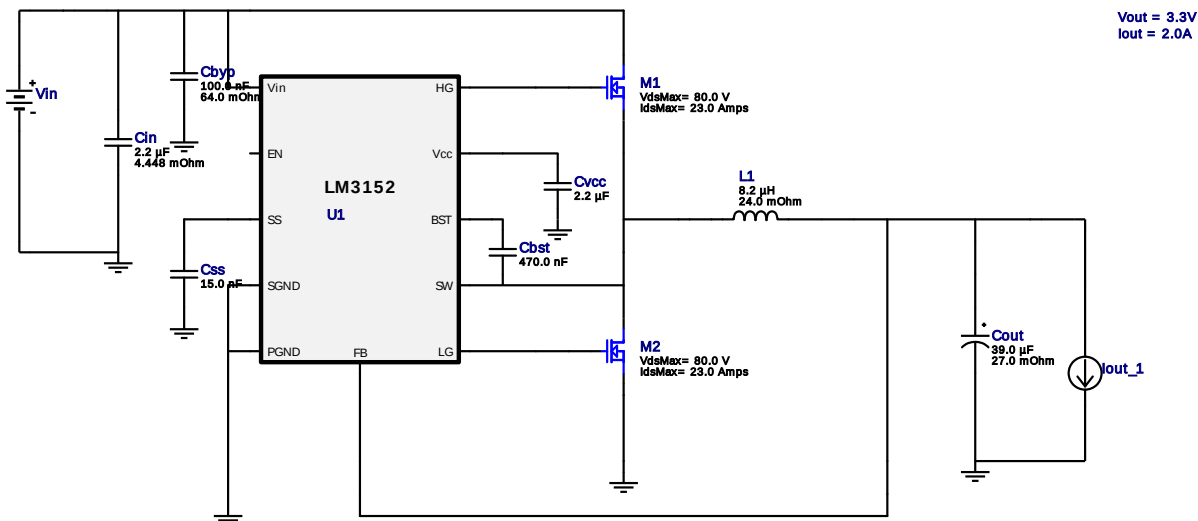


## WEBENCH® Design Report

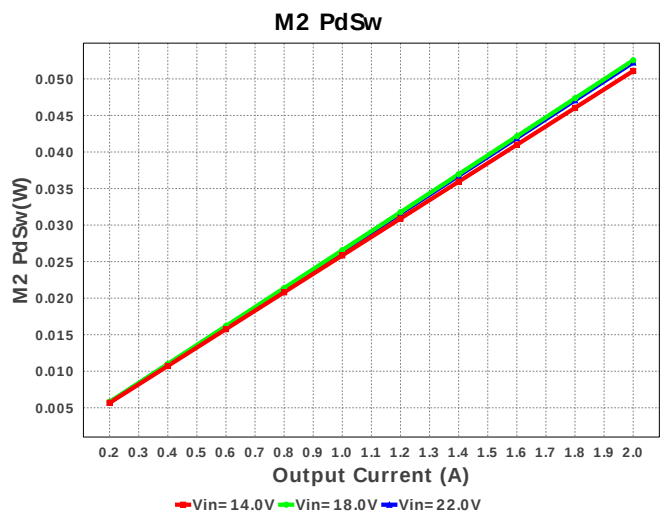
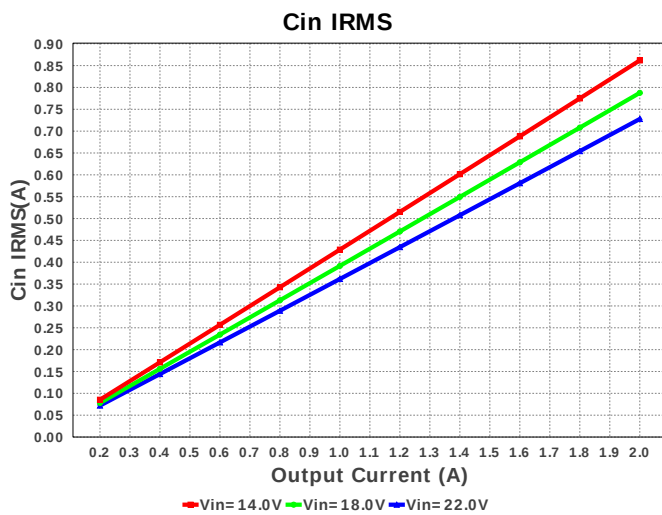
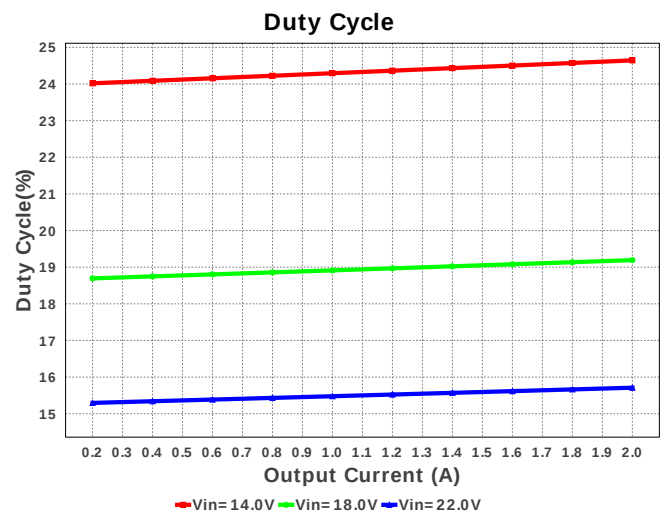
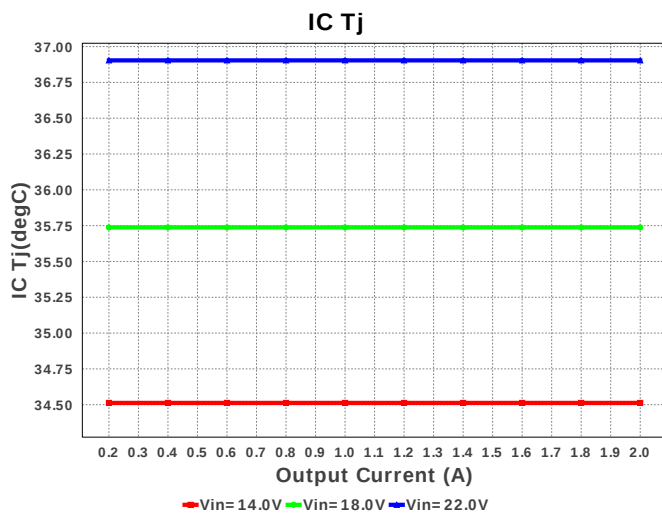
Design : 4800933/8 LM3152MHX-3.3/NOPB  
LM3152MHX-3.3/NOPB 14.0V-22.0V to 3.30V @ 2.0A

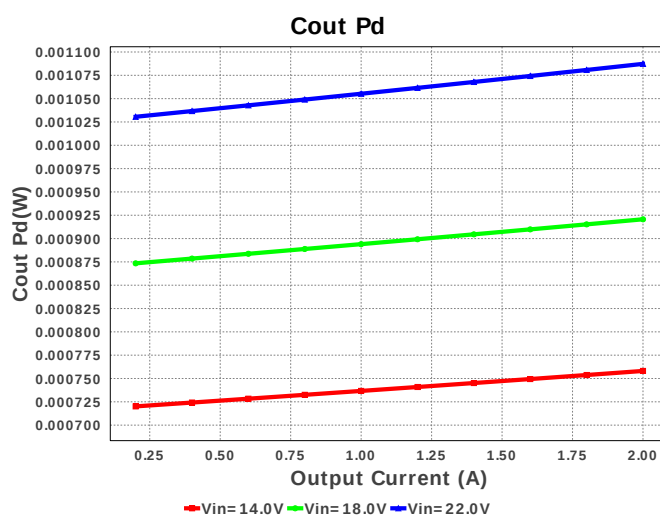
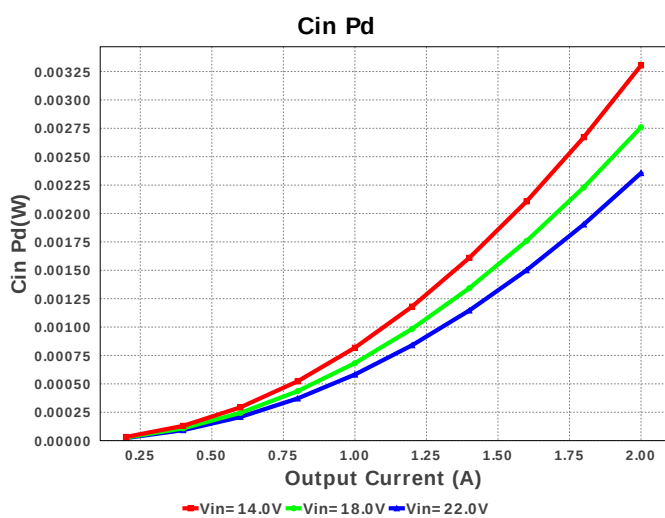
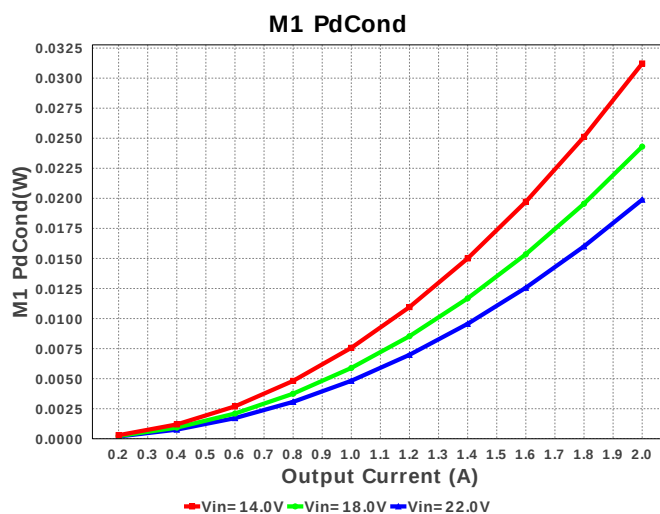
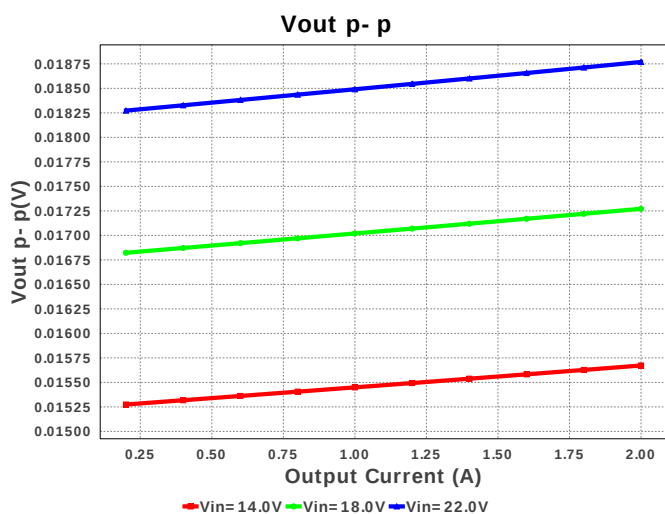
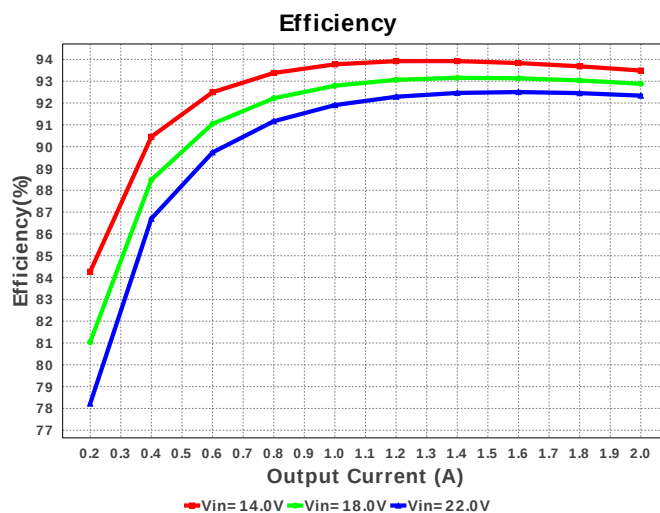
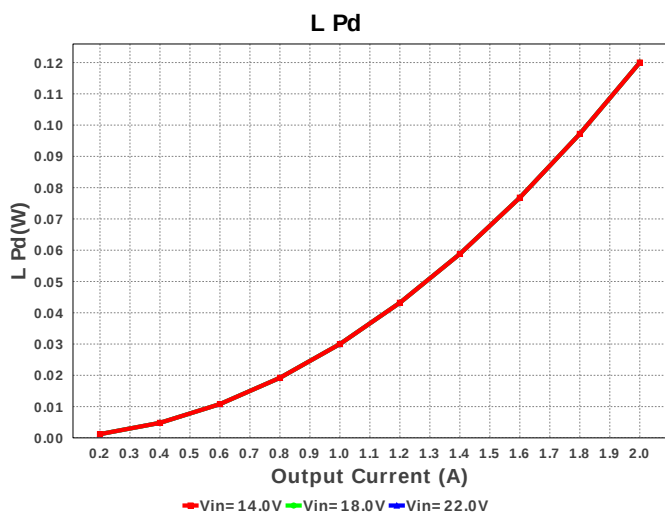


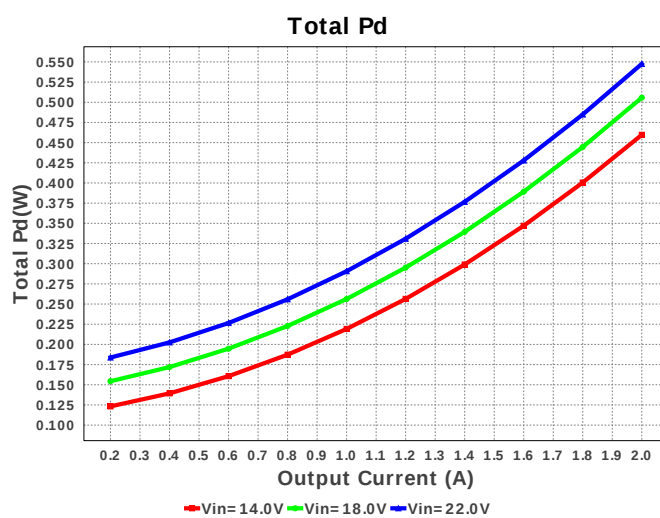
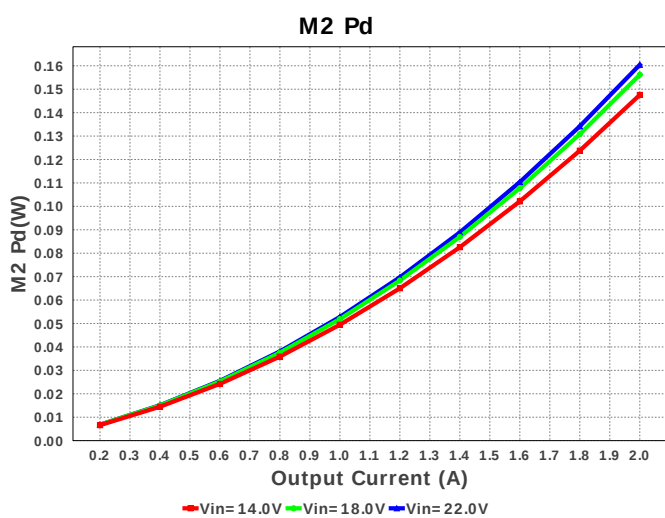
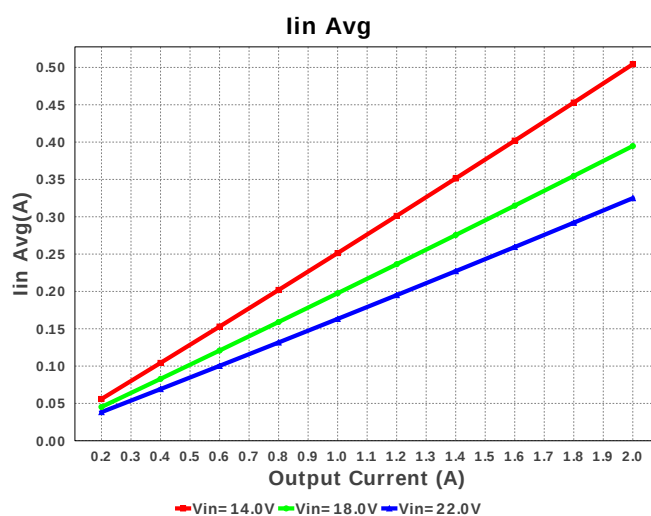
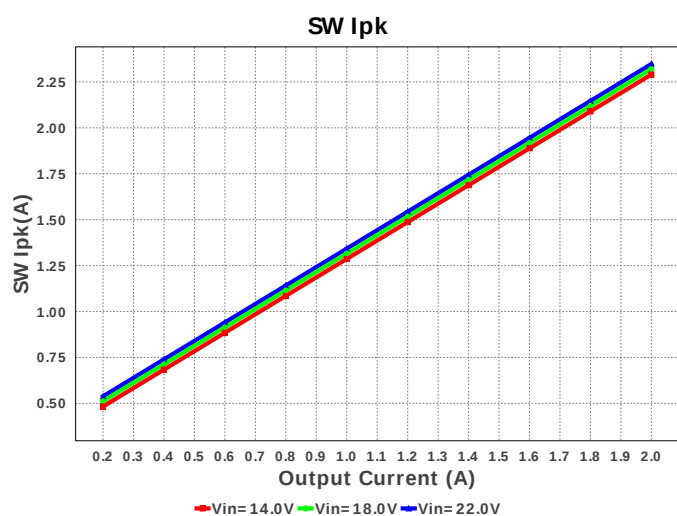
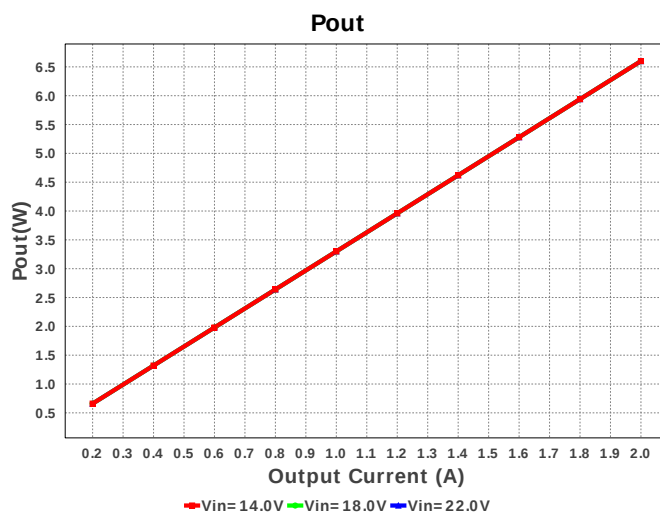
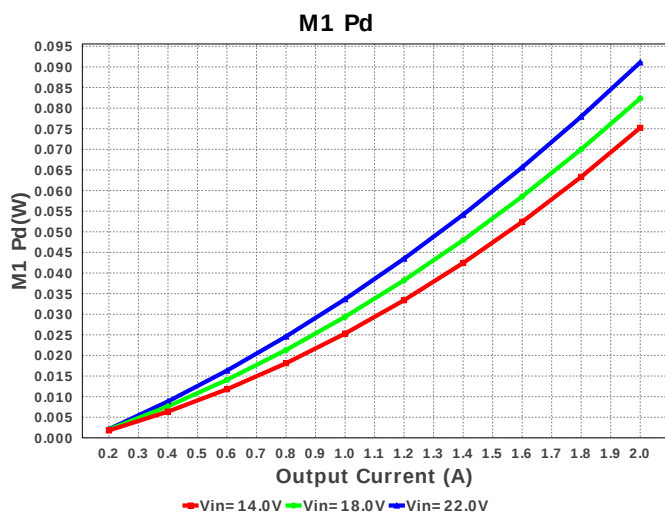
## Electrical BOM

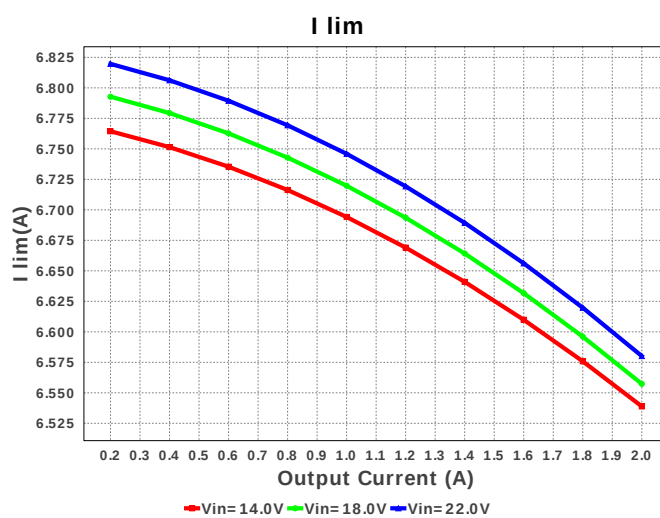
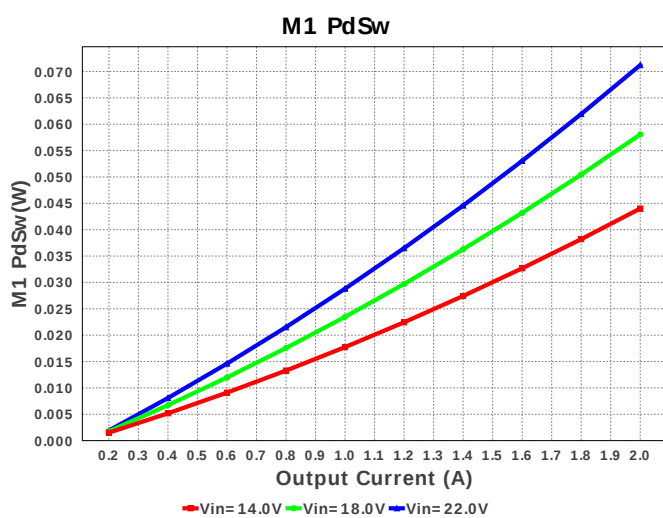
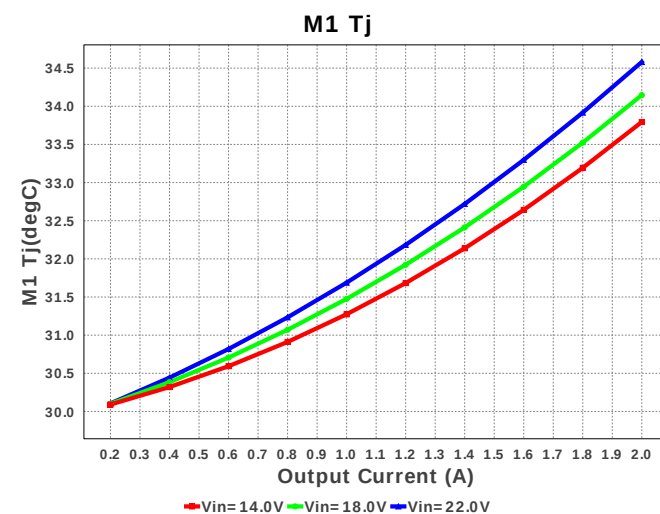
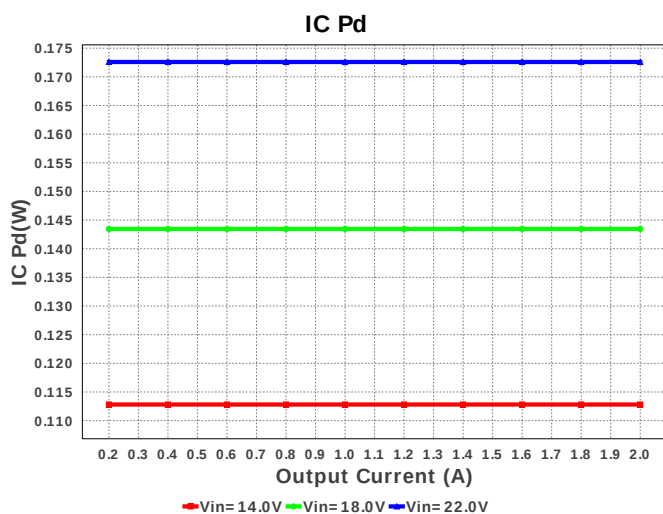
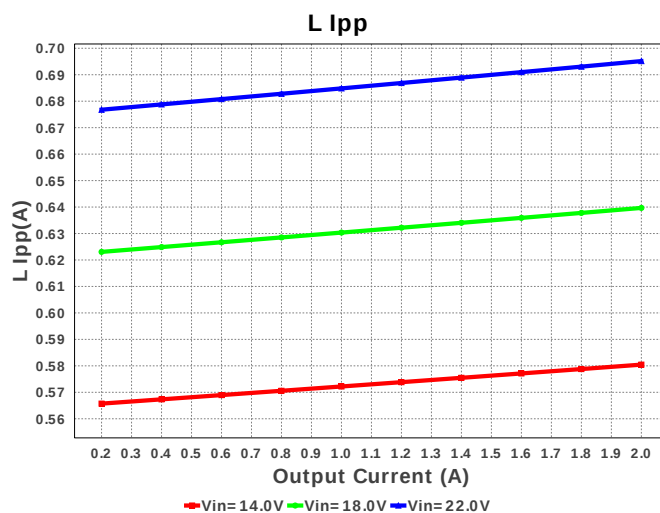
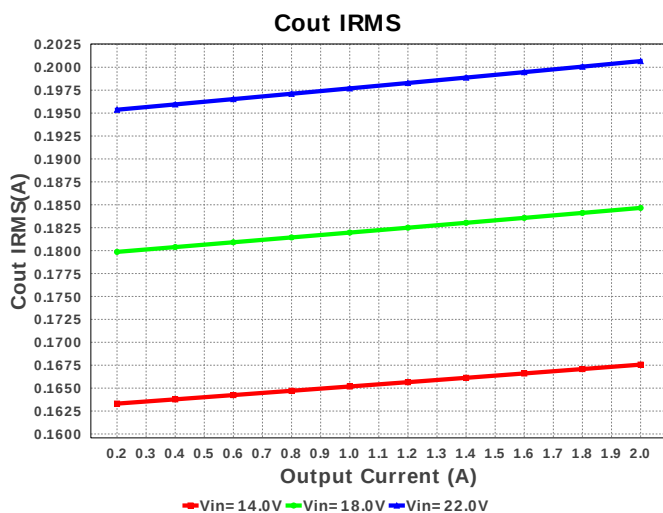
