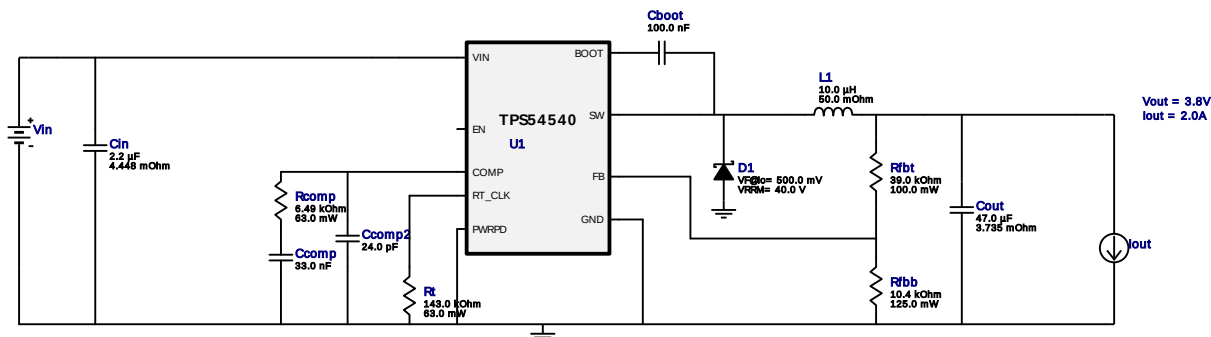


WEBENCH® Design Report

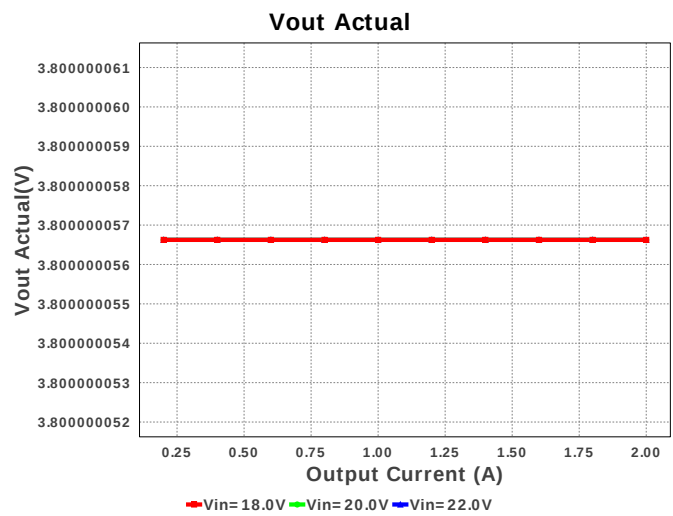
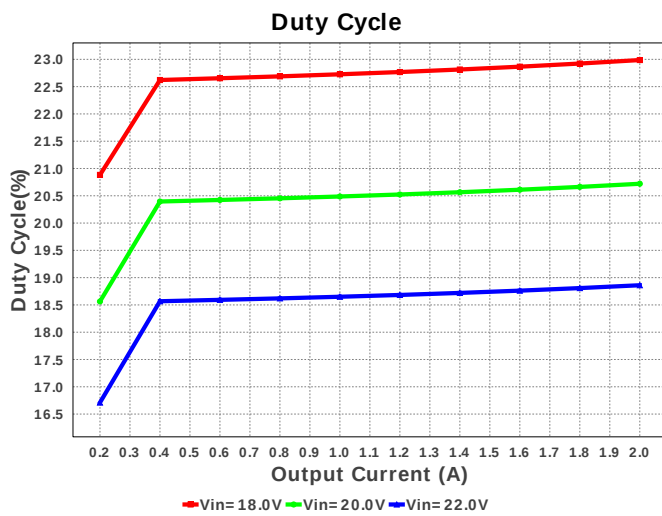
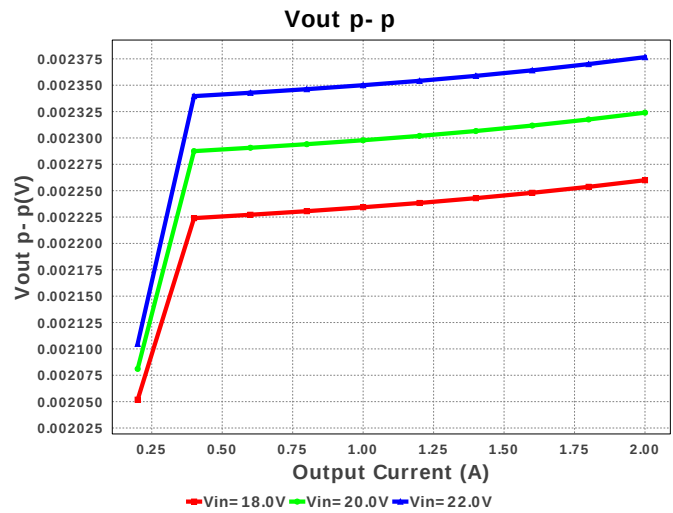
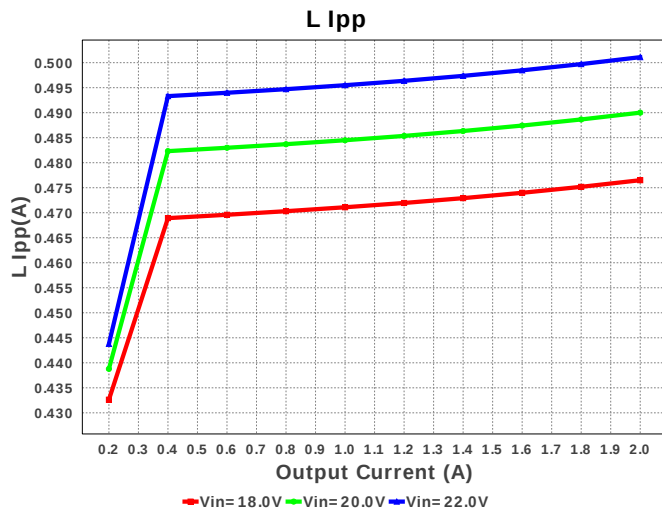
Design : 4794696/5 TPS54540DDAR
TPS54540DDAR 18.0V-22.0V to 3.80V @ 2.0A

