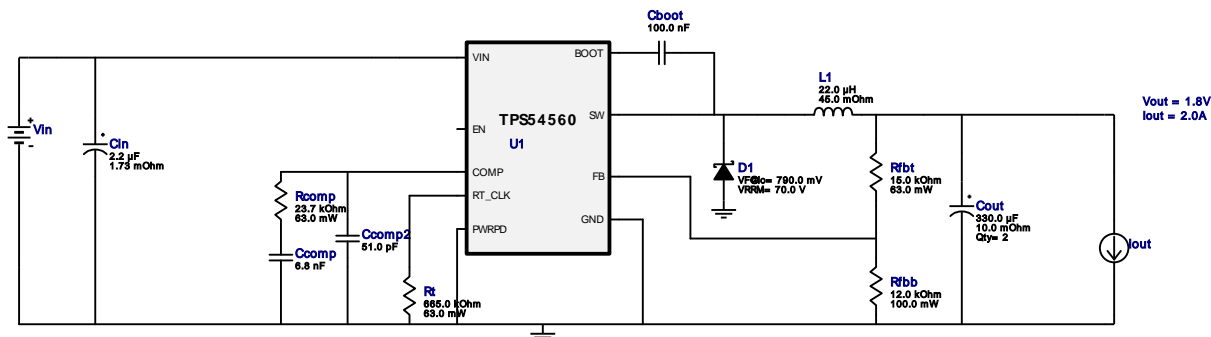


## WEBENCH® Design Report

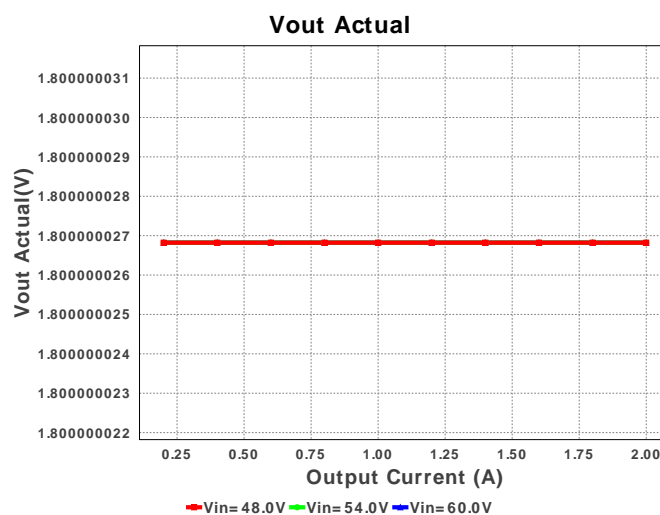
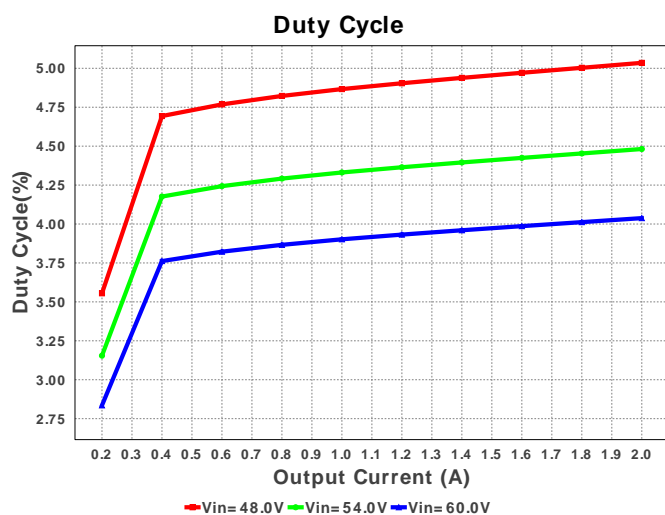
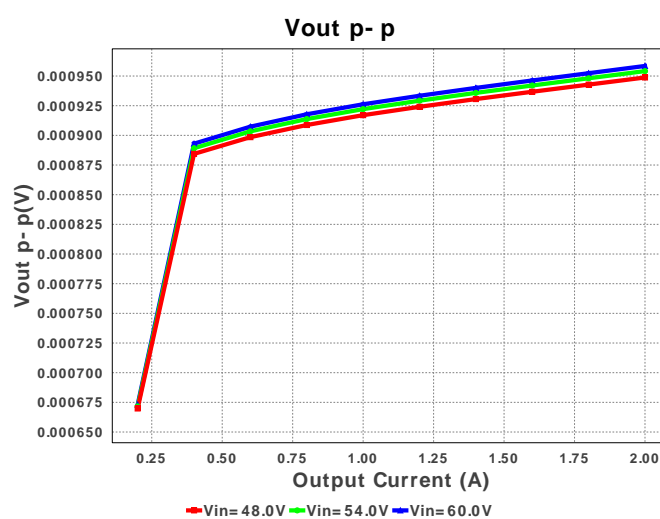
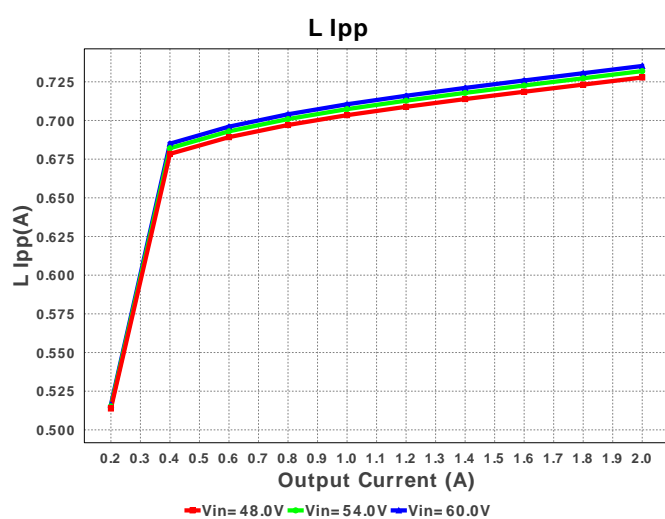
Design : 4466246/54 TPS54560DDAR  
TPS54560DDAR 48.0V-60.0V to 1.80V @ 2.0A

