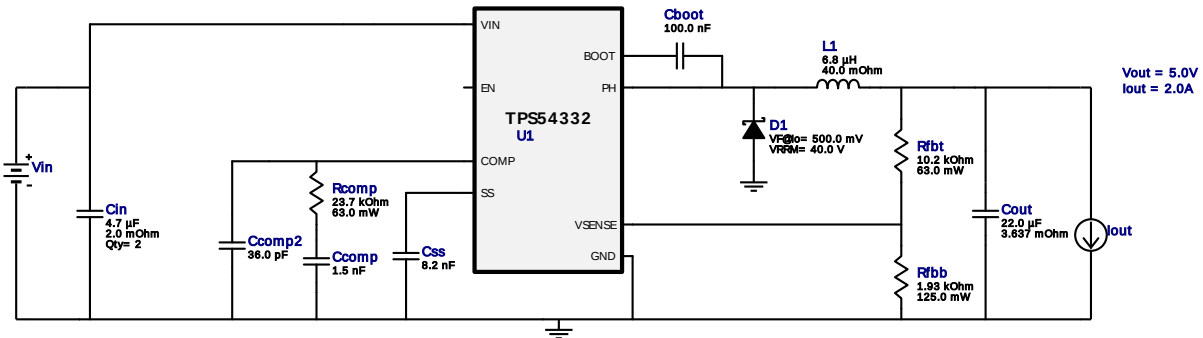


WEBENCH® Design Report

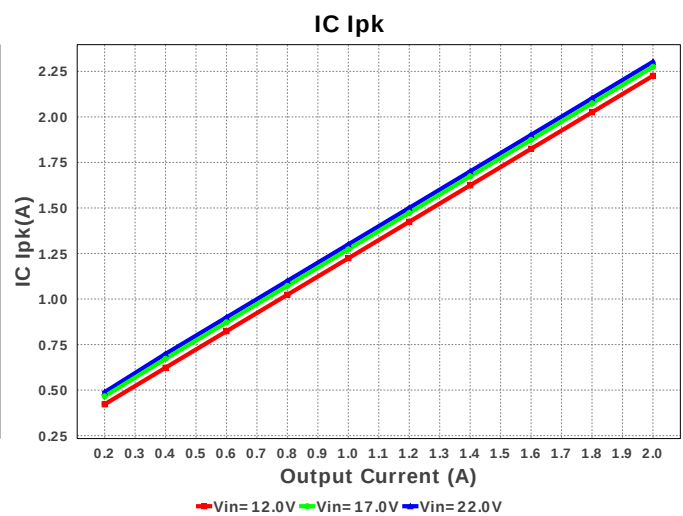
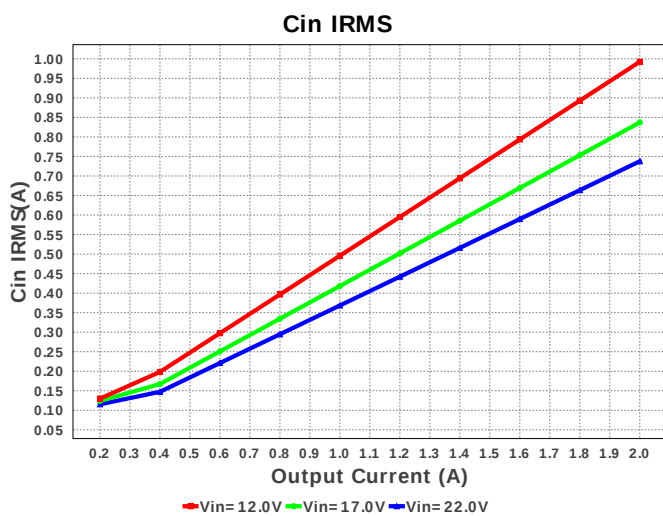
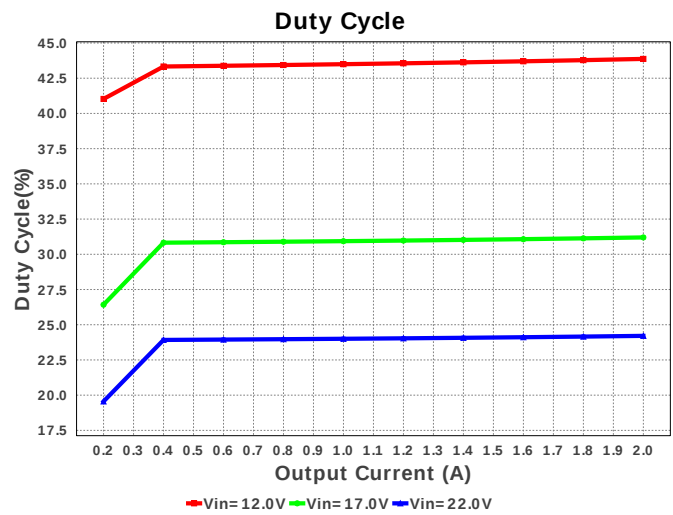
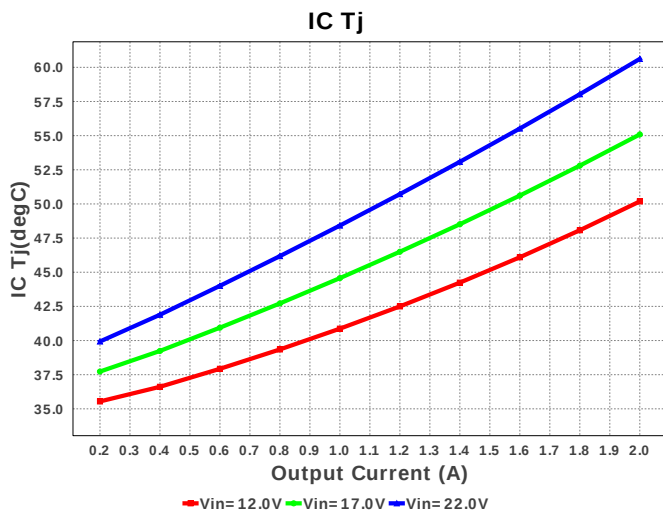
Design : 4765113/11 TPS54332DDAR
TPS54332DDAR 12.0V-22.0V to 5.00V @ 2.0A

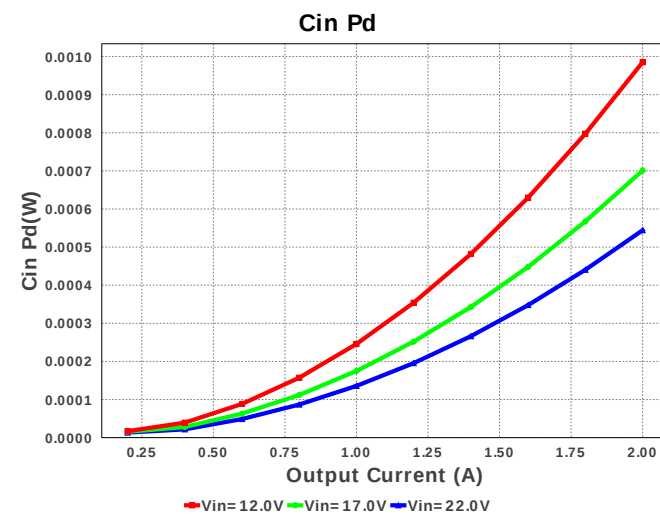
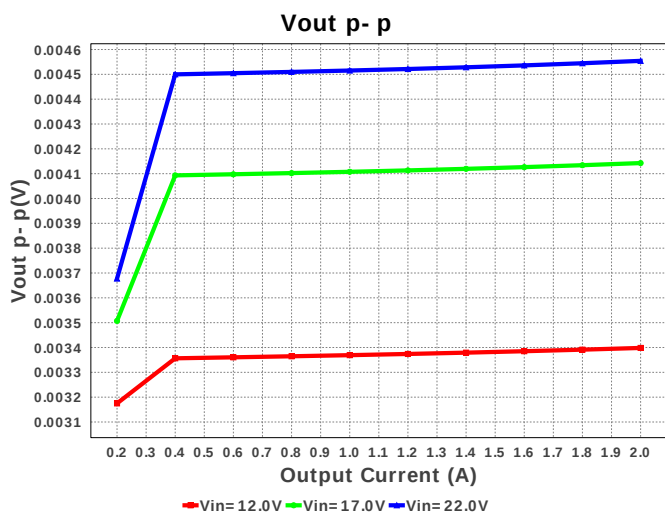
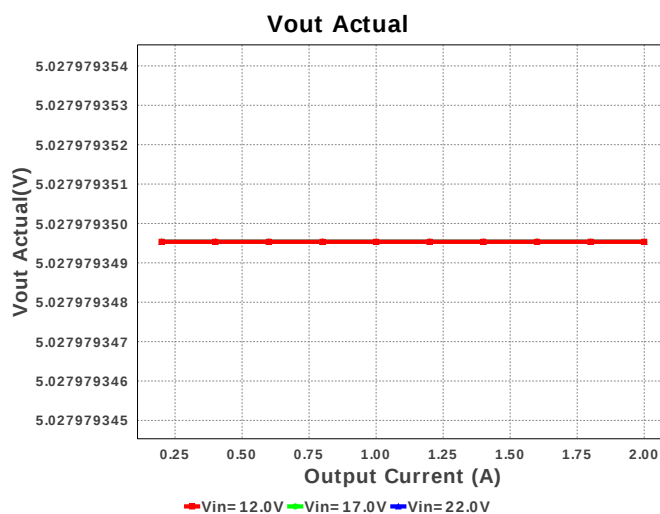
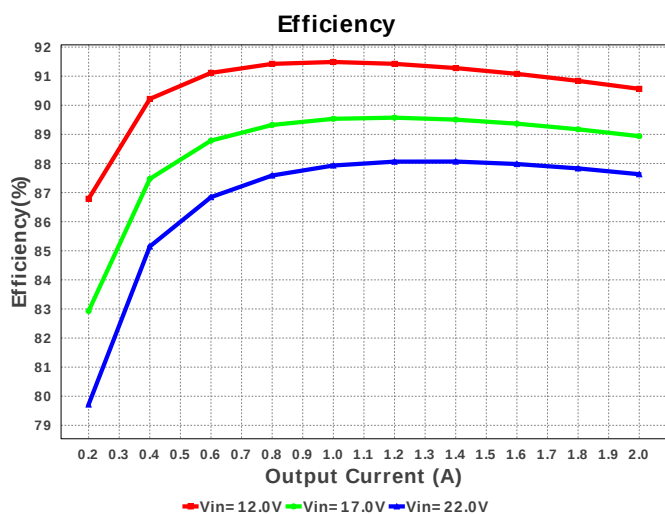
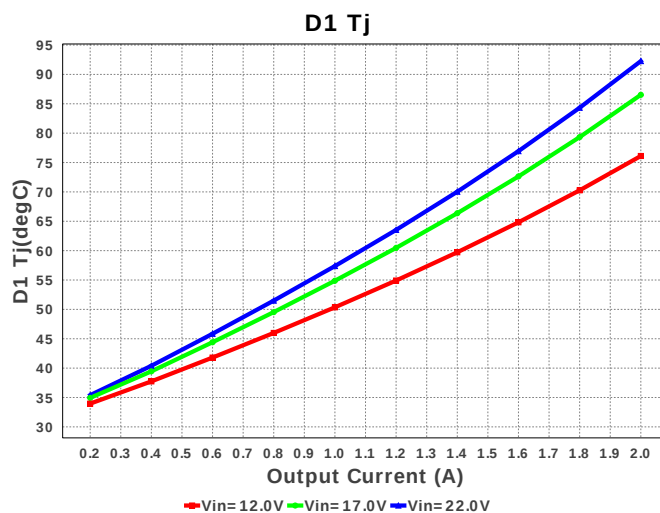
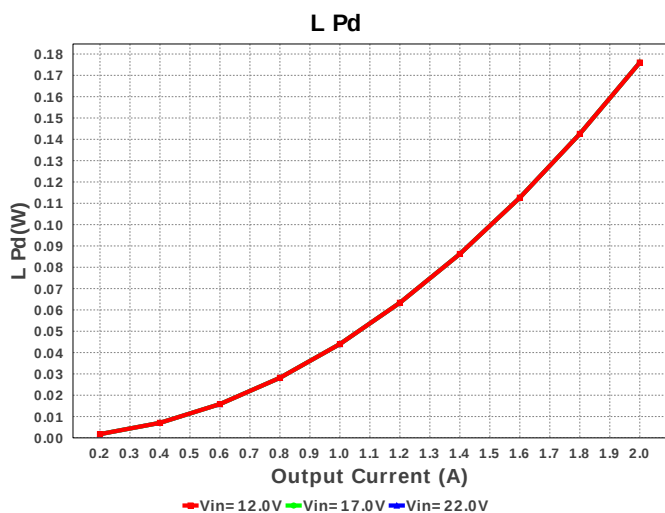


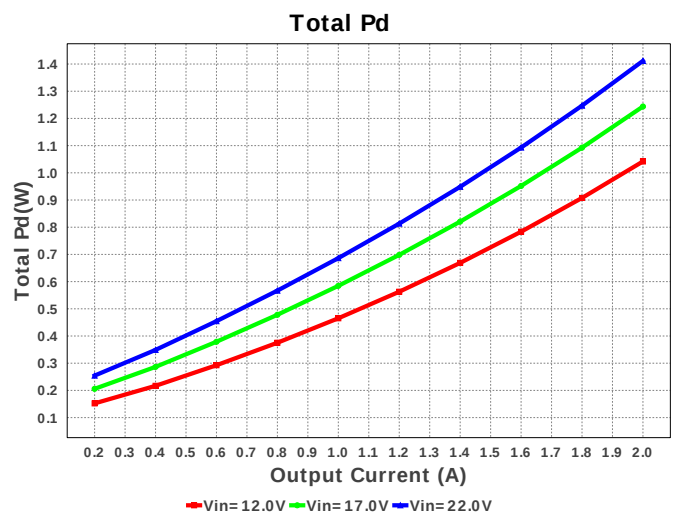
