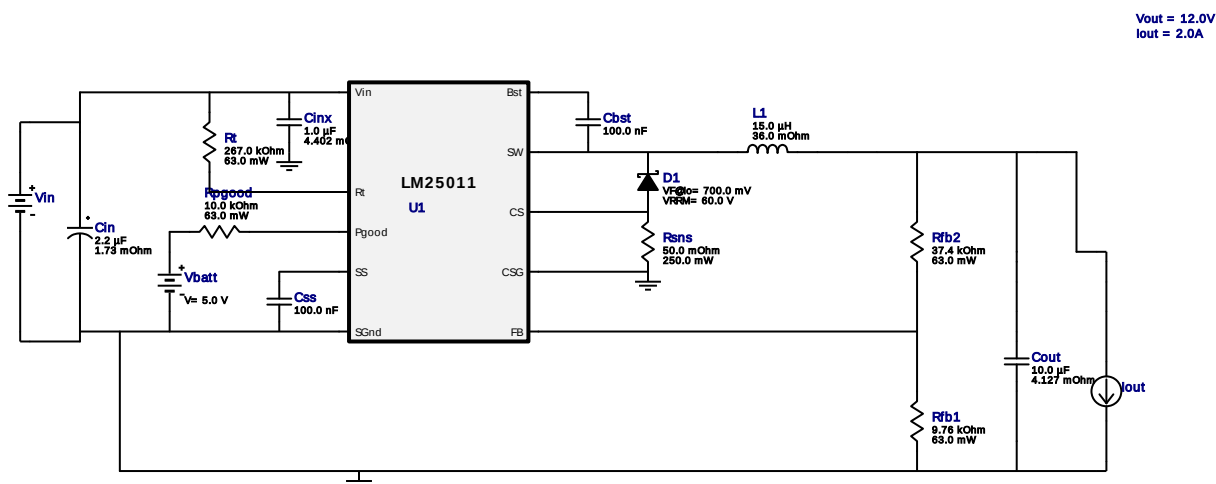
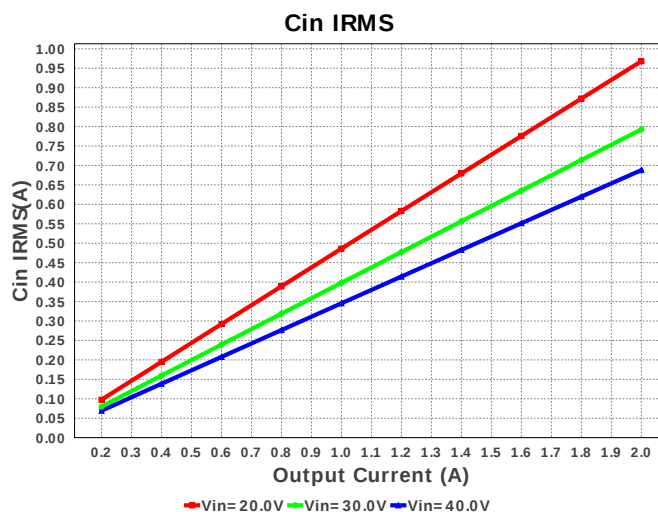
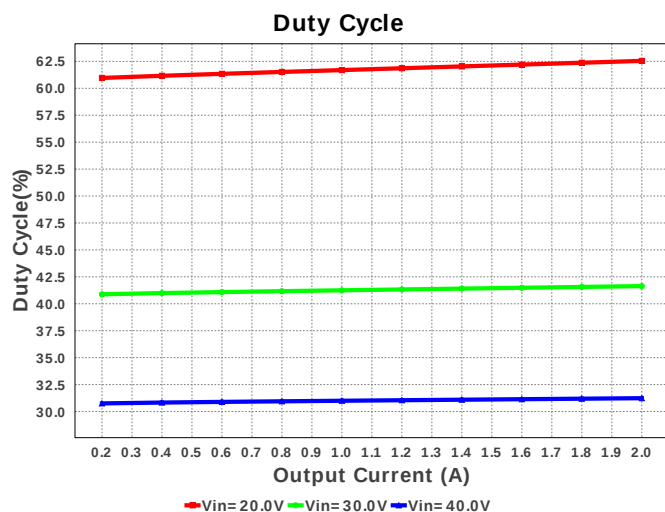
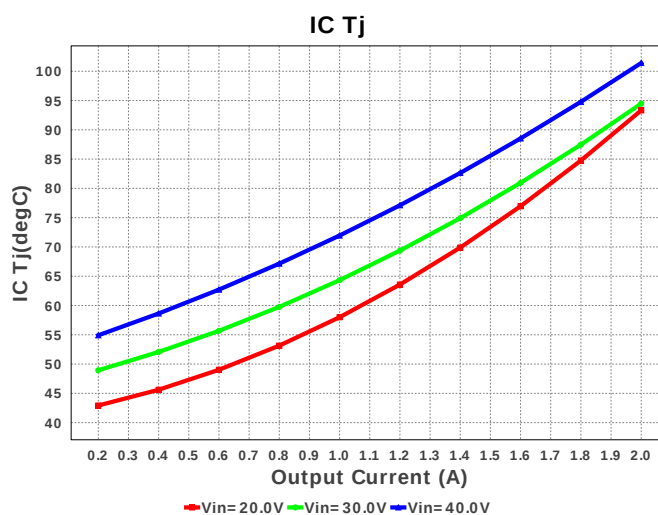
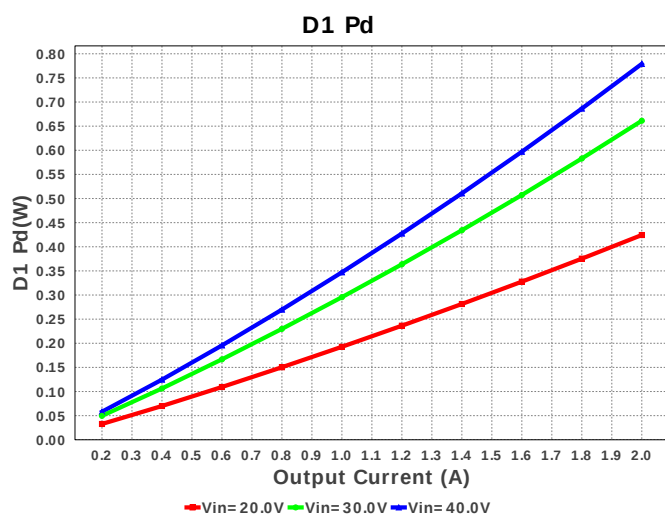


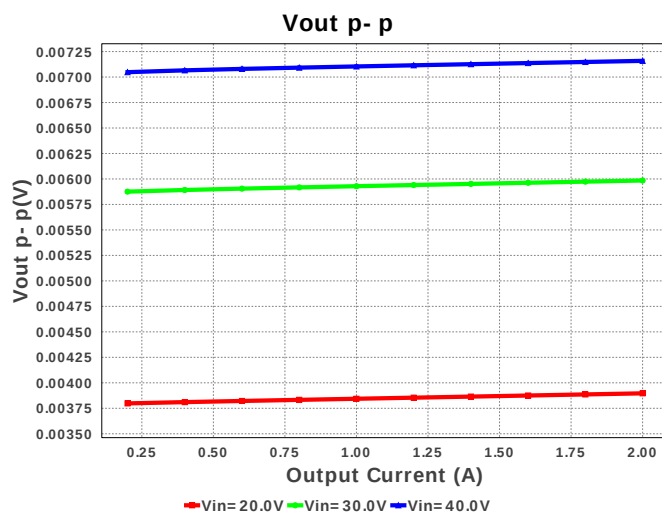
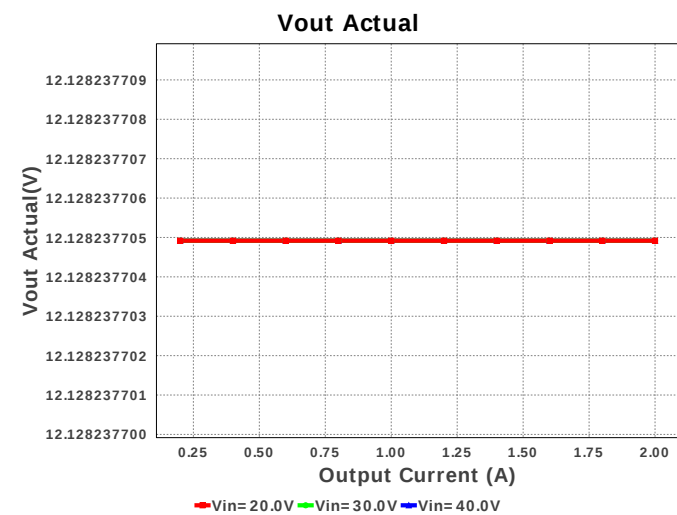
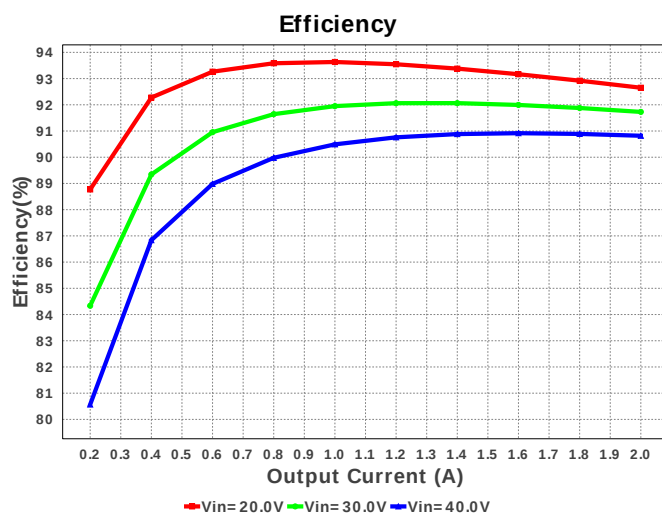
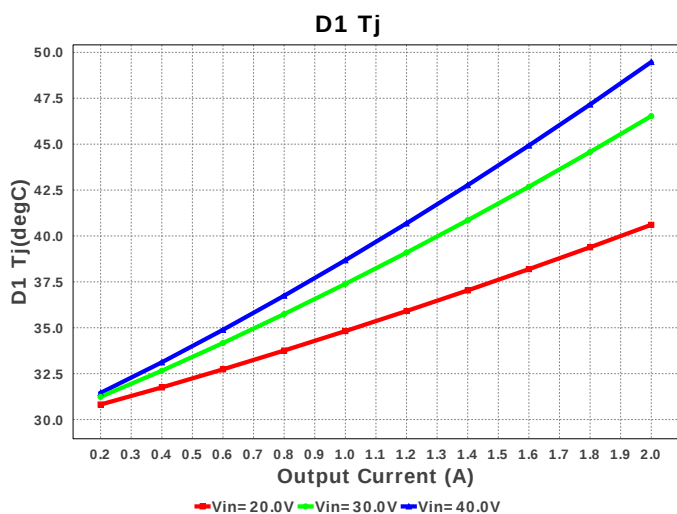
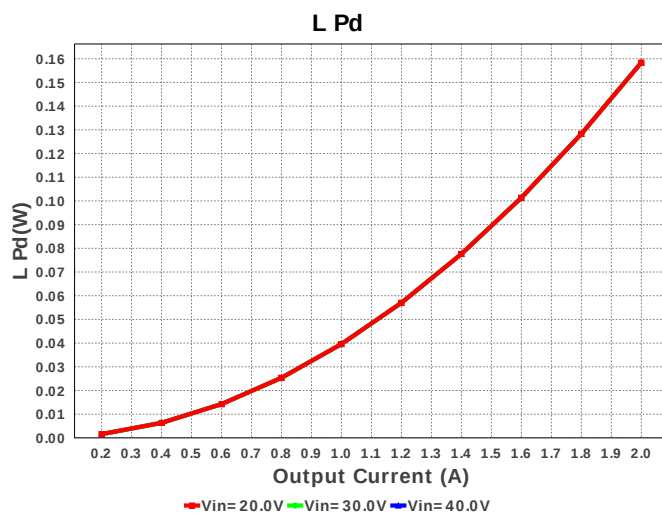
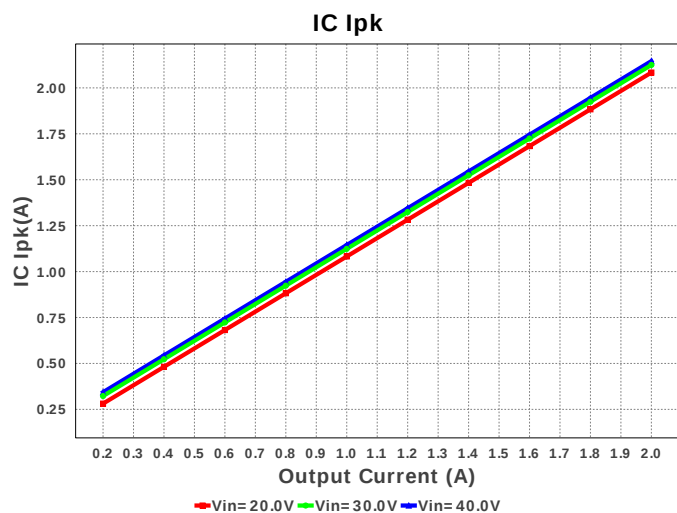


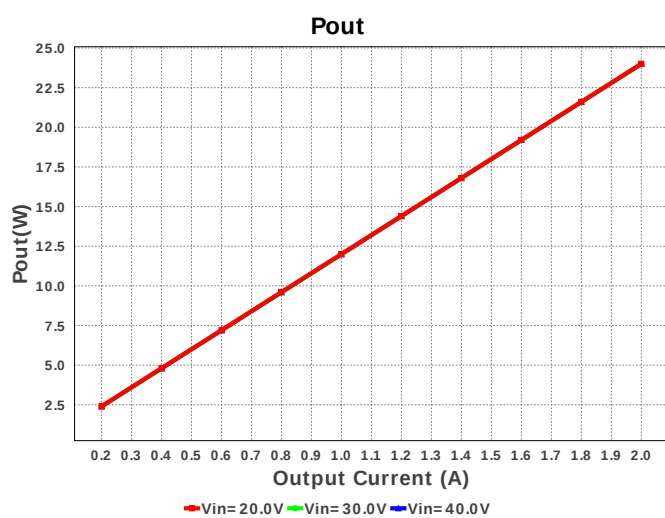
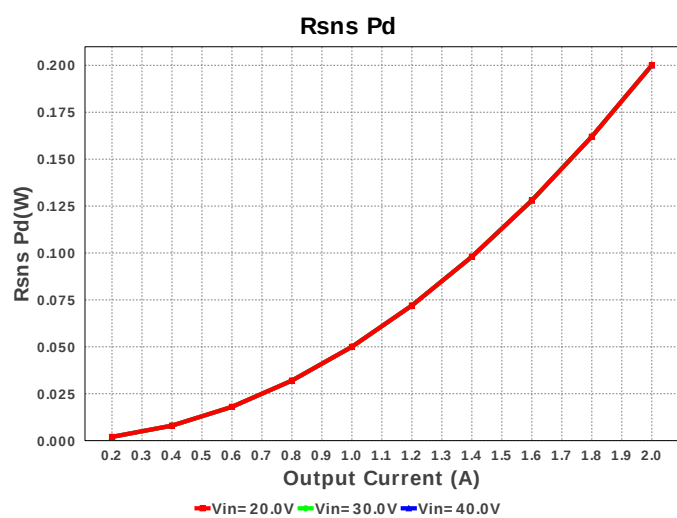
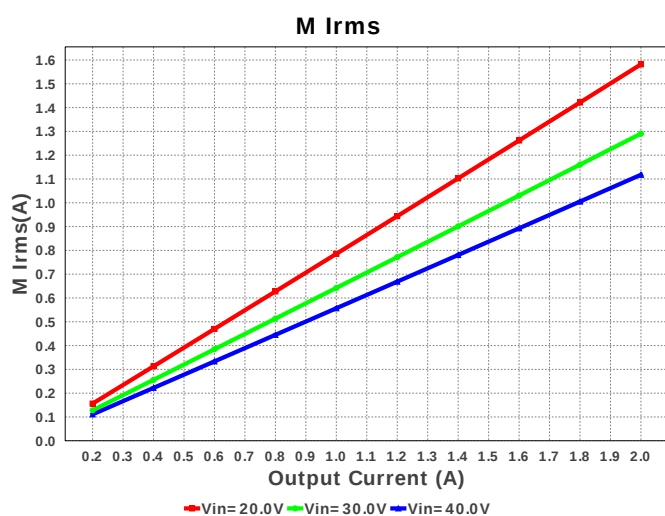
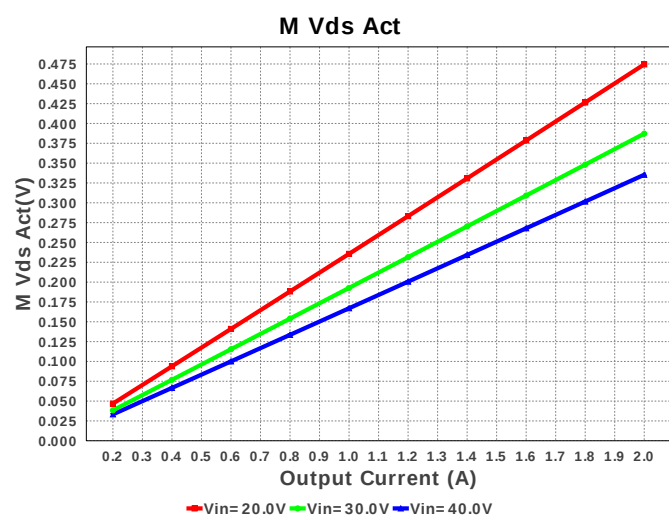
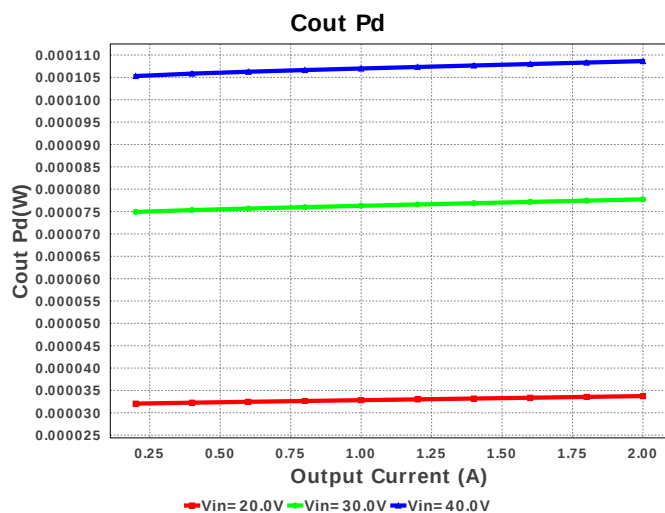
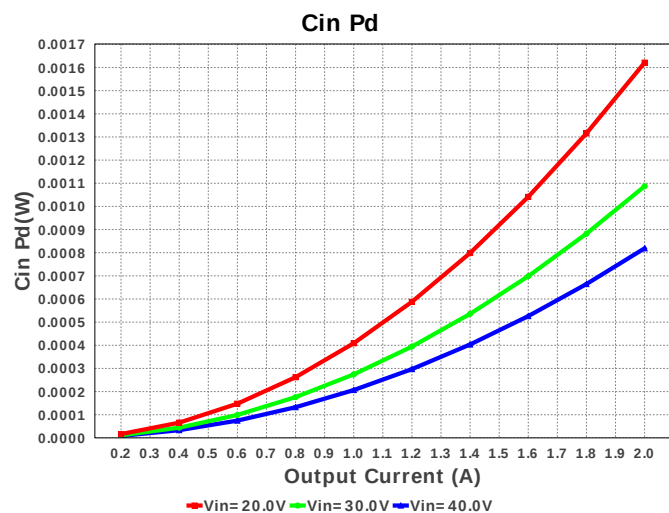
## Electrical BOM

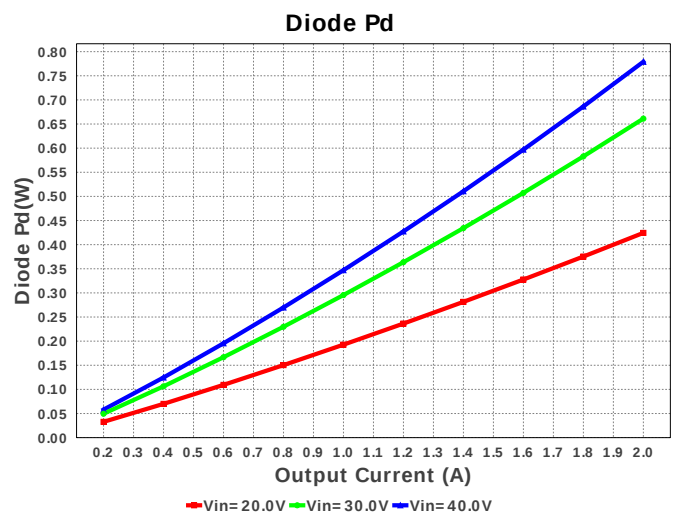
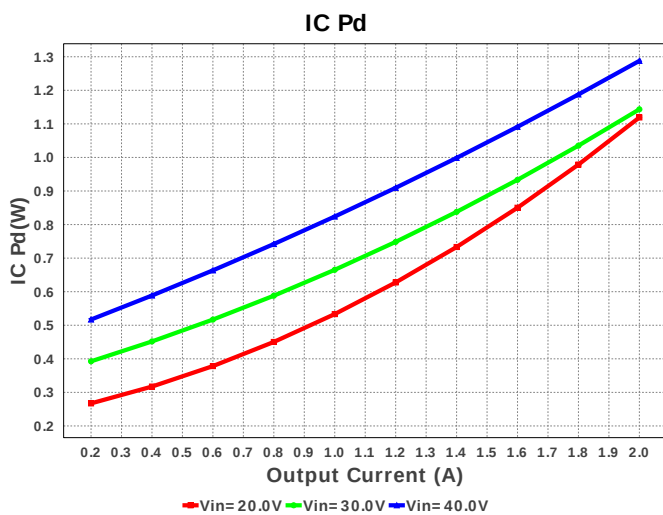
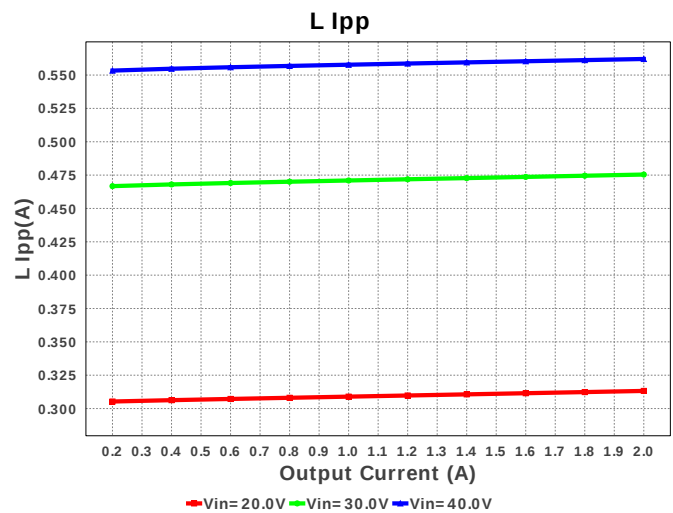
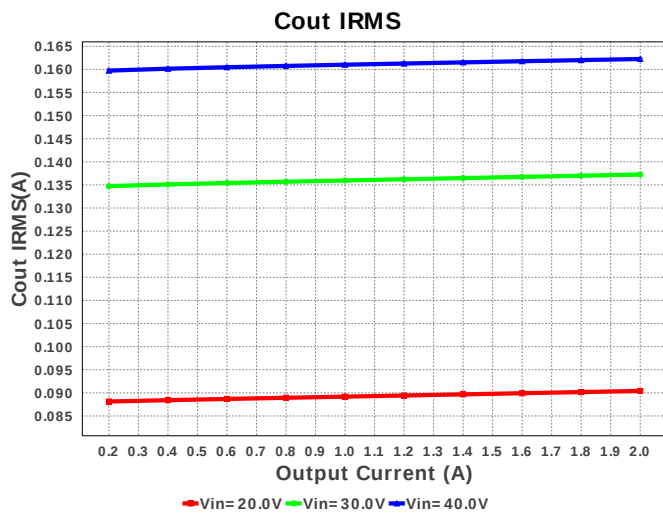
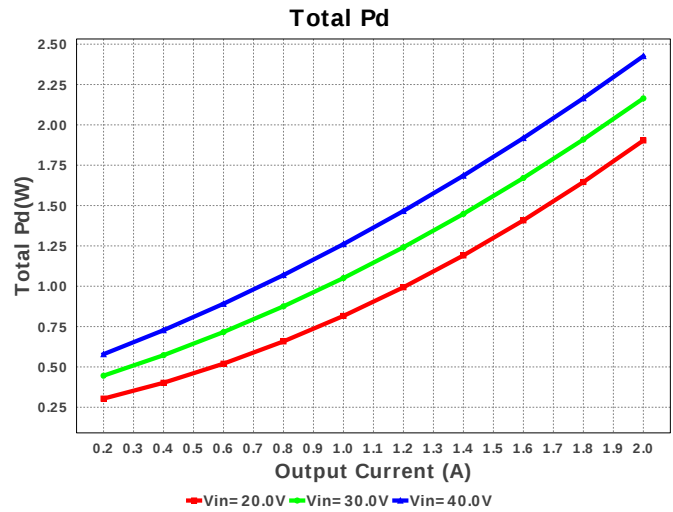
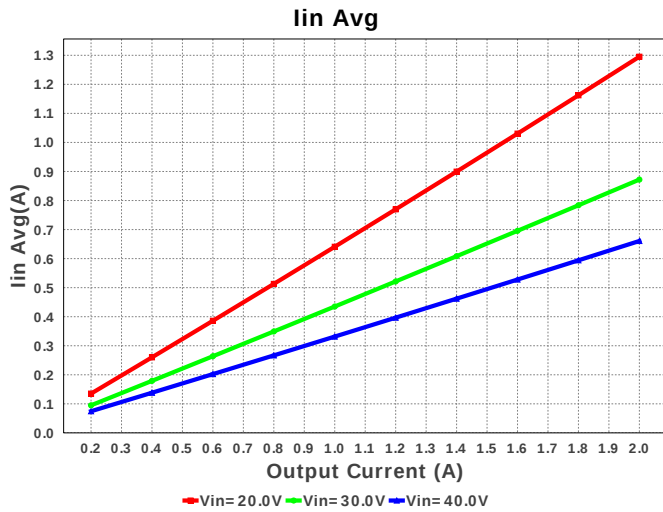
| #  | Name | Manufacturer | Part Number                          | Properties                                                        | Qty | Price  | Footprint                                                                                                         |