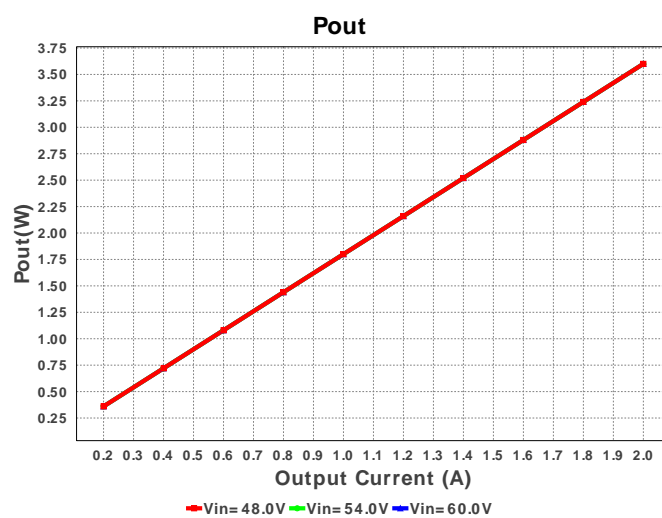
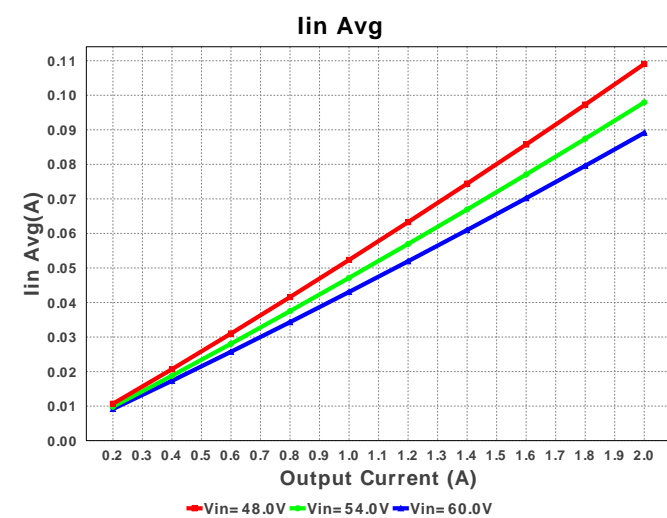
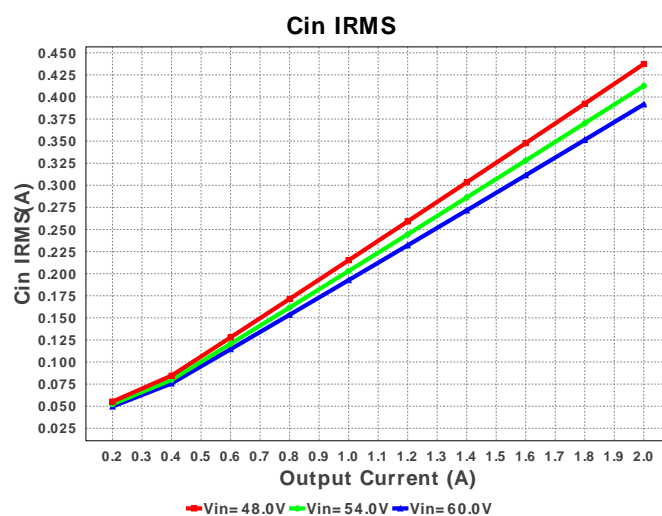
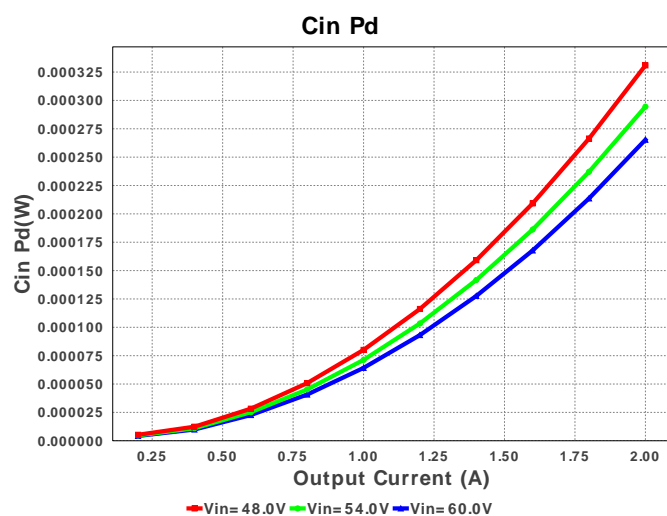
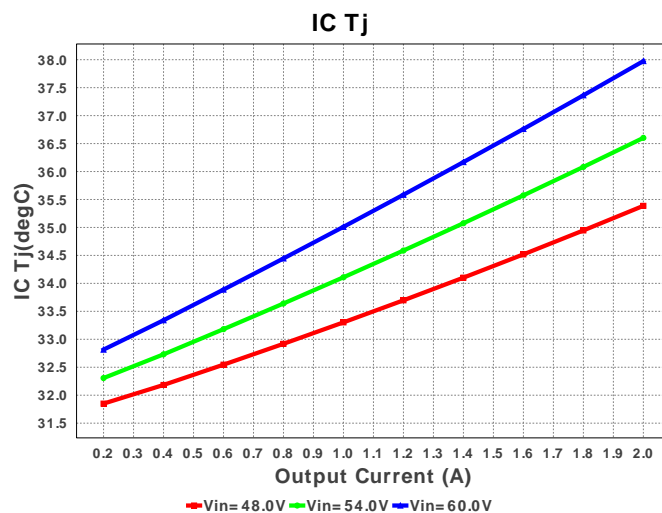
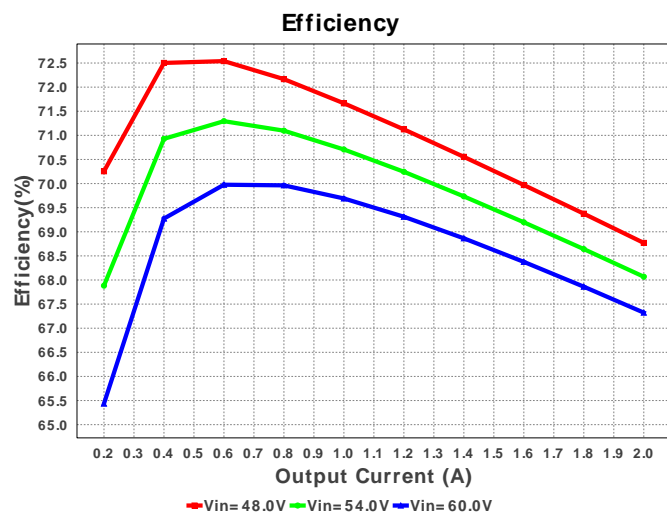


