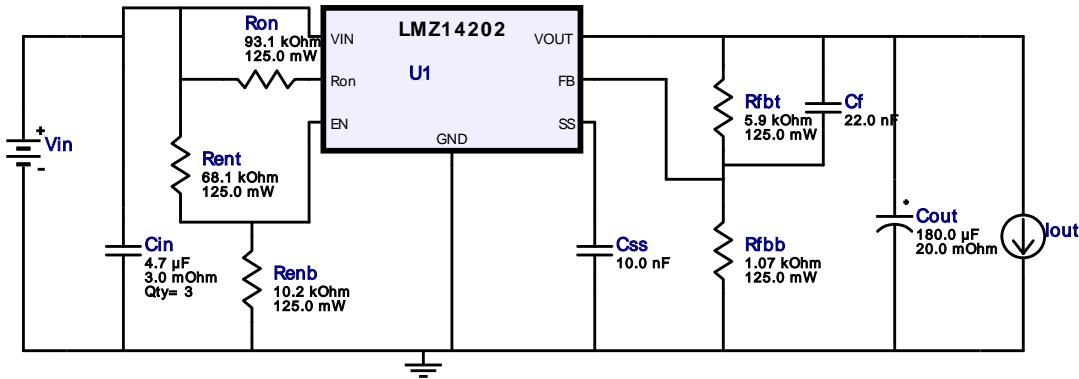


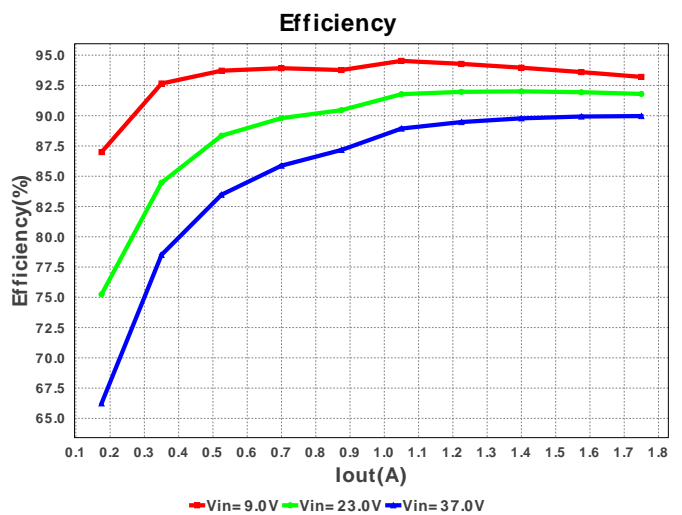
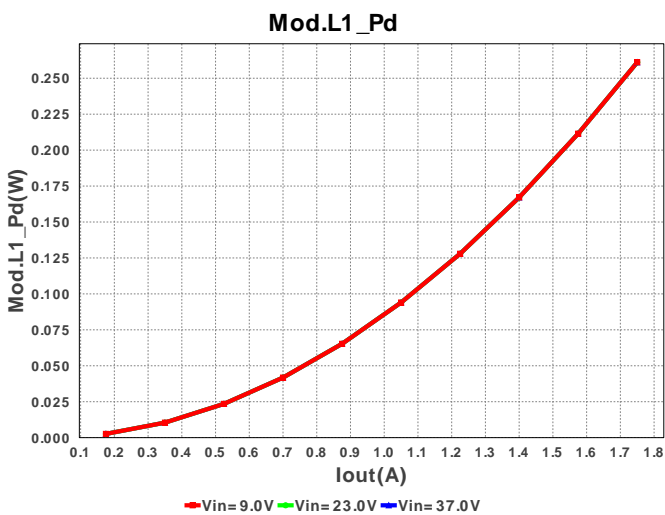
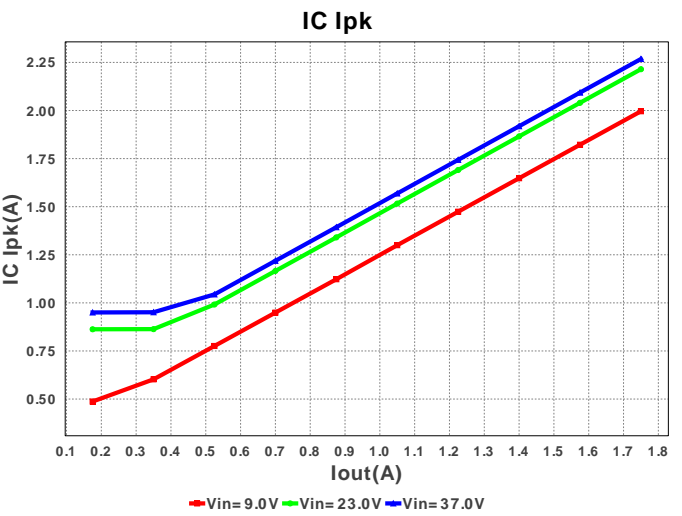
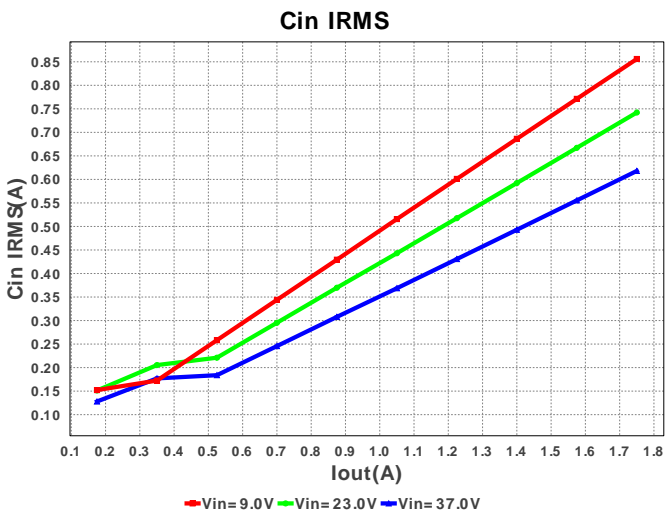
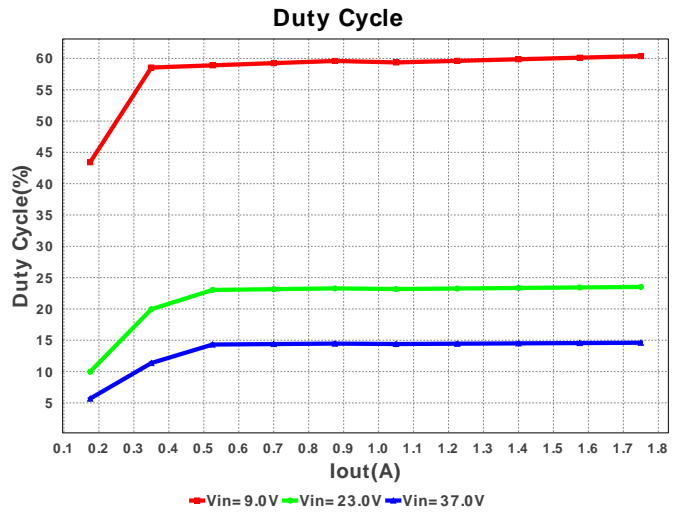
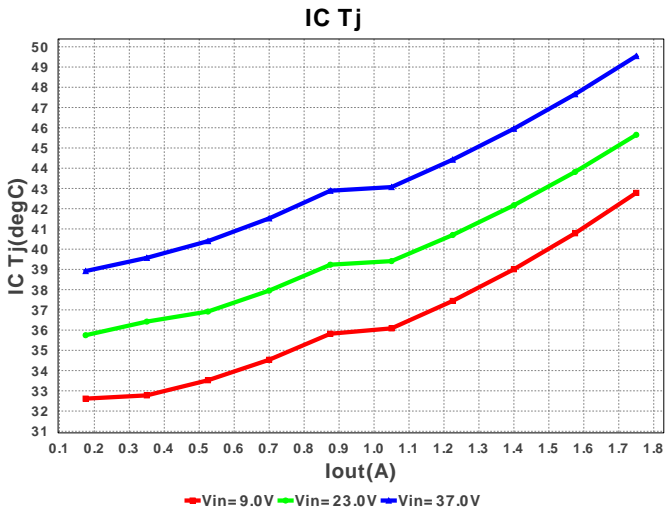
**WEBENCH® Design Report**

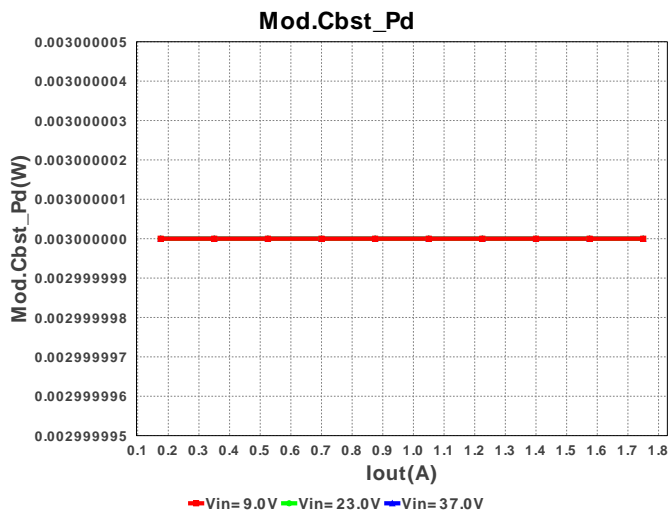
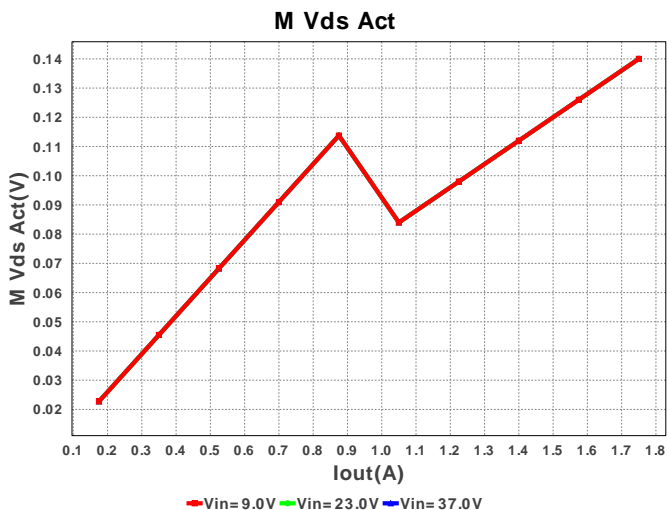
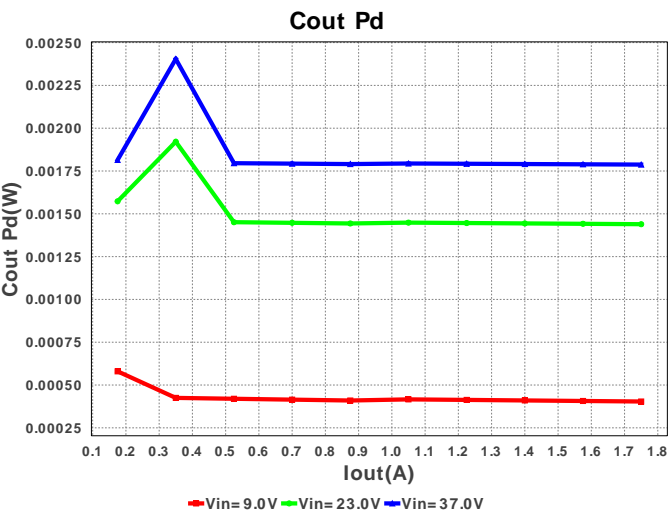
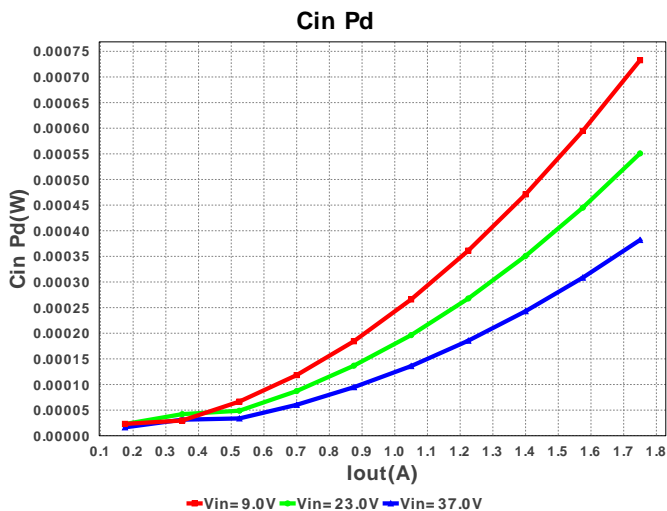
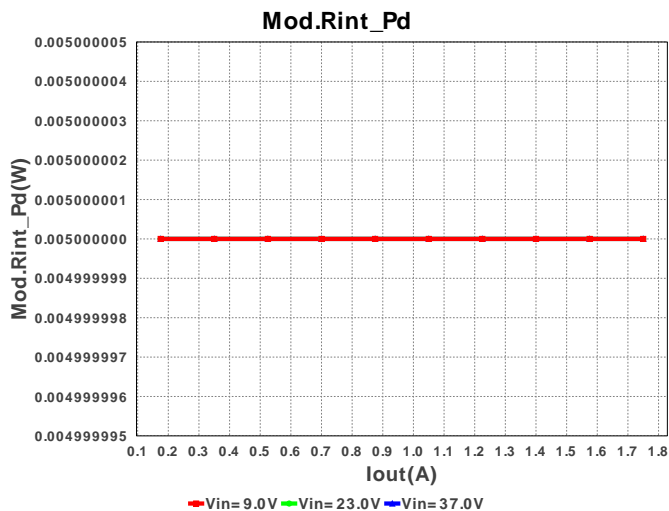
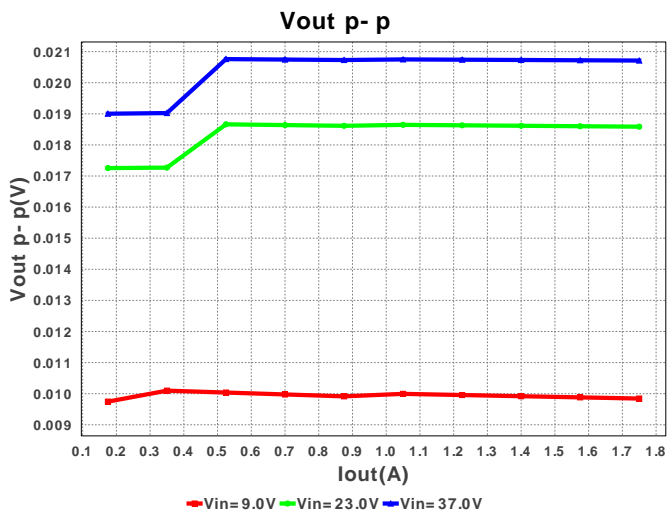
 Design : 1268316/28 LMZ14202TZ-ADJ/NOPB  
 LMZ14202TZ-ADJ/NOPB 9.0V-37.0V to 5.2V @ 1.75A  
 VinMax = 37.0V

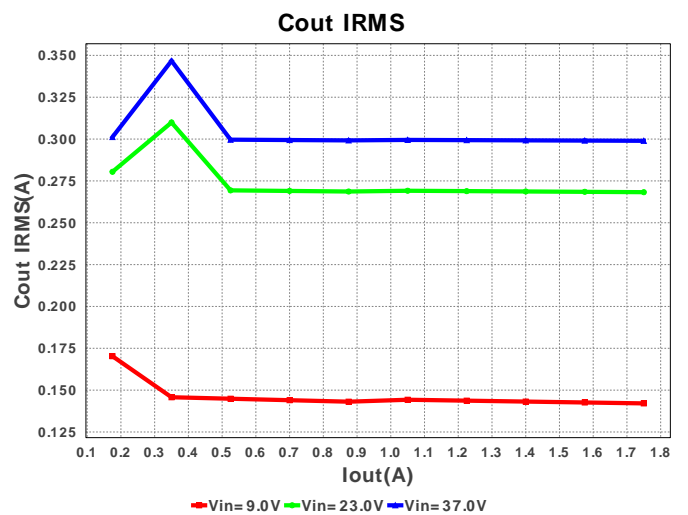
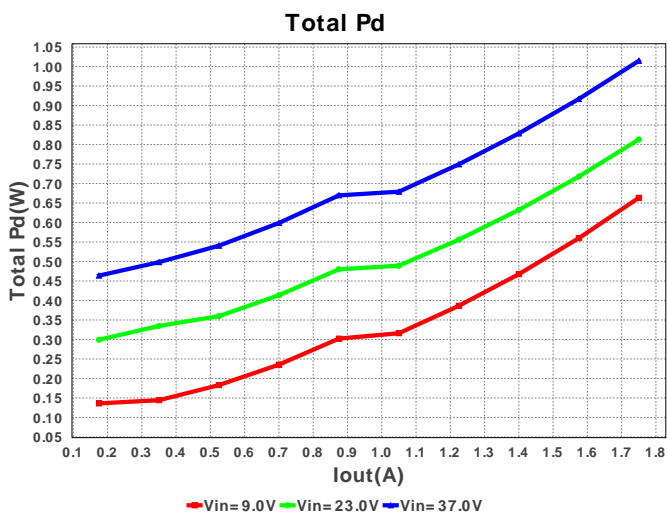
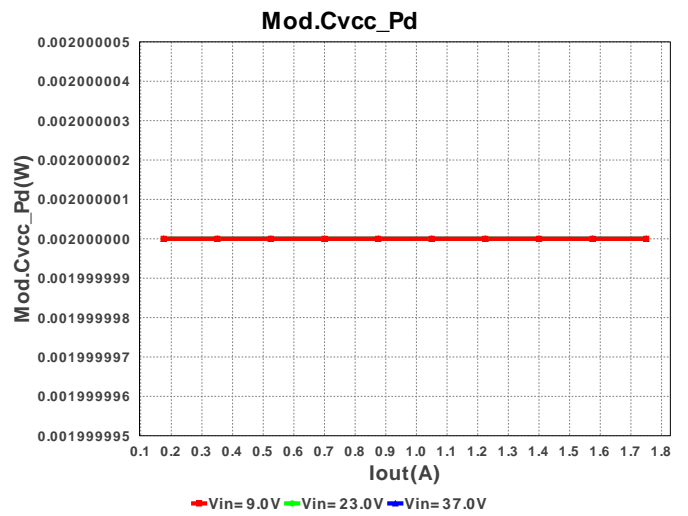
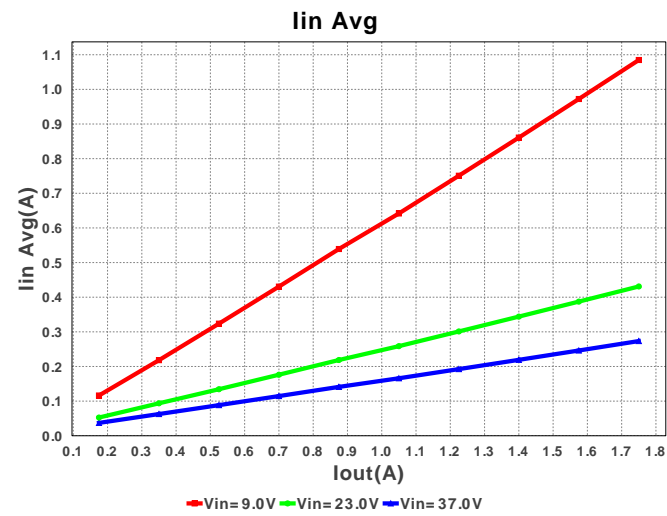
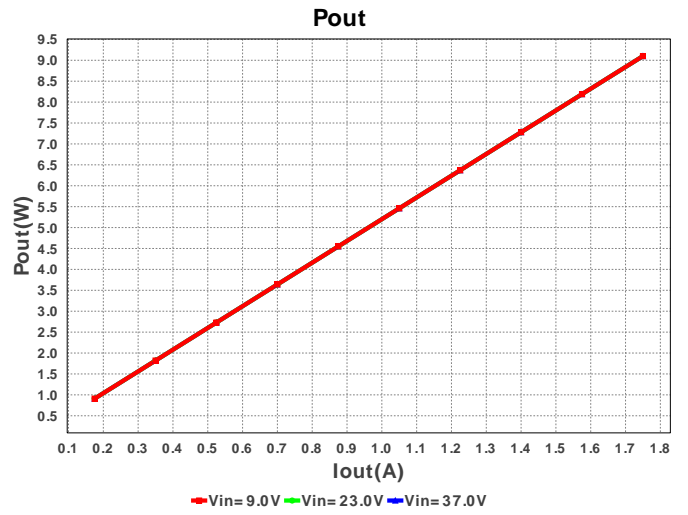
