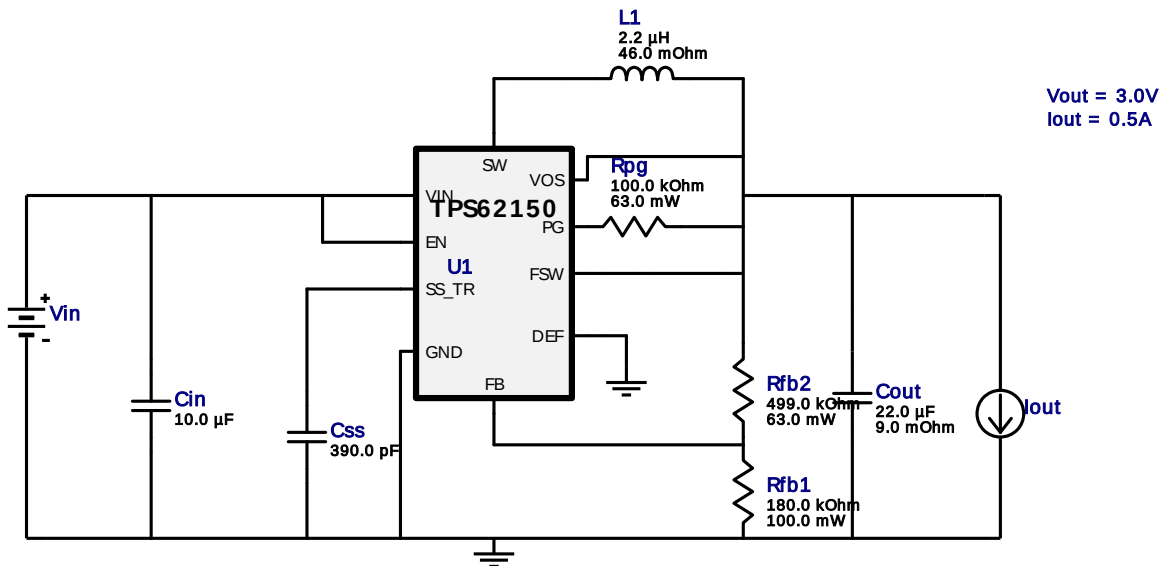


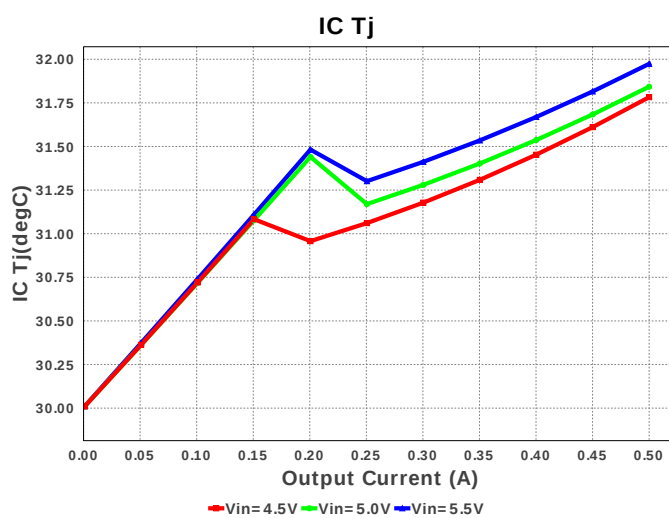
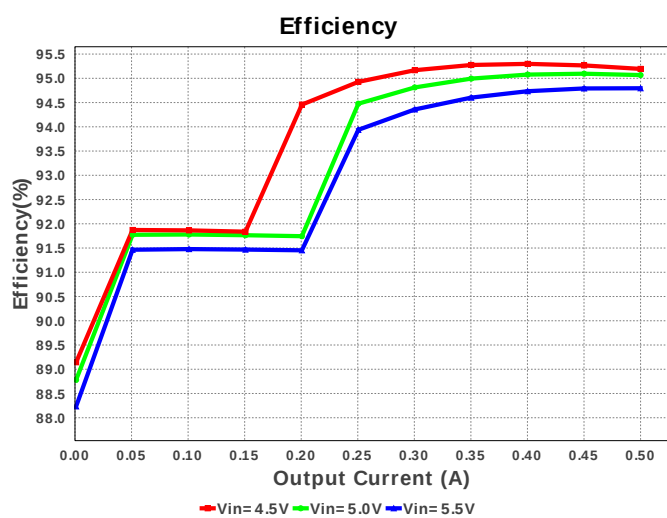
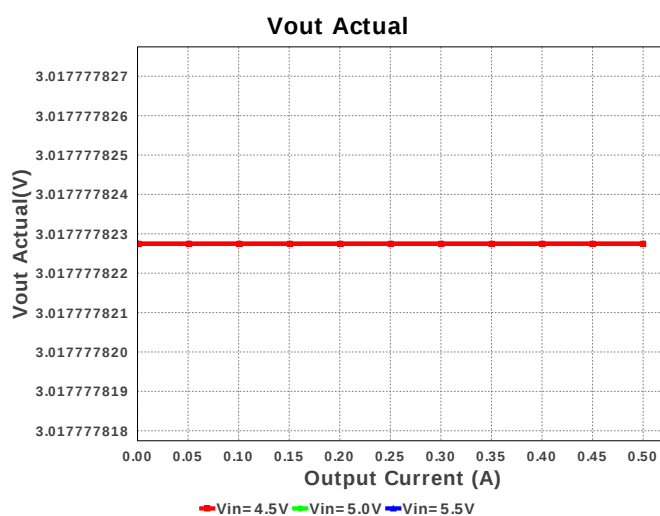
