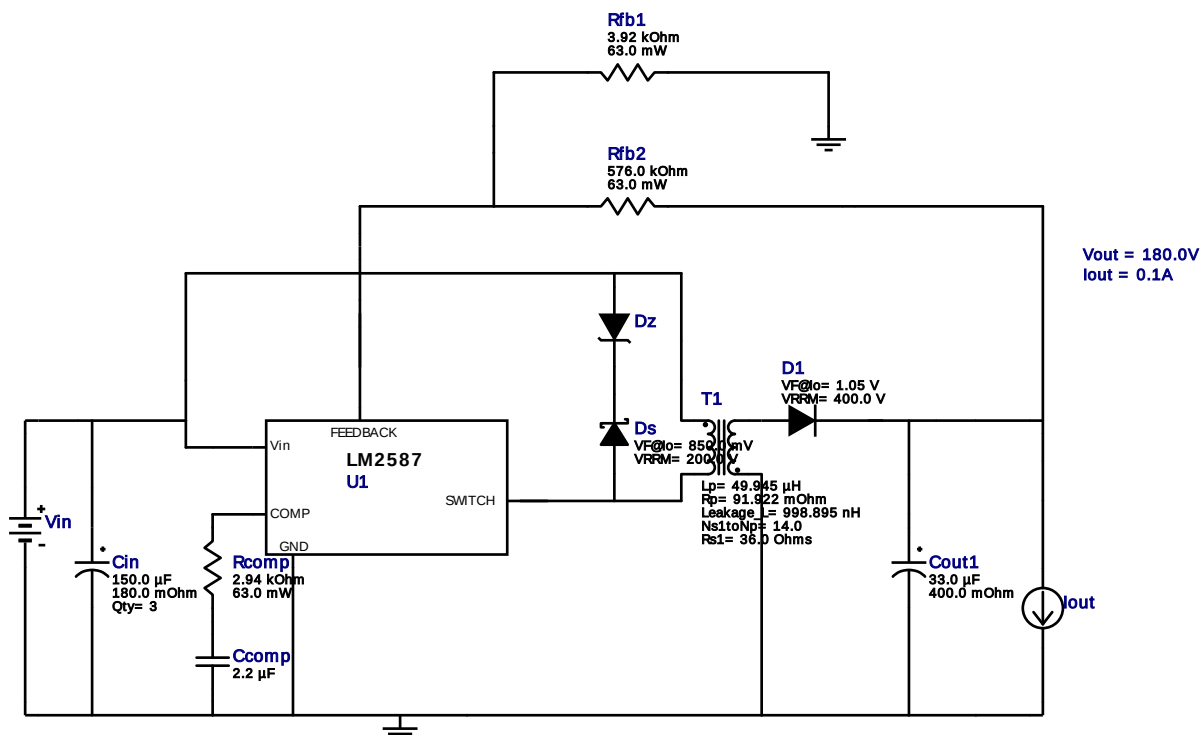


## WEBENCH® Design Report

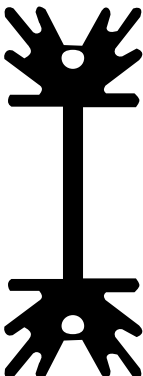
Design : 3893481/38 LM2587T-ADJ/NOPB  
LM2587T-ADJ/NOPB 10.0V-30.0V to 180.00V @ 0.1A

