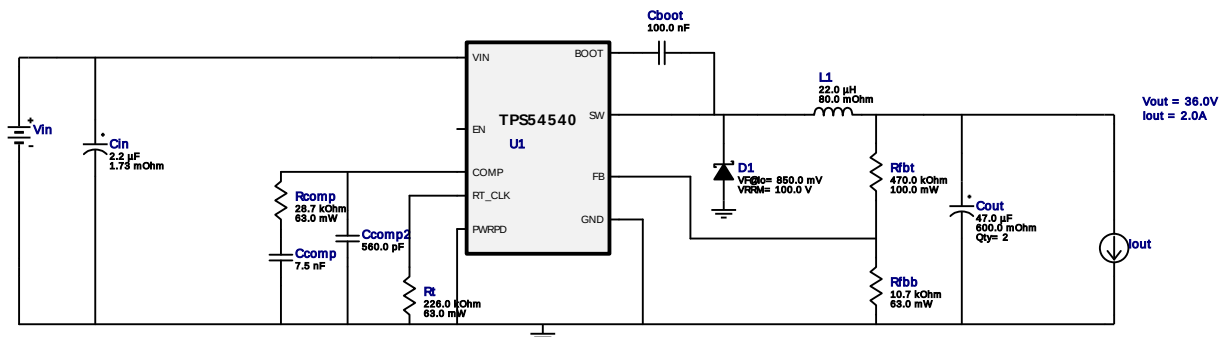


WEBENCH® Design Report

Design : 4738396/5 TPS54540DDAR
TPS54540DDAR 37.0V-42.0V to 36.00V @ 2.0A



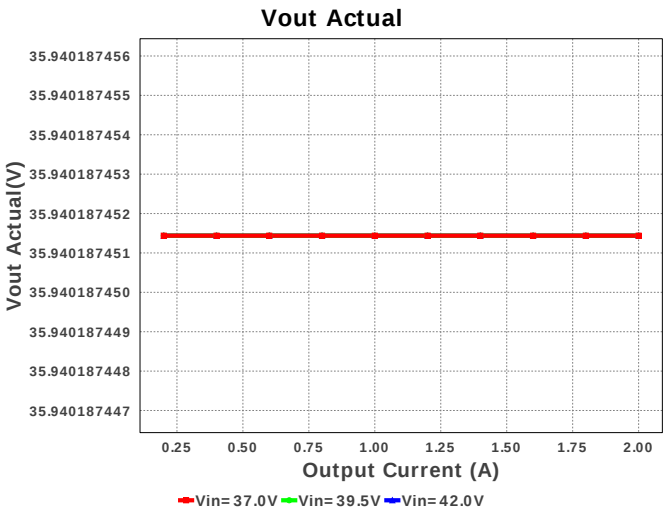
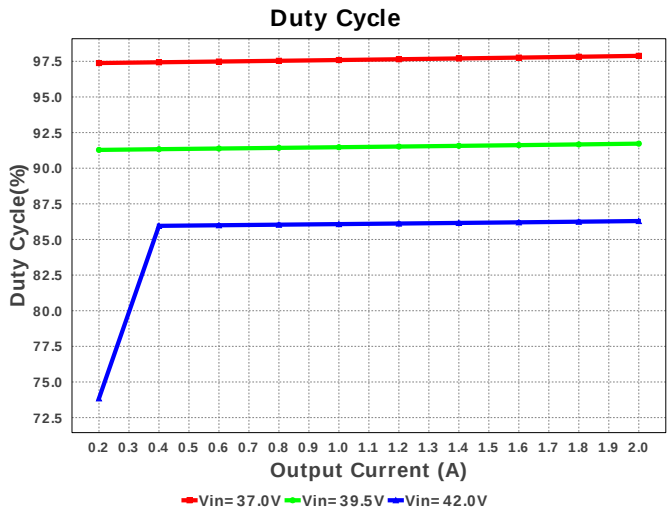
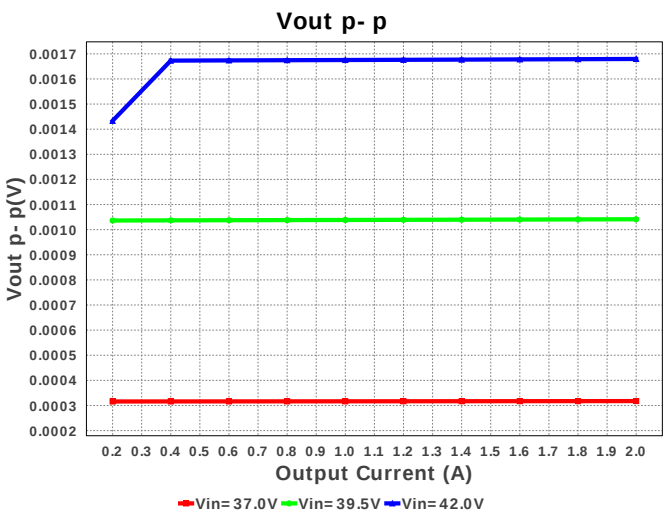
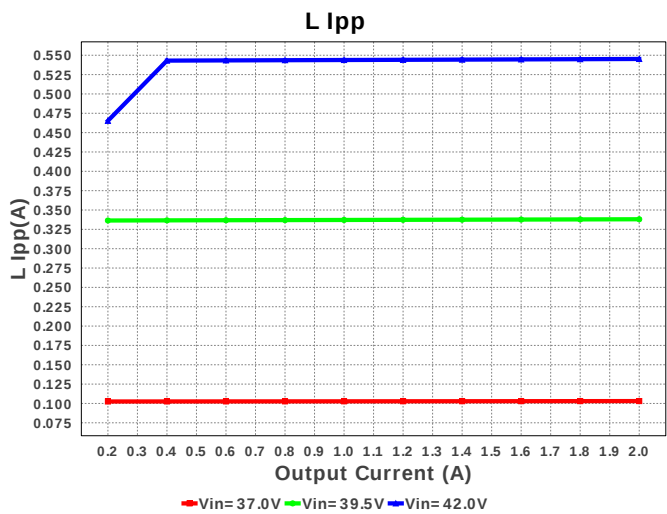
Electrical BOM

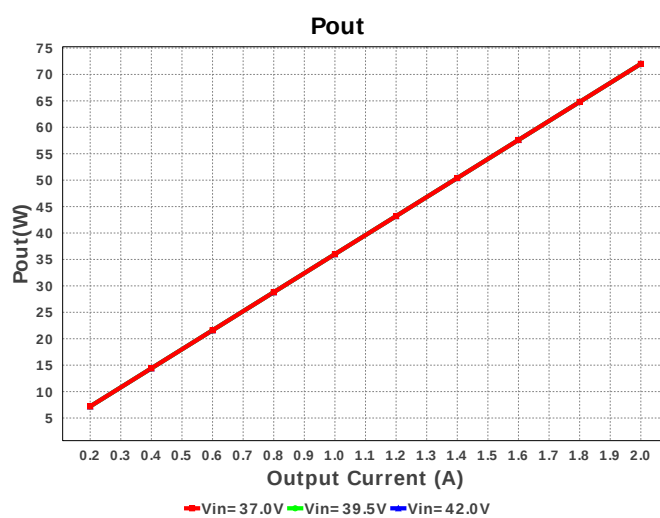
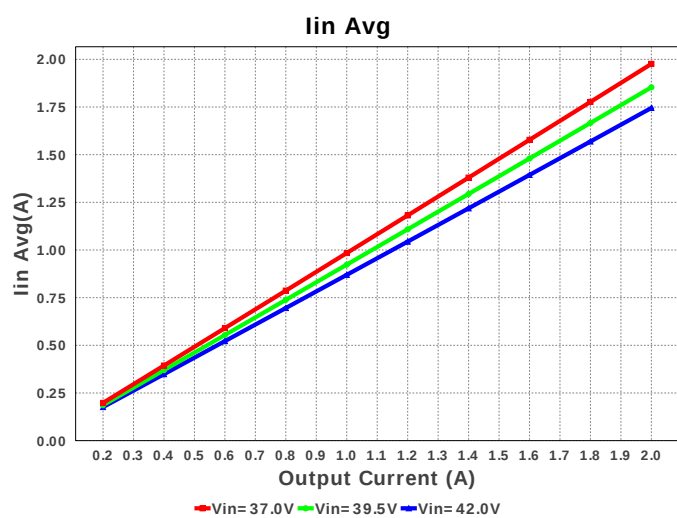
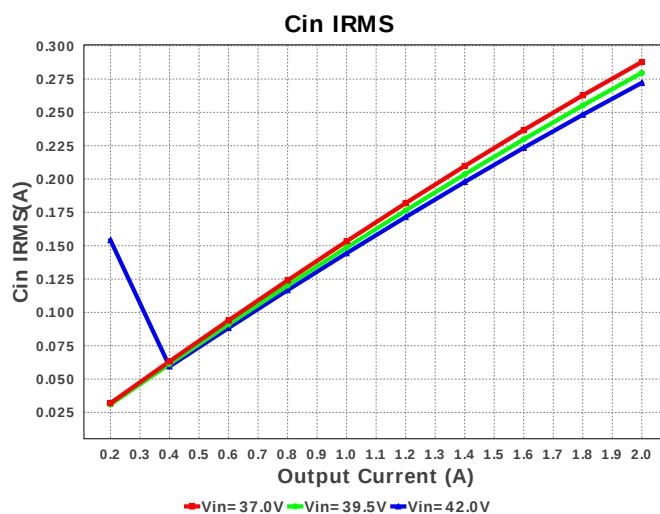
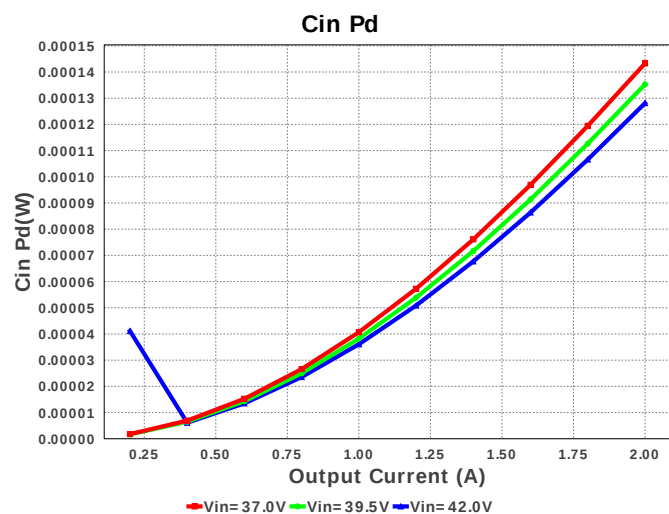
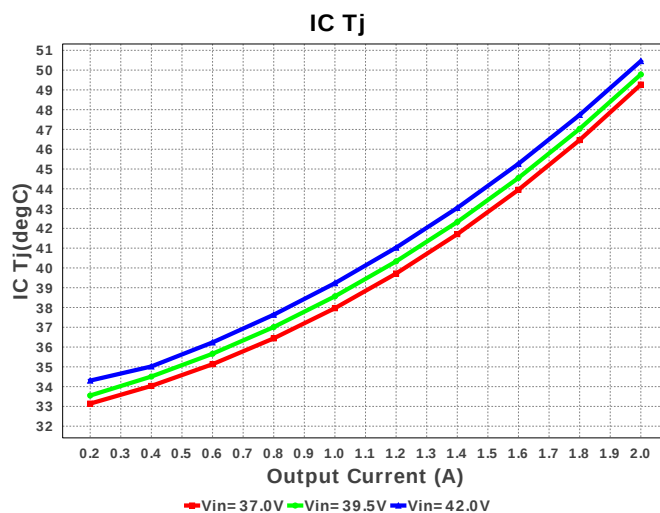
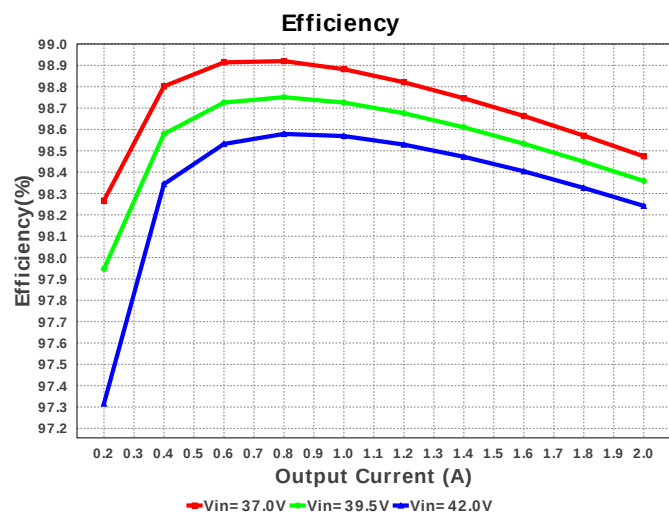
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	MuRata	GRM2195C1H752JA01D Series= C0G/NP0	Cap= 7.5 