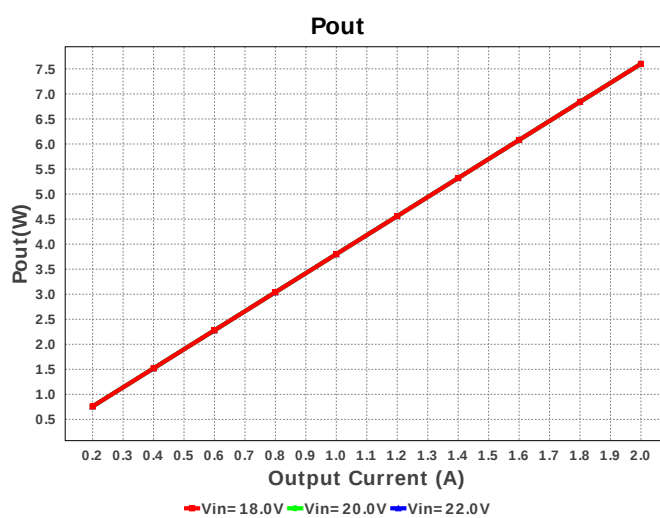
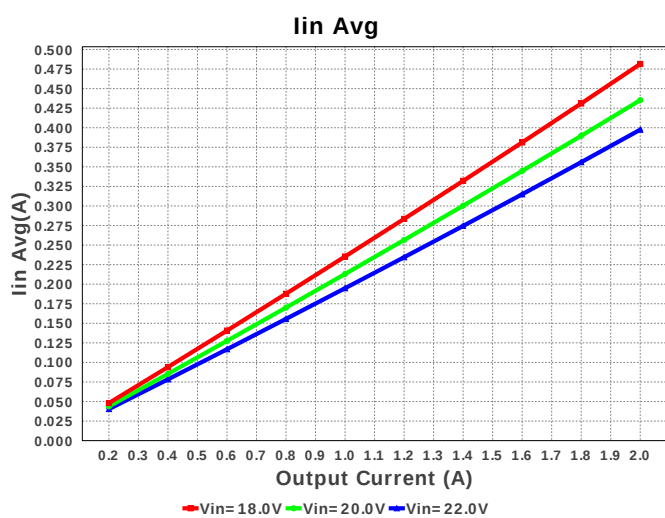
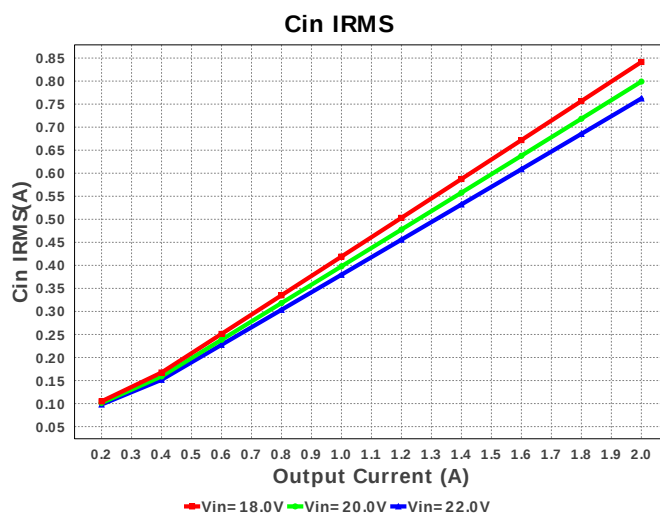