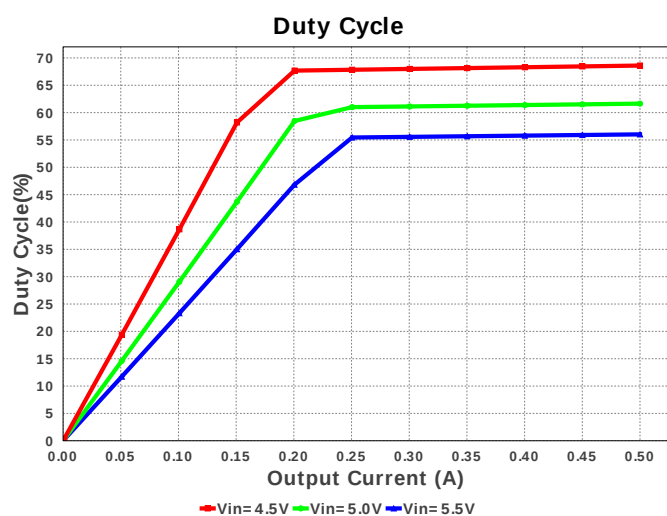
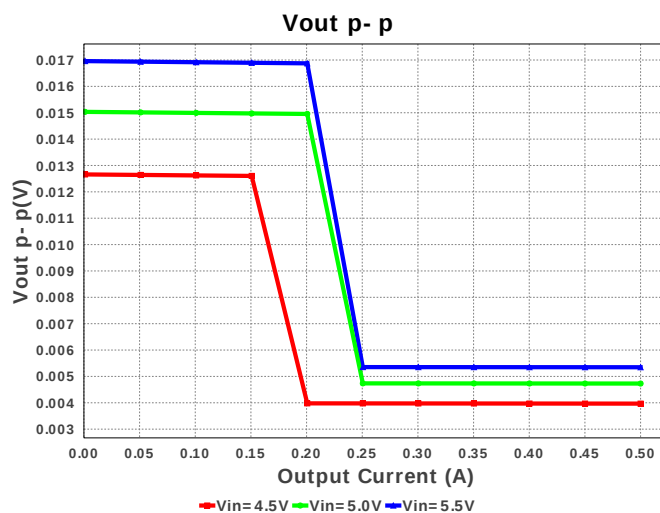
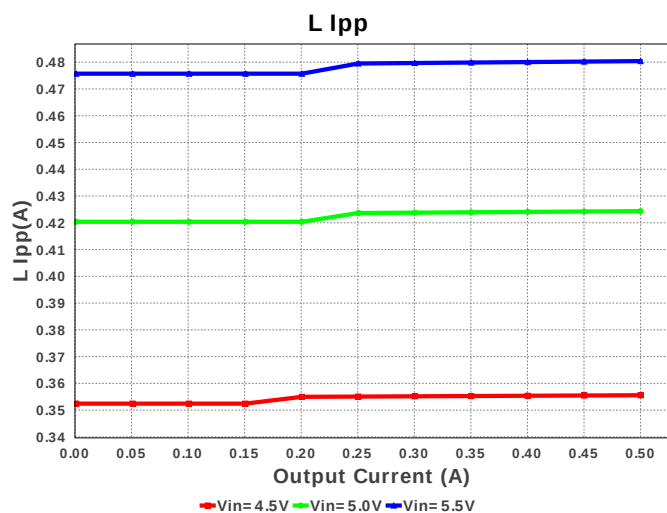
## WEBENCH® Design Report

