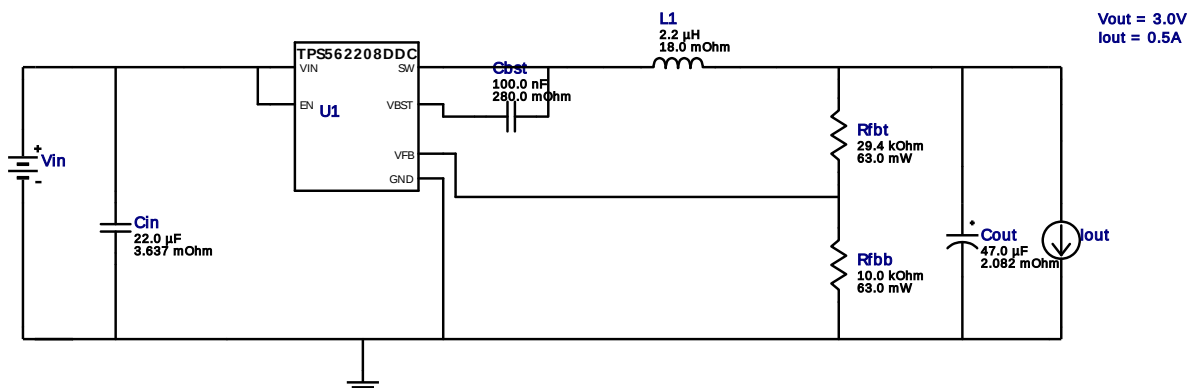


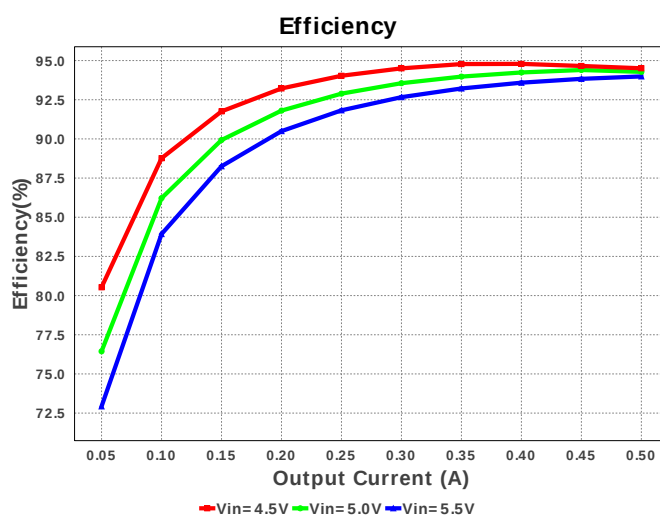
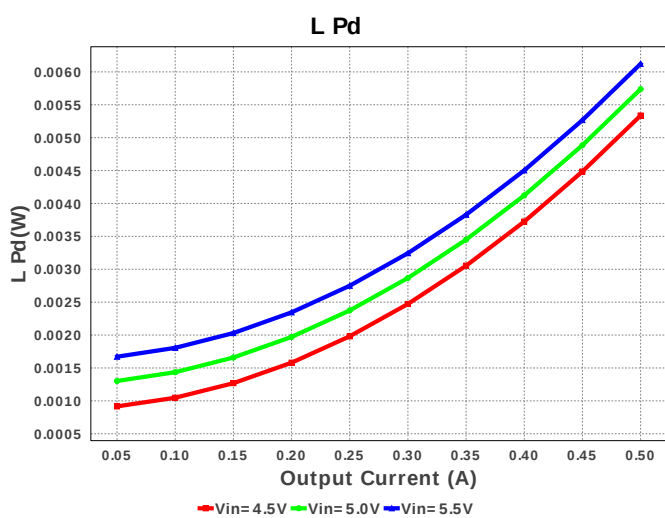
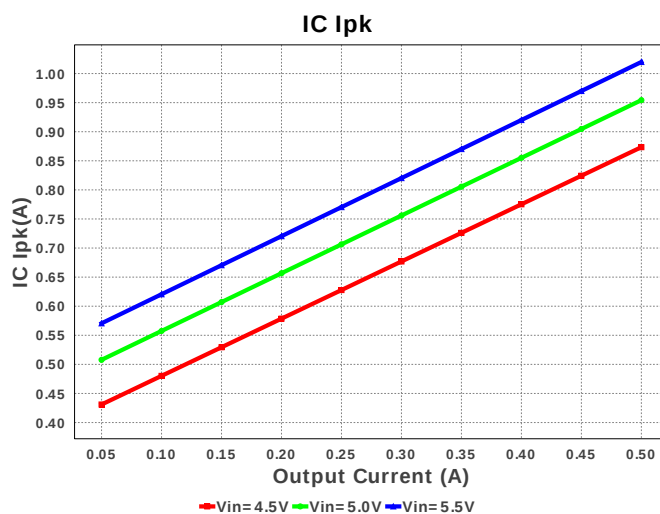