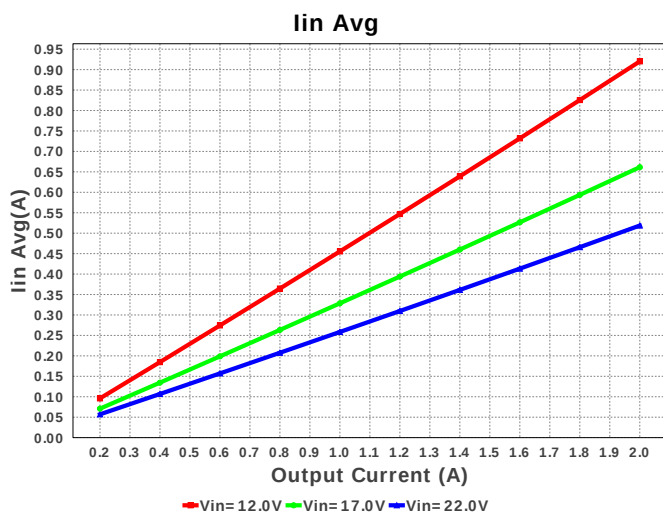
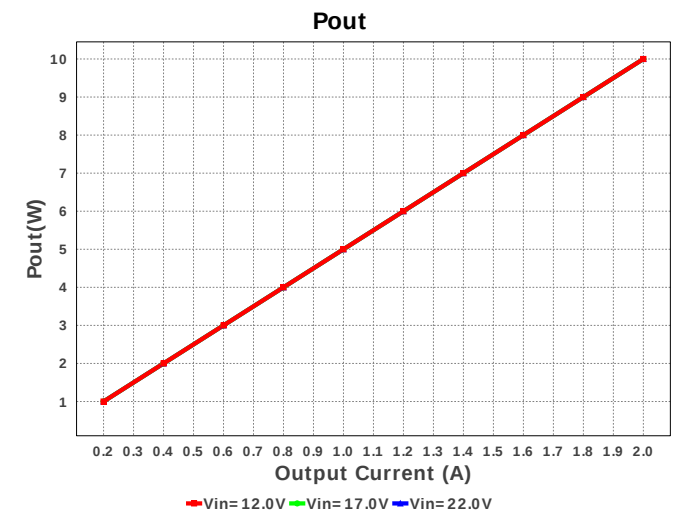
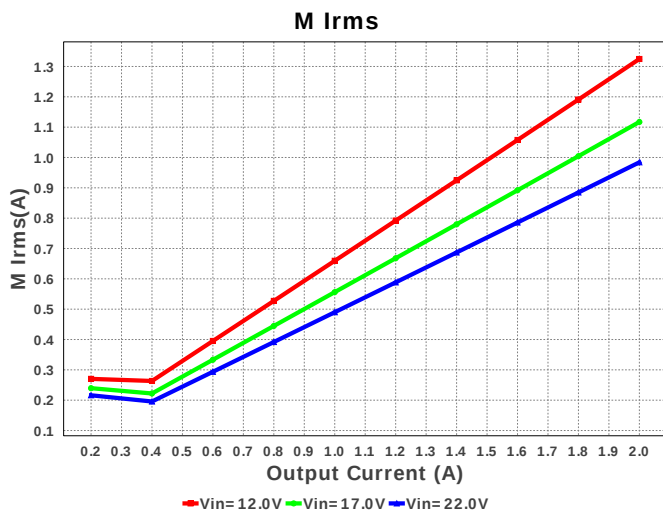
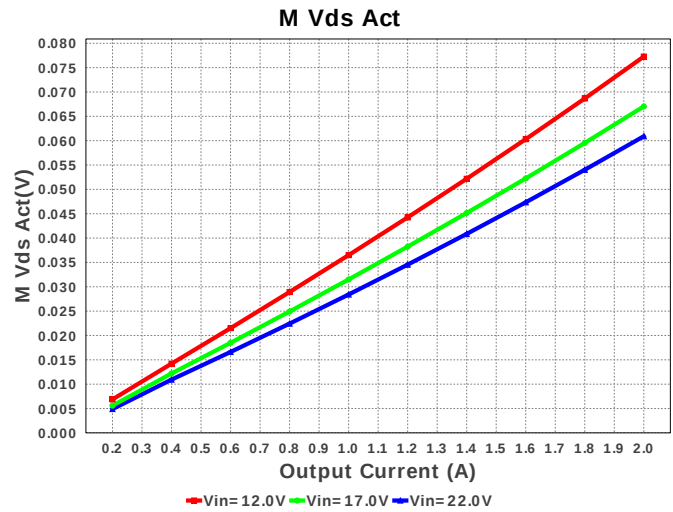
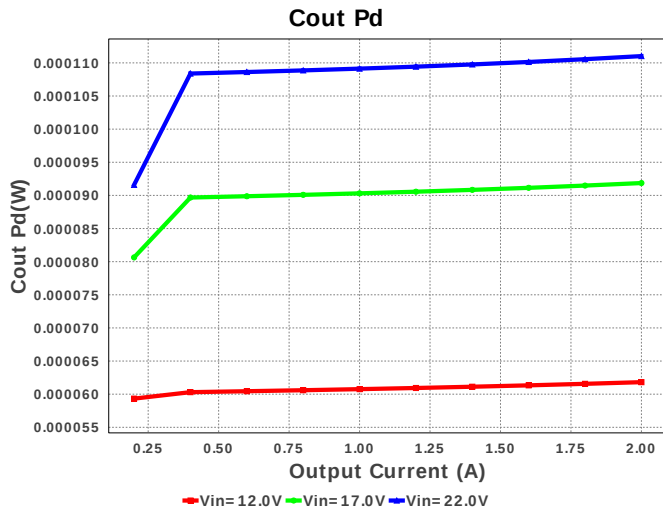
Electrical BOM

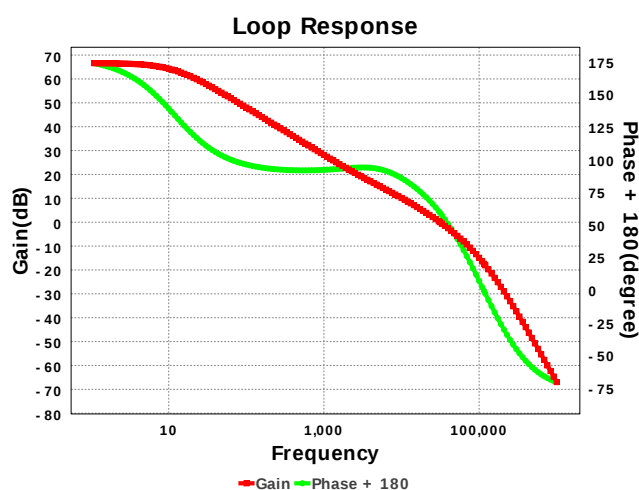
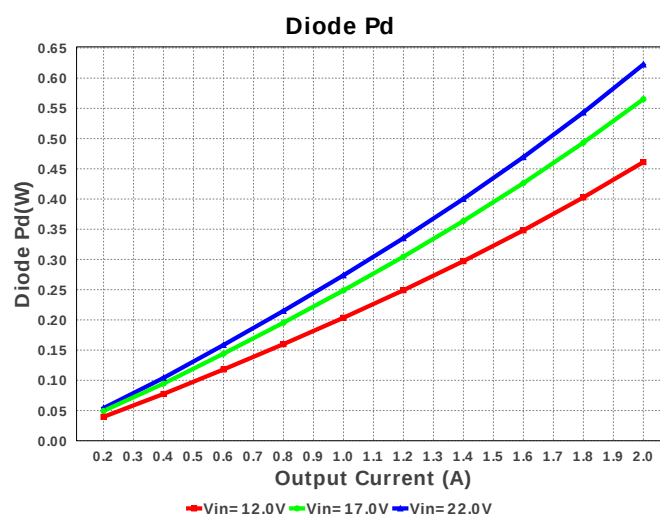
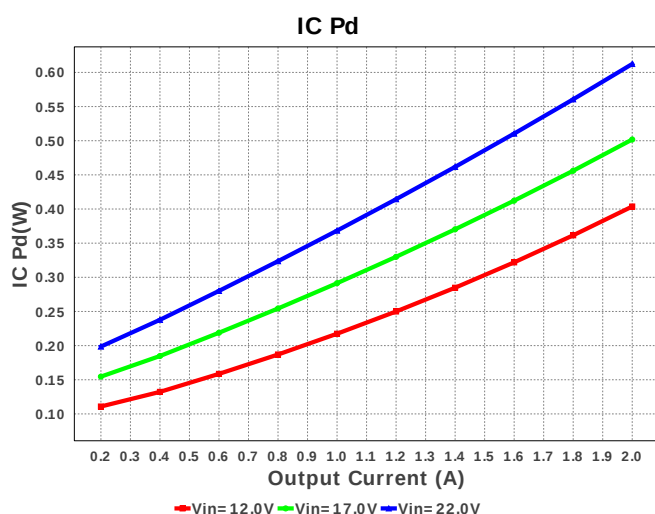
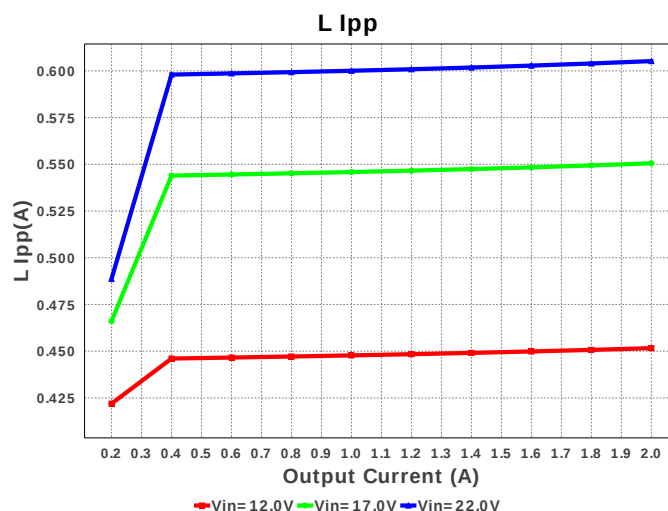
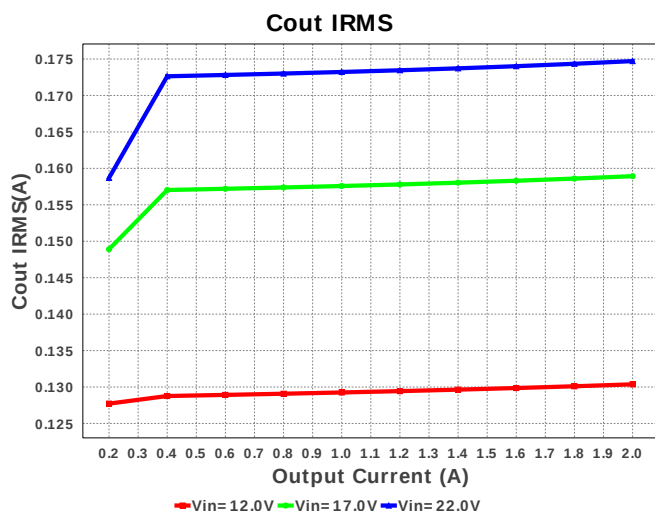
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB152 Series= X7R	Cap= 1.5 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Ccomp2	Samsung Electro-Mechanics	CL21C360JBANNNC Series= C0G/NP0	Cap= 36.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
