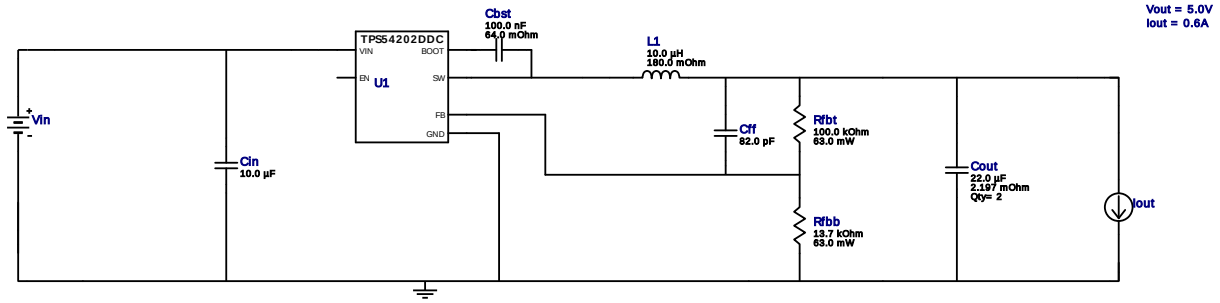
WEBENCH® Design Report

VinMin = 14.0V
VinMax = 22.0V
Vout = 5.0V
Iout = 0.6A

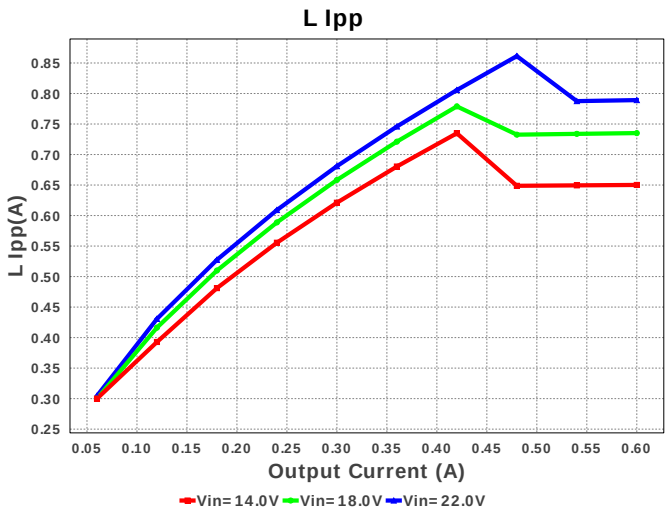
Device = TPS54202DDCR
Topology = Buck
Created = 8/4/16 1:24:57 AM
BOM Cost = $2.16
BOM Count = 9
Total Pd = 0.34W

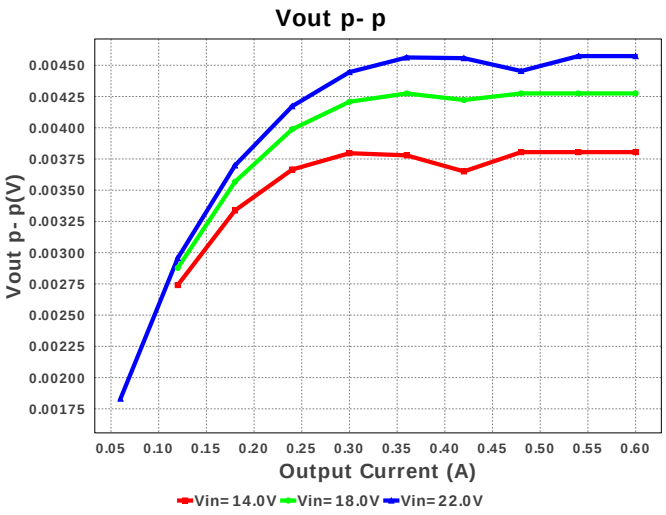
Design : 4743458/26 TPS54202DDCR
TPS54202DDCR 14.0V-22.0V to 5.00V @ 0.6A

