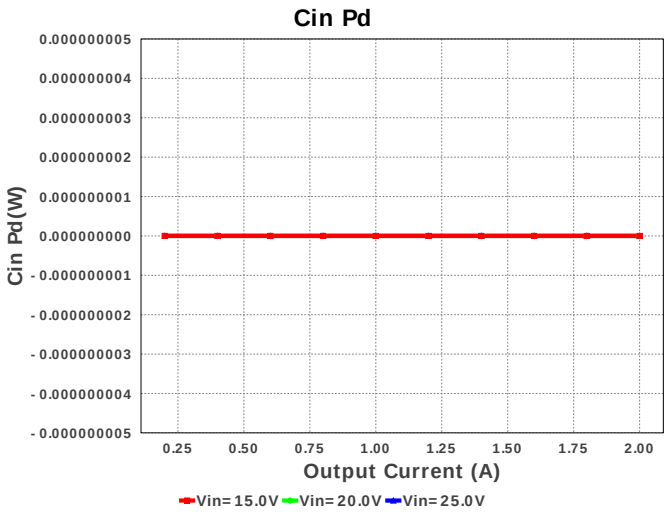


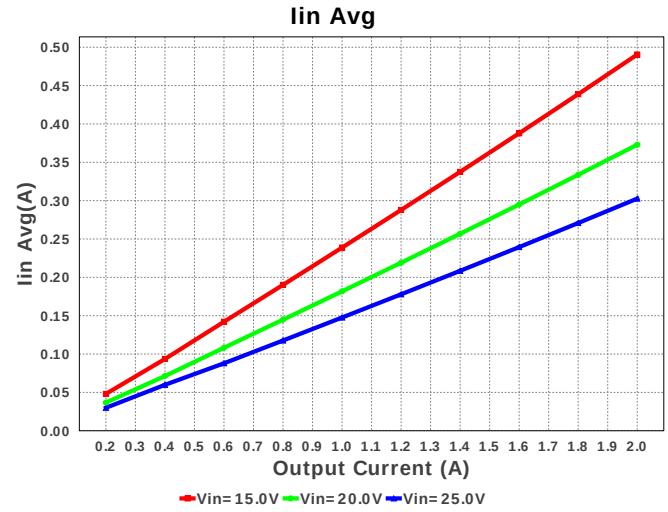


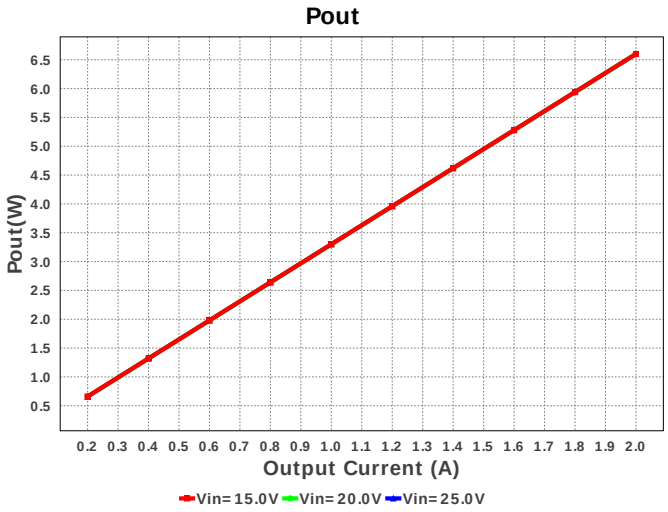


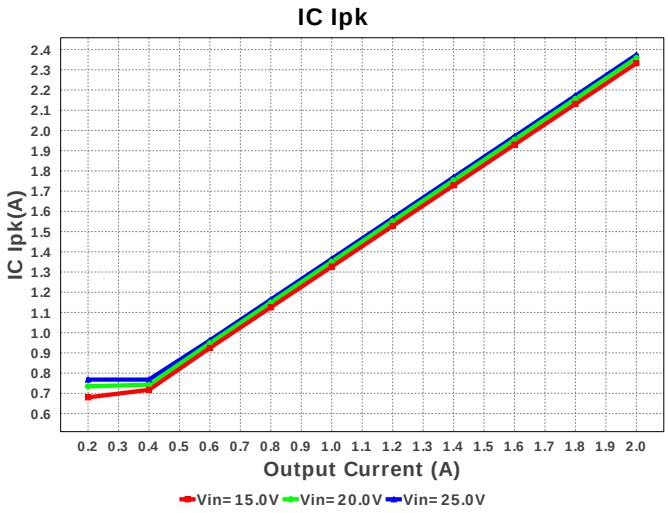


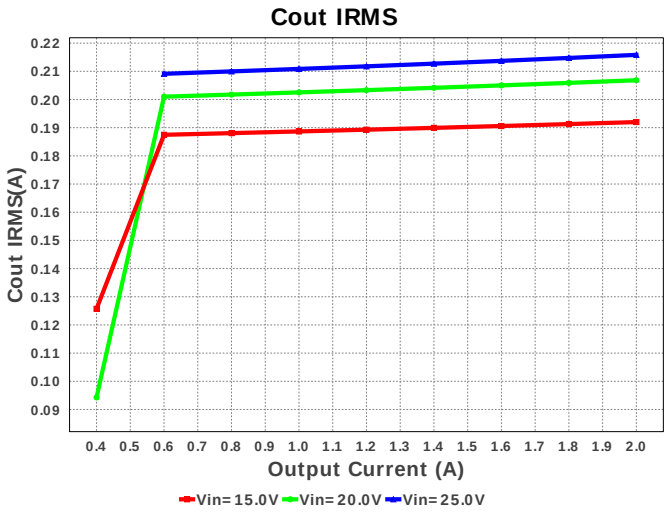


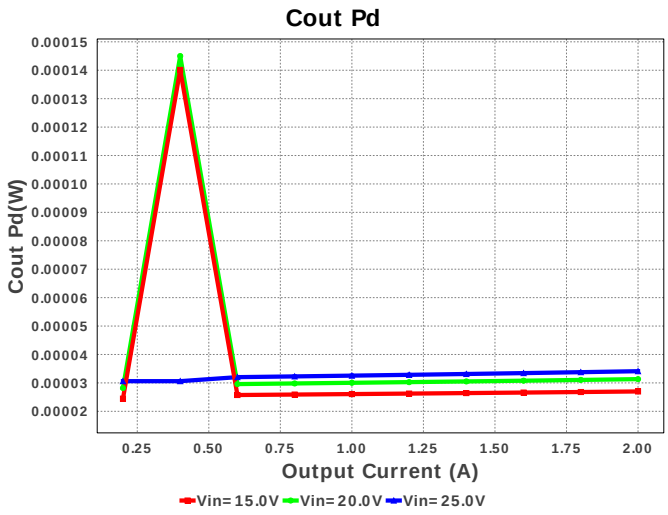


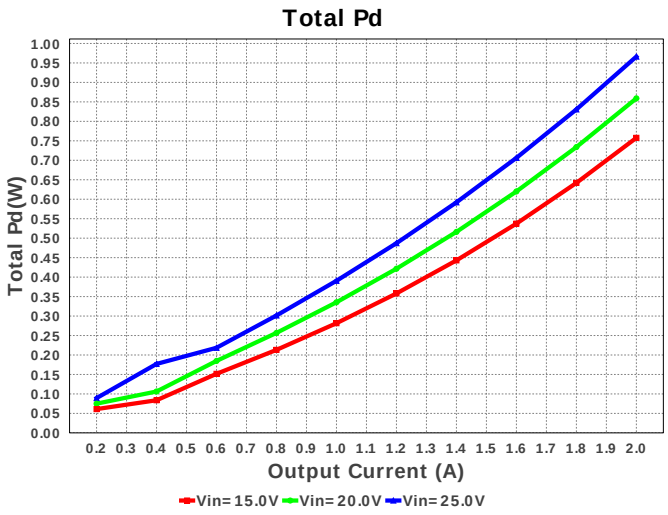


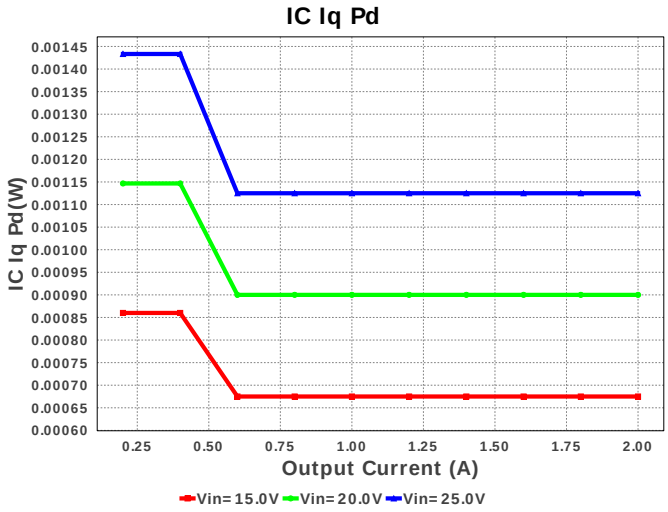


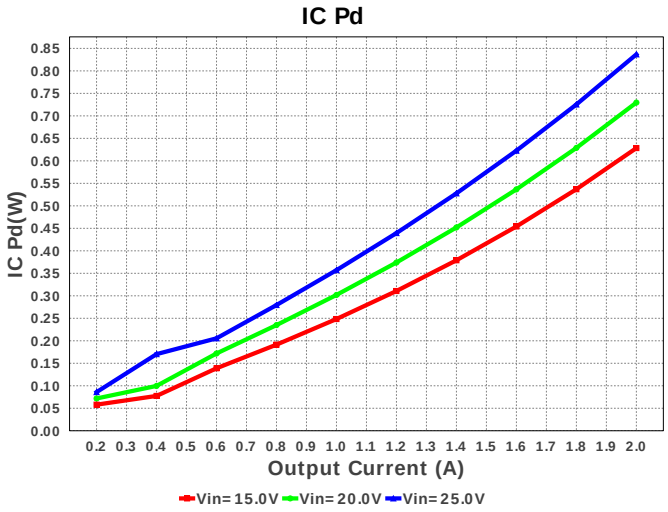


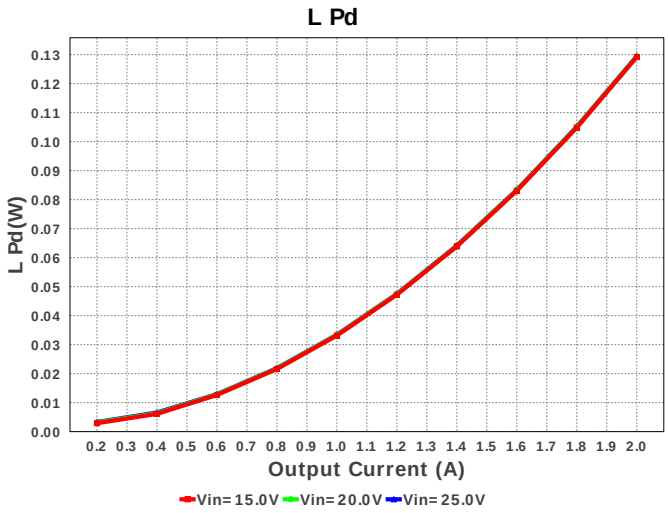


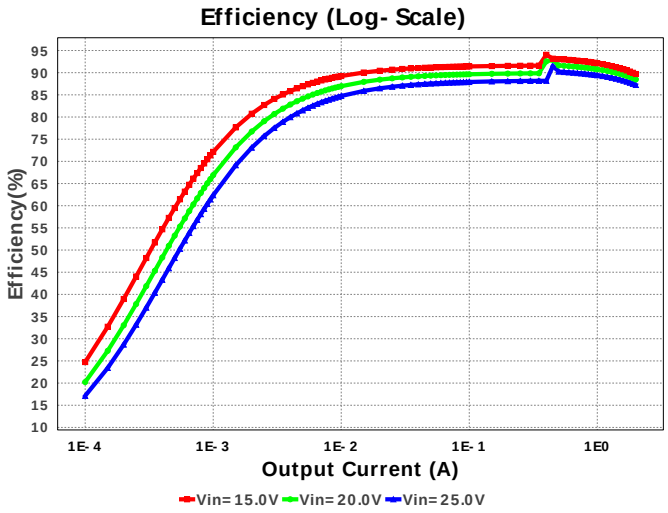












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	698.199 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	215.837 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.374 A	Current	Peak switch current in IC