|----|------|--------------|--------------------------------------|-------------------------------------------------------------------|-----|--------|-------------------------------------------------------------------------------------------------------------------|
| 1. | Cbst | MuRata       | GRM21BR71E104KA01L<br>Series= X7R    | Cap= 100.0 nF<br>VDC= 25.0 V<br>IRMS= 0.0 A                       | 1   | \$0.01 |  0805 7 mm <sup>2</sup>      |
| 2. | Cin  | TDK          | C3225X7R2A225K230AB<br>Series= X7R   | Cap= 2.2 uF<br>ESR= 1.73 mOhm<br>VDC= 100.0 V<br>IRMS= 5.5932 A   | 1   | \$0.19 |  1210_250 15 mm <sup>2</sup> |
| 3. | Cinx | MuRata       | GRM21BR71H105KA12L<br>Series= X7R    | Cap= 1.0 uF<br>ESR= 4.402 mOhm<br>VDC= 50.0 V<br>IRMS= 1.677 A    | 1   | \$0.05 |  0805 7 mm <sup>2</sup>      |
| 4. | Cout | MuRata       | GRM21BR61C106KE15L<br>Series= X5R    | Cap= 10.0 uF<br>ESR= 4.127 mOhm<br>VDC= 16.0 V<br>IRMS= 2.46634 A | 1   | \$0.03 |  0805 7 mm <sup>2</sup>      |
| 5. | Css  | MuRata       | GRM21BR71E104KA01L<br>Series= X7R    | Cap= 100.0 nF<br>VDC= 25.0 V<br>IRMS= 0.0 A                       | 1   | \$0.01 |  0805 7 mm <sup>2</sup>      |
