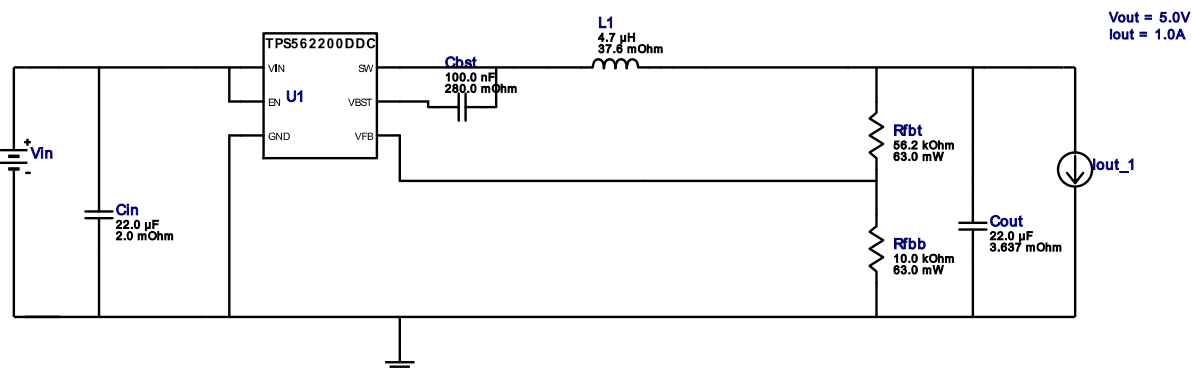


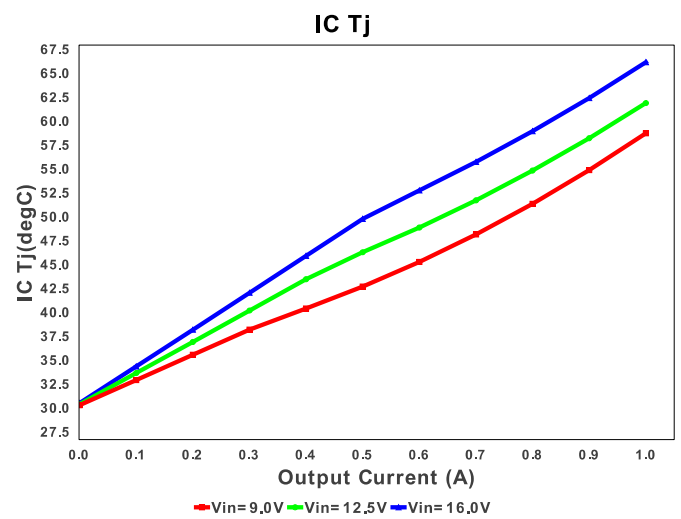
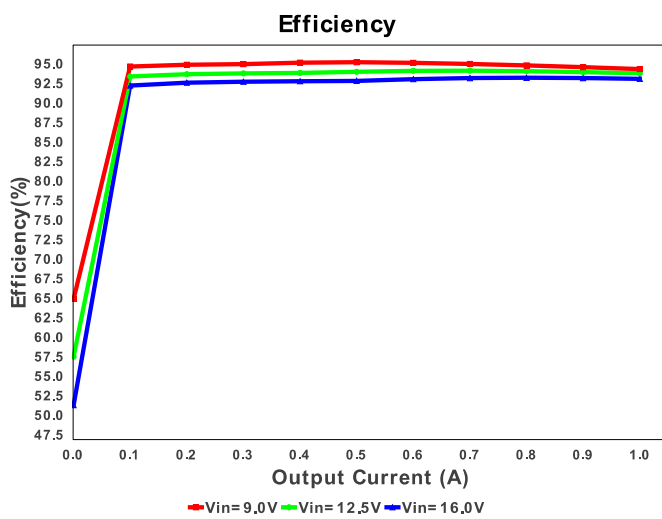
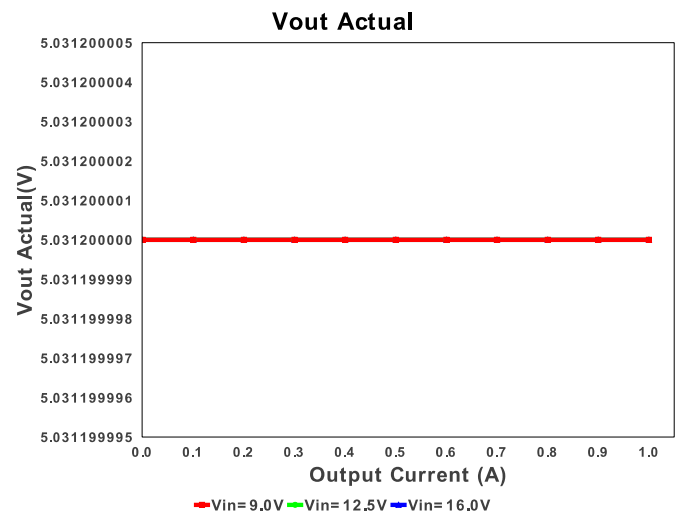
