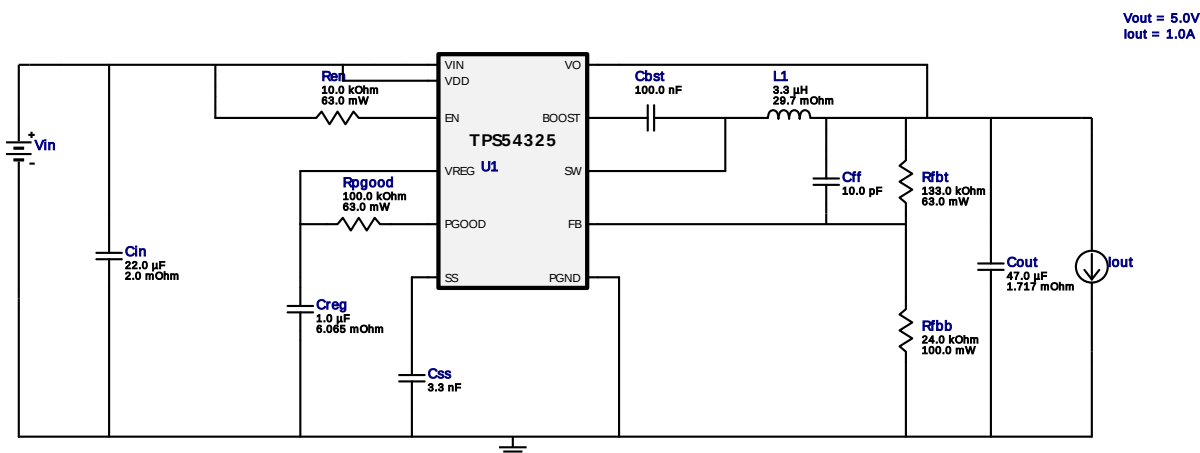


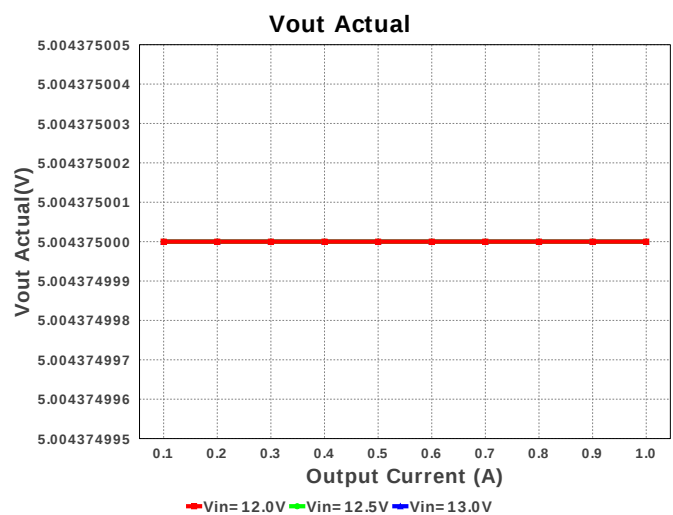
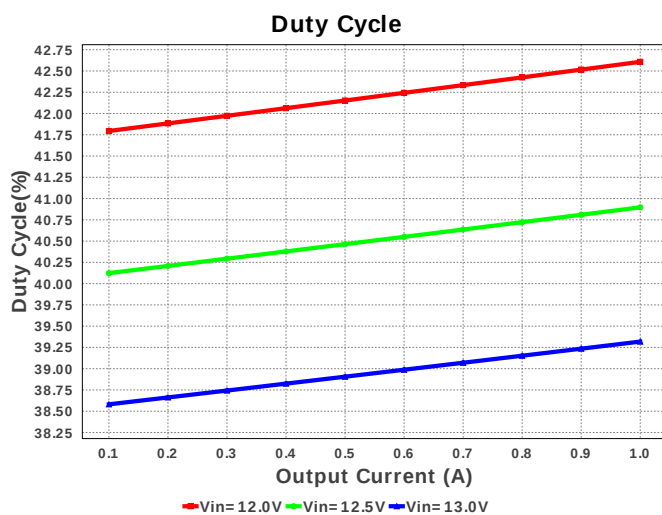
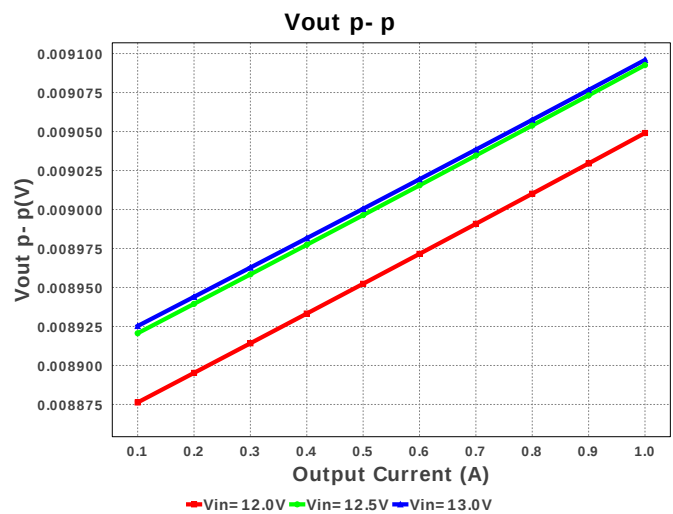
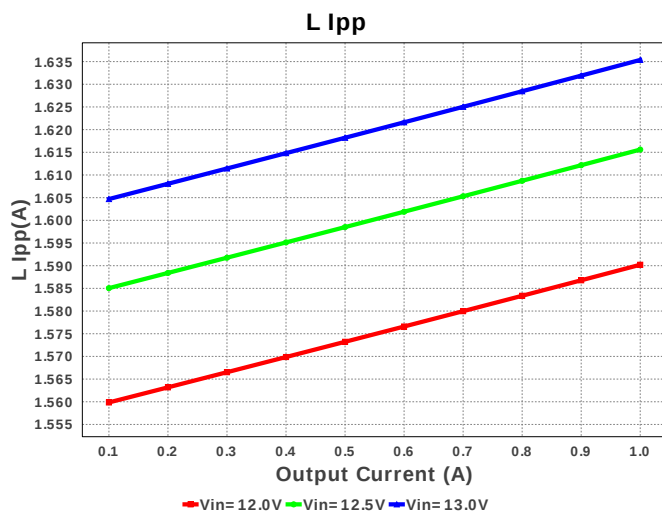


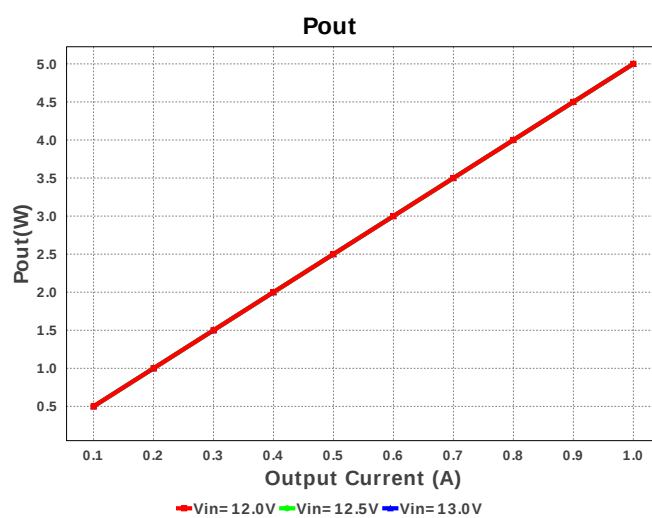
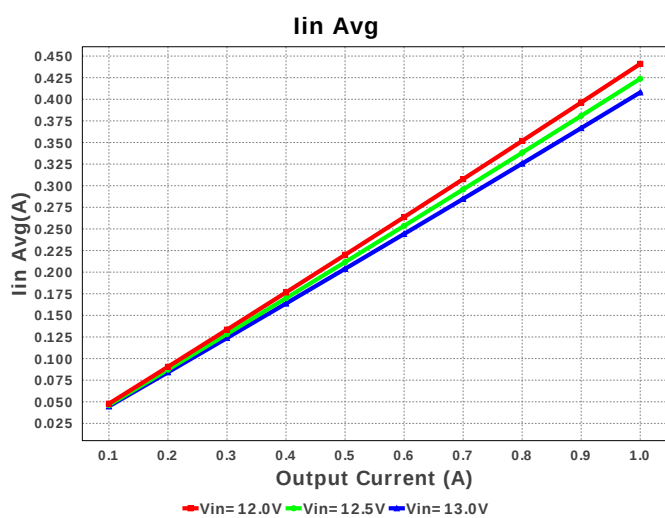
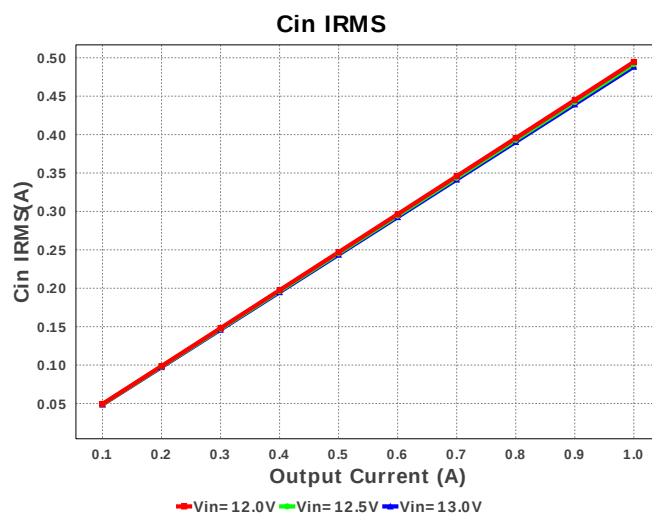
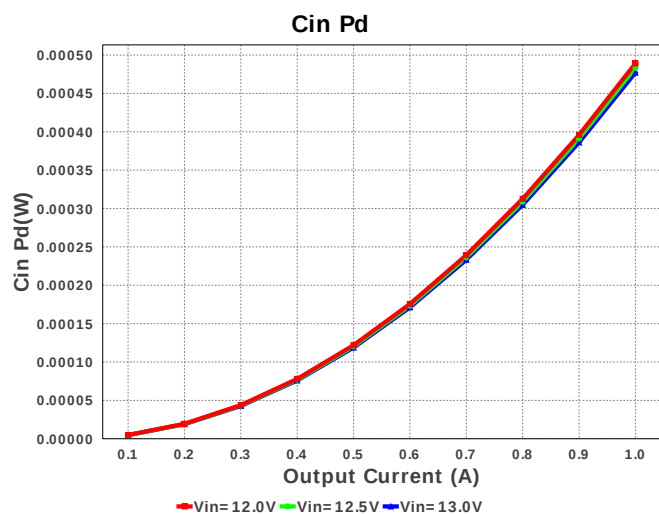
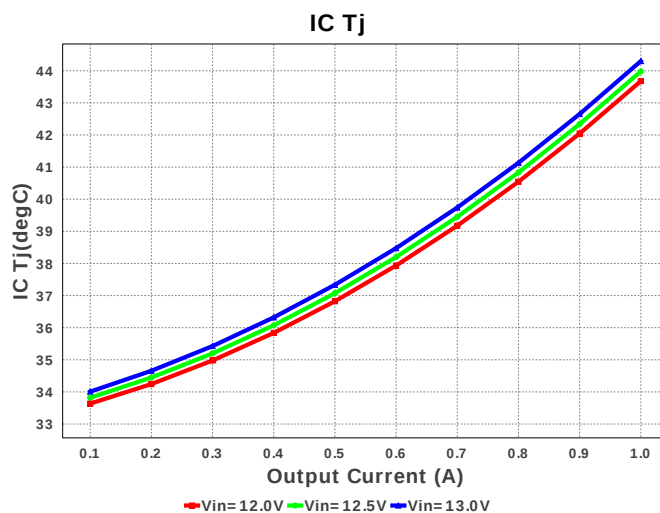
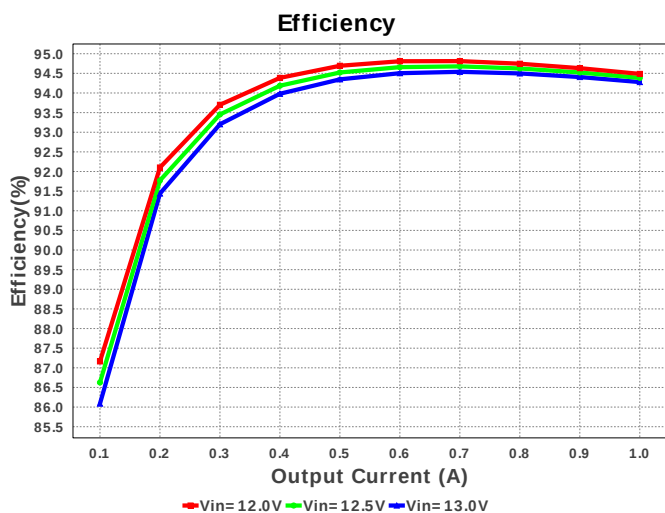
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Topology = Buck  
Created = 7/15/16 9:33:40 PM  
BOM Cost = \$1.99  
BOM Count = 12  
Total Pd = 0.3W

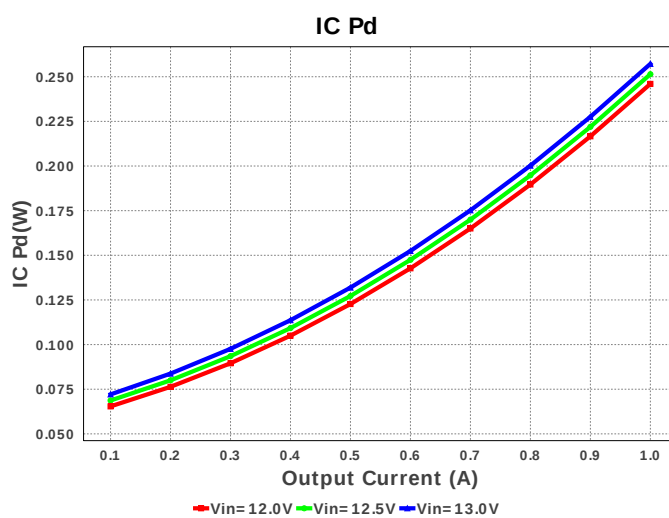
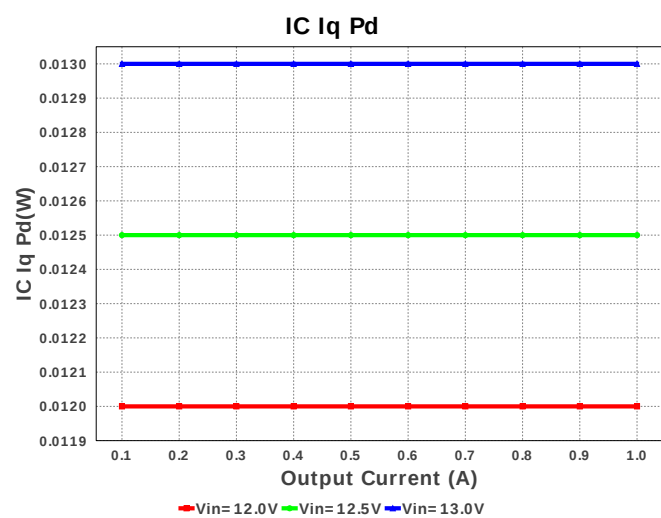
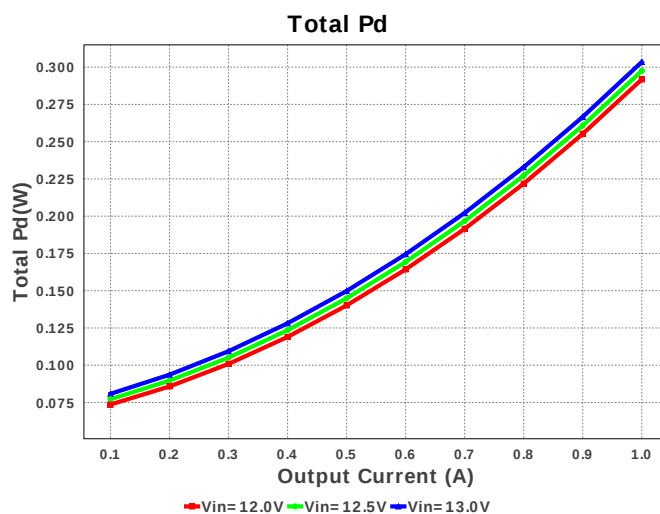
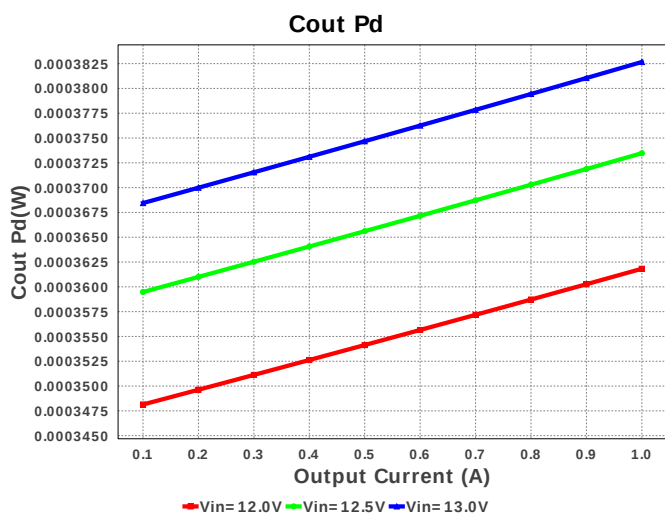
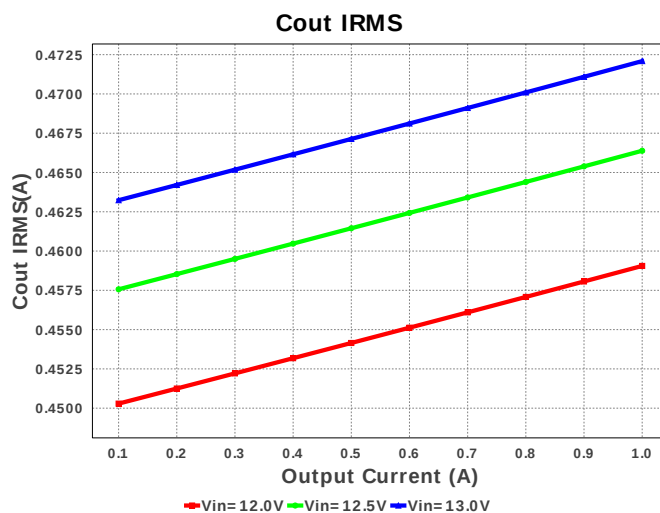
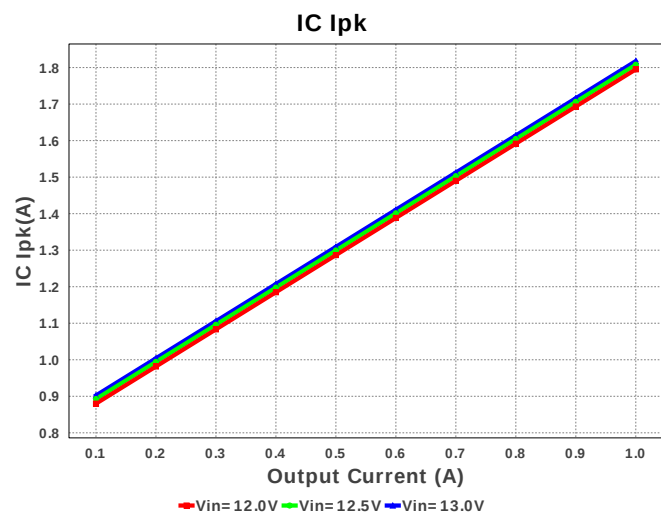


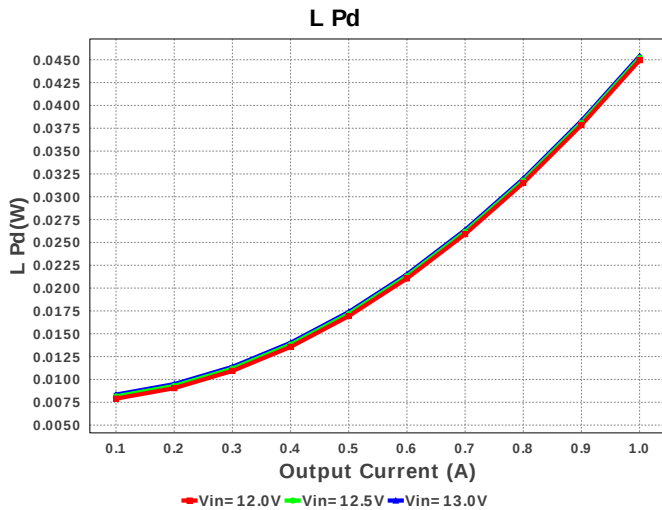
| #   | Name | Manufacturer  | Part Number                          | Properties                                                       | Qty | Price  | Footprint                                                                                                        |
