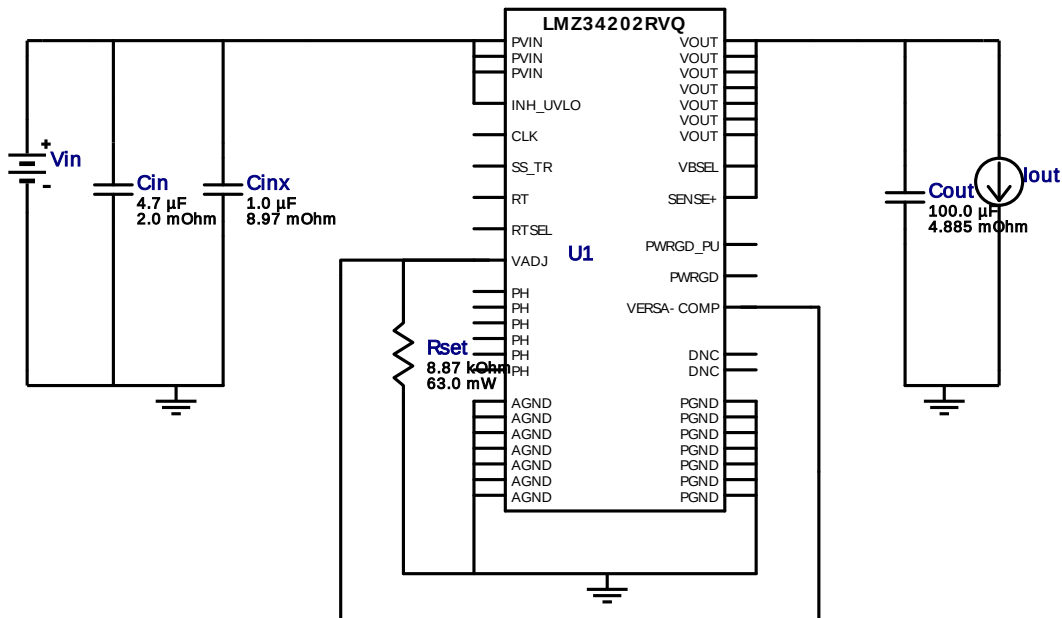
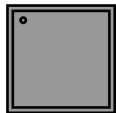


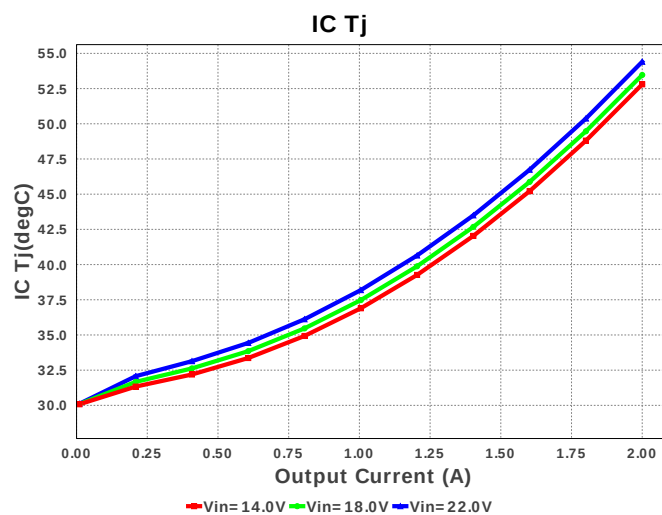
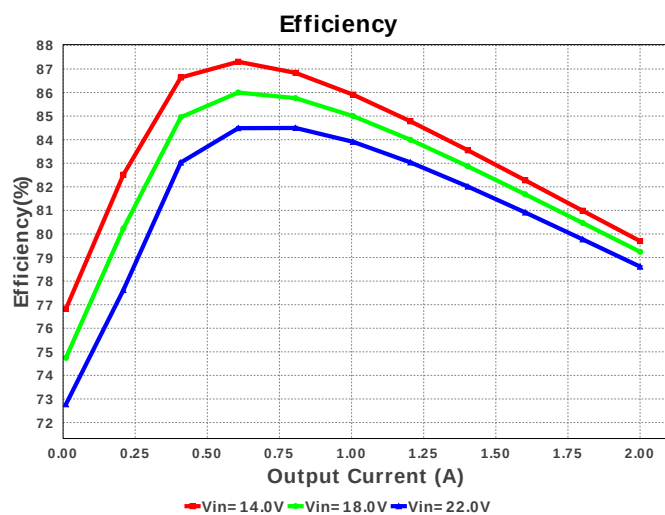
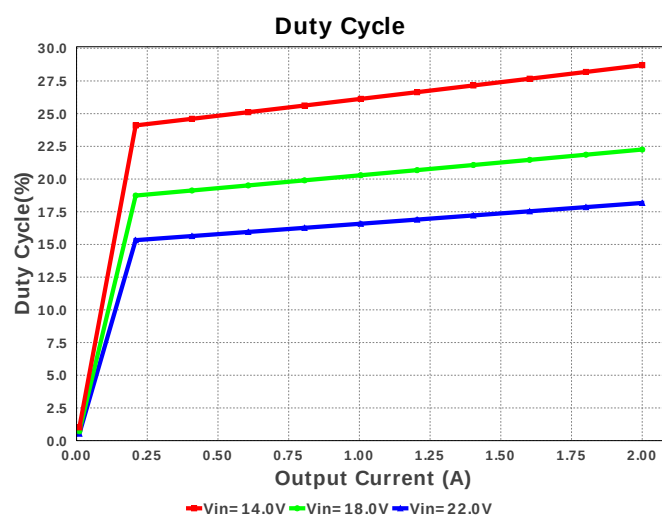
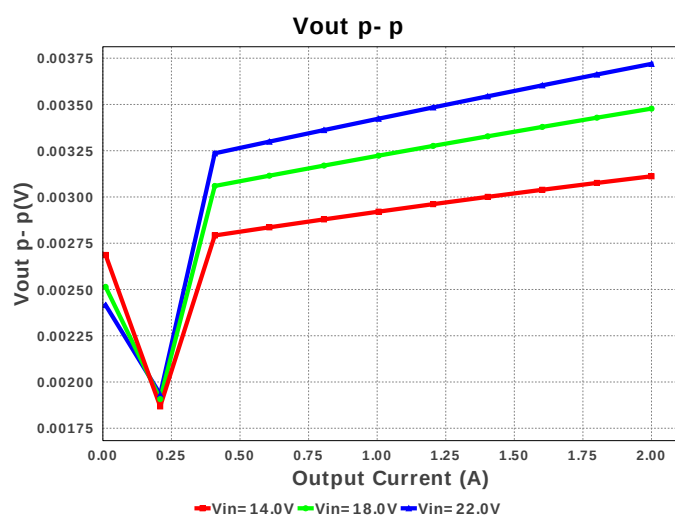
Vout = 3.3V