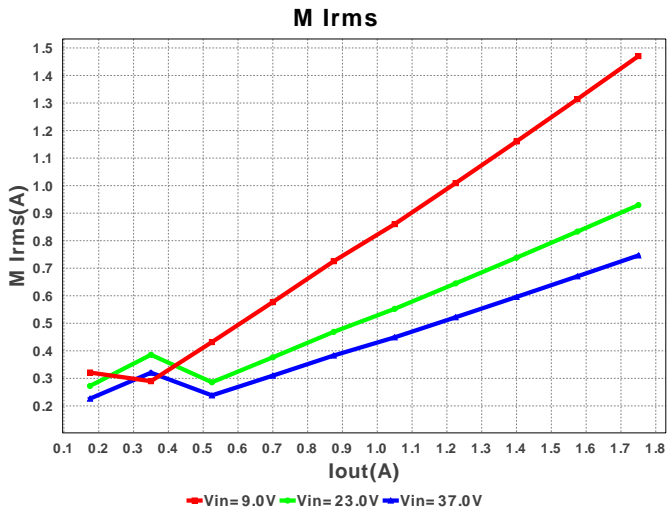
Iout = 1.75A

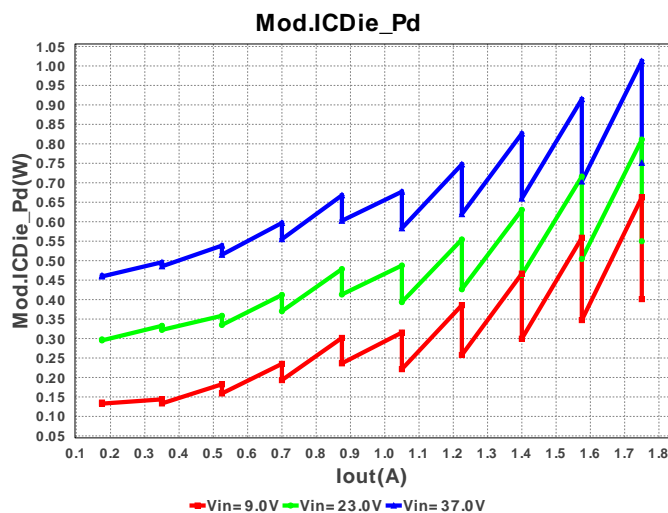

**Electrical BOM**

| #   | Name | Manufacturer      | Part Number                       | Properties   | Qty | Price  | Footprint   |
|-----|------|-------------------|-----------------------------------|--|-----|--------|---|
| 1.  | Cf   | Yageo America     | CC0805KRX7R9BB223<br>Series= X7R  | Cap= 22.0 nF<br>VDC= 50.0 V<br>IRMS= 0.0 A                     | 1   | \$0.01 | <br>0805 7mm2             |
| 2.  | Cin  | MuRata            | GRM31CR71H475KA12L<br>Series= X7R | Cap= 4.7 µF<br>ESR= 3.0 mOhm<br>VDC= 50.0 V<br>IRMS= 4.98 A    | 3   | \$0.10 | <br>1206 11mm2           |
| 3.  | Cout | Panasonic         | 16SVP180M<br>Series= 261          | Cap= 180.0 µF<br>ESR= 20.0 mOhm<br>VDC= 16.0 V<br>IRMS= 3.64 A | 1   | \$0.29 | <br>SM_RADIAL_8MM 113mm2 |