|-----|------|---------------|--------------------------------------|------------------------------------------------------------------|-----|--------|------------------------------------------------------------------------------------------------------------------|
| 1.  | Cbst | MuRata        | GRM155R61A104KA01D<br>Series= X5R    | Cap= 100.0 nF<br>VDC= 10.0 V<br>IRMS= 0.0 A                      | 1   | \$0.01 |  0402 3 mm <sup>2</sup>     |
| 2.  | Cff  | Kemet         | C0805C100M4GACTU<br>Series= COG/NP0  | Cap= 10.0 pF<br>VDC= 16.0 V<br>IRMS= 0.0 A                       | 1   | \$0.01 |  0805 7 mm <sup>2</sup>     |
| 3.  | 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 |  1210 15 mm <sup>2</sup>    |
| 4.  | Cout | TDK           | C3216JB1A476M<br>Series= JB          | Cap= 47.0 uF<br>ESR= 1.717 mOhm<br>VDC= 10.0 V<br>IRMS= 0.0 A    | 1   | \$0.34 |  1206 11 mm <sup>2</sup>    |
| 5.  | Creg | MuRata        | GRM188R61A105KA61D<br>Series= X5R    | Cap= 1.0 uF<br>ESR= 6.065 mOhm<br>VDC= 10.0 V<br>IRMS= 1.30675 A | 1   | \$0.01 |  0603 5 mm <sup>2</sup>     |
| 6.  | Css  | MuRata        | GRM216R71E332KA01D<br>Series= X7R    | Cap= 3.3 nF<br>VDC= 25.0 V<br>IRMS= 0.0 A                        | 1   | \$0.01 |  0805 7 mm <sup>2</sup>     |
