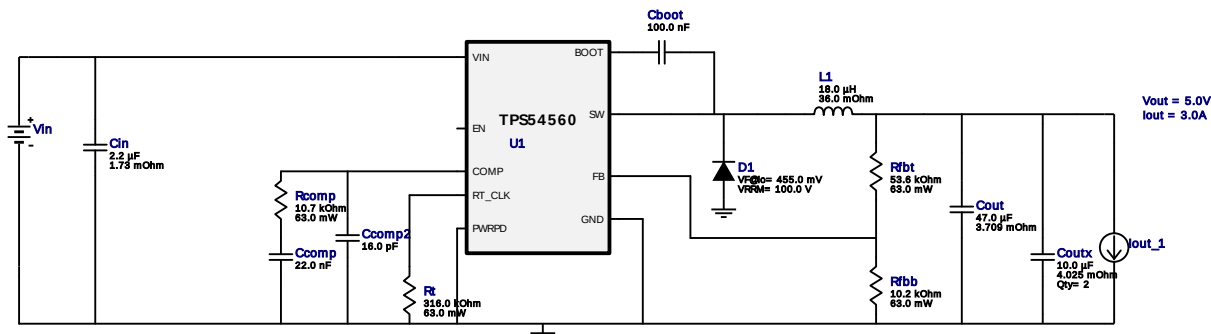


WEBENCH® Design Report

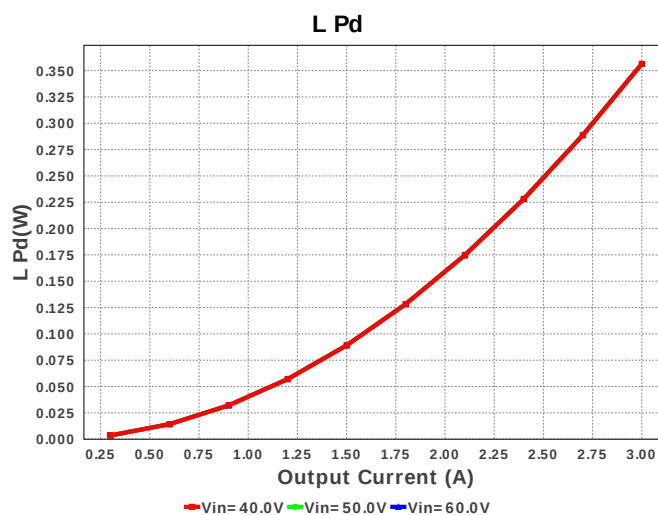
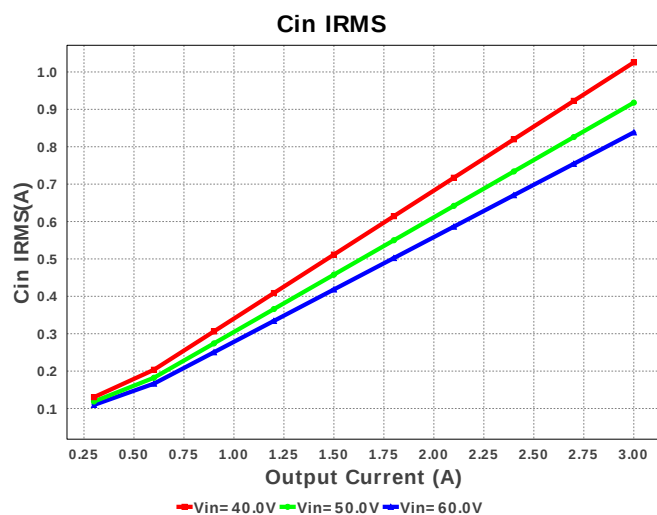
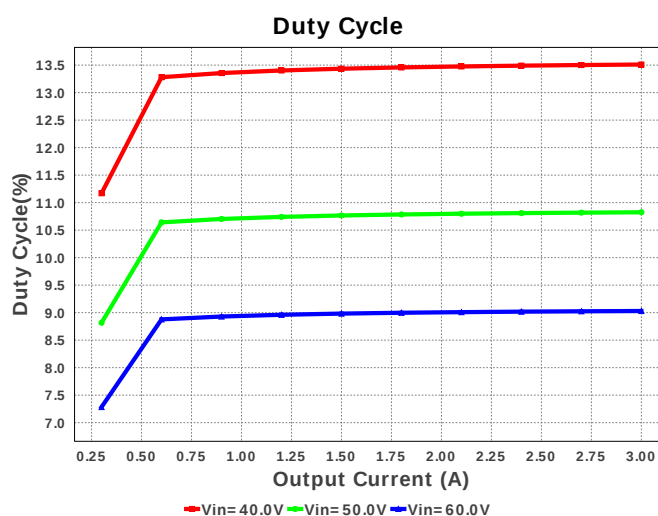
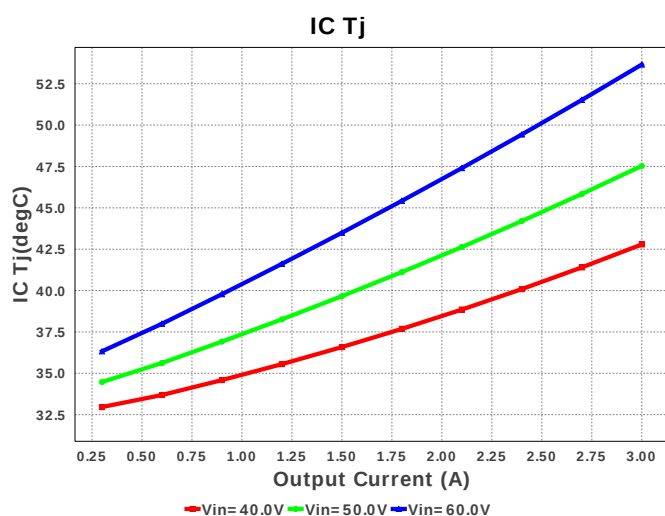
Design : 4161985/23 TPS54560DDAR
TPS54560DDAR 40.0V-60.0V to 5.00V @ 3.0A

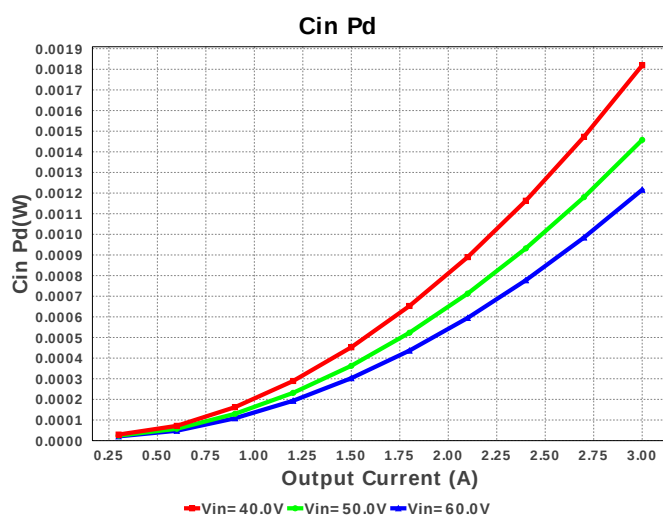
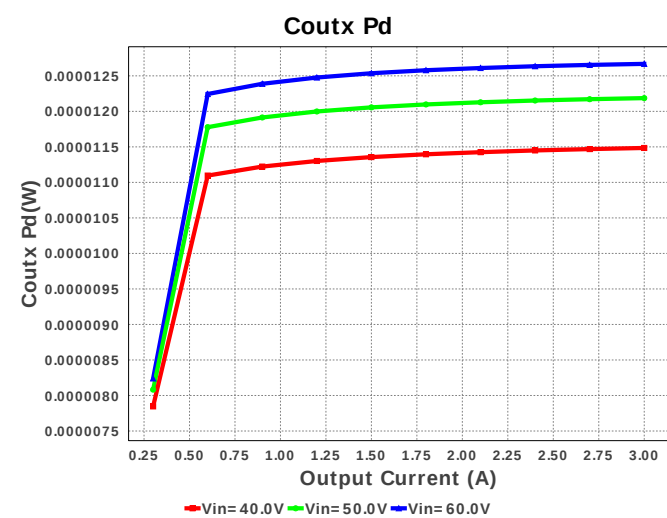
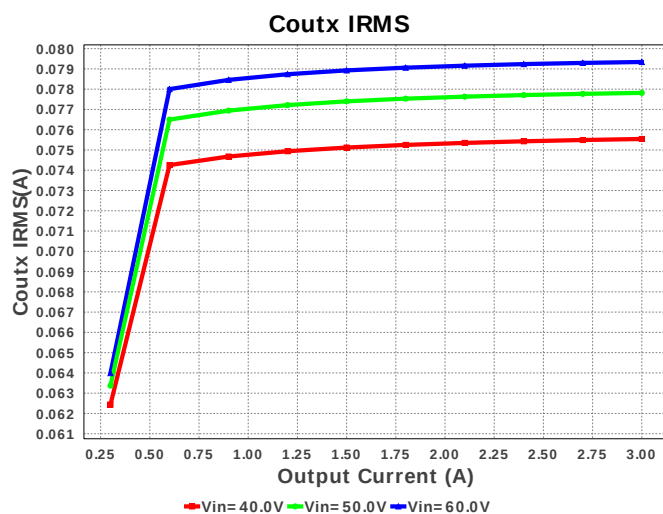
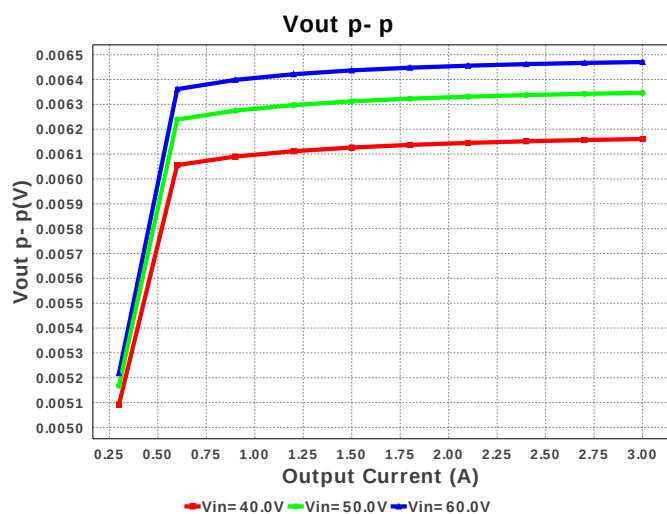
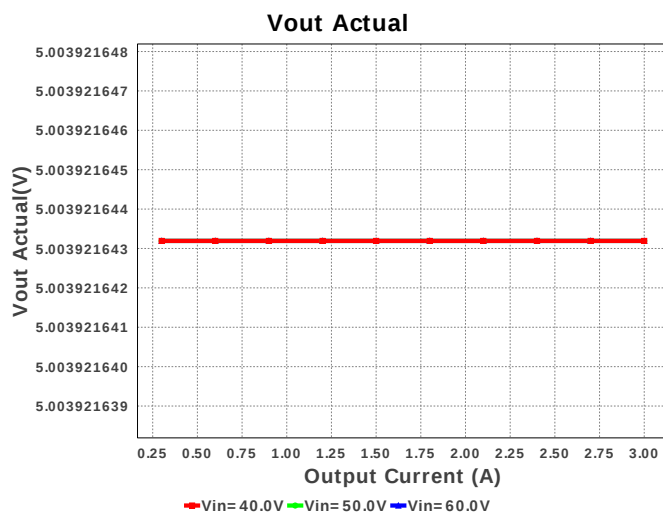
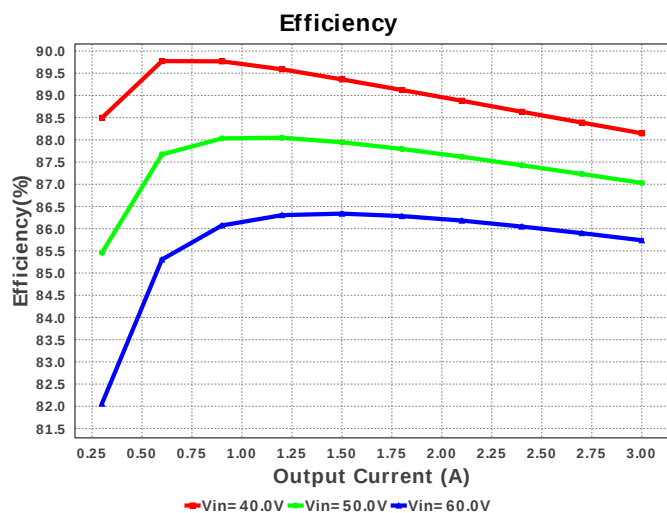


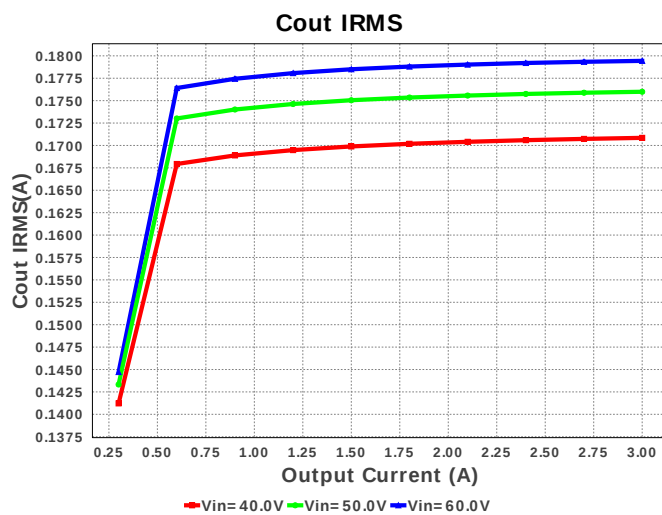
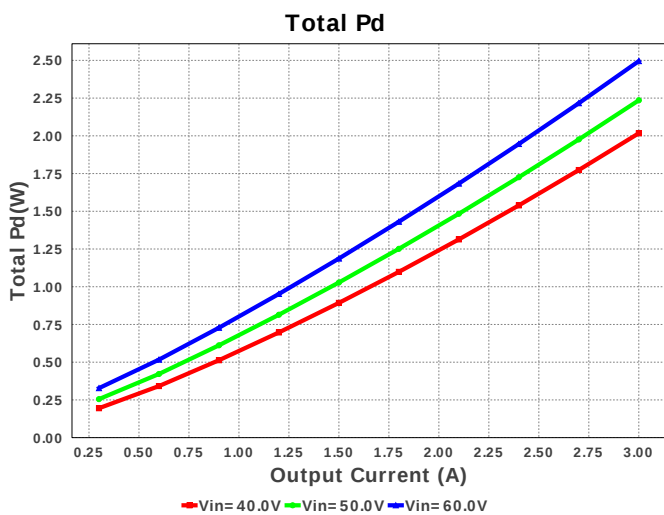