| 4.  | Css  | MuRata            | GRM216R71H103KA01D<br>Series= X7R | Cap= 10.0 nF<br>VDC= 50.0 V<br>IRMS= 0.0 A                     | 1   | \$0.01 | <br>0805 7mm2            |
| 5.  | Renb | Panasonic         | ERJ-6ENF1022V<br>Series= 225      | Res= 10.2 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%           | 1   | \$0.01 | <br>0805 7mm2            |
| 6.  | Rent | Panasonic         | ERJ-6ENF6812V<br>Series= 225      | Res= 68.1 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%           | 1   | \$0.01 | <br>0805 7mm2            |
| 7.  | Rfbb | Panasonic         | ERJ-6ENF1071V<br>Series= 225      | Res= 1.07 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%           | 1   | \$0.01 | <br>0805 7mm2            |
| 8.  | Rfbt | Panasonic         | ERJ-6ENF5901V<br>Series= 225      | Res= 5.9 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%            | 1   | \$0.01 | <br>0805 7mm2            |
| 9.  | Ron  | Panasonic         | ERJ-6ENF9312V<br>Series= 225      | Res= 93.1 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%           | 1   | \$0.01 | <br>0805 7mm2            |
| 10. | U1   | Texas Instruments | LMZ14202TZ-ADJ/NOPB               | Switcher   | 1   | \$7.76 | <br>TZA07A 199mm2        |









## Operating Values

| #   | Name         | Value       | Category | Description                               |
|-----|--------------|-------------|----------|---|
| 1.  | Cin IRMS     | 617.993 mA  | Current  | Input capacitor RMS ripple current        |
| 2.  | Cout IRMS    | 298.959 mA  | Current  | Output capacitor RMS ripple current       |
| 3.  | IC Ipk       | 2.268 A     | Current  | Peak switch current in IC                 |