| 7.  | L1   | TDK           | SPM6530T-3R3M                        | L= 3.3 µH<br>DCR= 29.7 mOhm                                      | 1   | \$0.56 |  SPM6530 77 mm <sup>2</sup> |
| 8.  | Ren  | 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>     |
| 9.  | Rfbb | Yageo America | RC0603FR-0724KL<br>Series= ?         | Res= 24.0 kOhm<br>Power= 100.0 mW<br>Tolerance= 1.0%             | 1   | \$0.01 |  0603 5 mm <sup>2</sup>     |
| 10. | Rfbt | Vishay-Dale   | CRCW0402133KFKED<br>Series= CRCW..e3 | Res= 133.0 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                     |
|-----|--------|-------------------|--------------------------------------|------------------------------------------------------|-----|--------|-------------------------------|
| 11. | Rpgood | 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>        |
| 12. | U1     | Texas Instruments | TPS54325PWPR                         | Switcher                                             | 1   | \$0.85 | R-PDSO-G14 61 mm <sup>2</sup> |









## Operating Values

| #   | Name           | Value                 | Category | Description                                                                                |
|-----|----------------|-----------------------|----------|--------------------------------------------------------------------------------------------|
| 1.  | Cin IRMS       | 488.457 mA            | Current  | Input capacitor RMS ripple current                                                         |
| 2.  | Cout IRMS      | 472.089 mA            | Current  | Output capacitor RMS ripple current                                                        |
| 3.  | IC Ipk         | 1.818 A               | Current  | Peak switch current in IC                                                                  |
| 4.  | Iin Avg        | 407.96 mA             | Current  | Average input current                                                                      |
| 5.  | L Ipp          | 1.635 A               | Current  | Peak-to-peak inductor ripple current                                                       |
| 6.  | BOM Count      | 12                    | General  | Total Design BOM count                                                                     |