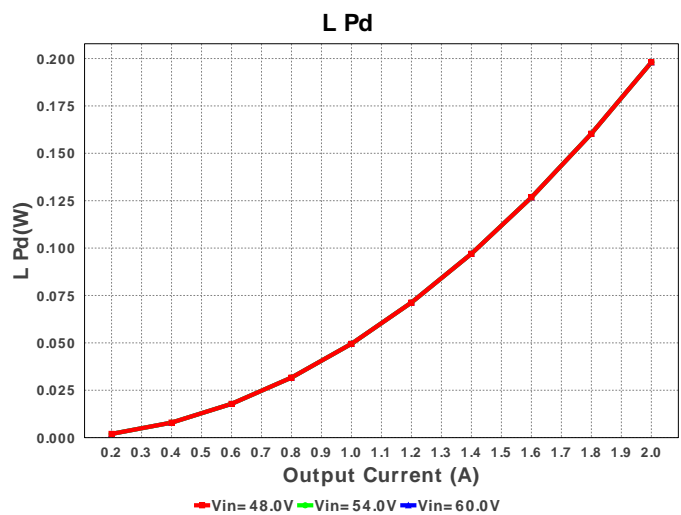
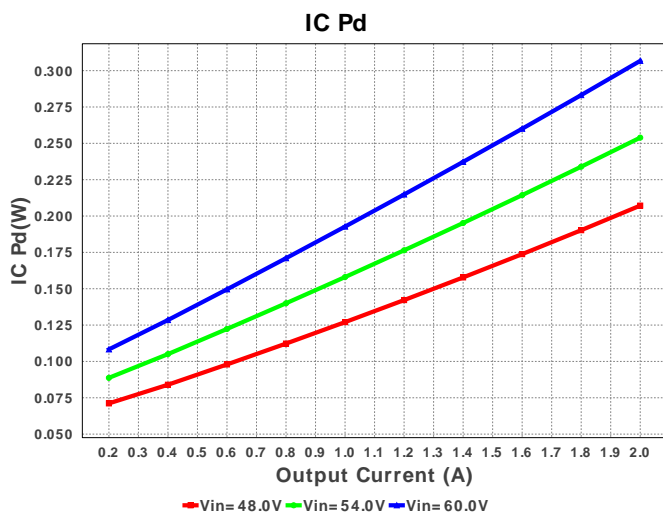
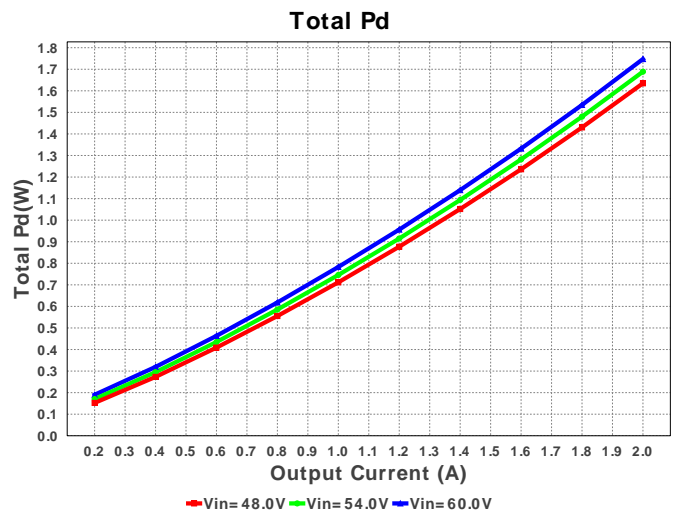