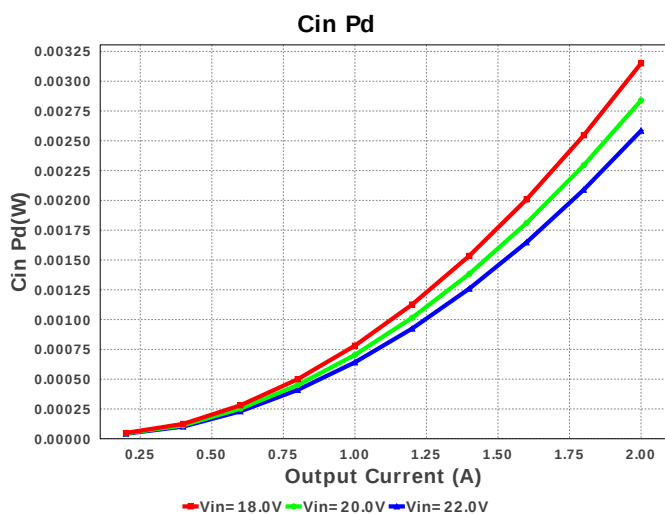
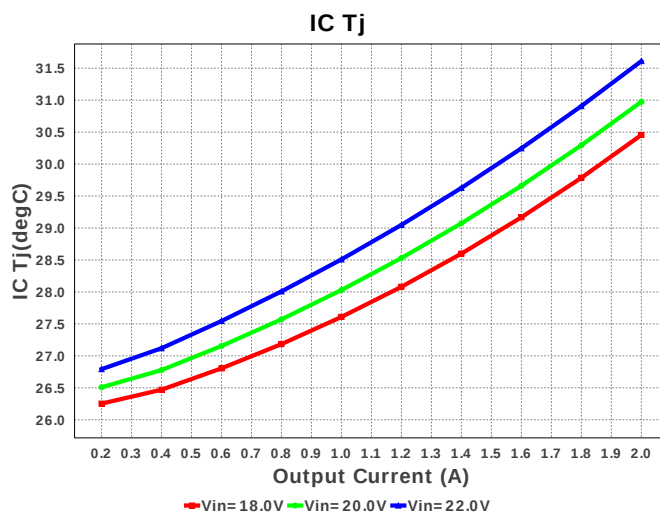
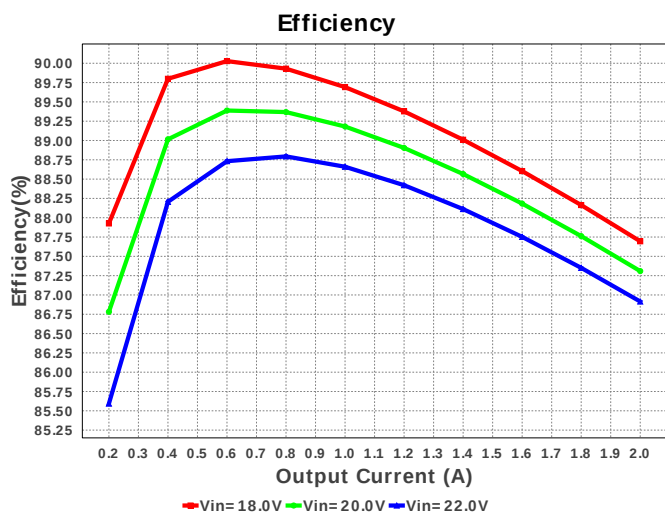