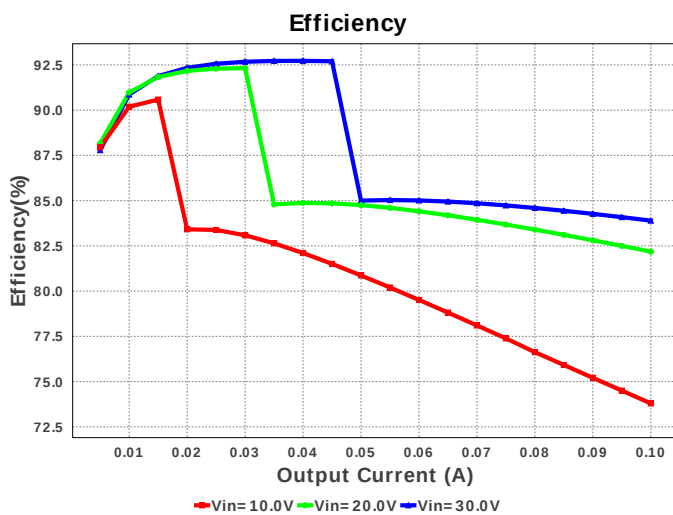
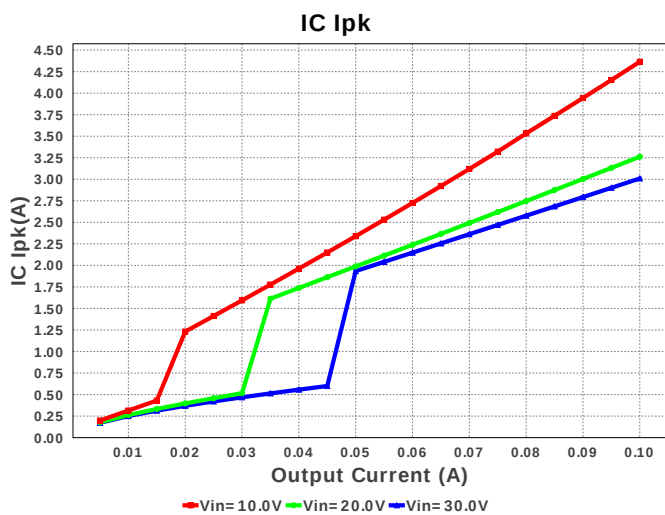
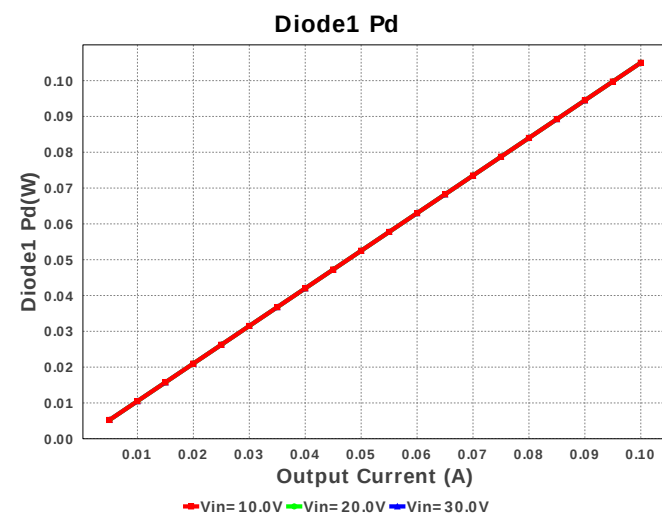
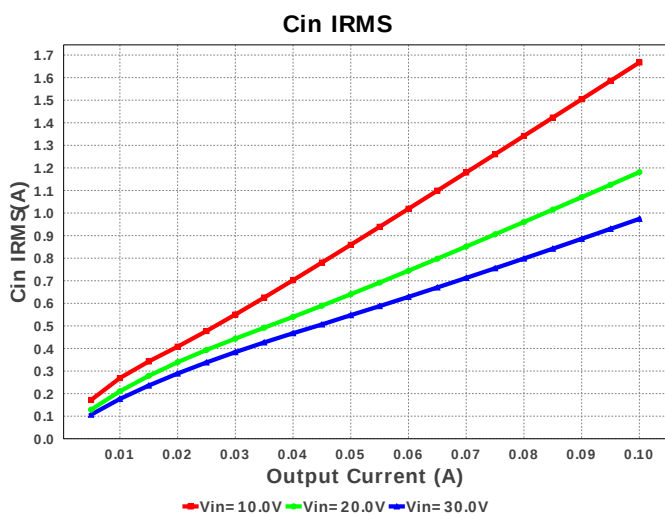
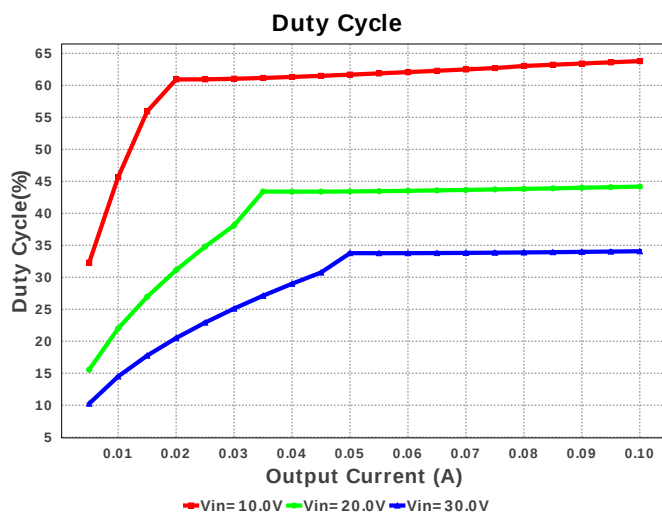
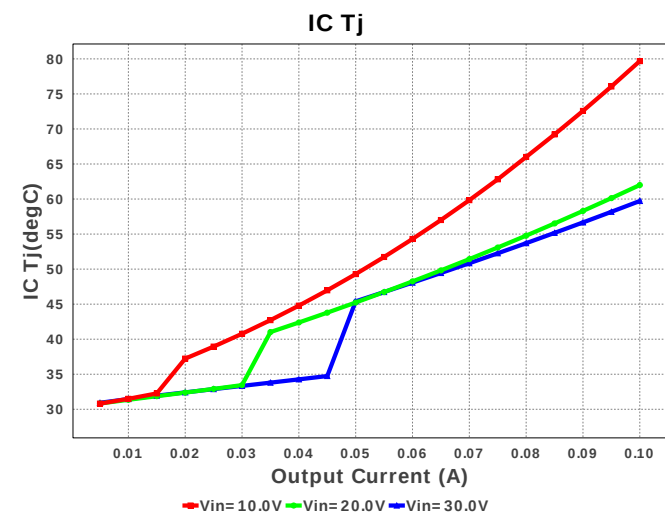