| 6. | D1   | Diodes Inc.  | B260A-13-F                           | VF@Io= 700.0 mV<br>VRRM= 60.0 V                                   | 1   | \$0.09 |  SMA 37 mm <sup>2</sup>      |
| 7. | L1   | Bourns       | SRR1208-150ML                        | L= 15.0 uH<br>DCR= 36.0 mOhm                                      | 1   | \$0.37 |  SRR1208 216 mm <sup>2</sup> |
| 8. | Rfb1 | Vishay-Dale  | CRCW04029K76FKED<br>Series= CRCW..e3 | Res= 9.76 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%               | 1   | \$0.01 |  0402 3 mm <sup>2</sup>      |
| 9. | Rfb2 | Vishay-Dale  | CRCW040237K4FKED<br>Series= CRCW..e3 | Res= 37.4 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%               | 1   | \$0.01 |  0402 3 mm <sup>2</sup>      |

| #   | Name   | Manufacturer      | Part Number                          | Properties                                           | Qty | Price  | Footprint                                                                                                     |
|-----|--------|-------------------|--------------------------------------|------------------------------------------------------|-----|--------|---------------------------------------------------------------------------------------------------------------|
| 10. | Rpgood | Vishay-Dale       | CRCW040210K0FKED<br>Series= CRCW..e3 | Res= 10.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%  | 1   | \$0.01 |  0402 3 mm <sup>2</sup>    |
| 11. | Rsns   | Bourns            | CRM0805-FW-R050ELF<br>Series= ?      | Res= 50.0 mOhm<br>Power= 250.0 mW<br>Tolerance= 1.0% | 1   | \$0.10 |  0805 7 mm <sup>2</sup>    |
| 12. | Rt     | Vishay-Dale       | CRCW0402267KFKED<br>Series= CRCW..e3 | Res= 267.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0% | 1   | \$0.01 |  0402 3 mm <sup>2</sup>    |
| 13. | U1     | Texas Instruments | LM25011MYX/NOPB                      | Switcher                                             | 1   | \$0.95 |  MUC10A 24 mm <sup>2</sup> |









## Operating Values

| #   | Name         | Value                 | Category | Description                             |
|-----|--------------|-----------------------|----------|-----------------------------------------|
| 1.  | Cin IRMS     | 688.006 mA            | Current  | Input capacitor RMS ripple current      |