Electrical BOM

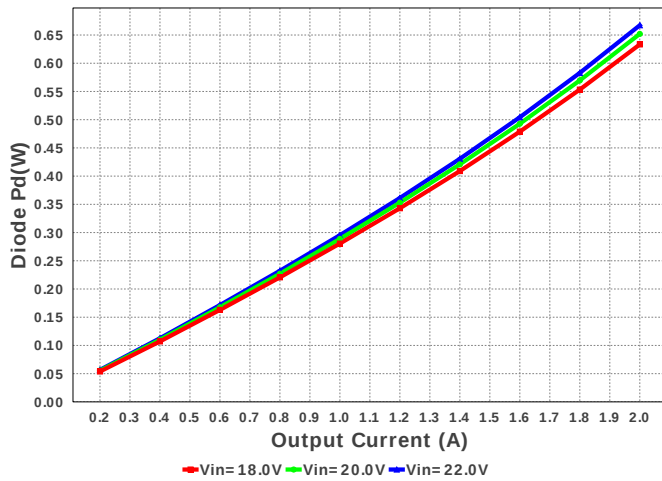
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	MuRata	GRM033R60J333KE01D Series= X5R	Cap= 33.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
3.	Ccomp2	Samsung Electro-Mechanics	CL21C240JBANNNC Series= C0G/NP0	Cap= 24.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
4.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	\$0.05	 1206_190 11 mm ²
5.	Cout	MuRata	GRM31CC80J476KE18L Series= X6S	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 6.3 V IRMS= 4.0522 A	1	\$0.10	 1206_190 11 mm ²
6.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMA 37 mm ²
7.	L1	Bourns	SRN8040-100M	L= 10.0 uH DCR= 50.0 mOhm	1	\$0.22	 SRN8040 100 mm ²
8.	Rcomp	Vishay-Dale	CRCW04026K49FKED Series= CRCW..e3	Res= 6.49 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rfbb	Yageo America	RT0805BRD0710K4L Series= RT0805	Res= 10.4 kOhm Power= 125.0 mW Tolerance= 0.1%	1	\$0.04	 0805 7 mm ²
10.	Rfht	Yageo America	RC0603FR-0739KL Series= ?	Res= 39.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
11.	Rt	Vishay-Dale	CRCW0402143KFKED Series= CRCW..e3	Res= 143.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	U1	Texas Instruments	TPS54540DDAR	Switcher	1	\$1.95	 R-PDSO-G8 55 mm ²