Iout = 2.0A


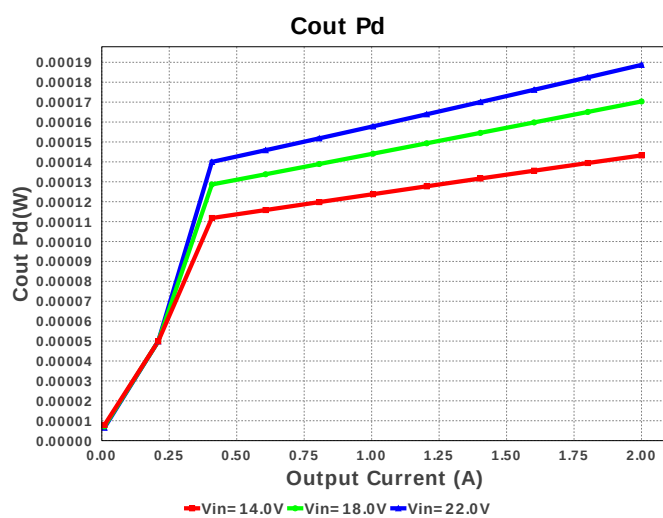
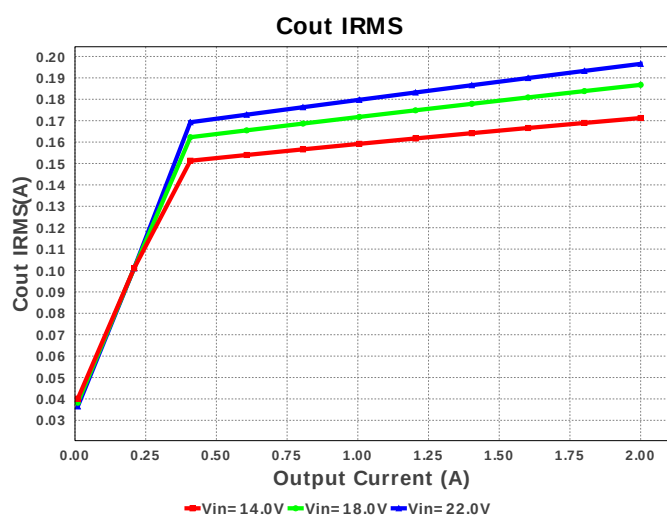
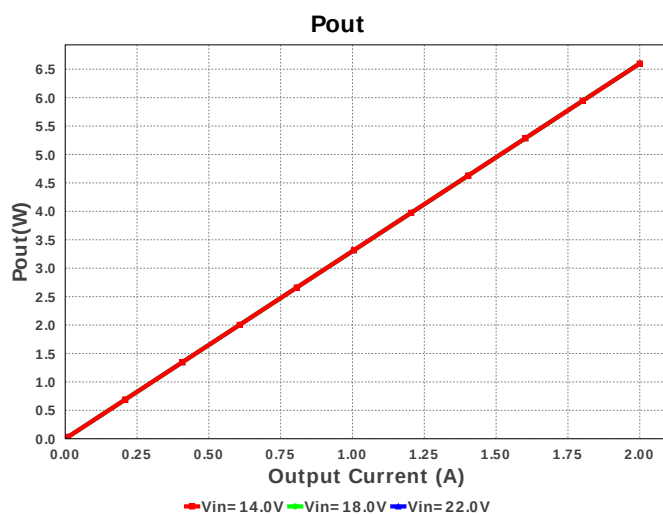
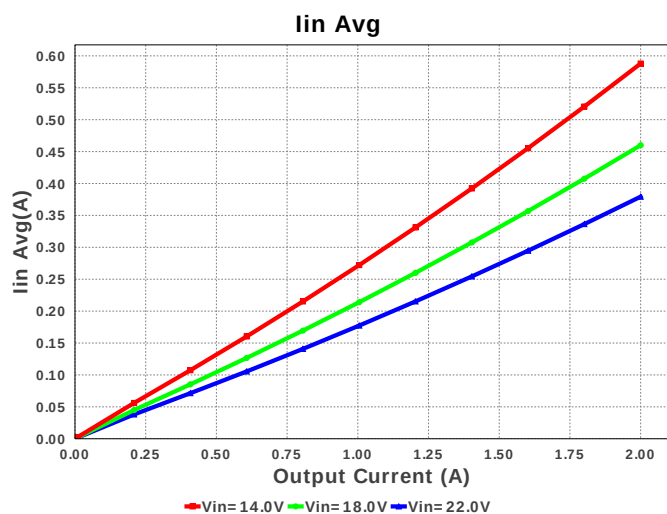
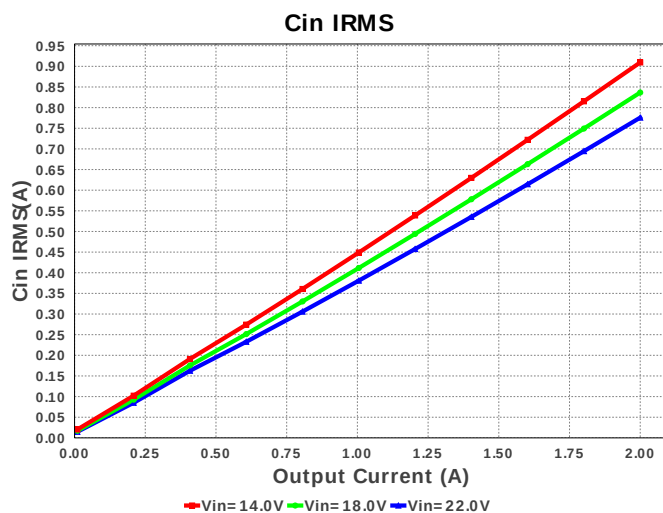
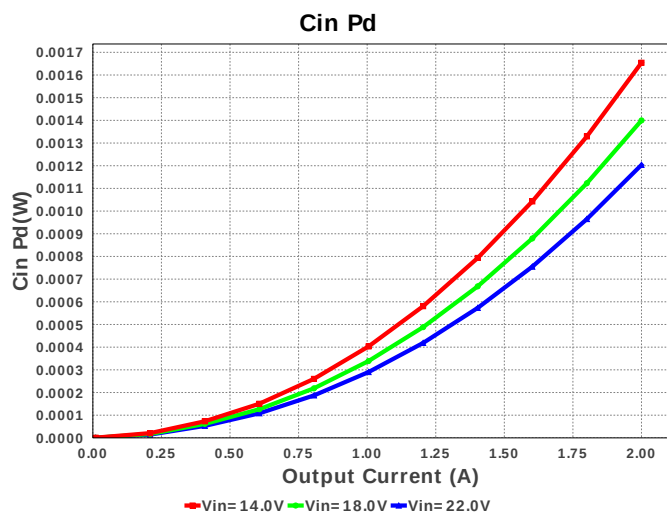
1. The input capacitor included in the BOM only contains a small filter capacitor that should be placed near the IC. Depending on where the power supply is laid out in the system additional bulk capacitance may need to be added to filter the line ripple.