| 4.  | Iin Avg      | 270.27 mA   | Current  | Average input current                     |
| 5.  | M1 Irms      | 738.194 mA  | Current  | Q lavg                                    |
| 6.  | BOM Count    | 12          | General  | Total Design BOM count                    |
| 7.  | FootPrint    | 392.0 mm2   | General  | Total Foot Print Area of BOM components   |
| 8.  | Frequency    | 446.434 kHz | General  | Switching frequency                       |
| 9.  | IC Tolerance | 20.0 mV     | General  | IC Feedback Tolerance                     |
| 10. | M Vds Act    | 140.0 mV    | General  | Voltage drop across the MosFET            |
| 11. | Pout         | 9.1 W       | General  | Total output power                        |
| 12. | Total BOM    | \$8.41      | General  | Total BOM Cost                            |
| 13. | Vout OP      | 5.2 V       | Op_Point | Operational Output Voltage                |
| 14. | Duty Cycle   | 14.603 %    | Op_point | Duty cycle                                |
| 15. | Efficiency   | 91.001 %    | Op_point | Steady state efficiency                   |
| 16. | IC Tj        | 47.326 degC | Op_point | IC junction temperature                   |
| 17. | ICThetaJA    | 19.3 degC/W | Op_point | IC junction-to-ambient thermal resistance |
| 18. | IOUT_OP      | 1.75 A      | Op_point | Iout operating point                      |
| 19. | VIN_OP       | 37.0 V      | Op_point | Vin operating point                       |
| 20. | Vout p-p     | 20.712 mV   | Op_point | Peak-to-peak output ripple voltage        |
| 21. | Cin Pd       | 381.915 µW  | Power    | Input capacitor power dissipation         |
| 22. | Cout Pd      | 1.788 mW    | Power    | Output capacitor power dissipation        |
| 23. | Total Pd     | 899.899 mW  | Power    | Total Power Dissipation                   |

## Design Inputs

| #  | Name    | Value     | Description            |
|----|---------|-----------|------------------------|
| 1. | Iout    | 1.75 A    | Maximum Output Current |
| 2. | Iout1   | 1.75 Amps | Output Current #1      |
| 3. | VinMax  | 37.0 V    | Maximum input voltage  |
| 4. | VinMin  | 9.0 V     | Minimum input voltage  |
| 5. | Vout    | 5.2 V     | Output Voltage         |
| 6. | Vout1   | 5.2 Volt  | Output Voltage #1      |
| 7. | base_pn | LMZ14202  | Base Product Number    |
| 8. | source  | DC        | Input Source Type      |
| 9. | Ta      | 30.0 degC | Ambient temperature    |

## Design Assistance

1. **LMZ14202** Product Folder : <http://www.ti.com/product/lmz14202> : 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](#).