| #  | Name | Manufacturer          | Part Number                       | Properties                                                      | Qty | Price  | Footprint                                                                                                              |
|----|------|-----------------------|-----------------------------------|-----------------------------------------------------------------|-----|--------|------------------------------------------------------------------------------------------------------------------------|
| 1. | Cbst | Taiyo Yuden           | EMK212B7474KD-T<br>Series= X7R    | Cap= 470.0 nF<br>VDC= 16.0 V<br>IRMS= 0.0 A                     | 1   | \$0.02 |  0805 7 mm <sup>2</sup>           |
| 2. | Cbyp | Kemet                 | C0805C104K5RACTU<br>Series= X7R   | Cap= 100.0 nF<br>ESR= 64.0 mOhm<br>VDC= 50.0 V<br>IRMS= 1.64 A  | 1   | \$0.01 |  0805 7 mm <sup>2</sup>           |
| 3. | Cin  | MuRata                | GRM31CR71H225KA88L<br>Series= X7R | Cap= 2.2 uF<br>ESR= 4.448 mOhm<br>VDC= 50.0 V<br>IRMS= 2.2252 A | 1   | \$0.05 |  1206_190 11 mm <sup>2</sup>      |
| 4. | Cout | Panasonic             | 16SVPC39MV<br>Series= SVPC        | Cap= 39.0 uF<br>ESR= 27.0 mOhm<br>VDC= 16.0 V<br>IRMS= 2.35 A   | 1   | \$0.28 |  SM_RADIAL_5MM 58 mm <sup>2</sup> |