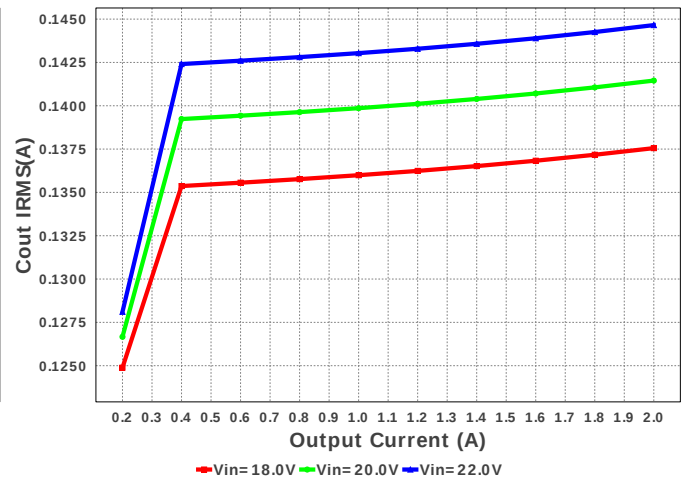




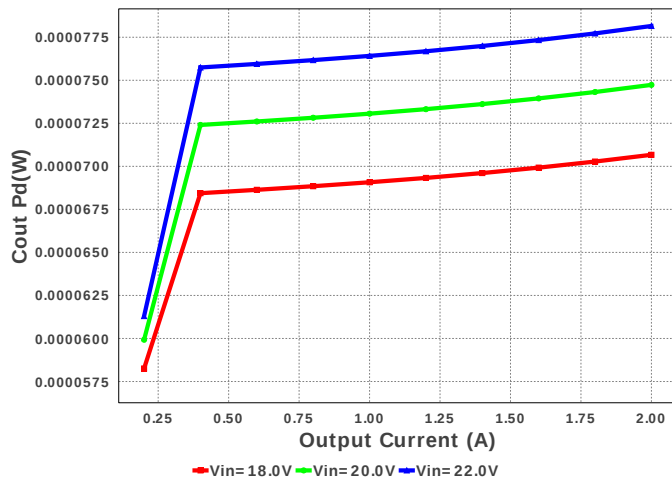
Diode Pd



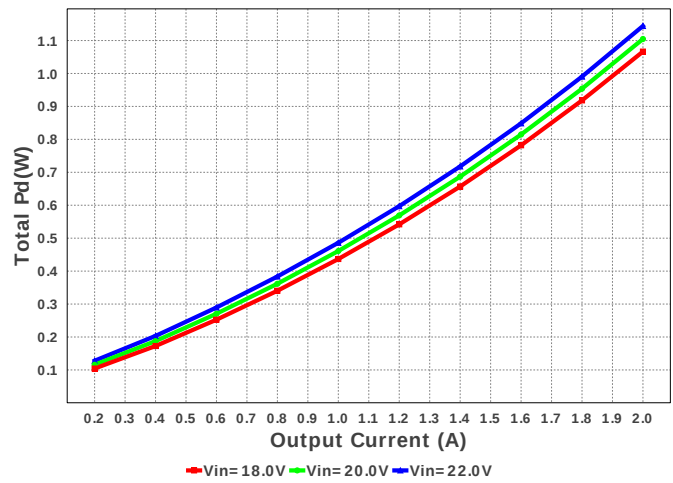
Cout IRMS



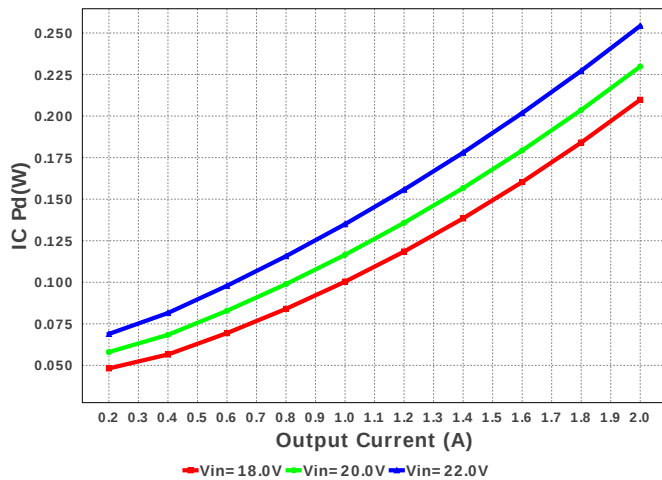
Cout Pd



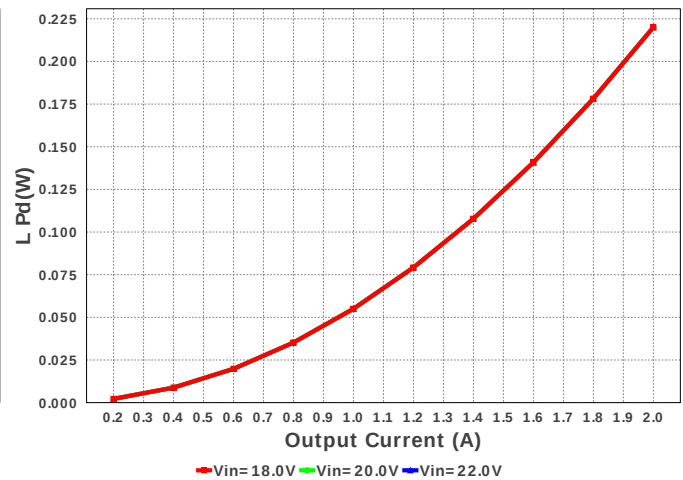
Total Pd

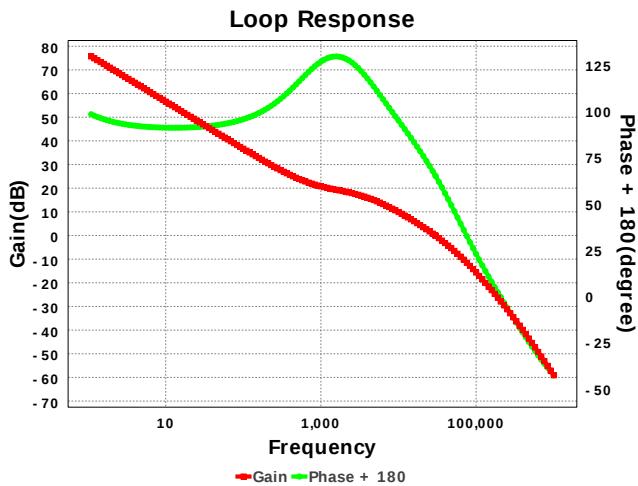


IC Pd



L Pd





Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	764.835 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	146.01 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	401.01 mA	Current	Average input current
4.	L Ipp	505.8 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	244.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	685.024 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	7.6 W	General	Total output power
10.	Total BOM	\$2.53	General	Total BOM Cost
11.	ICThetaJA Effective	26.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	75.692 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	3.8 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	3.8 V	Op_Point	Operational Output Voltage
15.	Cross Freq	29.732 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	19.037 %	Op_point	Duty cycle
17.	Efficiency	86.146 %	Op_point	Steady state efficiency
18.	Gain Marg	-27.796 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	31.629 degC	Op_point	IC junction temperature
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	Phase Marg	65.764 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	22.0 V	Op_point	Vin operating point
23.	Vout p-p	2.399 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	2.602 mW	Power	Input capacitor power dissipation
25.	Cout Pd	79.627 μ W	Power	Output capacitor power dissipation
26.	Diode Pd	744.594 mW	Power	Diode power dissipation
27.	IC Pd	254.968 mW	Power	IC power dissipation
28.	L Pd	220.0 mW	Power	Inductor power dissipation
29.	Total Pd	1.222 W	Power	Total Power Dissipation
30.	Vout Tolerance	1.878 %		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	22.0	Maximum input voltage
3.	VinMin	18.0	Minimum input voltage
4.	Vout	3.8	Output Voltage
5.	base_pn	TPS54540	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	25.0	Ambient temperature

Design Assistance

1. **TPS54540** Product Folder : <http://www.ti.com/product/TPS54540> : contains the data sheet and other resources.

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