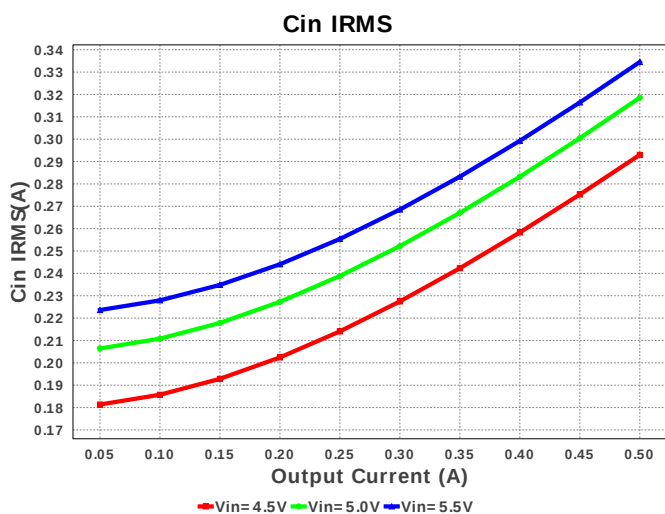
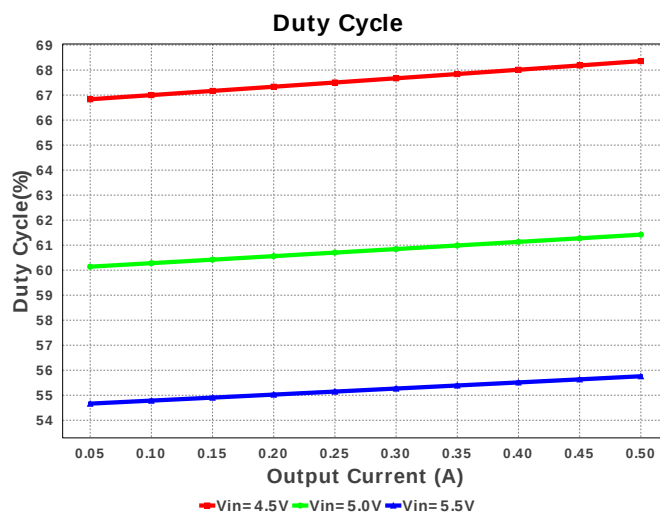
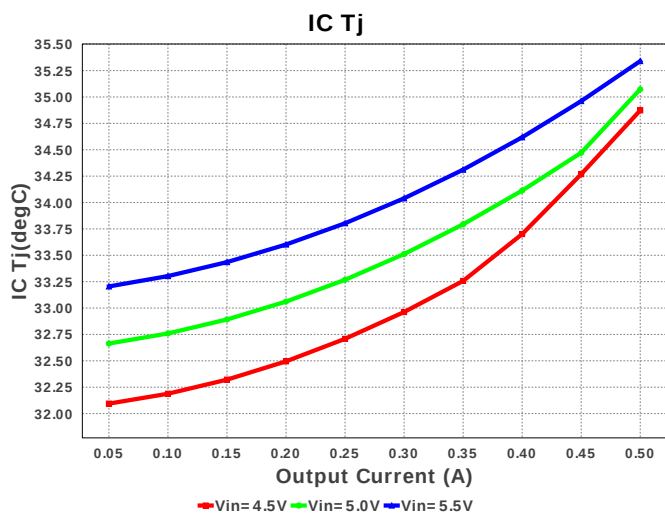
## WEBENCH® Design Report