| 5. | Css  | Yageo America         | CC0805KRX7R9BB153<br>Series= X7R  | Cap= 15.0 nF<br>VDC= 50.0 V<br>IRMS= 0.0 A                      | 1   | \$0.01 |  0805 7 mm <sup>2</sup>           |
| 6. | Cvcc | Taiyo Yuden           | EMK212B7225KG-T<br>Series= X7R    | Cap= 2.2 uF<br>VDC= 16.0 V<br>IRMS= 0.0 A                       | 1   | \$0.03 |  0805 7 mm <sup>2</sup>           |
| 7. | L1   | Coilcraft             | XAL6060-822MEB                    | L= 8.2 uH<br>DCR= 24.0 mOhm                                     | 1   | \$0.82 |  XAL6060 72 mm <sup>2</sup>       |
| 8. | M1   | Infineon Technologies | BSC340N08NS3 G                    | VdsMax= 80.0 V<br>IdsMax= 23.0 Amps                             | 1   | \$0.19 |  PG-TDSON-8 55 mm <sup>2</sup>    |

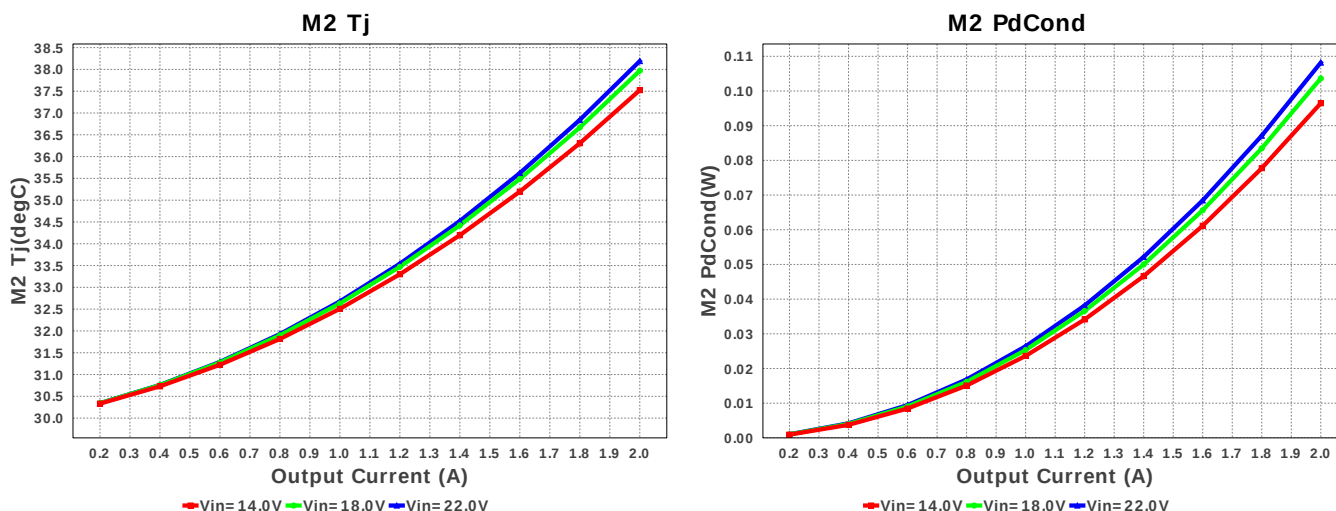
| #   | Name | Manufacturer          | Part Number        | Properties                          | Qty | Price  | Footprint                                                                                                            |
|-----|------|-----------------------|--------------------|-------------------------------------|-----|--------|----------------------------------------------------------------------------------------------------------------------|