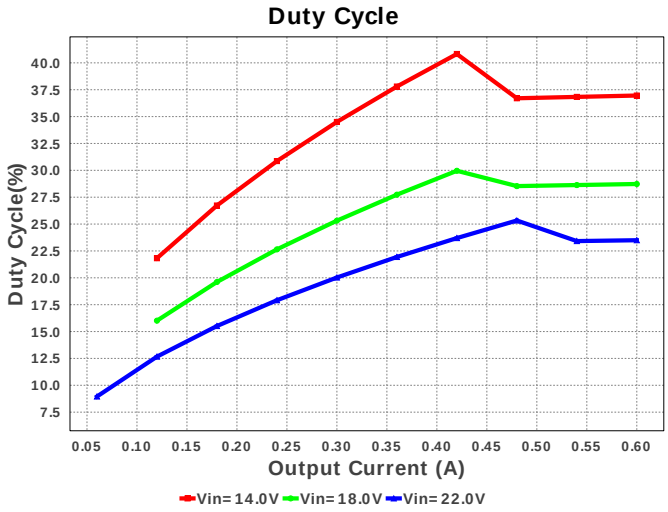


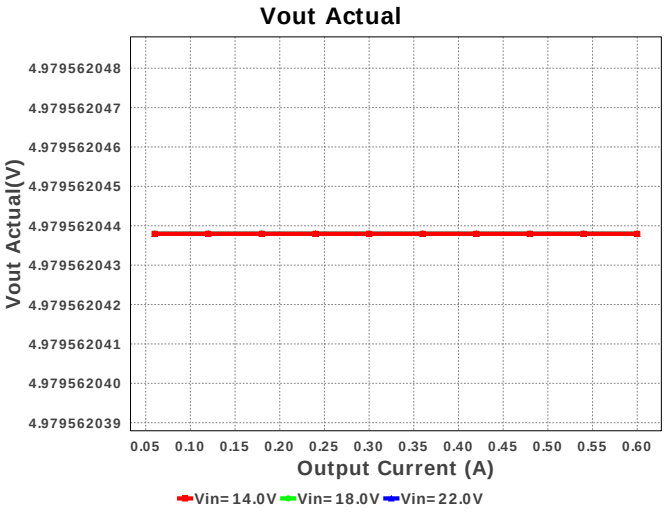
Electrical BOM

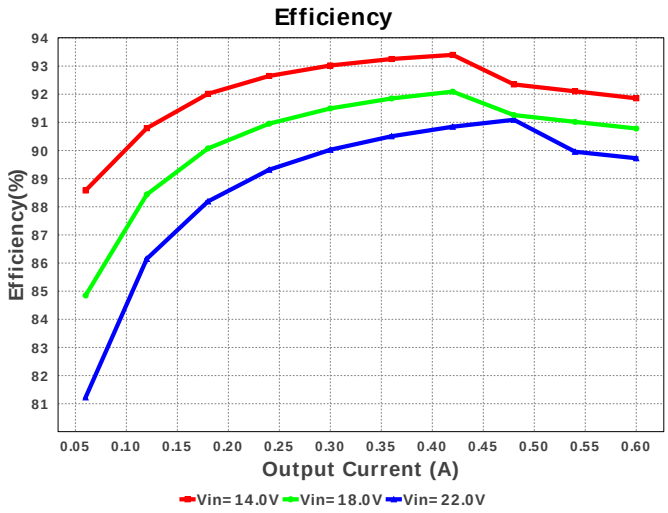
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Cff	TDK	C0603C0G1E820K030BA Series= C0G/NP0	Cap= 82.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
3.	Cin	MuRata	GRM32ER71J106KA12L 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	2	$0.50	1812 23 mm²
5.	L1	Coilcraft	LPS4018-103MRB	L= 10.0 µH DCR= 180.0 mOhm	1	$0.35	LPS4018 24 mm²
6.	Rfbb	Vishay-Dale	CRCW040213K7FKED Series= CRCW..e3	Res= 13.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 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	TPS54202DDCR	Switcher	1	$0.50	DDC0006A_N 10 mm²