4.	Iin Avg	302.65 mA	Current	Average input current
5.	L Ipp	747.68 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	10	General	Total Design BOM count
7.	FootPrint	321.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	400.0 kHz	General	Switching frequency
9.	Mode	CCM	General	PWM/PFM Mode
10.	Pout	6.6 W	General	Total output power
11.	Total BOM	$2.82	General	Total BOM Cost

#	Name	Value	Category	Description
12.	ICThetaJA Effective	60.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Vout Actual	3.305 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Duty Cycle	13.978 %	Op_point	Duty cycle
15.	Efficiency	87.229 %	Op_point	Steady state efficiency
16.	IC Tj	80.203 degC	Op_point	IC junction temperature
17.	IOUT_OP	2.0 A	Op_point	Iout operating point
18.	VIN_OP	25.0 V	Op_point	Vin operating point
19.	Vout p-p	3.475 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
21.	Cout Pd	34.116 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	1.125 mW	Power	IC Iq Pd
23.	IC Pd	836.718 mW	Power	IC power dissipation
24.	L Pd	129.491 mW	Power	Inductor power dissipation
25.	Total Pd	966.286 mW	Power	Total Power Dissipation
26.	Vout Tolerance	1.656 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	25.0	Maximum input voltage
3.	VinMin	15.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS54302	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54302** Product Folder : http://www.ti.com/product/TPS54302 : contains the data sheet and other resources.