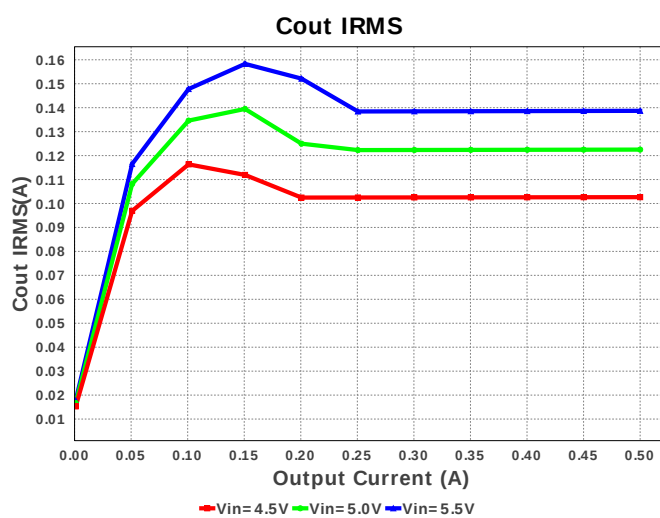
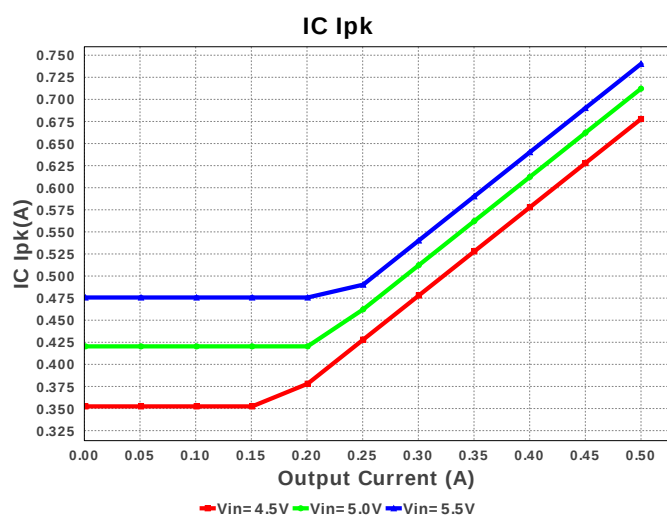
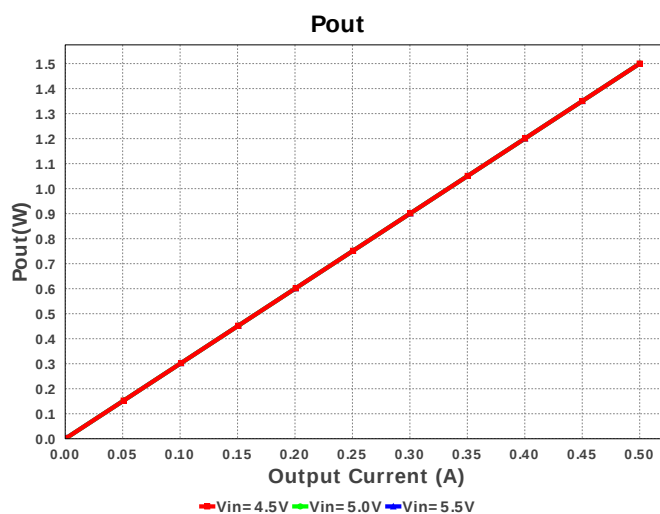
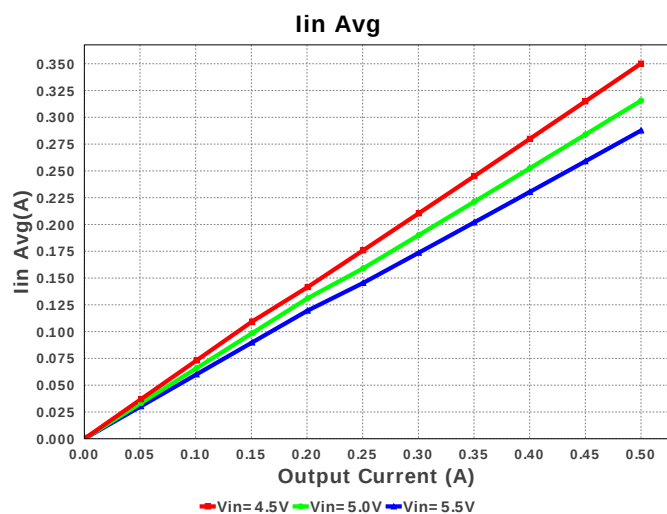