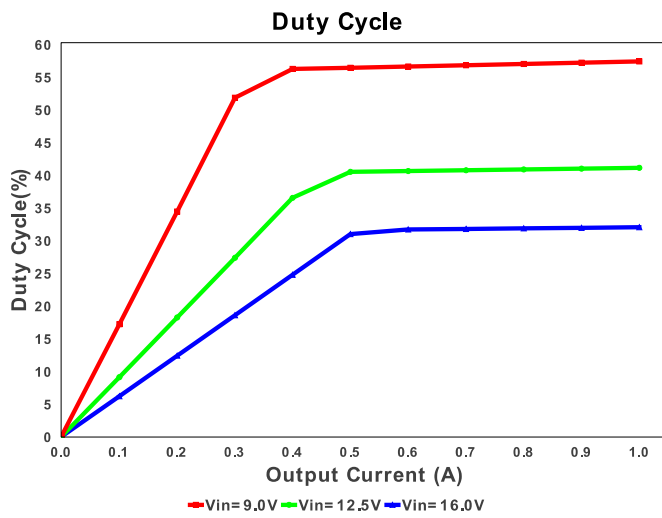
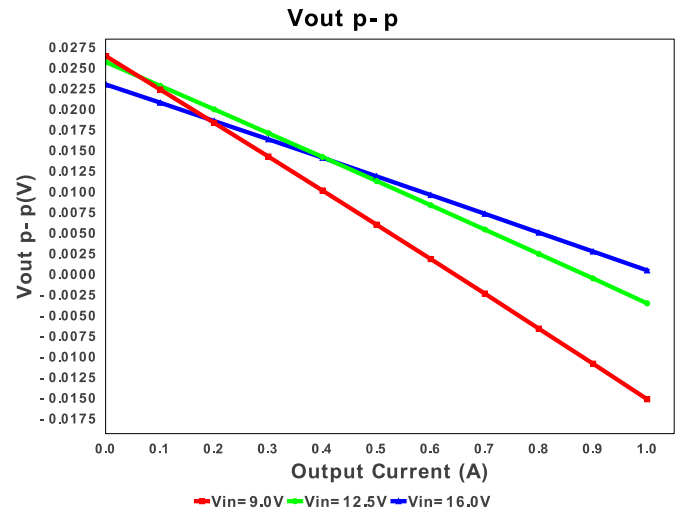
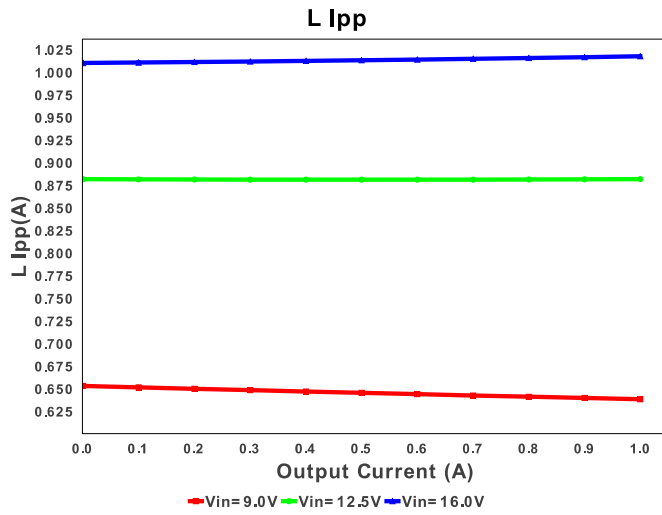
## WEBENCH® Design Report