| 2.  | Cout IRMS    | 162.25 mA             | Current  | Output capacitor RMS ripple current     |
| 3.  | IC Ipk       | 2.281 A               | Current  | Peak switch current in IC               |
| 4.  | Iin Avg      | 660.65 mA             | Current  | Average input current                   |
| 5.  | L Ipp        | 562.05 mA             | Current  | Peak-to-peak inductor ripple current    |
| 6.  | M Irms       | 1.118 A               | Current  | MOSFET RMS current                      |
| 7.  | BOM Count    | 13                    | General  | Total Design BOM count                  |
| 8.  | FootPrint    | 337.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components |
| 9.  | Frequency    | 1.037 MHz             | General  | Switching frequency                     |
| 10. | IC Tolerance | 50.0 mV               | General  | IC Feedback Tolerance                   |
| 11. | M Vds Act    | 335.333 mV            | General  | Voltage drop across the MosFET          |

| #   | Name           | Value        | Category | Description                                                                                |
|-----|----------------|--------------|----------|--------------------------------------------------------------------------------------------|
| 12. | Pout           | 24.0 W       | General  | Total output power                                                                         |
| 13. | Total BOM      | \$1.84       | General  | Total BOM Cost                                                                             |
| 14. | D1 Tj          | 49.477 degC  | Op_Point | D1 junction temperature                                                                    |
| 15. | Vout Actual    | 12.128 V     | Op_Point | Vout Actual calculated based on selected voltage divider resistors                         |
| 16. | Vout OP        | 12.0 V       | Op_Point | Operational Output Voltage                                                                 |
| 17. | Duty Cycle     | 31.236 %     | Op_point | Duty cycle                                                                                 |
| 18. | Efficiency     | 90.819 %     | Op_point | Steady state efficiency                                                                    |
| 19. | IC Tj          | 101.411 degC | Op_point | IC junction temperature                                                                    |