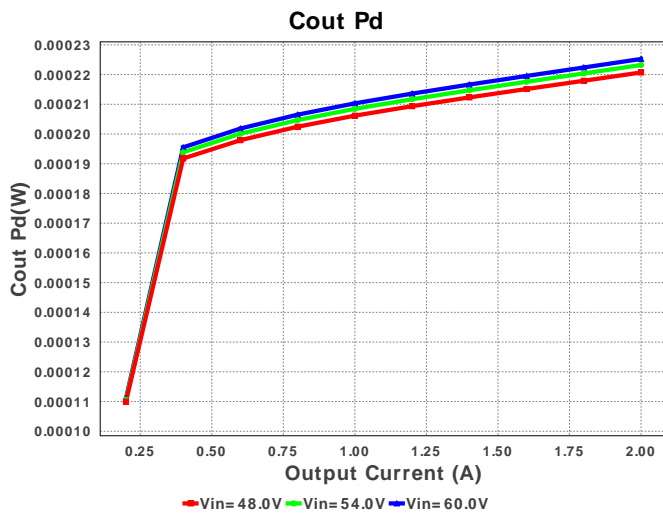
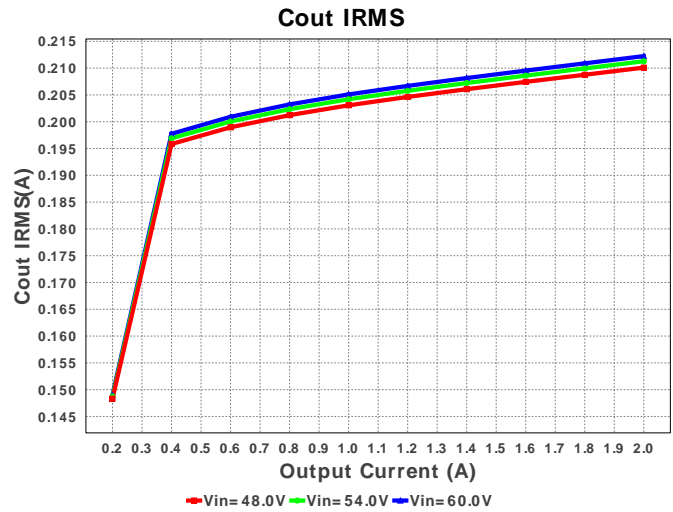
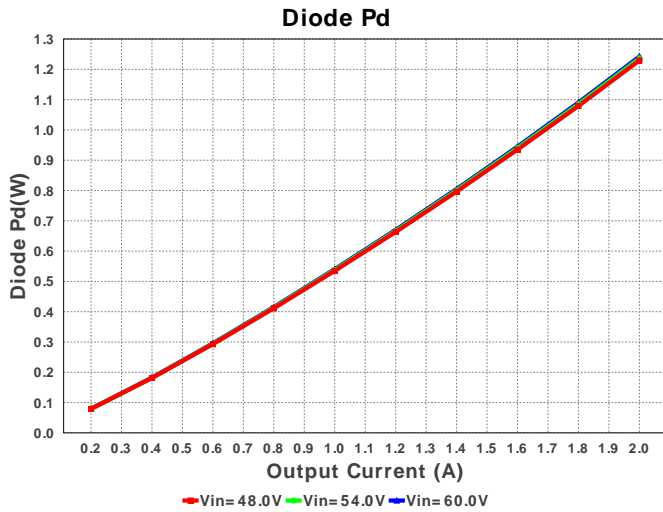
## Electrical BOM