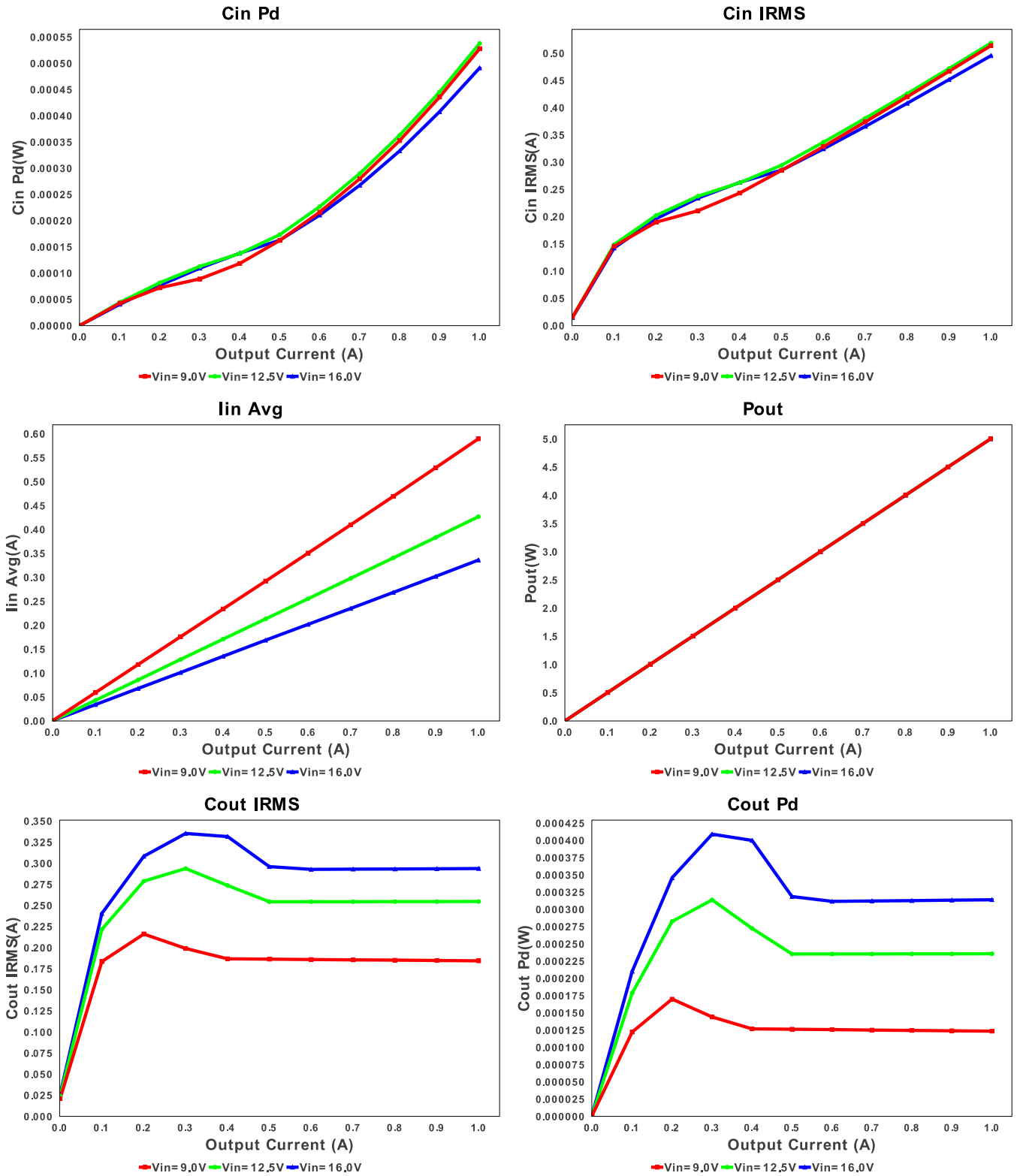
Design : 2412977/5 TPS562200DDCR  
TPS562200DDCR 9.0V-16.0V to 5.00V @ 1.0A