| 9.  | M2   | Infineon Technologies | BSC340N08NS3 G     | VdsMax= 80.0 V<br>IdsMax= 23.0 Amps | 1   | \$0.19 | <br>PG-TDSON-8 55 mm <sup>2</sup> |
| 10. | U1   | Texas Instruments     | LM3152MHX-3.3/NOPB | Switcher                            | 1   | \$1.35 | <br>MXA14A 59 mm <sup>2</sup>     |











## Operating Values

| #   | Name           | Value                 | Category | Description                                                                                |
|-----|----------------|-----------------------|----------|--------------------------------------------------------------------------------------------|
| 1.  | Cin IRMS       | 727.803 mA            | Current  | Input capacitor RMS ripple current                                                         |
| 2.  | Cout IRMS      | 200.673 mA            | Current  | Output capacitor RMS ripple current                                                        |
| 3.  | I lim          | 6.579 A               | Current  | Current limit threshold                                                                    |
| 4.  | Iin Avg        | 324.92 mA             | Current  | Average input current                                                                      |
| 5.  | L Ipp          | 695.15 mA             | Current  | Peak-to-peak inductor ripple current                                                       |
| 6.  | SW Ipk         | 2.348 A               | Current  | Peak switch current                                                                        |
| 7.  | BOM Count      | 10                    | General  | Total Design BOM count                                                                     |
| 8.  | FootPrint      | 337.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components                                                    |
| 9.  | Frequency      | 515.4 kHz             | General  | Switching frequency                                                                        |
| 10. | IC Tolerance   | 66.0 mV               | General  | IC Feedback Tolerance                                                                      |
| 11. | Mode           | CCM                   | General  | Conduction Mode                                                                            |