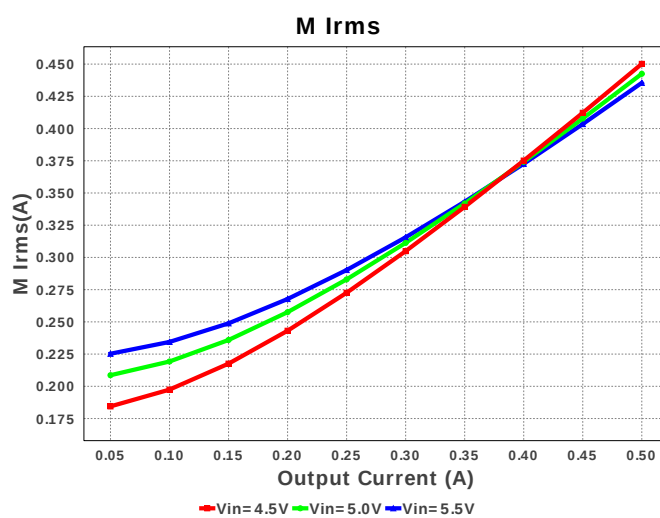
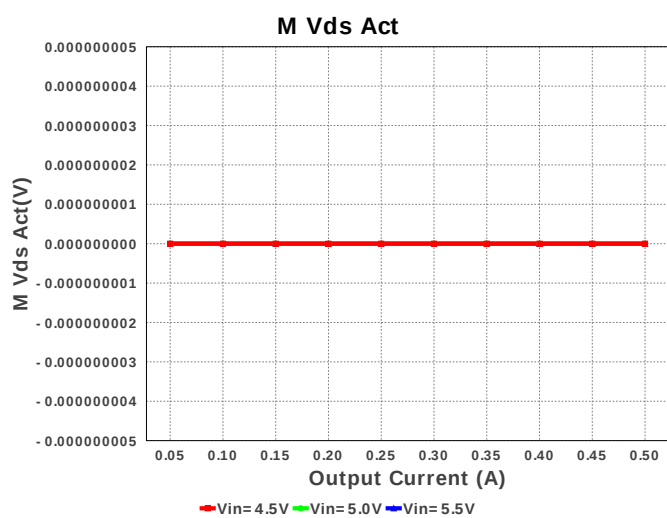
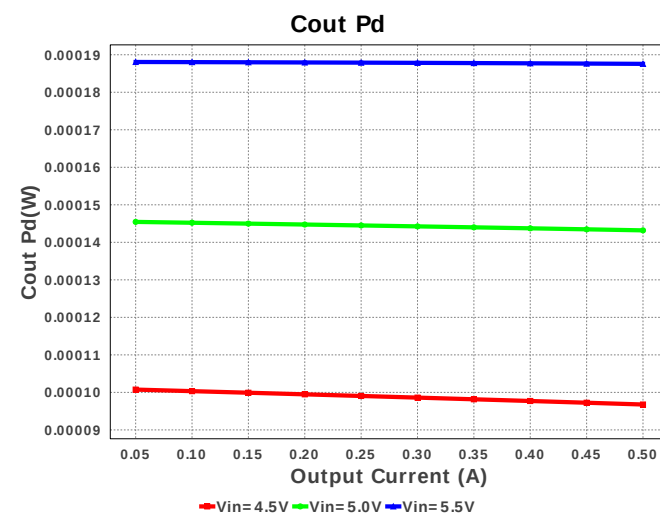
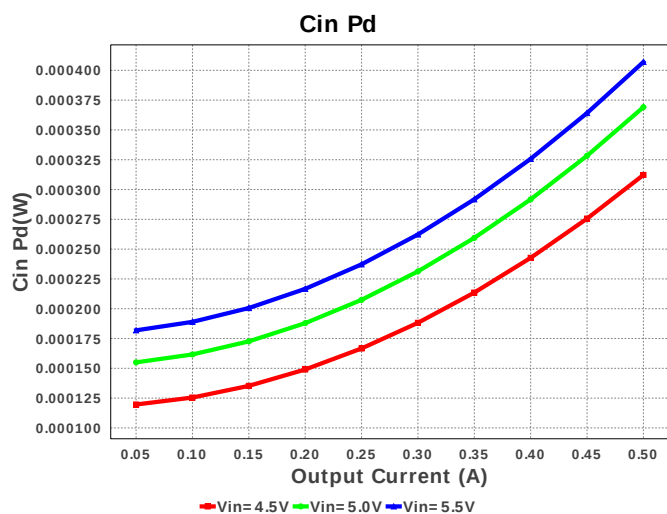