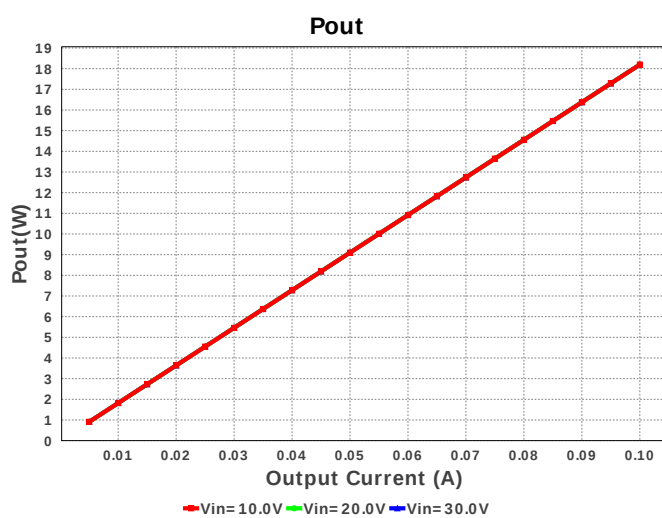
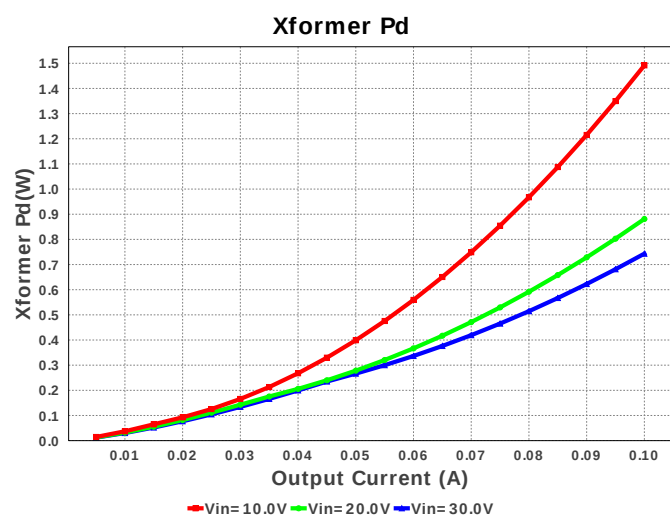
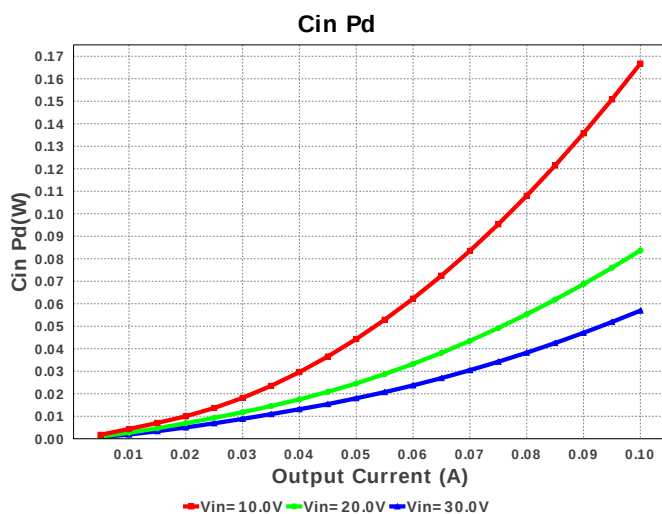
