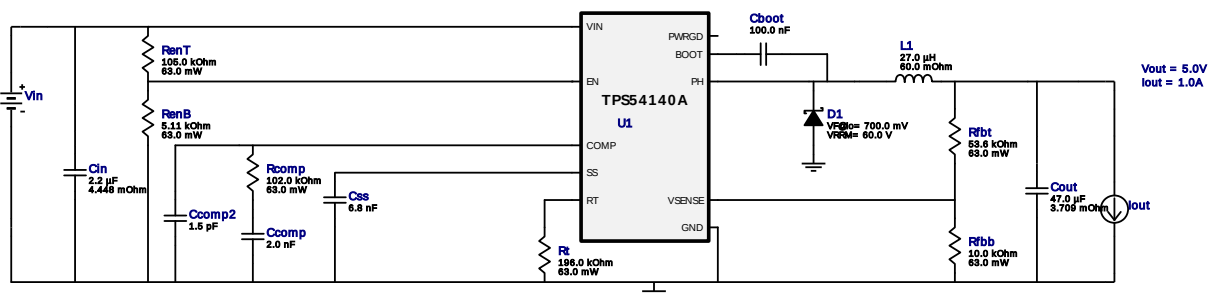
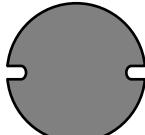


WEBENCH® Design Report

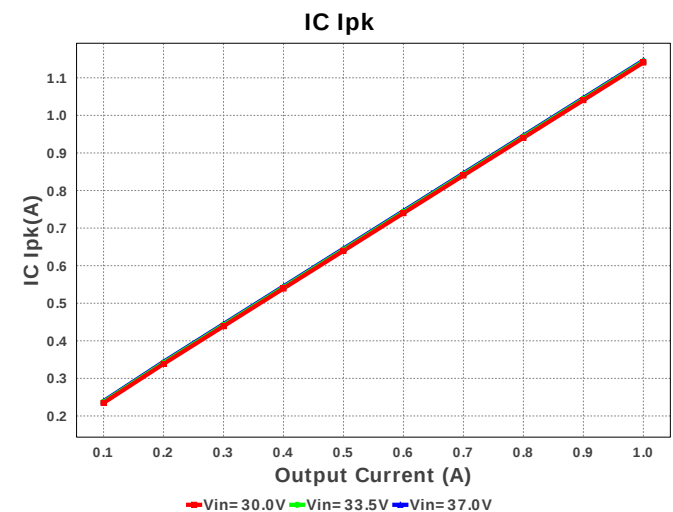
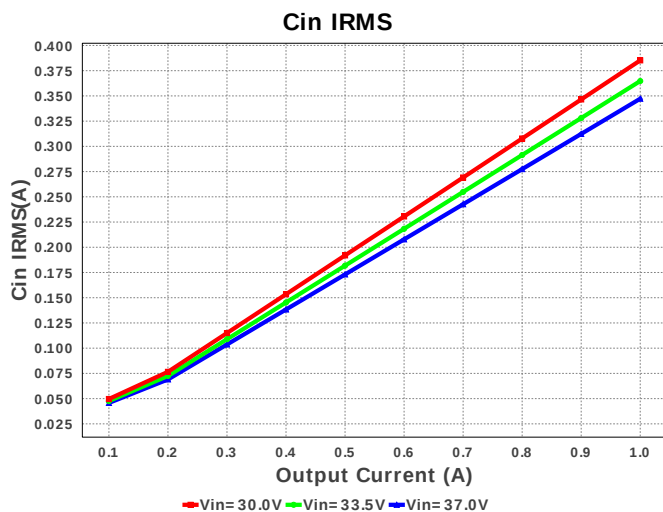
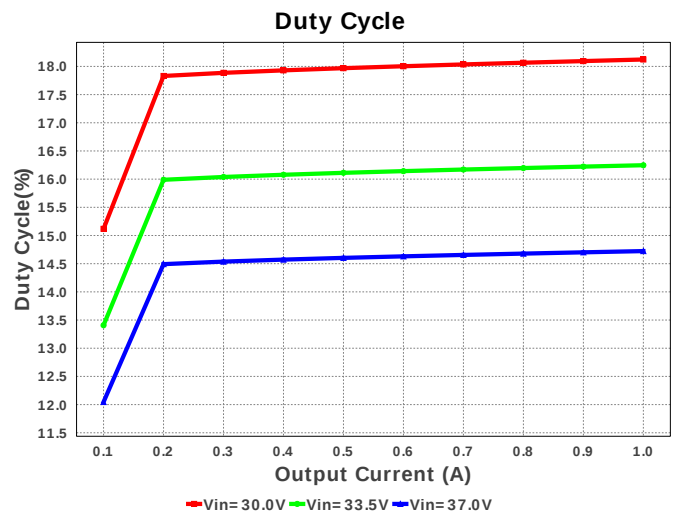
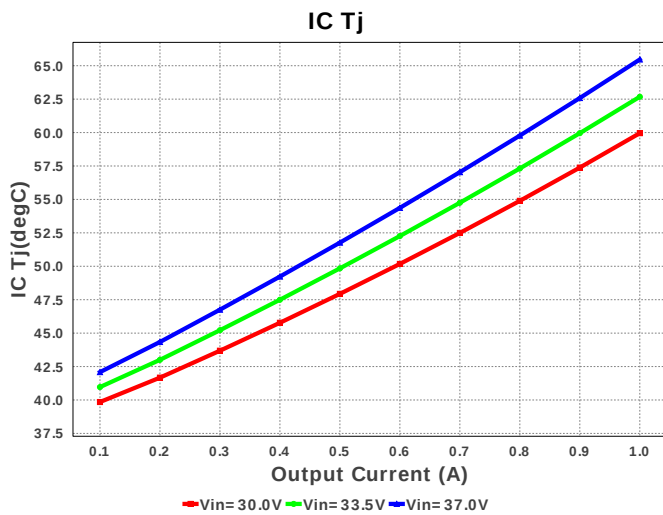
Design : 4742013/99 TPS54140ADGQR
TPS54140ADGQR 30.0V-37.0V to 5.00V @ 1.0A

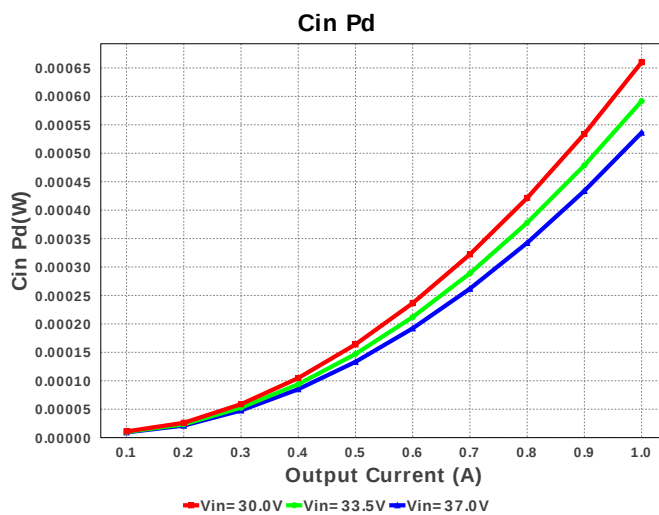
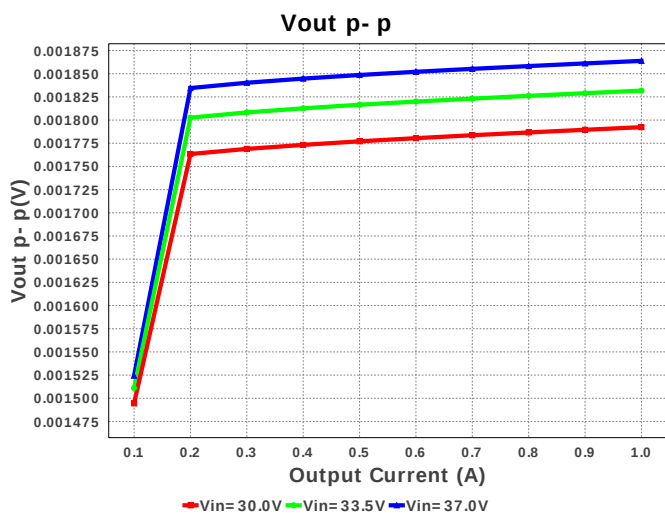
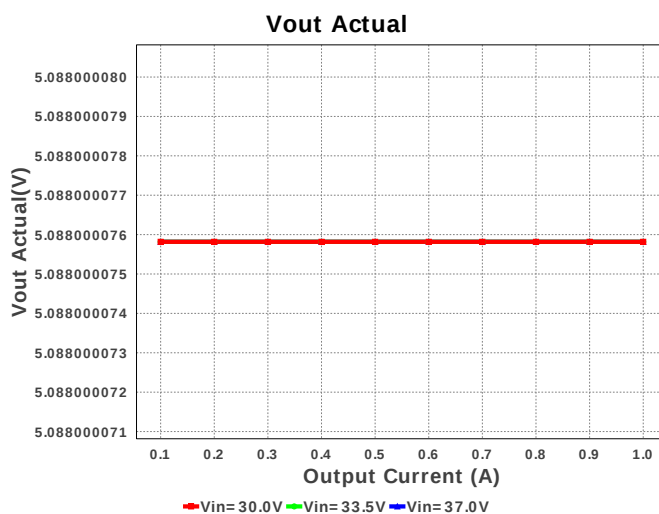
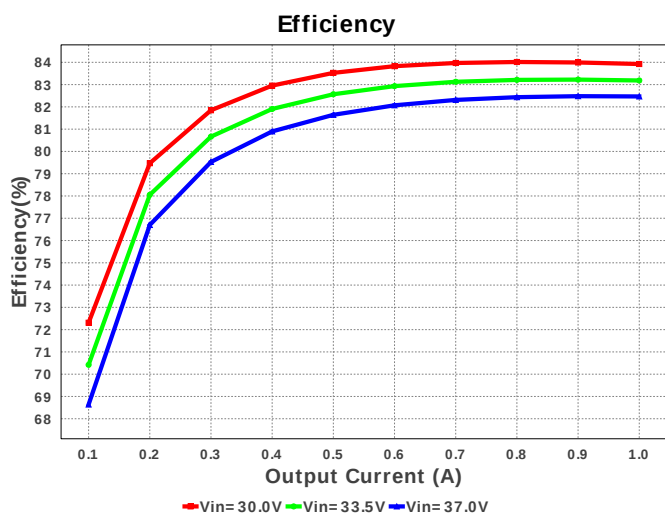
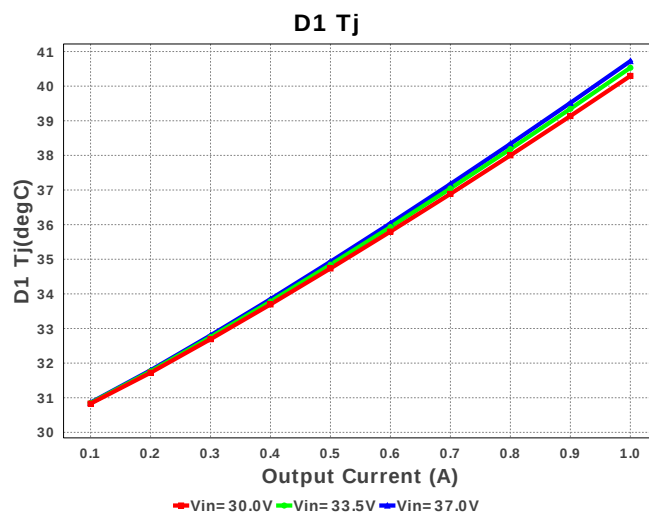
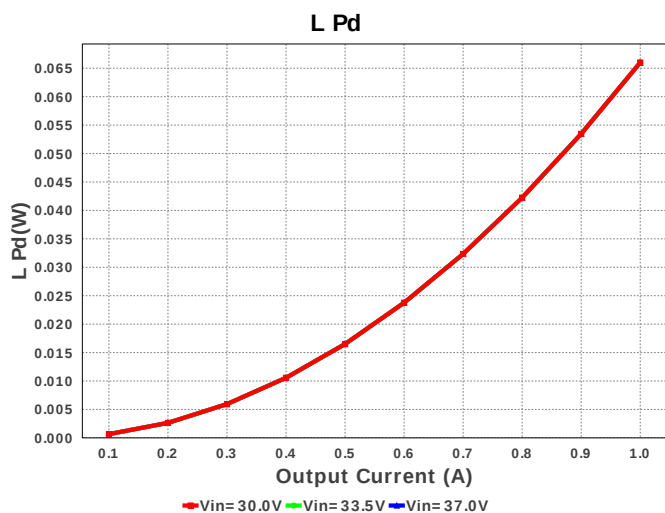


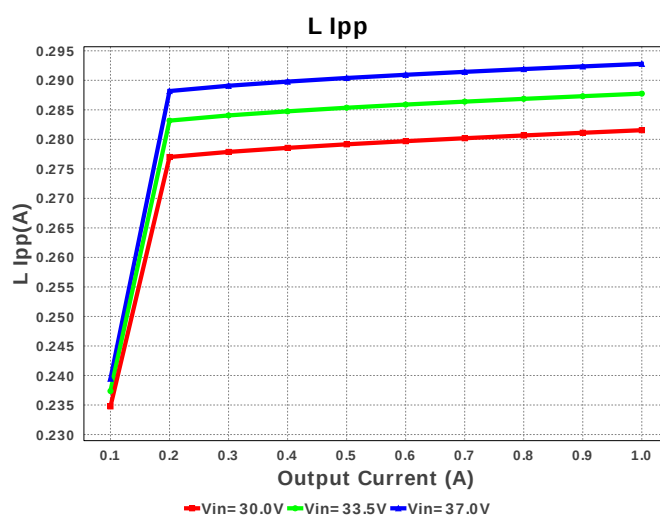
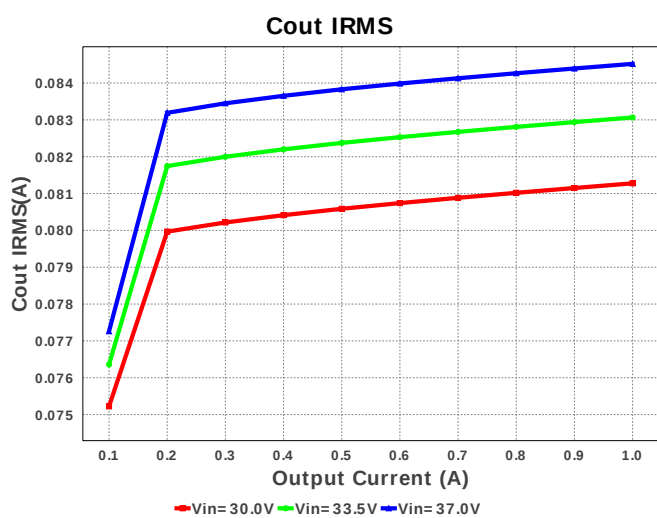