| 7.  | FootPrint      | 199.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components                                                    |
| 8.  | Frequency      | 582.849 kHz           | General  | Switching frequency                                                                        |
| 9.  | Pout           | 5.0 W                 | General  | Total output power                                                                         |
| 10. | Total BOM      | \$1.99                | General  | Total BOM Cost                                                                             |
| 11. | Vout Actual    | 5.004 V               | Op_Point | Vout Actual calculated based on selected voltage divider resistors                         |
| 12. | Vout OP        | 5.0 V                 | Op_Point | Operational Output Voltage                                                                 |
| 13. | Duty Cycle     | 39.318 %              | Op_point | Duty cycle                                                                                 |
| 14. | Efficiency     | 94.278 %              | Op_point | Steady state efficiency                                                                    |
| 15. | IC Tj          | 44.301 degC           | Op_point | IC junction temperature                                                                    |
| 16. | ICThetaJA      | 55.6 degC/W           | Op_point | IC junction-to-ambient thermal resistance                                                  |
| 17. | IOUT_OP        | 1.0 A                 | Op_point | Iout operating point                                                                       |
| 18. | VIN_OP         | 13.0 V                | Op_point | Vin operating point                                                                        |
| 19. | Vout p-p       | 9.096 mV              | Op_point | Peak-to-peak output ripple voltage                                                         |
| 20. | Cin Pd         | 477.18 μW             | Power    | Input capacitor power dissipation                                                          |
| 21. | Cout Pd        | 382.665 μW            | Power    | Output capacitor power dissipation                                                         |
| 22. | IC Iq Pd       | 13.0 mW               | Power    | IC Iq Pd                                                                                   |
| 23. | IC Pd          | 257.208 mW            | Power    | IC power dissipation                                                                       |
| 24. | L Pd           | 45.399 mW             | Power    | Inductor power dissipation                                                                 |
| 25. | Total Pd       | 303.465 mW            | Power    | Total Power Dissipation                                                                    |
| 26. | Vout Tolerance | 2.775 %               |          | 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  | 13.0     | Maximum input voltage  |
| 3. | VinMin  | 12.0     | Minimum input voltage  |
| 4. | Vout    | 5.0      | Output Voltage         |
| 5. | base_pn | TPS54325 | Base Product Number    |
| 6. | source  | DC       | Input Source Type      |
| 7. | Ta      | 30.0     | Ambient temperature    |

## Design Assistance

1. **TPS54325** Product Folder : <http://www.ti.com/product/TPS54325> : contains the data sheet and other resources.

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