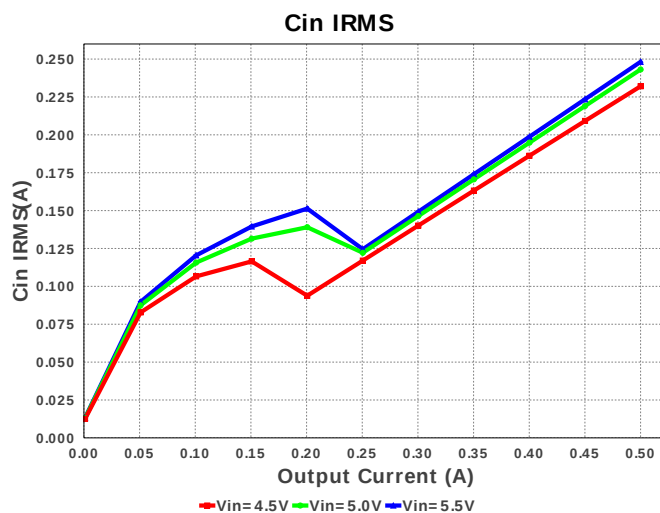
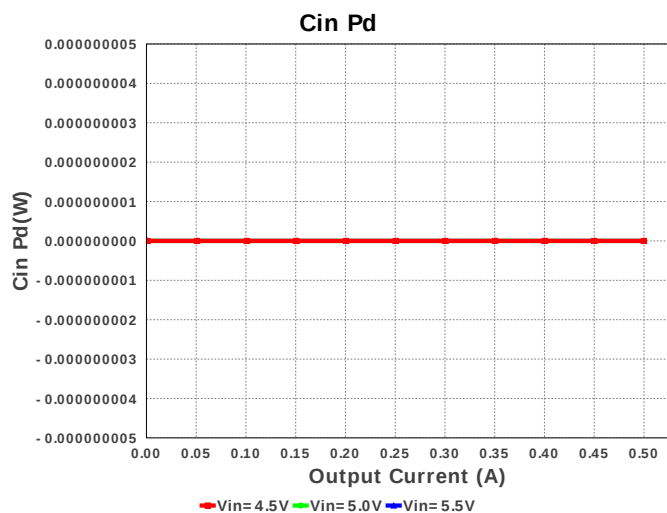
Design : 4742013/137 TPS62150RGTR  
TPS62150RGTR 4.5V-5.5V to 3.00V @ 0.5A