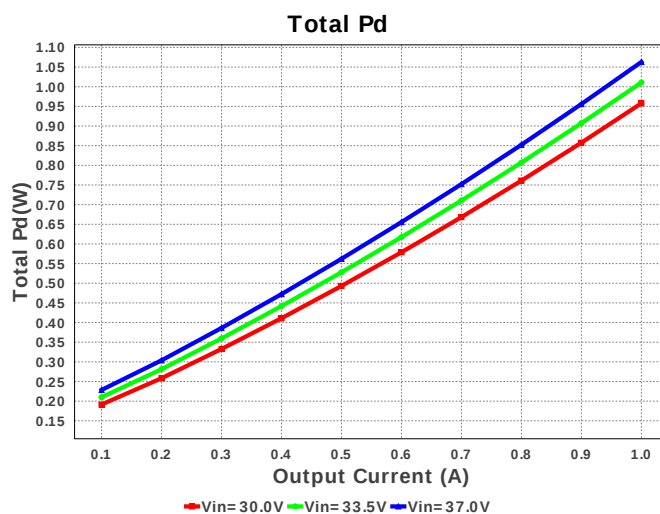
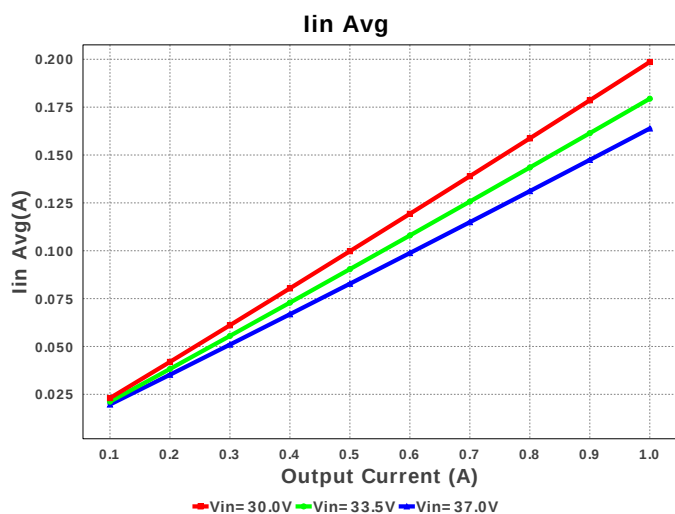
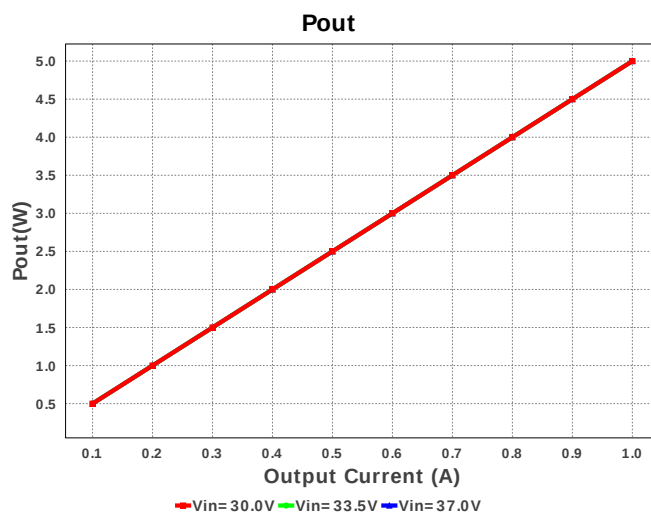
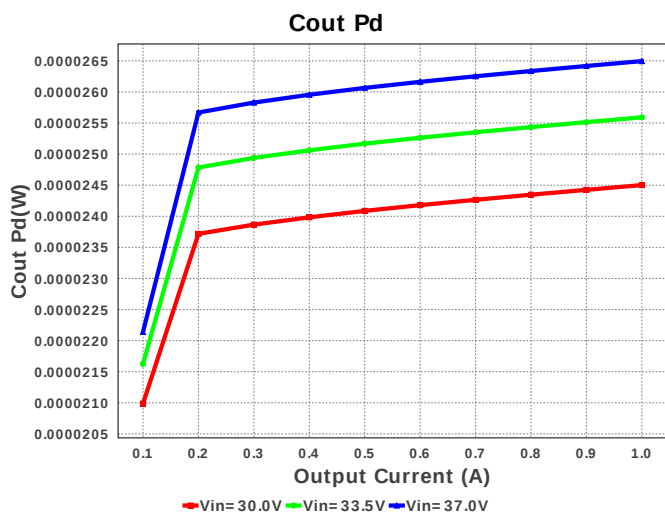
Electrical BOM

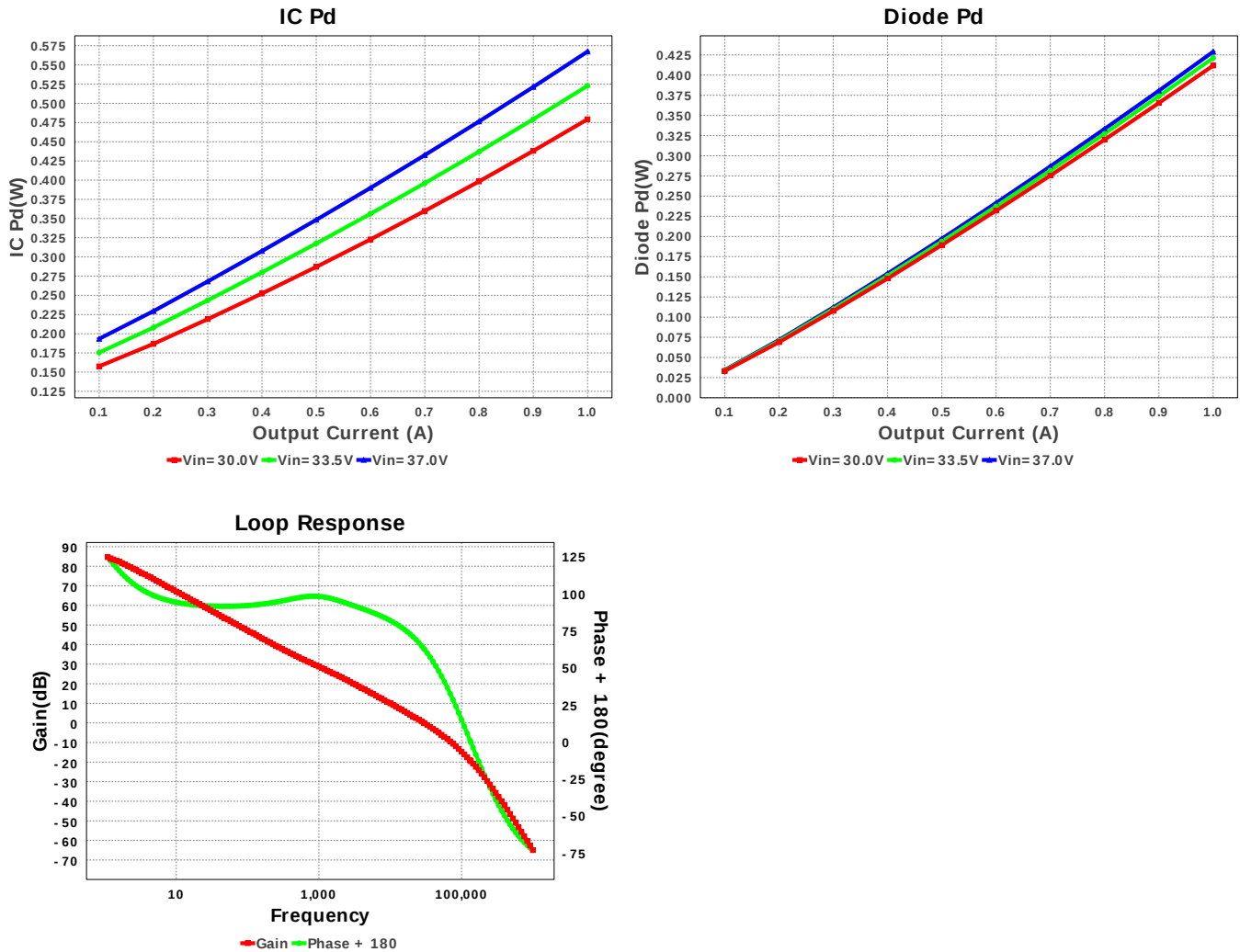
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm²
2.	Ccomp	MuRata	GRM1885C1H202JA01D Series= C0G/NP0	Cap= 2.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm²
3.	Ccomp2	MuRata	GRM1555C1H1R5CA01D Series= C0G/NP0	Cap= 1.5 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm²
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 mm²
5.	Cout	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	\$0.15	 1206_190 11 mm²
6.	Css	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm²