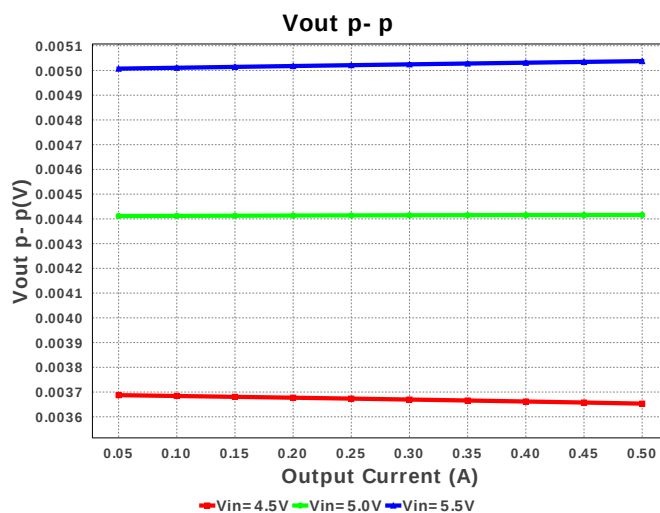
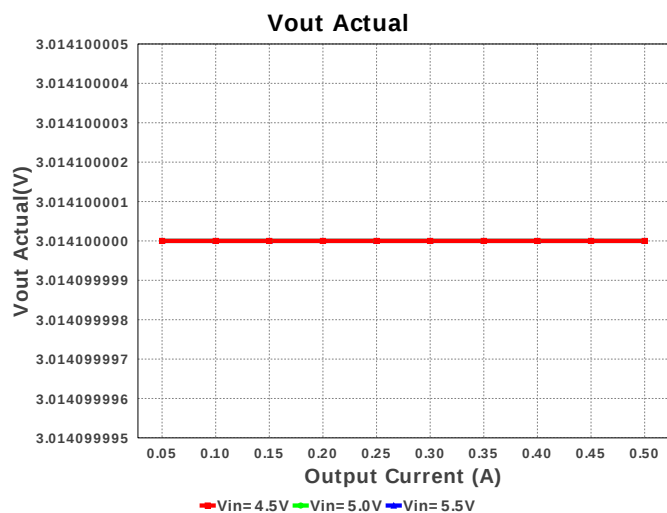
Design : 4742013/124 TPS562208DDCR  
TPS562208DDCR 4.5V-5.5V to 3.00V @ 0.5A