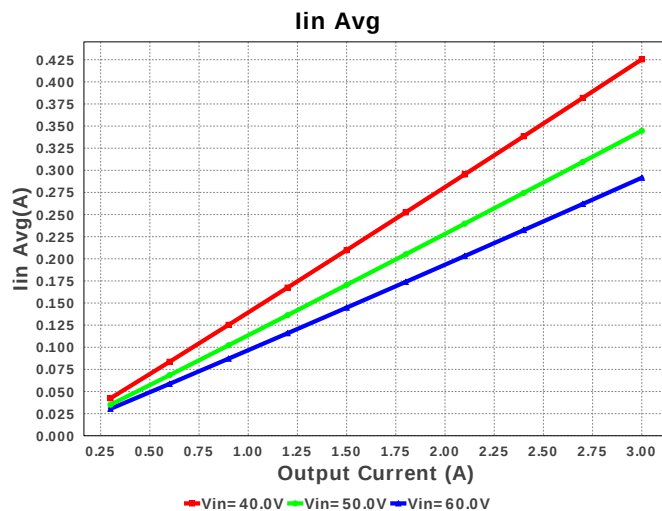
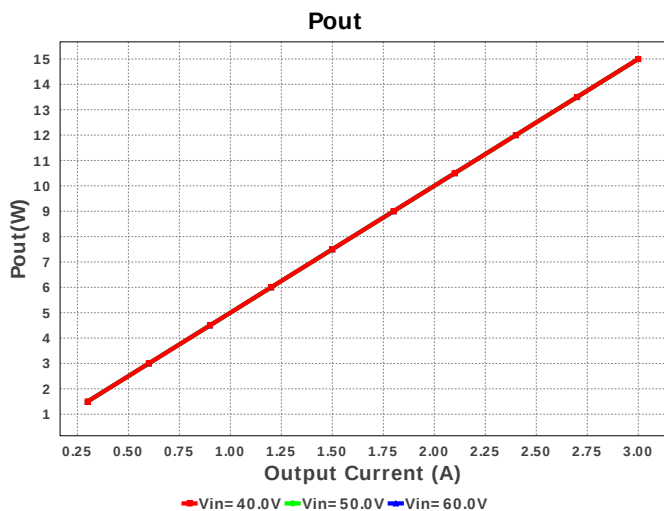
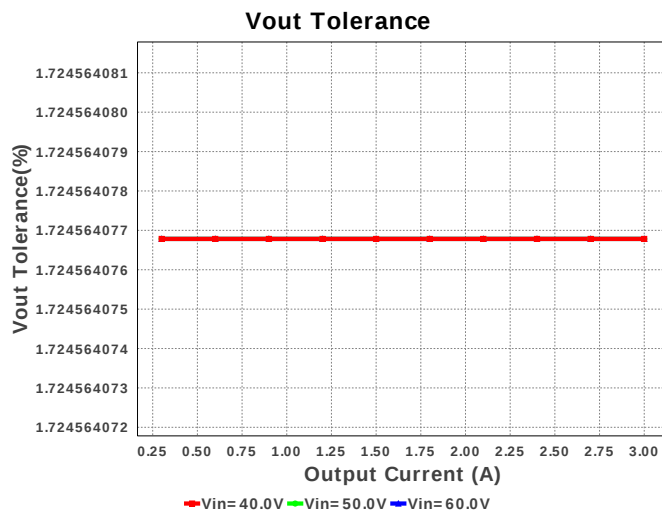
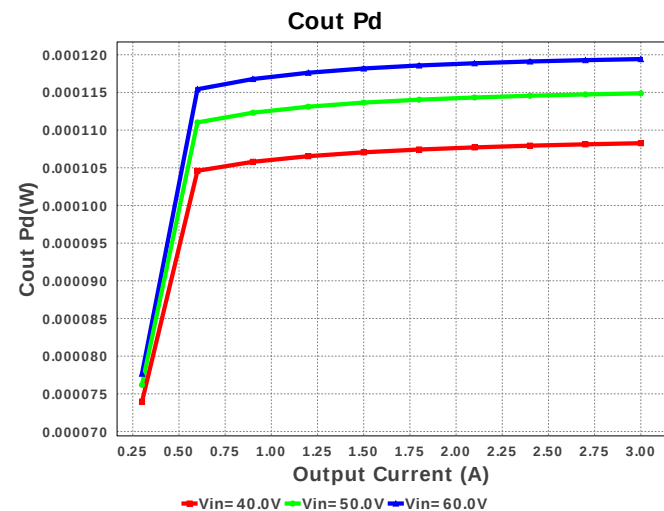
Electrical BOM

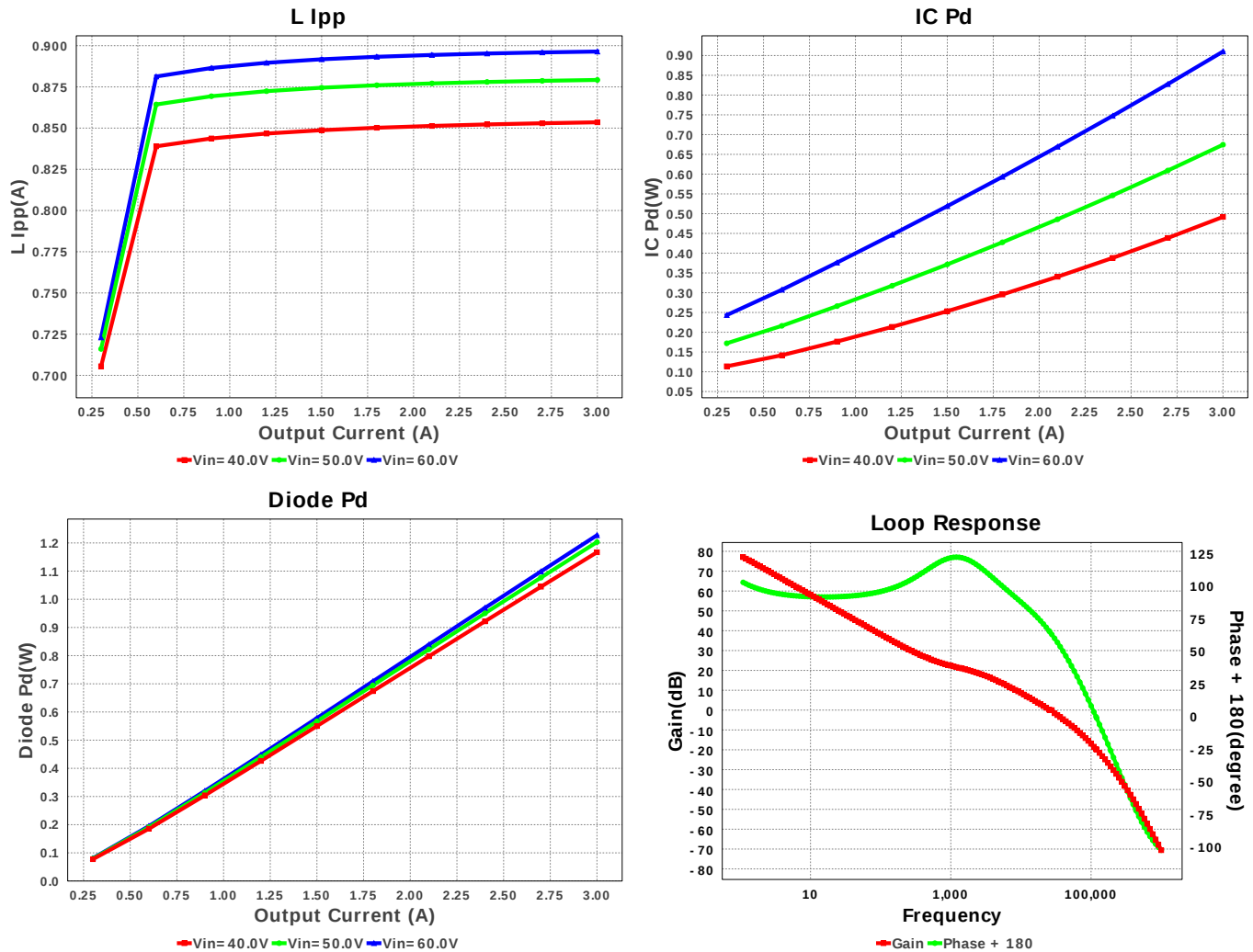
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB223 Series= X7R	Cap= 22.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Ccomp2	TDK	C0603C0G1E160G Series= C0G/NP0	Cap= 16.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 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	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	\$0.21	 1206_190 11 mm ²
6.	Coutx	MuRata	GRM21BR61A106KE19L Series= X5R	Cap= 10.0 uF ESR= 4.025 mOhm VDC= 10.0 V IRMS= 2.445 A	2	\$0.03	 0805 7 mm ²