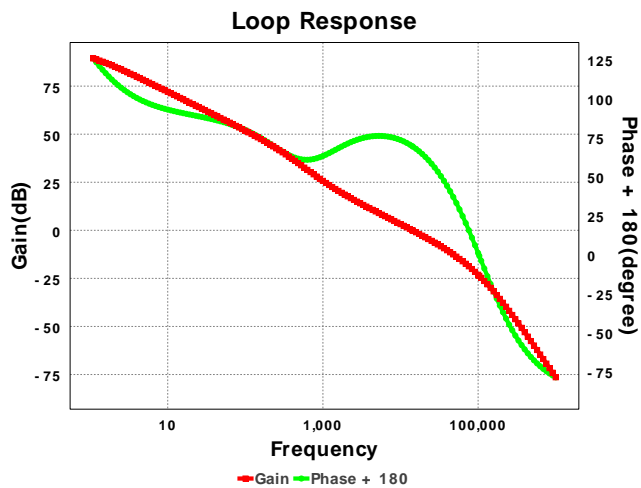
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
2.	Ccomp	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
3.	Ccomp2	Samsung Electro-Mechanics	CL21C510JBANNNC Series= C0G/NP0	Cap= 51.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
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 <sup>2</sup>
5.	Cout	Panasonic	2R5SVPE330MY Series= SVPE	Cap= 330.0 uF ESR= 10.0 mOhm VDC= 2.5 V IRMS= 3.86 A	2	\$0.22	 CAPSMT_62_E61 53 mm <sup>2</sup>
6.	D1	Diodes Inc.	B370-13-F	Vf@Io= 790.0 mV VRRM= 70.0 V	1	\$0.22	 SMC 83 mm <sup>2</sup>
7.	L1	Coilcraft	MSS1048-223MLB	L= 22.0 uH DCR= 45.0 mOhm	1	\$0.56	 MSS1048 146 mm <sup>2</sup>
8.	Rcomp	Vishay-Dale	CRCW040223K7FKED Series= CRCW..e3	Res= 23.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
9.	Rfbb	Yageo America	RC0603FR-0712KL Series= ?	Res= 12.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm <sup>2</sup>
10.	Rf1	Vishay-Dale	CRCW040215K0FKED Series= CRCW..e3	Res= 15.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
11.	Rt	Vishay-Dale	CRCW0402665KFKED Series= CRCW..e3	Res= 665.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	U1	Texas Instruments	TPS54560DDAR	Switcher	1	\$2.30	