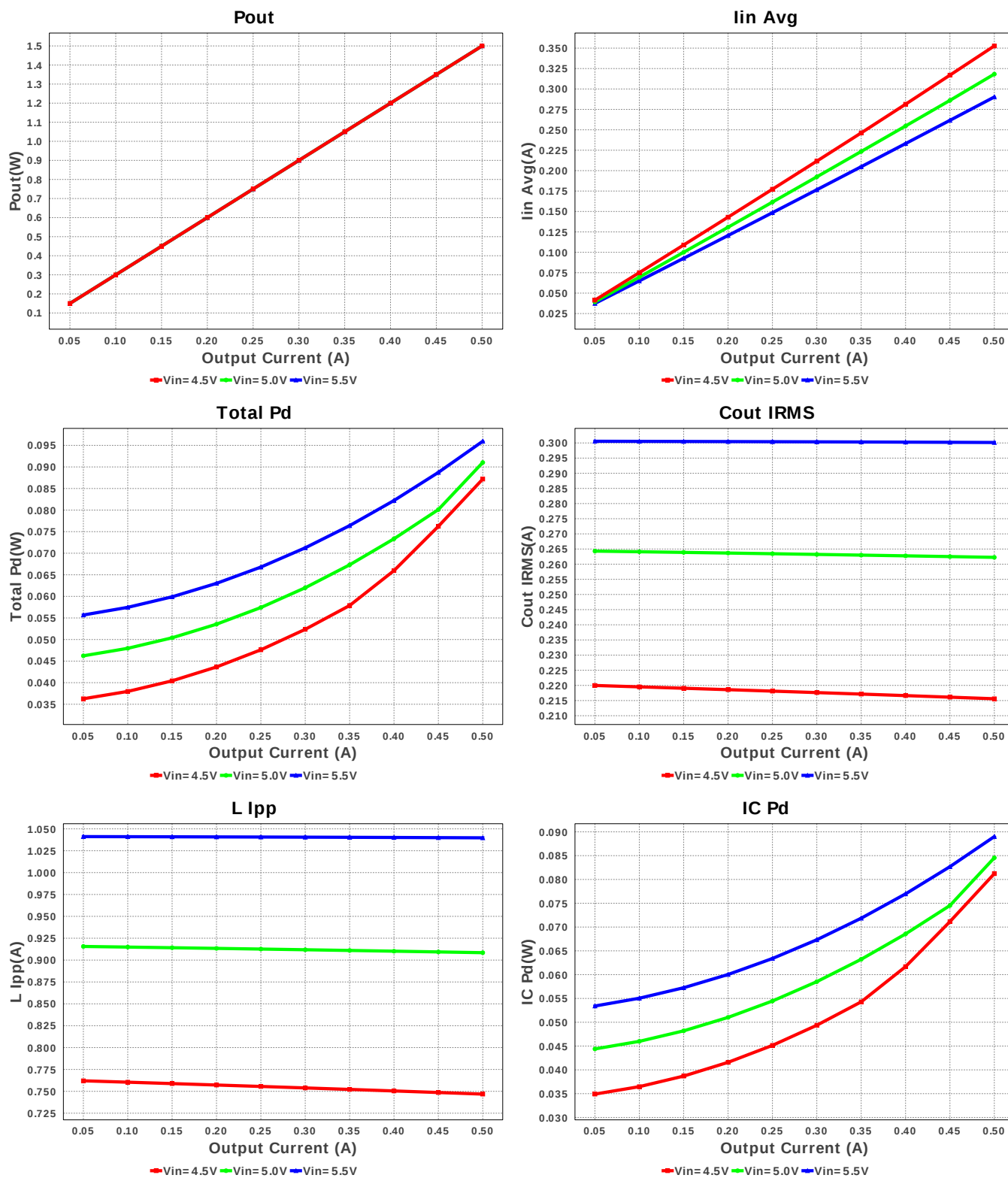


## Electrical BOM

| #  | 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 | 0805 7 mm <sup>2</sup>        |
| 2. | Cin  | 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 | 1206_190 11 mm <sup>2</sup>   |
| 3. | Cout | TDK               | C3216X5R1E476M160AC<br>Series= X5R   | Cap= 47.0 uF<br>ESR= 2.082 mOhm<br>VDC= 25.0 V<br>IRMS= 5.0279 A  | 1   | \$0.35 | 1206 11 mm <sup>2</sup>       |
| 4. | L1   | Coilcraft         | MSS5131-222MLB                       | L= 2.2 uH<br>DCR= 18.0 mOhm                                       | 1   | \$0.48 | MSS5131 50 mm <sup>2</sup>    |
| 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 | 0402 3 mm <sup>2</sup>        |
| 6. | Rfht | Vishay-Dale       | CRCW040229K4FKED<br>Series= CRCW..e3 | Res= 29.4 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%               | 1   | \$0.01 | 0402 3 mm <sup>2</sup>        |
| 7. | U1   | Texas Instruments | TPS562208DDCR                        | Switcher                                                          | 1   | \$0.30 | DDC0006A_N 10 mm <sup>2</sup> |