2. If there is no VinTyp specified, WEBENCH will use the VinMax value. To change the VinTyp value, click on the "Change Design Inputs" button under the Optimization Tuning knob. In some applications, while the design requires the input voltage to be a wide range, for a majority of the time, it is operating at a much lower voltage than the maximum input voltage. Sizing the inductor based on the maximum input voltage may yield an inductance much larger than typically needed, causing a larger footprint for the overall design. At the same time, components such as the input capacitor must be rated based on the maximum input voltage. WEBENCH now supports the use of this additional input voltage specification.

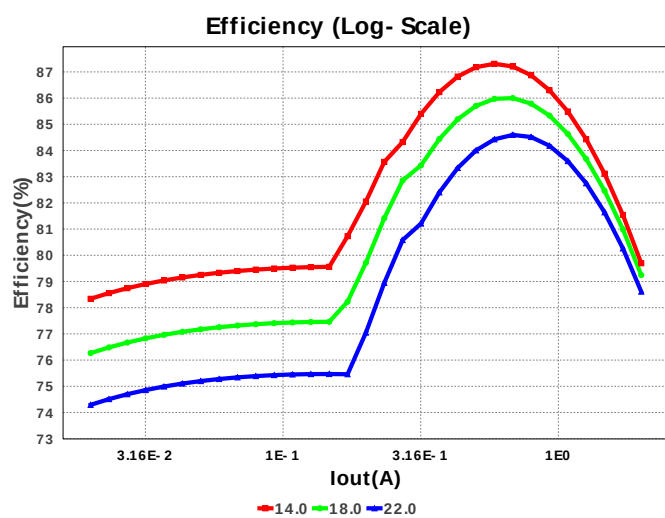
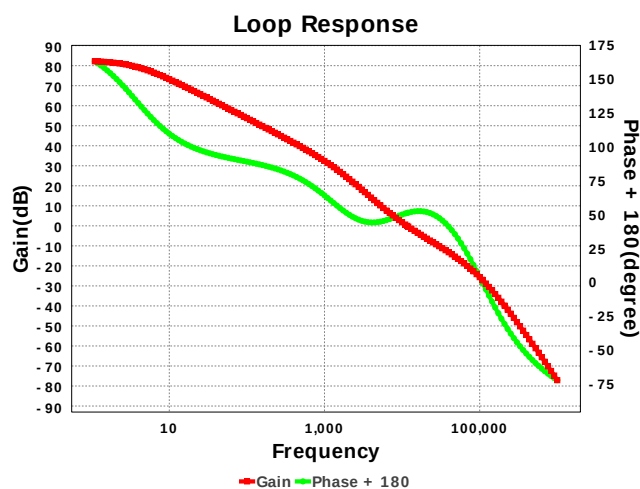
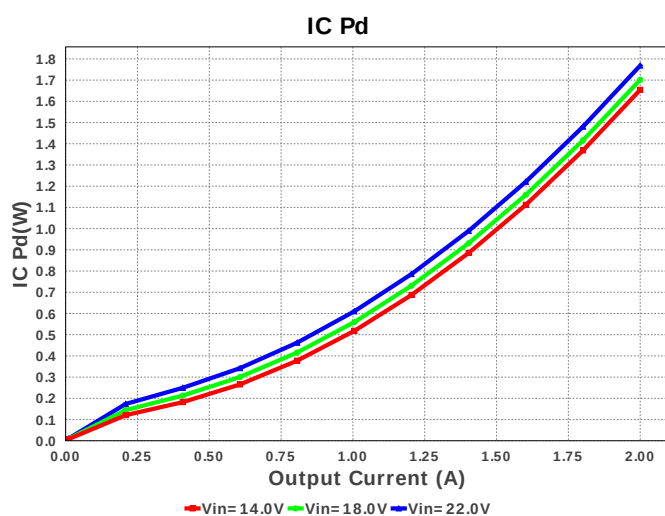
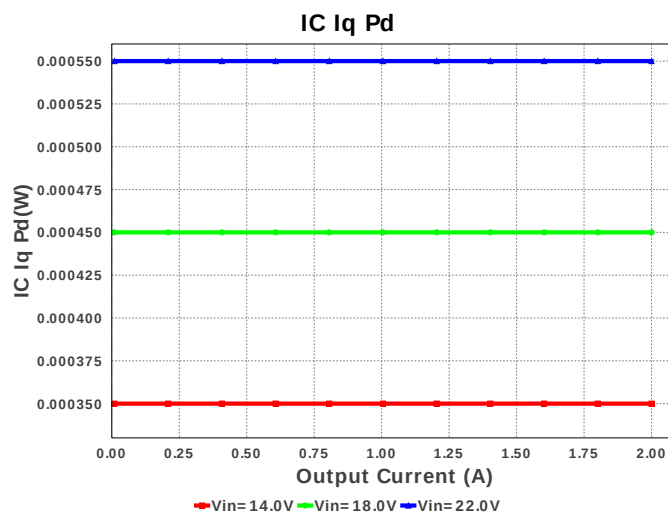
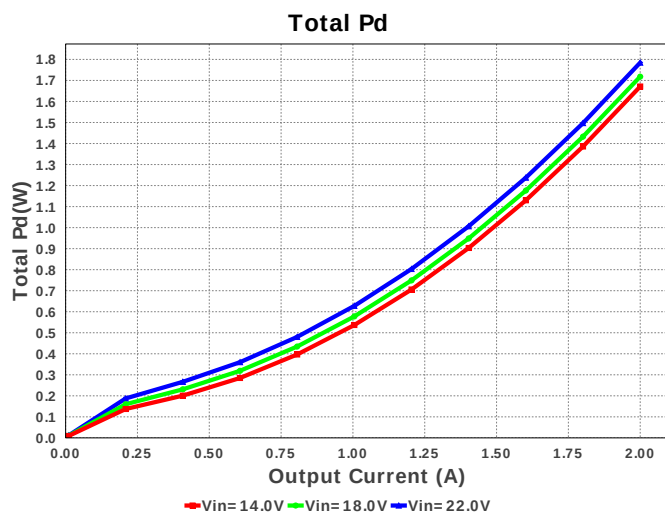
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM32ER71H475KA88L Series= X7R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 50.0 V IRMS= 5.35 A	1	\$0.19	1210 15 mm ²
2.	Cinx	TDK	C3216X5R1H105K Series= X5R	Cap= 1.0 uF ESR= 8.97 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	1206 11 mm ²
3.	Cout	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	1	\$0.14	1206_190 11 mm ²
4.	Rset	Vishay-Dale	CRCW04028K87FKED Series= CRCW..e3	Res= 8.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
5.	U1	Texas Instruments	LMZ34202RVQR	Switcher	1	\$6.95	 RVQ0043A 144 mm ²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	775.785 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	196.544 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	379.32 mA	Current	Average input current