| 12. | Pout           | 6.6 W                 | General  | Total output power                                                                         |
| 13. | Total BOM      | \$2.95                | General  | Total BOM Cost                                                                             |
| 14. | Duty Cycle     | 15.711 %              | Op_point | Duty cycle                                                                                 |
| 15. | Efficiency     | 92.331 %              | Op_point | Steady state efficiency                                                                    |
| 16. | IC Tj          | 41.218 degC           | Op_point | IC junction temperature                                                                    |
| 17. | IOUT_OP        | 2.0 A                 | Op_point | Iout operating point                                                                       |
| 18. | M1 Tj          | 34.581 degC           | Op_point | M1 MOSFET junction temperature                                                             |
| 19. | M2 Tj          | 38.221 degC           | Op_point | M2 MOSFET junction temperature                                                             |
| 20. | VIN_OP         | 22.0 V                | Op_point | Vin operating point                                                                        |
| 21. | Vout p-p       | 18.769 mV             | Op_point | Peak-to-peak output ripple voltage                                                         |
| 22. | Cin Pd         | 2.356 mW              | Power    | Input capacitor power dissipation                                                          |
| 23. | Cout Pd        | 1.087 mW              | Power    | Output capacitor power dissipation                                                         |
| 24. | IC Pd          | 172.59 mW             | Power    | IC power dissipation                                                                       |
| 25. | L Pd           | 120.0 mW              | Power    | Inductor power dissipation                                                                 |
| 26. | M1 Pd          | 91.104 mW             | Power    | M1 MOSFET total power dissipation                                                          |
| 27. | M1 PdCond      | 19.895 mW             | Power    | M1 MOSFET conduction losses                                                                |
| 28. | M1 PdSw        | 71.209 mW             | Power    | M1 MOSFET switching losses                                                                 |
| 29. | M2 Pd          | 161.044 mW            | Power    | M2 MOSFET total power dissipation                                                          |
| 30. | M2 PdCond      | 108.21 mW             | Power    | M2 MOSFET conduction losses                                                                |
| 31. | M2 PdSw        | 52.834 mW             | Power    | M2 MOSFET switching losses                                                                 |
| 32. | Total Pd       | 548.199 mW            | Power    | Total Power Dissipation                                                                    |
| 33. | Vout Tolerance | 2.0 %                 |          | 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 | LM3152 | Base Product Number    |
| 6. | source  | DC     | Input Source Type      |
| 7. | Ta      | 30.0   | Ambient temperature    |

## Design Assistance

1. **LM3152** Product Folder : <http://www.ti.com/product/LM3152> : contains the data sheet and other resources.

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