| 20. | ICThetaJA      | 48.0 degC/W  | Op_point | IC junction-to-ambient thermal resistance                                                  |
| 21. | IOUT_OP        | 2.0 A        | Op_point | Iout operating point                                                                       |
| 22. | VIN_OP         | 40.0 V       | Op_point | Vin operating point                                                                        |
| 23. | Vout p-p       | 7.159 mV     | Op_point | Peak-to-peak output ripple voltage                                                         |
| 24. | Cin Pd         | 818.899 µW   | Power    | Input capacitor power dissipation                                                          |
| 25. | Cout Pd        | 108.644 µW   | Power    | Output capacitor power dissipation                                                         |
| 26. | D1 Pd          | 779.075 mW   | Power    | Output Diode Power Dissipation                                                             |
| 27. | Diode Pd       | 779.075 mW   | Power    | Diode power dissipation                                                                    |
| 28. | IC Pd          | 1.488 W      | Power    | IC power dissipation                                                                       |
| 29. | L Pd           | 158.4 mW     | Power    | Inductor power dissipation                                                                 |
| 30. | Rsns Pd        | 74.124 mW    | Power    | Current Limit Sense Resistor Power Dissipation                                             |
| 31. | Total Pd       | 2.5 W        | Power    | Total Power Dissipation                                                                    |
| 32. | Vout Tolerance | 3.626 %      |          | 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  | 40.0    | Maximum input voltage              |
| 3. | VinMin  | 20.0    | Minimum input voltage              |
| 4. | Vout    | 12.0    | Output Voltage                     |
| 5. | base_pn | LM25011 | Texas Instruments Base Part Number |
| 6. | source  | DC      | Input Source Type                  |
| 7. | ta      | 30.0    | Ambient temperature                |

## Design Assistance

1. LM25011 Product Folder : <http://www.ti.com/product/LM25011> : contains the data sheet and other resources.

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