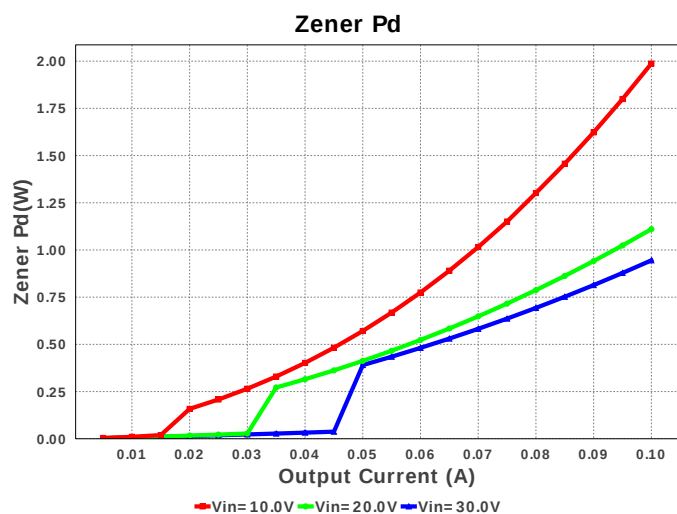
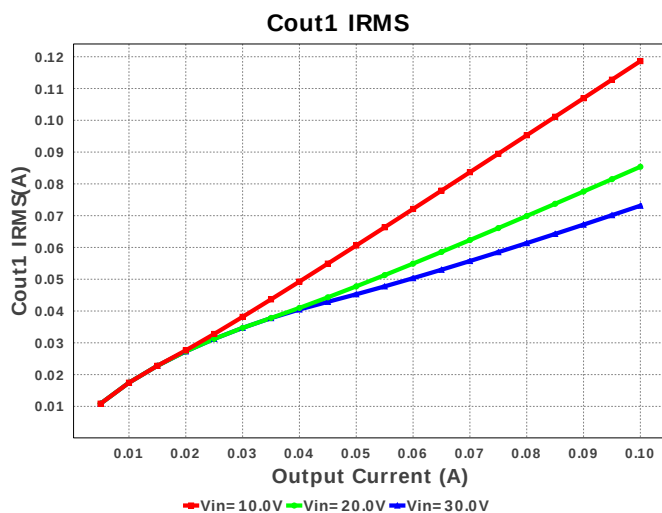
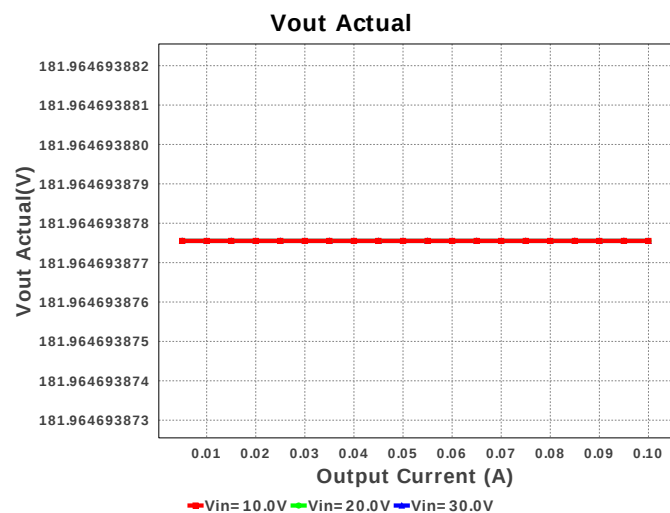
## My Comments