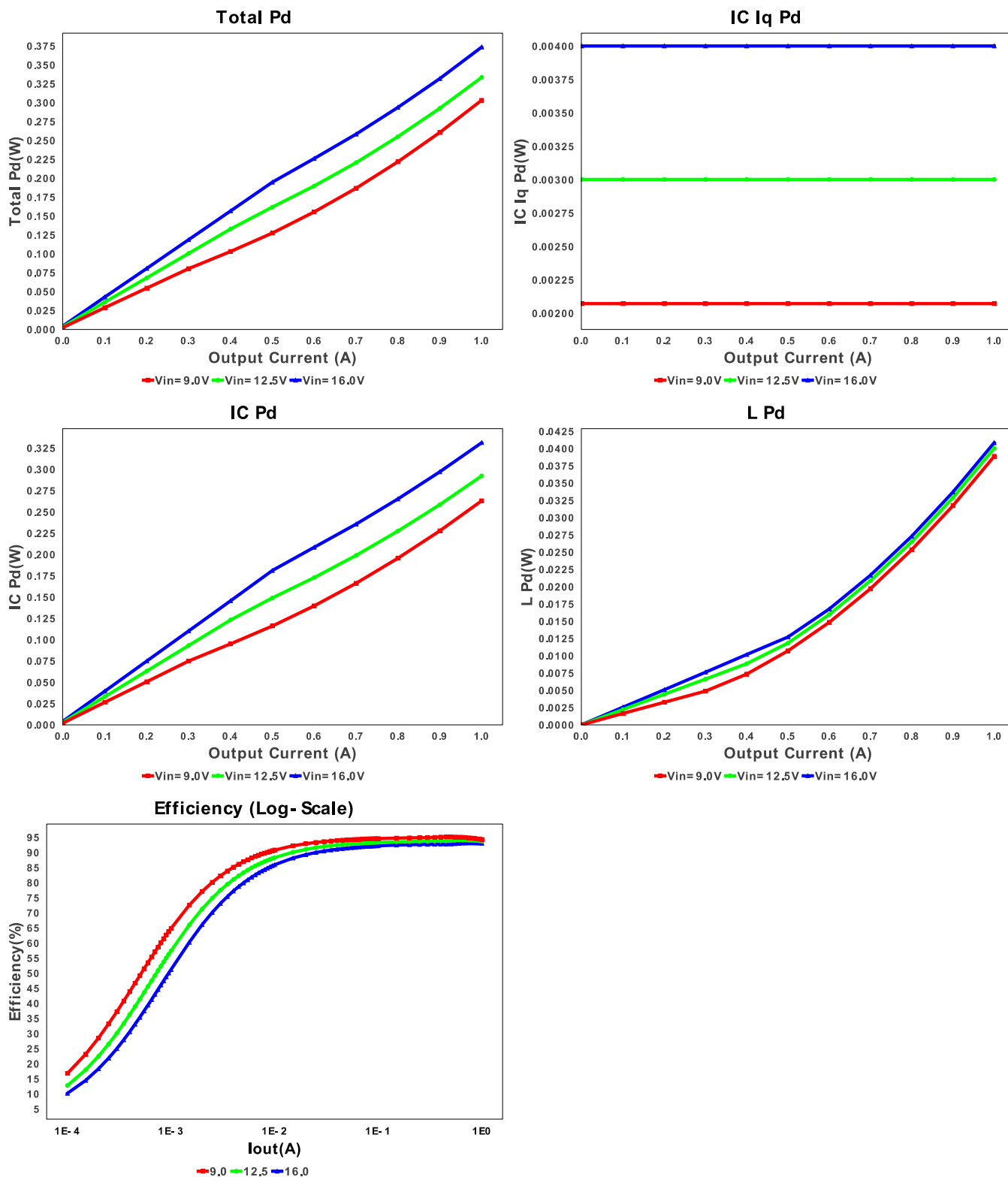


## Electrical BOM

| #  | Name | Manufacturer      | Part Number                          | Properties                                                        | Qty | Price  | Footprint                                                                                                |
|----|------|-------------------|--------------------------------------|-------------------------------------------------------------------|-----|--------|----------------------------------------------------------------------------------------------------------|
| 1. | Cbst | AVX               | 08053C104KAT2A<br>Series= X7R        | Cap= 100.0 nF<br>ESR= 280.0 mOhm<br>VDC= 25.0 V<br>IRMS= 0.0 A    | 1   | \$0.01 | <br>0805 7 mm²        |
| 2. | Cin  | MuRata            | GRM32ER61E226KE15L<br>Series= X5R    | Cap= 22.0 uF<br>ESR= 2.0 mOhm<br>VDC= 25.0 V<br>IRMS= 3.67 A      | 1   | \$0.16 | <br>1210 15 mm²     |
| 3. | Cout | MuRata            | GRM31CR61A226KE19L<br>Series= X5R    | Cap= 22.0 uF<br>ESR= 3.637 mOhm<br>VDC= 10.0 V<br>IRMS= 3.56456 A | 1   | \$0.07 | <br>1206_190 11 mm² |
| 4. | L1   | Bourns            | SRN6045-4R7Y                         | L= 4.7 uH<br>DCR= 37.6 mOhm                                       | 1   | \$0.16 | <br>SRN6045 64 mm²  |
| 5. | Rfbb | Vishay-Dale       | CRCW040210K0FKED<br>Series= CRCW..e3 | Res= 10.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%               | 1   | \$0.01 | <br>0402 3 mm²      |
| 6. | Rfbt | Vishay-Dale       | CRCW040256K2FKED<br>Series= CRCW..e3 | Res= 56.2 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%               | 1   | \$0.01 | <br>0402 3 mm²      |
| 7. | U1   | Texas Instruments | TPS562200DDCR                        | Switcher                                                          | 1   | \$0.47 | <br>DDC0006A 10 mm² |