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.04	 0805 7 mm ²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB561 Series= X7R	Cap= 560.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
4.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 1.73 mOhm VDC= 100.0 V IRMS= 5.5932 A	1	\$0.19	 1210_250 15 mm ²
5.	Cout	Chemi-Con	EMVY500ADA470MF80G Series= MVY	Cap= 47.0 uF ESR= 600.0 mOhm VDC= 50.0 V IRMS= 170.0 mA	2	\$0.12	 CAPSMT_62_F80 74 mm ²
6.	D1	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	\$0.10	 SMA 37 mm ²
7.	L1	Bourns	SDR1105-220ML	L= 22.0 µH DCR= 80.0 mOhm	1	\$0.29	 SDR1105 157 mm ²
8.	Rcomp	Vishay-Dale	CRCW040228K7FKED Series= CRCW..e3	Res= 28.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rfbb	Vishay-Dale	CRCW040210K7FKED Series= CRCW..e3	Res= 10.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	Rfbb	Yageo America	RC0603FR-07470KL Series= ?	Res= 470.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
11.	Rt	Vishay-Dale	CRCW0402226KFKED Series= CRCW..e3	Res= 226.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

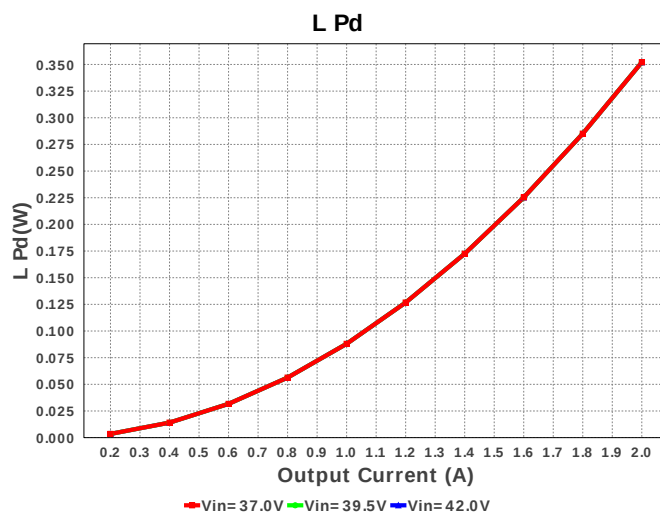
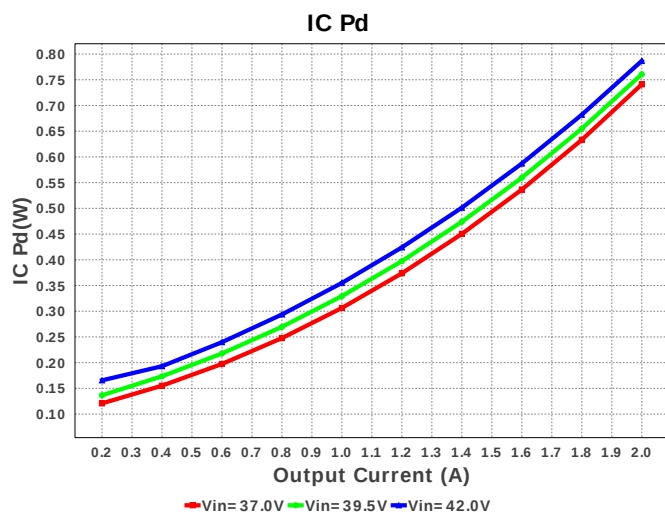
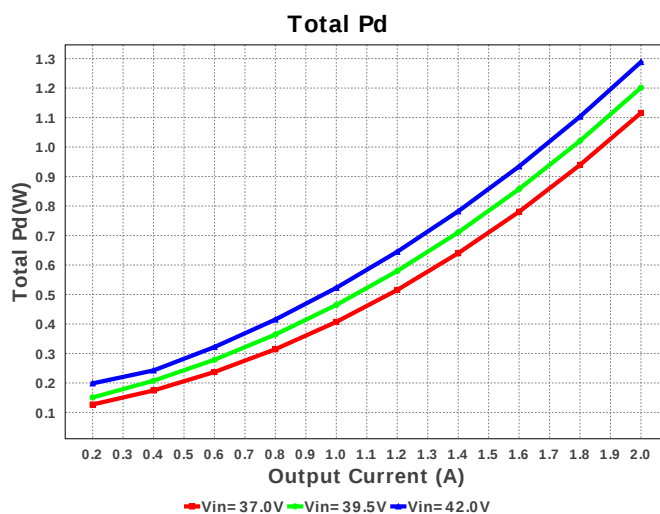
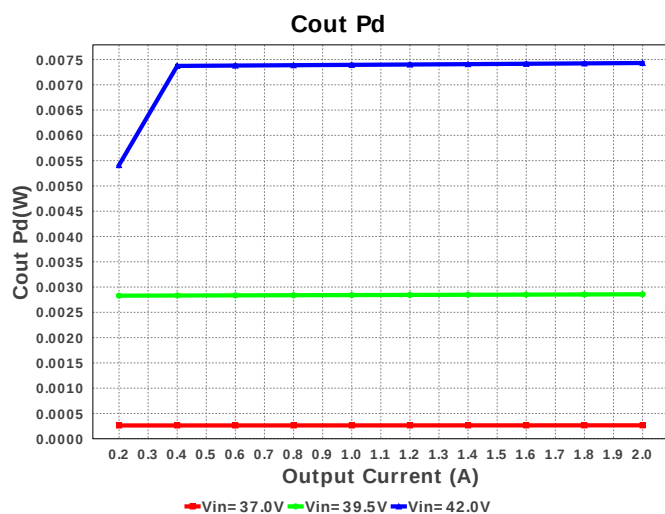
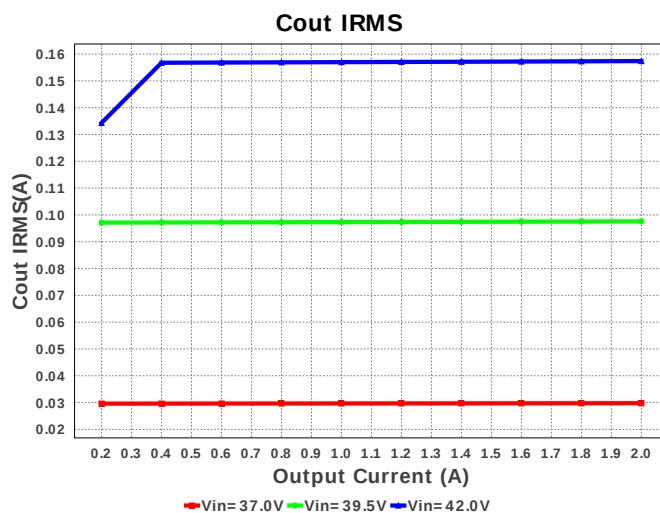
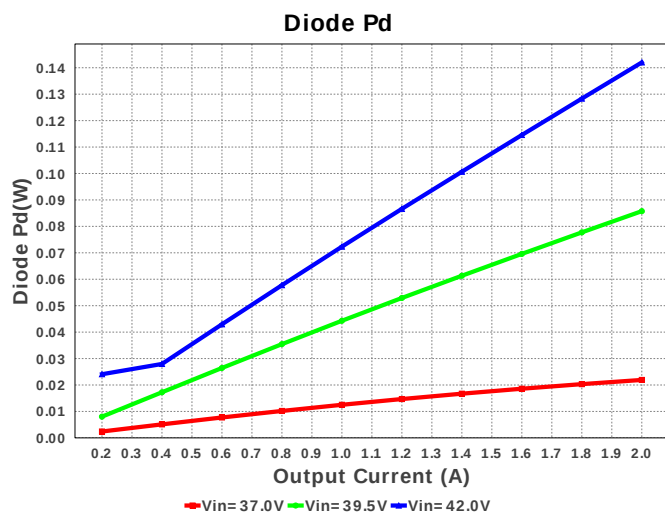