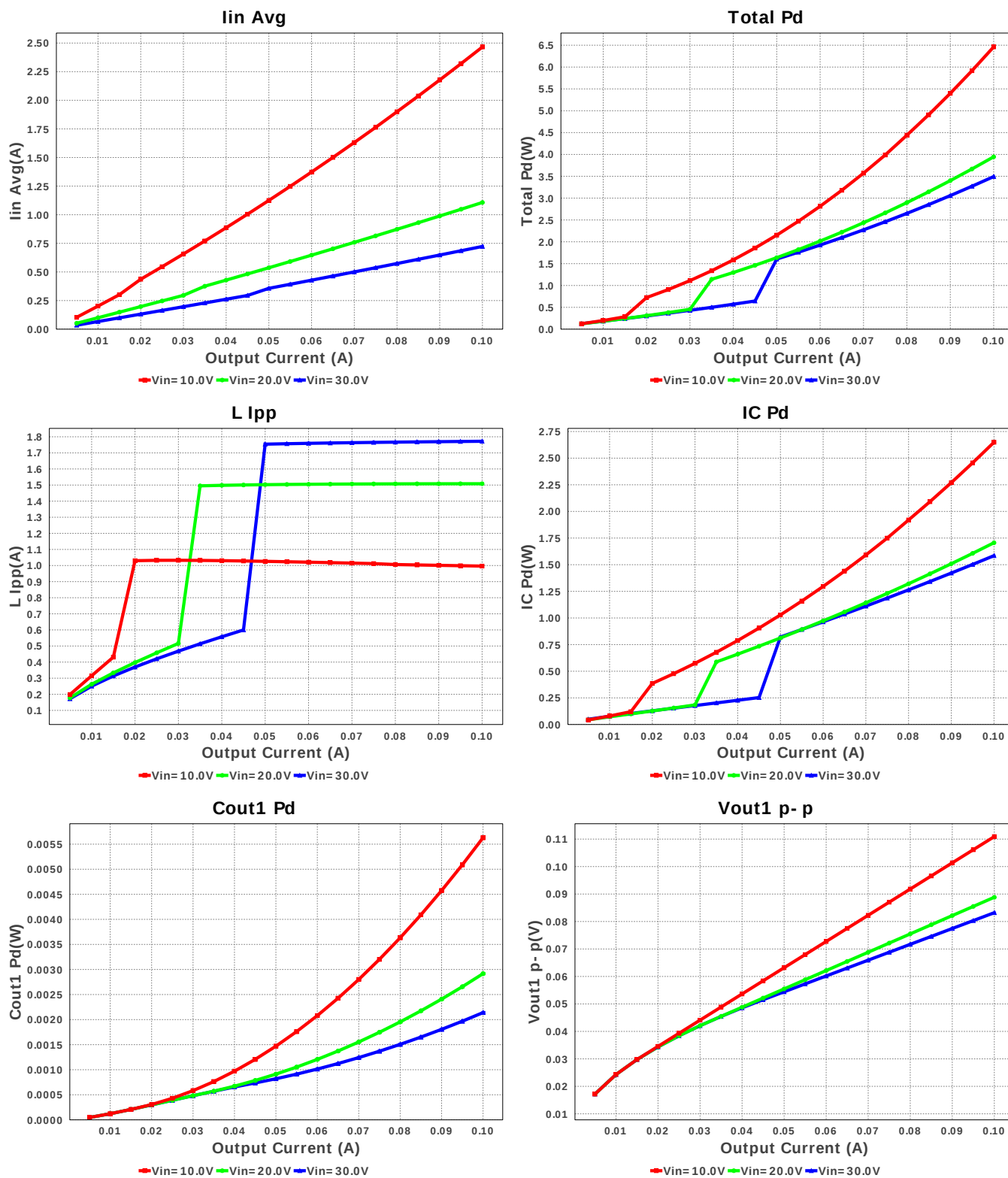
## Electrical BOM

| #  | Name  | Manufacturer | Part Number                    | Properties                                                        | Qty | Price  | Footprint                           |
|----|-------|--------------|--------------------------------|-------------------------------------------------------------------|-----|--------|-------------------------------------|
| 1. | Ccomp | 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>              |
| 2. | Cin   | Nichicon     | UUD1H151MNL1GS<br>Series= uD   | Cap= 150.0 uF<br>ESR= 180.0 mOhm<br>VDC= 50.0 V<br>IRMS= 670.0 mA | 3   | \$0.26 | SM_RADIAL_10BMM 160 mm <sup>2</sup> |
| 3. | Cout1 | Panasonic    | EEV-EB2E330SM<br>Series= ?     | Cap= 33.0 uF<br>ESR= 400.0 mOhm<br>VDC= 250.0 V<br>IRMS= 560.0 mA | 1   | \$1.25 | EB_K16 483 mm <sup>2</sup>          |
| 4. | D1    | Bourns       | CD1408-FU1400                  | Vf@Io= 1.05 V<br>VRRM= 400.0 V                                    | 1   | \$0.13 | Diode_1408 13 mm <sup>2</sup>       |
| 5. | Ds    | Diodes Inc.  | DFLS1200-7                     | Vf@Io= 850.0 mV<br>VRRM= 200.0 V                                  | 1   | \$0.21 | PowerDI123 13 mm <sup>2</sup>       |

| #   | Name     | Manufacturer                | Part Number                          | Properties                                                                                   | Qty | Price  | Footprint                                                                                                          |
|-----|----------|-----------------------------|--------------------------------------|----------------------------------------------------------------------------------------------|-----|--------|--------------------------------------------------------------------------------------------------------------------|