## Operating Values

| #   | Name         | Value                | Category | Description                             |
|-----|--------------|----------------------|----------|-----------------------------------------|
| 1.  | Cin IRMS     | 334.522 mA           | Current  | Input capacitor RMS ripple current      |
| 2.  | Cout IRMS    | 300.153 mA           | Current  | Output capacitor RMS ripple current     |
| 3.  | IC Ipk       | 1.02 A               | Current  | Peak switch current in IC               |
| 4.  | Iin Avg      | 290.17 mA            | Current  | Average input current                   |
| 5.  | L Ipp        | 1.04 A               | Current  | Peak-to-peak inductor ripple current    |
| 6.  | M1 Irms      | 435.466 mA           | Current  | Q lavg                                  |
| 7.  | BOM Count    | 7                    | General  | Total Design BOM count                  |
| 8.  | FootPrint    | 95.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components |
| 9.  | Frequency    | 590.06 kHz           | General  | Switching frequency                     |
| 10. | IC Tolerance | 19.0 mV              | General  | IC Feedback Tolerance                   |
| 11. | M Vds Act    | 0.0 V                | General  | Voltage drop across the MosFET          |

| #   | Name           | Value           | Category | Description                                                                                |
|-----|----------------|-----------------|----------|--------------------------------------------------------------------------------------------|
| 12. | Pout           | 1.5 W           | General  | Total output power                                                                         |
| 13. | Total BOM      | \$1.23          | General  | Total BOM Cost                                                                             |
| 14. | Vout Actual    | 3.014 V         | Op_Point | Vout Actual calculated based on selected voltage divider resistors                         |
| 15. | Vout OP        | 3.0 V           | Op_Point | Operational Output Voltage                                                                 |
| 16. | Duty Cycle     | 55.759 %        | Op_point | Duty cycle                                                                                 |
| 17. | Efficiency     | 93.988 %        | Op_point | Steady state efficiency                                                                    |
| 18. | IC Tj          | 35.34 degC      | Op_point | IC junction temperature                                                                    |
| 19. | ICThetaJA      | 60.0 degC/W     | Op_point | IC junction-to-ambient thermal resistance                                                  |
| 20. | IOUT_OP        | 500.0 mA        | Op_point | Iout operating point                                                                       |
| 21. | VIN_OP         | 5.5 V           | Op_point | Vin operating point                                                                        |
| 22. | Vout p-p       | 5.038 mV        | Op_point | Peak-to-peak output ripple voltage                                                         |
| 23. | Cin Pd         | 406.998 $\mu$ W | Power    | Input capacitor power dissipation                                                          |
| 24. | Cout Pd        | 187.571 $\mu$ W | Power    | Output capacitor power dissipation                                                         |
| 25. | IC Pd          | 89.001 mW       | Power    | IC power dissipation                                                                       |
| 26. | L Pd           | 6.122 mW        | Power    | Inductor power dissipation                                                                 |
| 27. | Total Pd       | 95.948 mW       | Power    | Total Power Dissipation                                                                    |
| 28. | Vout Tolerance | 4.029 %         |          | Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable |

## Design Inputs

| #  | Name    | Value     | Description            |
|----|---------|-----------|------------------------|
| 1. | Iout    | 500.0 m   | Maximum Output Current |
| 2. | VinMax  | 5.5       | Maximum input voltage  |
| 3. | VinMin  | 4.5       | Minimum input voltage  |
| 4. | Vout    | 3.0       | Output Voltage         |
| 5. | base_pn | TPS562208 | Base Product Number    |
| 6. | source  | DC        | Input Source Type      |
| 7. | Ta      | 30.0      | Ambient temperature    |

## Design Assistance

1. **TPS562208** Product Folder : <http://www.ti.com/product/TPS562208> : contains the data sheet and other resources.

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