R-PDSO-G8 57 mm<sup>2</sup>







## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	395.318 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	216.481 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	90.737 mA	Current	Average input current
4.	L Ipp	749.91 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	13	General	Total Design BOM count
6.	FootPrint	439.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
7.	Frequency	145.282 kHz	General	Switching frequency
8.	Pout	3.6 W	General	Total output power
9.	Total BOM	\$3.78	General	Total BOM Cost
10.	ICThetaJA Effective	26.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Low Freq Gain	89.402 dB	Op_Point	Gain at 10Hz
12.	Vout Actual	1.8 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	1.8 V	Op_Point	Operational Output Voltage
14.	Cross Freq	14.213 kHz	Op_point	Bode plot crossover frequency
15.	Duty Cycle	4.118 %	Op_point	Duty cycle
16.	Efficiency	66.125 %	Op_point	Steady state efficiency
17.	Gain Marg	-23.704 dB	Op_point	Bode Plot Gain Margin
18.	IC Tj	37.983 degC	Op_point	IC junction temperature
19.	IOUT_OP	2.0 A	Op_point	Iout operating point
20.	Phase Marg	70.147 deg	Op_point	Bode Plot Phase Margin
21.	VIN_OP	60.0 V	Op_point	Vin operating point
22.	Vout p-p	977.606 $\mu$ V	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	270.358 $\mu$ W	Power	Input capacitor power dissipation
24.	Cout Pd	234.32 $\mu$ W	Power	Output capacitor power dissipation
25.	Diode Pd	1.339 W	Power	Diode power dissipation
26.	IC Pd	307.047 mW	Power	IC power dissipation
27.	L Pd	198.0 mW	Power	Inductor power dissipation
28.	Total Pd	1.844 W	Power	Total Power Dissipation
29.	Vout Tolerance	2.134 %		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	60.0	Maximum input voltage
3.	VinMin	48.0	Minimum input voltage
4.	Vout	1.8	Output Voltage
5.	base_pn	TPS54560	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

## Design Assistance

1. **TPS54560** Product Folder : <http://www.ti.com/product/TPS54560> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

**You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.**

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).