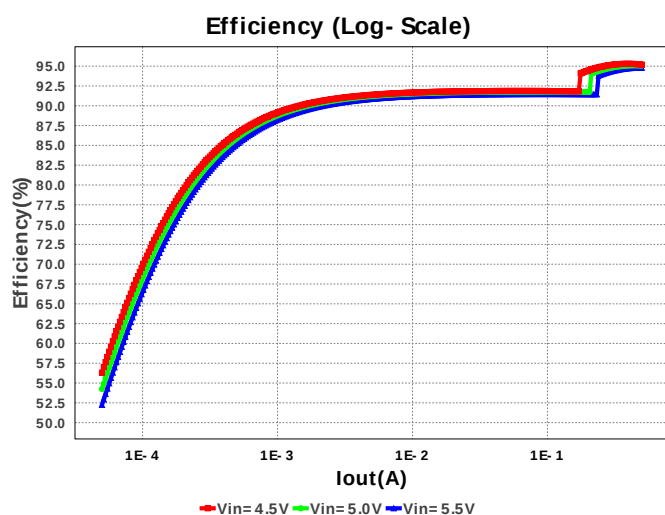
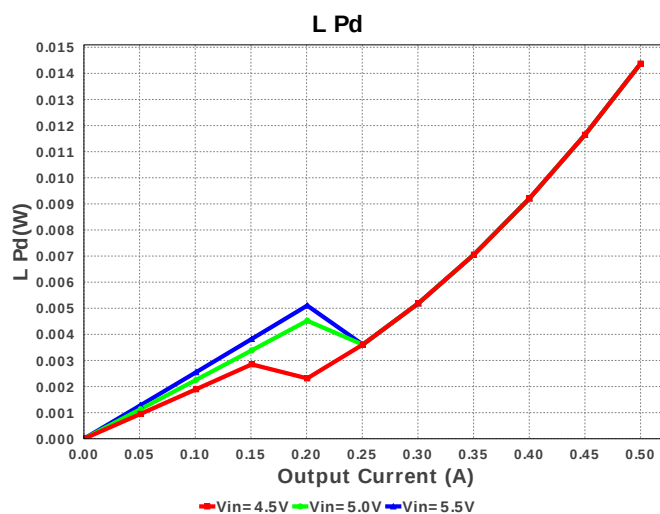
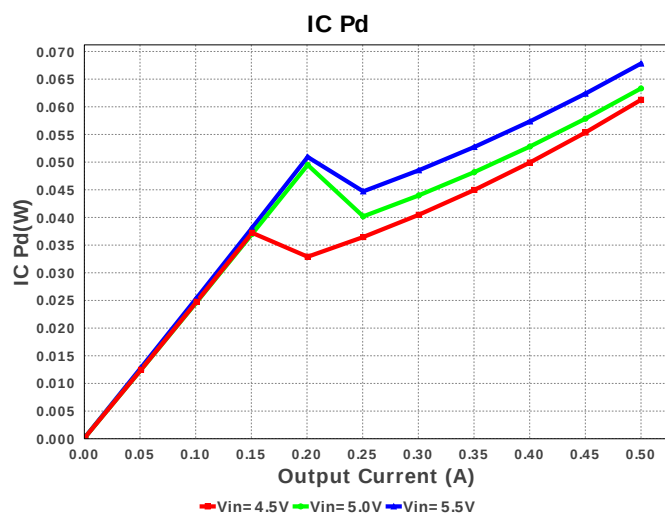
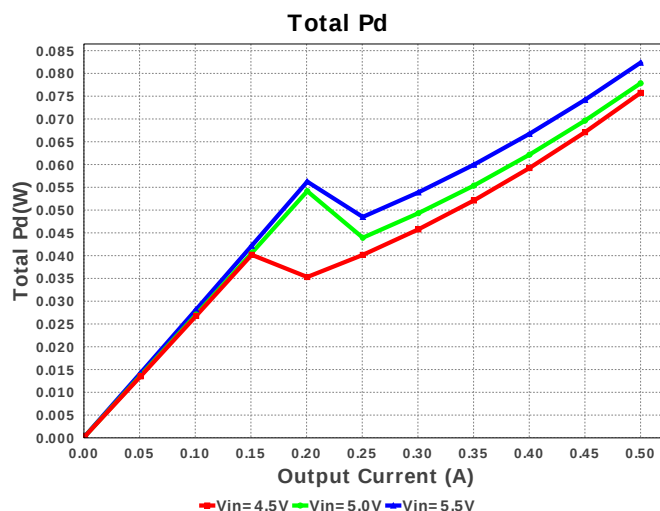
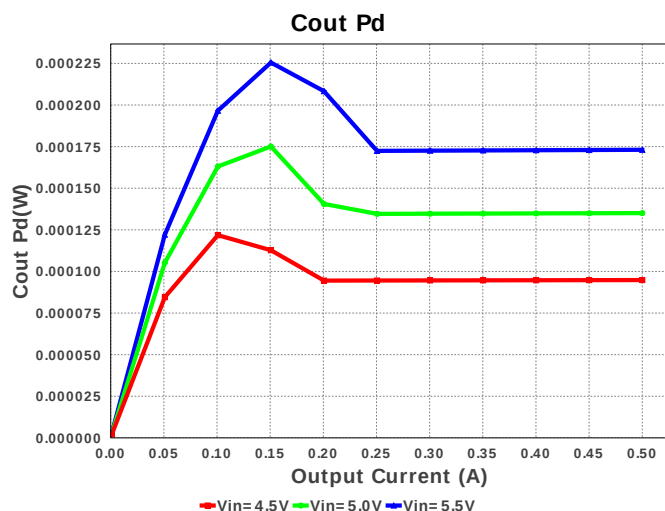