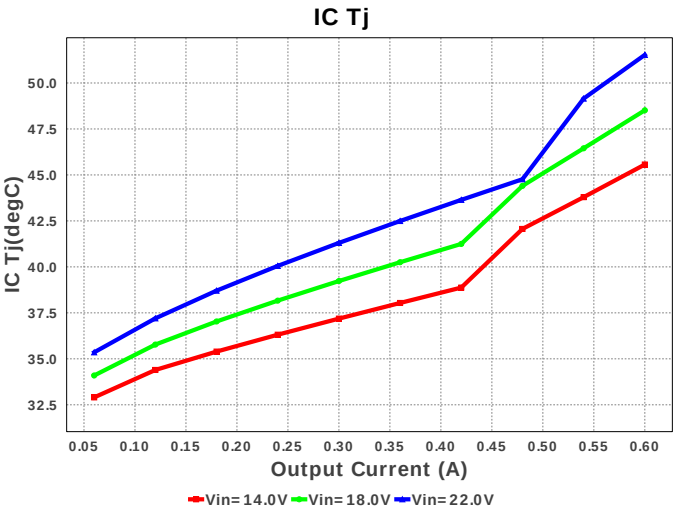


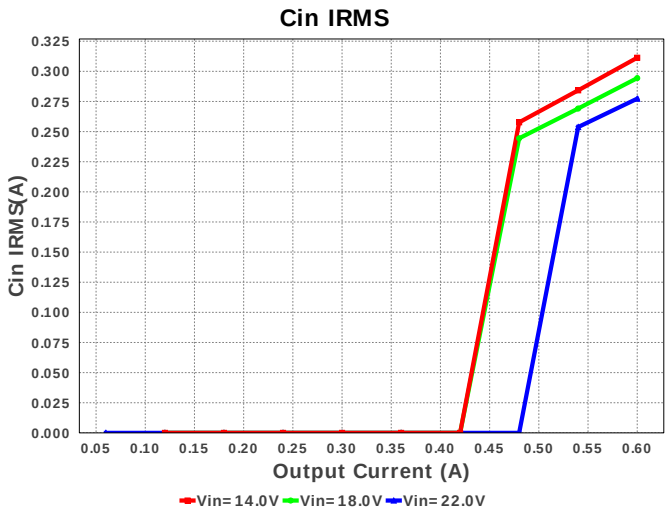


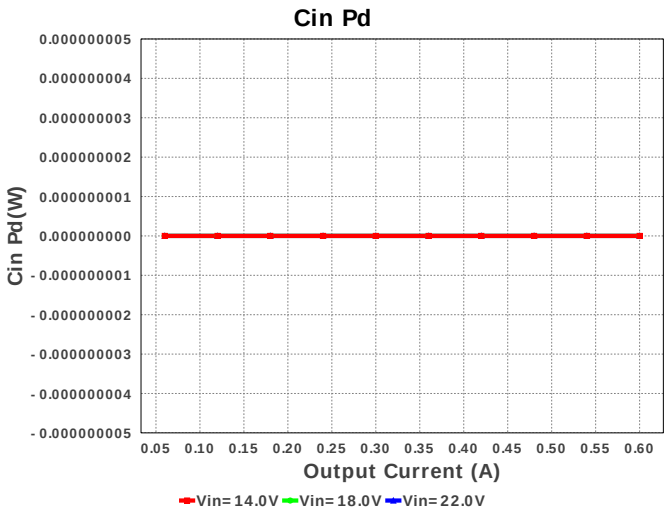


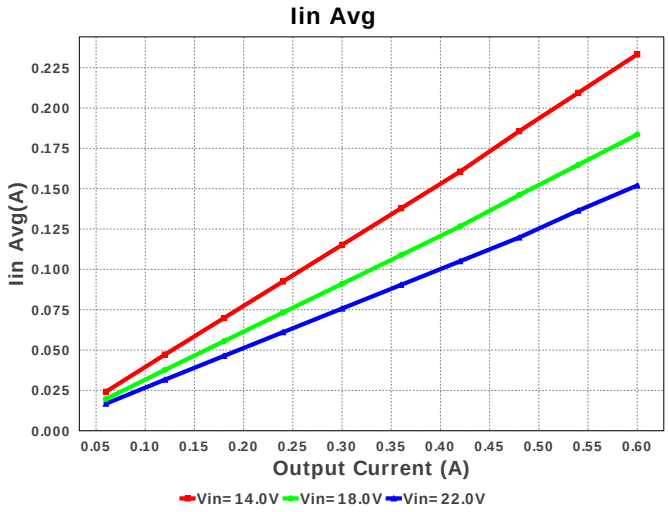


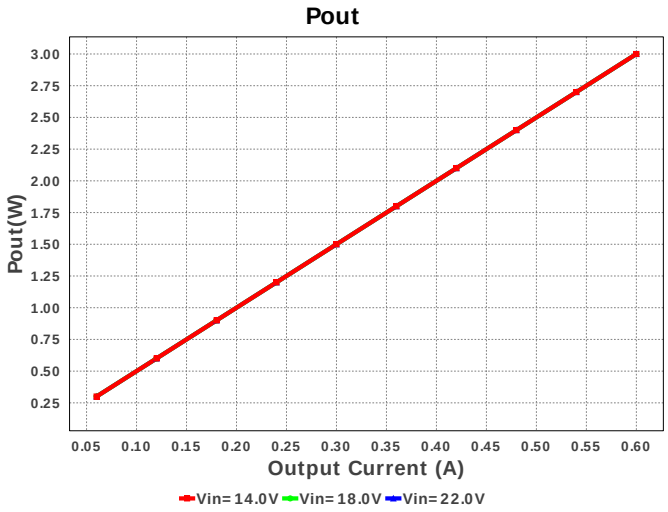


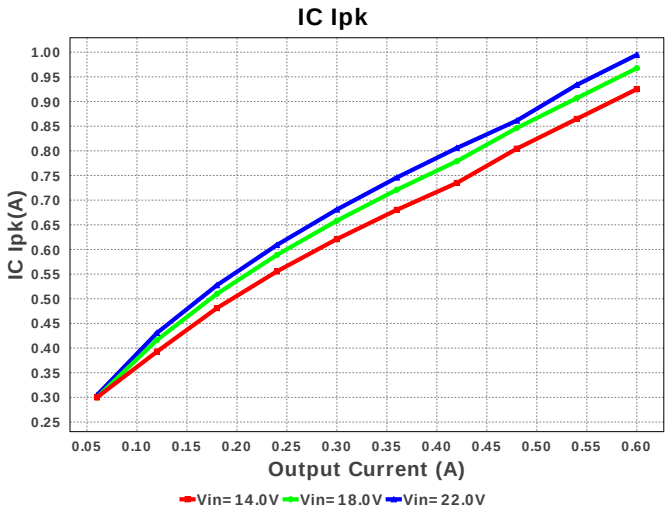


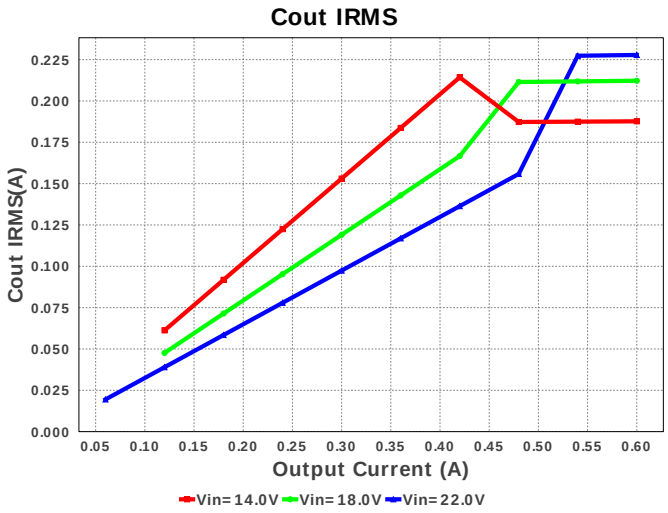


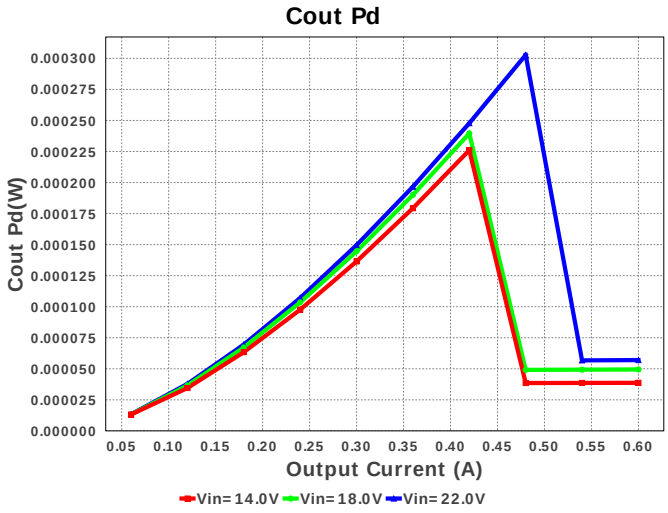


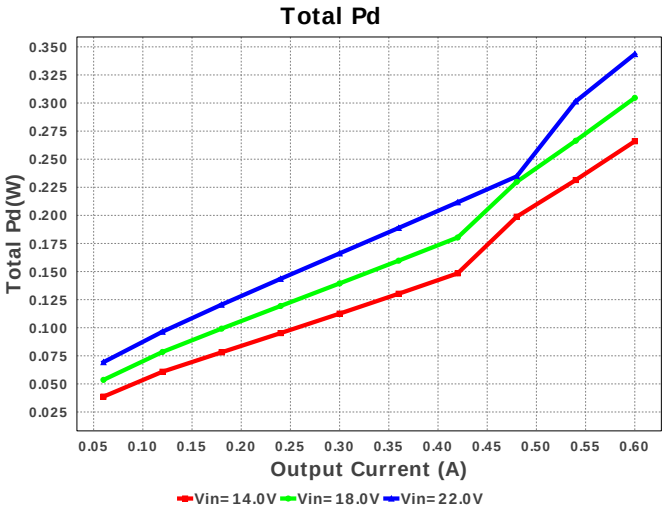


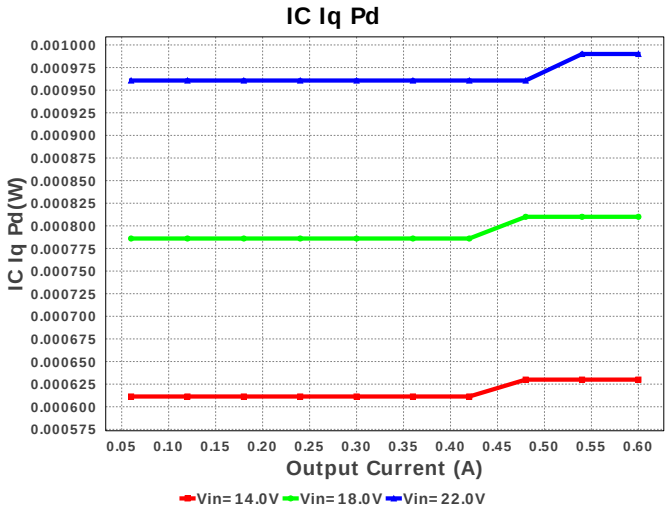


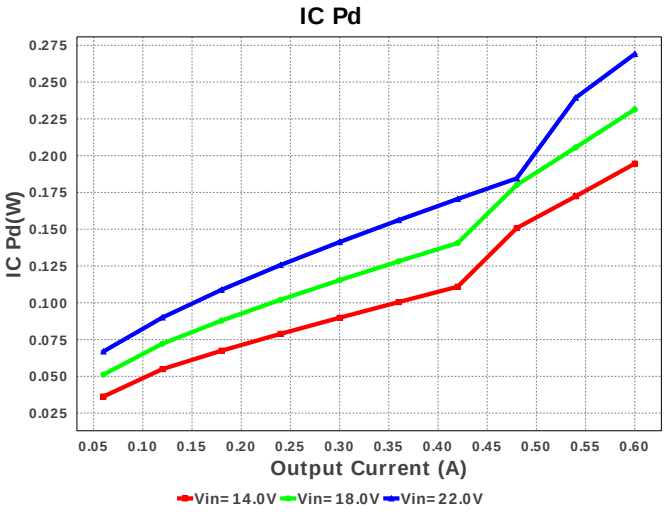


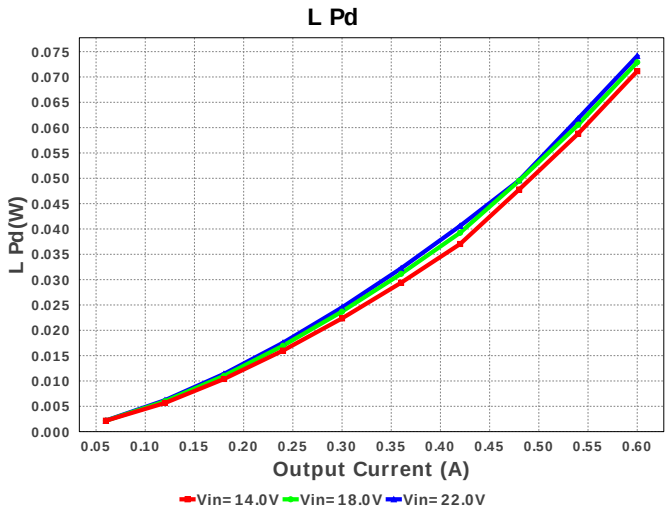


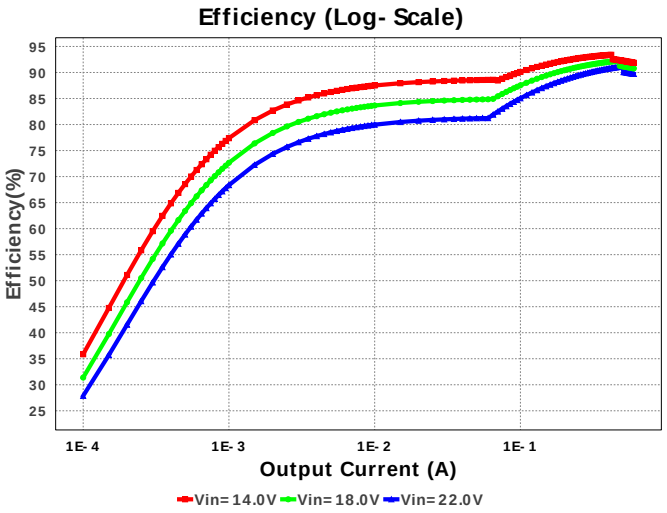