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	U1	Texas Instruments	TPS54540DDAR	Switcher	1	\$1.95	

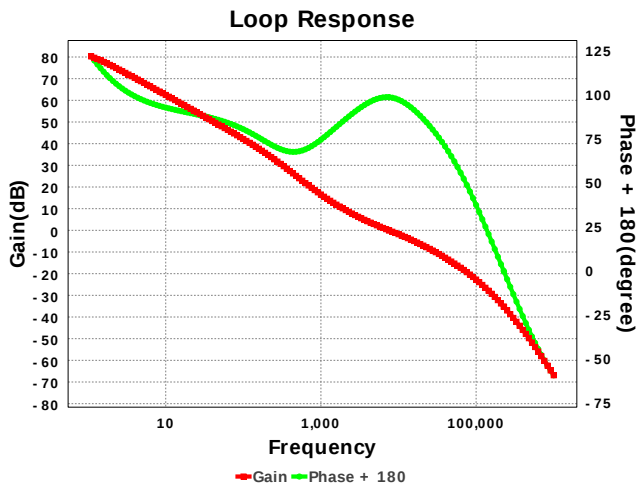


R-PDSO-G8 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	271.08 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	157.582 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.747 A	Current	Average input current
4.	L Ipp	545.88 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	13	General	Total Design BOM count
6.	FootPrint	445.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	431.663 kHz	General	Switching frequency
8.	Pout	72.0 W	General	Total output power
9.	Total BOM	\$2.87	General	Total BOM Cost