## Electrical BOM

| #  | Name | Manufacturer      | Part Number                          | Properties                                                 | Qty | Price  | Footprint                      |
|----|------|-------------------|--------------------------------------|------------------------------------------------------------|-----|--------|--------------------------------|
| 1. | Cin  | Taiyo Yuden       | LMK212BJ106KG-T<br>Series= X5R       | Cap= 10.0 uF<br>VDC= 10.0 V<br>IRMS= 0.0 A                 | 1   | \$0.03 | 0805 7 mm <sup>2</sup>         |
| 2. | Cout | MuRata            | GRM21BR60J226ME39L<br>Series= X5R    | Cap= 22.0 uF<br>ESR= 9.0 mOhm<br>VDC= 6.3 V<br>IRMS= 3.5 A | 1   | \$0.04 | 0805 7 mm <sup>2</sup>         |
| 3. | Css  | MuRata            | GRM033R71C391KA01D<br>Series= X7R    | Cap= 390.0 pF<br>VDC= 16.0 V<br>IRMS= 0.0 A                | 1   | \$0.01 | 0201 2 mm <sup>2</sup>         |
| 4. | L1   | Vishay-Dale       | IHLP1212BZER2R2M11                   | L= 2.2 uH<br>DCR= 46.0 mOhm                                | 1   | \$0.56 | IHLP-1212BZ 19 mm <sup>2</sup> |
| 5. | Rfb1 | Yageo America     | RC0603FR-07180KL<br>Series= ?        | Res= 180.0 kOhm<br>Power= 100.0 mW<br>Tolerance= 1.0%      | 1   | \$0.01 | 0603 5 mm <sup>2</sup>         |
| 6. | Rfb2 | Vishay-Dale       | CRCW0402499KFKED<br>Series= CRCW..e3 | Res= 499.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%       | 1   | \$0.01 | 0402 3 mm <sup>2</sup>         |
| 7. | Rpg  | Vishay-Dale       | CRCW0402100KFKED<br>Series= CRCW..e3 | Res= 100.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%       | 1   | \$0.01 | 0402 3 mm <sup>2</sup>         |
| 8. | U1   | Texas Instruments | TPS62150RGTR                         | Switcher                                                   | 1   | \$0.79 | S-PVQFN-N16 17 mm <sup>2</sup> |