| 6.  | Dz       | Micro Commercial Components | SMBJ5360B-TP                         | Zener                                                                                        | 1   | \$0.23 | <br>SMB 44 mm <sup>2</sup>      |
| 7.  | HeatSink | Aavid                       | 531102B02500G                        | Heatsink                                                                                     | 1   | \$0.81 | <br>531102 545 mm <sup>2</sup>  |
| 8.  | Rcomp    | Vishay-Dale                 | CRCW04022K94FKED<br>Series= CRCW..e3 | Res= 2.94 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%                                          | 1   | \$0.01 | <br>0402 3 mm <sup>2</sup>      |
| 9.  | Rfb1     | Vishay-Dale                 | CRCW04023K92FKED<br>Series= CRCW..e3 | Res= 3.92 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%                                          | 1   | \$0.01 | <br>0402 3 mm <sup>2</sup>      |
| 10. | Rfb2     | Vishay-Dale                 | CRCW0402576KFKED<br>Series= CRCW..e3 | Res= 576.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%                                         | 1   | \$0.01 | <br>0402 3 mm <sup>2</sup>      |
| 11. | T1       | CUSTOM                      | CUSTOM                               | Lp= 49.945 µH<br>Rp= 91.922 mOhm<br>Leakage_L= 998.895 nH<br>Ns1toNp= 14.0<br>Rs1= 36.0 Ohms | 1   | NA     | CUSTOM 0 mm <sup>2</sup>                                                                                           |
| 12. | U1       | Texas Instruments           | LM2587T-ADJ/NOPB                     | Switcher                                                                                     | 1   | \$3.95 | <br>TA07B 121 mm <sup>2</sup> |