10.	ICThetaJA Effective	26.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Low Freq Gain	80.259 dB	Op_Point	Gain at 10Hz
12.	Vout Actual	35.94 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	36.0 V	Op_Point	Operational Output Voltage
14.	Cross Freq	7.523 kHz	Op_point	Bode plot crossover frequency
15.	Duty Cycle	86.4 %	Op_point	Duty cycle
16.	Efficiency	98.122 %	Op_point	Steady state efficiency
17.	Gain Marg	-35.153 dB	Op_point	Bode Plot Gain Margin
18.	IC Tj	50.468 degC	Op_point	IC junction temperature
19.	IOUT_OP	2.0 A	Op_point	Iout operating point
20.	Phase Marg	98.804 deg	Op_point	Bode Plot Phase Margin
21.	VIN_OP	42.0 V	Op_point	Vin operating point
22.	Vout p-p	1.682 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	127.128 μ W	Power	Input capacitor power dissipation
24.	Cout Pd	7.45 mW	Power	Output capacitor power dissipation
25.	Diode Pd	231.203 mW	Power	Diode power dissipation
26.	IC Pd	787.232 mW	Power	IC power dissipation
27.	L Pd	352.0 mW	Power	Inductor power dissipation
28.	Total Pd	1.378 W	Power	Total Power Dissipation
29.	Vout Tolerance	2.995 %		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	42.0	Maximum input voltage
3.	VinMin	37.0	Minimum input voltage
4.	Vout	36.0	Output Voltage
5.	base_pn	TPS54540	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	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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