## Operating Values

| #   | Name        | Value                | Category | Description                                                        |
|-----|-------------|----------------------|----------|--------------------------------------------------------------------|
| 1.  | Cin IRMS    | 248.18 mA            | Current  | Input capacitor RMS ripple current                                 |
| 2.  | Cout IRMS   | 138.682 mA           | Current  | Output capacitor RMS ripple current                                |
| 3.  | IC IpK      | 740.205 mA           | Current  | Peak switch current in IC                                          |
| 4.  | Iin Avg     | 287.7 mA             | Current  | Average input current                                              |
| 5.  | L Ipp       | 480.41 mA            | Current  | Peak-to-peak inductor ripple current                               |
| 6.  | BOM Count   | 8                    | General  | Total Design BOM count                                             |
| 7.  | FootPrint   | 62.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components                            |
| 8.  | Frequency   | 1.325 MHz            | General  | Switching frequency                                                |
| 9.  | Pout        | 1.5 W                | General  | Total output power                                                 |
| 10. | Total BOM   | \$1.46               | General  | Total BOM Cost                                                     |
| 11. | Vout Actual | 3.018 V              | Op_Point | Vout Actual calculated based on selected voltage divider resistors |

| #   | Name           | Value           | Category | Description                                                                                |
|-----|----------------|-----------------|----------|--------------------------------------------------------------------------------------------|
| 12. | Vout OP        | 3.0 V           | Op_Point | Operational Output Voltage                                                                 |
| 13. | Duty Cycle     | 56.022 %        | Op_point | Duty cycle                                                                                 |
| 14. | Efficiency     | 94.795 %        | Op_point | Steady state efficiency                                                                    |
| 15. | IC Tj          | 31.974 degC     | Op_point | IC junction temperature                                                                    |
| 16. | ICThetaJA      | 29.1 degC/W     | Op_point | IC junction-to-ambient thermal resistance                                                  |
| 17. | IOUT_OP        | 500.0 mA        | Op_point | Iout operating point                                                                       |
| 18. | VIN_OP         | 5.5 V           | Op_point | Vin operating point                                                                        |
| 19. | Vout p-p       | 5.348 mV        | Op_point | Peak-to-peak output ripple voltage                                                         |
| 20. | Cin Pd         | 0.0 W           | Power    | Input capacitor power dissipation                                                          |
| 21. | Cout Pd        | 173.095 $\mu$ W | Power    | Output capacitor power dissipation                                                         |
| 22. | IC Pd          | 67.821 mW       | Power    | IC power dissipation                                                                       |
| 23. | L Pd           | 14.375 mW       | Power    | Inductor power dissipation                                                                 |
| 24. | Total Pd       | 82.361 mW       | Power    | Total Power Dissipation                                                                    |
| 25. | Vout Tolerance | 3.311 %         |          | 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 | TPS62150 | Base Product Number    |
| 6. | source  | DC       | Input Source Type      |
| 7. | Ta      | 30.0     | Ambient temperature    |

## Design Assistance

1. Feature Highlights: DCS-Control(TM) Architecture with upto 1A output current, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 6V Selectable operating frequency, Optional Softstart Capacitor for slow startup, Tracking, Pin selectable output voltage (nominal, +5%) Seamless Power Save Mode for Light Load Efficiency, Power Good Output, 100% Duty Cycle mode, Short Circuit Protection, Thermal Shutdown

2. **TPS62150 Product Folder** : <http://www.ti.com/product/TPS62150> : contains the data sheet and other resources.

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**You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.**

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