## Operating Values

| #   | Name        | Value                 | Category | Description                                                        |
|-----|-------------|-----------------------|----------|--------------------------------------------------------------------|
| 1.  | Cin IRMS    | 495.572 mA            | Current  | Input capacitor RMS ripple current                                 |
| 2.  | Cout IRMS   | 293.818 mA            | Current  | Output capacitor RMS ripple current                                |
| 3.  | Iin Avg     | 335.84 mA             | Current  | Average input current                                              |
| 4.  | L Ipp       | 1.018 A               | Current  | Peak-to-peak inductor ripple current                               |
| 5.  | BOM Count   | 7                     | General  | Total Design BOM count                                             |
| 6.  | FootPrint   | 113.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components                            |
| 7.  | Frequency   | 721.961 kHz           | General  | Switching frequency                                                |
| 8.  | Pout        | 5.0 W                 | General  | Total output power                                                 |
| 9.  | Total BOM   | \$0.89                | General  | Total BOM Cost                                                     |
| 10. | Vout Actual | 5.031 V               | Op_Point | Vout Actual calculated based on selected voltage divider resistors |
| 11. | Vout OP     | 5.0 V                 | Op_Point | Operational Output Voltage                                         |

| #   | Name           | Value           | Category | Description                                                                                |
|-----|----------------|-----------------|----------|--------------------------------------------------------------------------------------------|
| 12. | Duty Cycle     | 32.082 %        | Op_point | Duty cycle                                                                                 |
| 13. | Efficiency     | 93.051 %        | Op_point | Steady state efficiency                                                                    |
| 14. | IC Tj          | 66.117 degC     | Op_point | IC junction temperature                                                                    |
| 15. | ICThetaJA      | 109.0 degC/W    | Op_point | IC junction-to-ambient thermal resistance                                                  |
| 16. | IOUT_OP        | 1.0 A           | Op_point | Iout operating point                                                                       |
| 17. | VIN_OP         | 16.0 V          | Op_point | Vin operating point                                                                        |
| 18. | Vout p-p       | 9.71 mV         | Op_point | Peak-to-peak output ripple voltage                                                         |
| 19. | Cin Pd         | 491.184 $\mu$ W | Power    | Input capacitor power dissipation                                                          |
| 20. | Cout Pd        | 313.978 $\mu$ W | Power    | Output capacitor power dissipation                                                         |
| 21. | IC Iq Pd       | 4.001 mW        | Power    | IC Iq Pd                                                                                   |
| 22. | IC Pd          | 331.35 mW       | Power    | IC power dissipation                                                                       |
| 23. | L Pd           | 40.846 mW       | Power    | Inductor power dissipation                                                                 |
| 24. | Total Pd       | 373.4 mW        | Power    | Total Power Dissipation                                                                    |
| 25. | Vout Tolerance | 3.053 %         |          | Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable |

## Design Inputs

| #  | Name    | Value     | Description                        |
|----|---------|-----------|------------------------------------|
| 1. | Iout    | 1.0       | Maximum Output Current             |
| 2. | VinMax  | 16.0      | Maximum input voltage              |
| 3. | VinMin  | 9.0       | Minimum input voltage              |
| 4. | Vout    | 5.0       | Output Voltage                     |
| 5. | base_pn | TPS562200 | Texas Instruments Base Part Number |
| 6. | source  | DC        | Input Source Type                  |
| 7. | ta      | 30.0      | Ambient temperature                |

## Design Assistance

1. TPS562200 Product Folder : <http://www.ti.com/product/TPS562200> : contains the data sheet and other resources.

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