## Operating Values

| #   | Name         | Value                   | Category | Description                             |
|-----|--------------|-------------------------|----------|-----------------------------------------|
| 1.  | Cin IRMS     | 1.669 A                 | Current  | Input capacitor RMS ripple current      |
| 2.  | Cout1 IRMS   | 118.787 mA              | Current  | Output capacitor1 RMS ripple current    |
| 3.  | IC IpK       | 4.881 A                 | Current  | Peak switch current                     |
| 4.  | Iin Avg      | 3.051 A                 | Current  | Average input current                   |
| 5.  | L Ipp        | 876.1 mA                | Current  | Peak-to-peak inductor ripple current    |
| 6.  | BOM Count    | 14                      | General  | Total Design BOM count                  |
| 7.  | FootPrint    | 1.719 k mm <sup>2</sup> | General  | Total Foot Print Area of BOM components |
| 8.  | Frequency    | 100.0 kHz               | General  | Switching frequency                     |
| 9.  | IC Tolerance | 22.0 mV                 | General  | IC Feedback Tolerance                   |
| 10. | Pout         | 18.196 W                | General  | Total output power                      |
| 11. | Total BOM    | \$0.0                   | General  | Total BOM Cost                          |

| #   | Name           | Value         | Category | Description                                                                                |
|-----|----------------|---------------|----------|--------------------------------------------------------------------------------------------|
| 12. | Vout Actual    | 181.965 V     | Op_Point | Vout Actual calculated based on selected voltage divider resistors                         |
| 13. | Duty Cycle     | 68.486 %      | Op_point | Duty cycle                                                                                 |
| 14. | Efficiency     | 59.642 %      | Op_point | Steady state efficiency                                                                    |
| 15. | IC Tj          | 86.796 degC   | Op_point | IC junction temperature                                                                    |
| 16. | ICThetaJA      | 18.756 degC/W | Op_point | IC junction-to-ambient thermal resistance                                                  |
| 17. | IOUT_OP        | 100.0 mA      | Op_point | Iout operating point                                                                       |
| 18. | VIN_OP         | 10.0 V        | Op_point | Vin operating point                                                                        |
| 19. | Vout1 OP       | 181.965 V     | Op_point | Operational Voltage 1                                                                      |
| 20. | Vout1 p-p      | 111.078 mV    | Op_point | Peak-to-peak output1 ripple voltage                                                        |
| 21. | Cin Pd         | 167.227 mW    | Power    | Input capacitor power dissipation                                                          |
| 22. | Cout1 Pd       | 5.644 mW      | Power    | Output capacitor1 power dissipation                                                        |
| 23. | Cout1 Pd       | 5.644 mW      | Power    | Output capacitor1 power dissipation                                                        |
| 24. | Diode1 Pd      | 5.068 W       | Power    | Diode1 power dissipation                                                                   |
| 25. | IC Pd          | 3.028 W       | Power    | IC power dissipation                                                                       |
| 26. | Total Pd       | 12.313 W      | Power    | Total Power Dissipation                                                                    |
| 27. | Xformer Pd     | 1.496 W       | Power    | Transformer power dissipation                                                              |
| 28. | Zener Pd       | 2.493 W       | Power    | Zener power dissipation                                                                    |
| 29. | Vout Tolerance | 3.831 %       |          | Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable |

## Design Inputs

| #  | Name    | Value   | Description                        |
|----|---------|---------|------------------------------------|
| 1. | Iout    | 100.0 m | Maximum Output Current             |
| 2. | VinMax  | 30.0    | Maximum input voltage              |
| 3. | VinMin  | 10.0    | Minimum input voltage              |
| 4. | Vout    | 180.0   | Output Voltage                     |
| 5. | base_pn | LM2587  | Texas Instruments Base Part Number |
| 6. | source  | DC      | Input Source Type                  |
| 7. | ta      | 30.0    | Ambient temperature                |

## Design Assistance

1. LM2587 Product Folder : <http://www.ti.com/product/LM2587> : contains the data sheet and other resources.

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