4.	BOM Count	5	General	Total Design BOM count
5.	FootPrint	184.0 mm ²	General	Total Foot Print Area of BOM components
6.	Frequency	500.0 kHz	General	Switching frequency
7.	Pout	6.6 W	General	Total output power
8.	Total BOM	\$7.31	General	Total BOM Cost
9.	Low Freq Gain	82.167 dB	Op_Point	Gain at 10Hz
10.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
11.	Cross Freq	12.626 kHz	Op_point	Bode plot crossover frequency

#	Name	Value	Category	Description
12.	Duty Cycle	18.173 %	Op_point	Duty cycle
13.	Efficiency	78.614 %	Op_point	Steady state efficiency
14.	Gain Marg	-24.41 dB	Op_point	Bode Plot Gain Margin
15.	IC Tj	54.406 degC	Op_point	IC junction temperature
16.	ICThetaJA	14.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	2.0 A	Op_point	Iout operating point
18.	Phase Marg	70.266 deg	Op_point	Bode Plot Phase Margin
19.	VIN_OP	22.0 V	Op_point	Vin operating point
20.	Vout p-p	3.719 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	1.204 mW	Power	Input capacitor power dissipation
22.	Cout Pd	188.705 µW	Power	Output capacitor power dissipation
23.	IC Iq Pd	550.0 µW	Power	IC Iq Pd
24.	IC Pd	1.769 W	Power	IC power dissipation
25.	Total Pd	1.785 W	Power	Total Power Dissipation
26.	Vout Tolerance	303.03 m%		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	14.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LMZ34202	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMZ34202** Product Folder : <http://www.ti.com/product/LMZ34202> : 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](#).