4.	Cin	MuRata	GRM32ER71H475KA88L Series= X7R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 50.0 V IRMS= 5.35 A	2	\$0.19	 1210 15 mm ²
5.	Cout	MuRata	GRM31CR61A226KE19L Series= X5R	Cap= 22.0 uF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.56456 A	1	\$0.07	 1206_190 11 mm ²
6.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
7.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMA 37 mm ²
8.	L1	Bourns	SDR0805-6R8ML	L= 6.8 uH DCR= 40.0 mOhm	1	\$0.22	 SDR0805 96 mm ²
9.	Rcomp	Vishay-Dale	CRCW040223K7FKED Series= CRCW..e3	Res= 23.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	Rfbb	Yageo America	RT0805BRD071K93L Series= RT0805	Res= 1.93 kOhm Power= 125.0 mW Tolerance= 0.1%	1	\$0.05	 0805 7 mm ²
11.	Rfht	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
12.	U1	Texas Instruments	TPS54332DDAR	Switcher	1	\$0.73	 DDA0008H 57 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	737.637 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	174.716 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.303 A	Current	Peak switch current in IC
4.	Iin Avg	518.71 mA	Current	Average input current
5.	L Ipp	605.24 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	984.062 mA	Current	Q lavg
7.	BOM Count	13	General	Total Design BOM count
8.	FootPrint	262.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	1000.0 kHz	General	Switching frequency
10.	M Vds Act	60.904 mV	General	Voltage drop across the MosFET
11.	Mode	CCM	General	Conduction Mode

#	Name	Value	Category	Description
12.	Pout	10.0 W	General	Total output power
13.	Total BOM	\$1.62	General	Total BOM Cost
14.	D1 Tj	92.266 degC	Op_Point	D1 junction temperature
15.	Low Freq Gain	66.593 dB	Op_Point	Gain at 10Hz
16.	Vout Actual	5.028 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	31.369 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	24.209 %	Op_point	Duty cycle
20.	Efficiency	87.63 %	Op_point	Steady state efficiency
21.	Gain Marg	-17.411 dB	Op_point	Bode Plot Gain Margin
22.	IC Tj	60.618 degC	Op_point	IC junction temperature
23.	ICThetaJA	50.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	2.0 A	Op_point	Iout operating point
25.	Phase Marg	59.956 deg	Op_point	Bode Plot Phase Margin
26.	VIN_OP	22.0 V	Op_point	Vin operating point
27.	Vout p-p	4.554 mV	Op_point	Peak-to-peak output ripple voltage
28.	Cin Pd	544.108 μW	Power	Input capacitor power dissipation
29.	Cout Pd	111.023 μW	Power	Output capacitor power dissipation
30.	Diode Pd	622.659 mW	Power	Diode power dissipation
31.	IC Pd	612.353 mW	Power	IC power dissipation
32.	L Pd	176.0 mW	Power	Inductor power dissipation
33.	Total Pd	1.412 W	Power	Total Power Dissipation
34.	Vout Tolerance	4.458 %		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	12.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54332	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54332** Product Folder : <http://www.ti.com/product/TPS54332> : 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](#).