7.	D1	Diodes Inc.	B260A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.09	 SMA 37 mm²
8.	L1	Bourns	SDR1307-270ML	L= 27.0 uH DCR= 60.0 mOhm	1	\$0.35	 SDR1307 227 mm²
9.	Rcomp	Vishay-Dale	CRCW0402102KFKED Series= CRCW..e3	Res= 102.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
10.	RenB	Vishay-Dale	CRCW04025K11FKED Series= CRCW..e3	Res= 5.11 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
11.	RenT	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	Rfbf	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
13.	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
14.	Rt	Vishay-Dale	CRCW0402196KFKED Series= CRCW..e3	Res= 196.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
15.	U1	Texas Instruments	TPS54140ADGQR	Switcher	1	\$1.26	S-PDSO-G10 24 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	347.642 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	84.783 mA	Current	Output capacitor RMS ripple current
3.	IC IpK	1.0 A	Current	Peak switch current in IC
4.	Iin Avg	164.32 mA	Current	Average input current
5.	L Ipp	293.7 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	15	General	Total Design BOM count
7.	FootPrint	345.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	595.991 kHz	General	Switching frequency
9.	Pout	5.0 W	General	Total output power
10.	Total BOM	\$2.0	General	Total BOM Cost
11.	D1 Tj	41.144 degC	Op_Point	D1 junction temperature
12.	Low Freq Gain	84.599 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	5.088 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	29.655 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	14.769 %	Op_point	Duty cycle
17.	Efficiency	82.238 %	Op_point	Steady state efficiency
18.	Gain Marg	-19.57 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	65.475 degC	Op_point	IC junction temperature
20.	ICThetaJA	62.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	1.0 A	Op_point	Iout operating point
22.	Phase Marg	62.897 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	37.0 V	Op_point	Vin operating point
24.	Vout p-p	1.87 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	537.562 μW	Power	Input capacitor power dissipation
26.	Cout Pd	26.661 μW	Power	Output capacitor power dissipation
27.	Diode Pd	445.767 mW	Power	Diode power dissipation
28.	IC Pd	567.593 mW	Power	IC power dissipation
29.	L Pd	66.0 mW	Power	Inductor power dissipation
30.	Total Pd	1.08 W	Power	Total Power Dissipation

#	Name	Value	Category	Description
31.	Vout Tolerance	2.72 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	37.0	Maximum input voltage
3.	VinMin	30.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54140A	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54140A** Product Folder : <http://www.ti.com/product/TPS54140A> : 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](#).