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	277.321 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	227.815 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	994.588 mA	Current	Peak switch current in IC
4.	Iin Avg	151.98 mA	Current	Average input current
5.	L Ipp	789.18 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	9	General	Total Design BOM count
7.	FootPrint	110.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	500.0 kHz	General	Switching frequency
9.	Pout	3.0 W	General	Total output power
10.	Total BOM	$2.16	General	Total BOM Cost
11.	ICThetaJA Effective	80.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance

#	Name	Value	Category	Description
12.	Vout Actual	4.98 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Duty Cycle	23.497 %	Op_point	Duty cycle
14.	Efficiency	89.725 %	Op_point	Steady state efficiency
15.	IC Tj	51.529 degC	Op_point	IC junction temperature
16.	IOUT_OP	600.0 mA	Op_point	Iout operating point
17.	VIN_OP	22.0 V	Op_point	Vin operating point
18.	Vout p-p	4.573 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
20.	Cout Pd	57.012 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	990.0 µW	Power	IC Iq Pd
22.	IC Pd	269.112 mW	Power	IC power dissipation
23.	L Pd	74.142 mW	Power	Inductor power dissipation
24.	Total Pd	343.551 mW	Power	Total Power Dissipation
25.	Vout Tolerance	1.777 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	600.0 m	Maximum Output Current
2.	VinMax	22.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54202	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54202** Product Folder : http://www.ti.com/product/TPS54202 : contains the data sheet and other resources.