7.	D1	STMicroelectronics	STPS20M100SG-TR	Vf@Io= 455.0 mV VRRM= 100.0 V	1	\$1.33	 DDPAK 210 mm ²
8.	L1	Bourns	SDR1307-180ML	L= 18.0 uH DCR= 36.0 mOhm	1	\$0.35	 SDR1307 227 mm ²
9.	Rcomp	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	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rfbt	Vishay-Dale	CRCW040253K6FKED Series= CRCW..e3	Res= 53.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	Rt	Vishay-Dale	CRCW0402316KFKED Series= CRCW..e3	Res= 316.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
13.	U1	Texas Instruments	TPS54560DDAR	Switcher	1	\$2.30	

R-PDSO-G8 57 mm²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	838.62 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	179.542 mA	Current	Output capacitor RMS ripple current
3.	Coutx IRMS	79.387 mA	Current	Output capacitor_x RMS ripple current
4.	Iin Avg	291.74 mA	Current	Average input current
5.	L Ipp	896.96 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	14	General	Total Design BOM count
7.	FootPrint	557.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	307.791 kHz	General	Switching frequency
9.	Pout	15.0 W	General	Total output power
10.	Total BOM	\$4.51	General	Total BOM Cost
11.	ICThetaJA Effective	26.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	77.053 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	5.004 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
15.	Cross Freq	25.829 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	9.035 %	Op_point	Duty cycle
17.	Efficiency	85.692 %	Op_point	Steady state efficiency
18.	Gain Marg	-19.652 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	53.663 degC	Op_point	IC junction temperature
20.	IOUT_OP	3.0 A	Op_point	Iout operating point
21.	Phase Marg	65.118 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	60.0 V	Op_point	Vin operating point
23.	Vout p-p	6.474 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	1.217 mW	Power	Input capacitor power dissipation
25.	Cout Pd	119.561 μW	Power	Output capacitor power dissipation
26.	Coutx Pd	12.683 μW	Power	Output capacitor_x power loss
27.	Diode Pd	1.237 W	Power	Diode power dissipation
28.	IC Pd	910.124 mW	Power	IC power dissipation
29.	L Pd	356.4 mW	Power	Inductor power dissipation
30.	Total Pd	2.505 W	Power	Total Power Dissipation

#	Name	Value	Category	Description
31.	Vout Tolerance	1.725 %		Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	VinMax	60.0	Maximum input voltage
3.	VinMin	40.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54560	Texas Instruments Base Part 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](#).