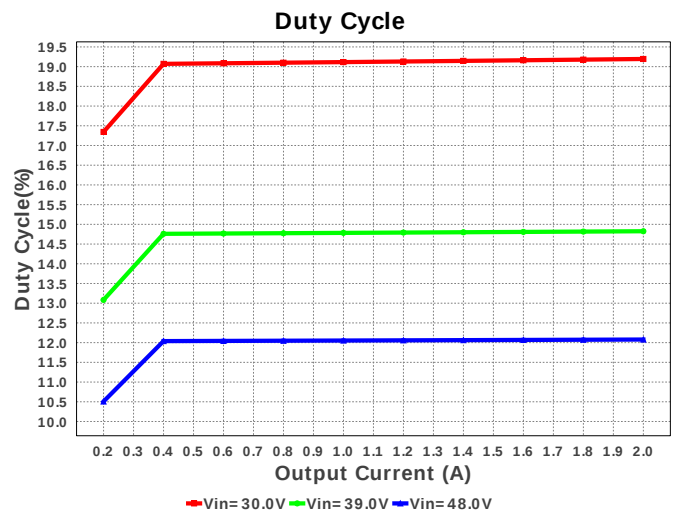
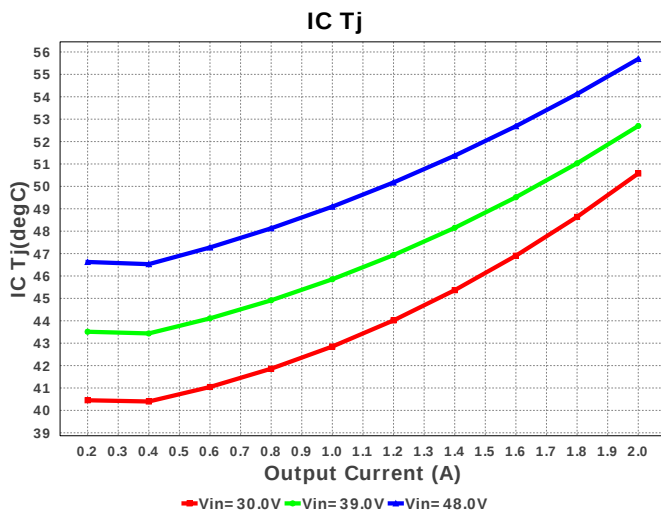


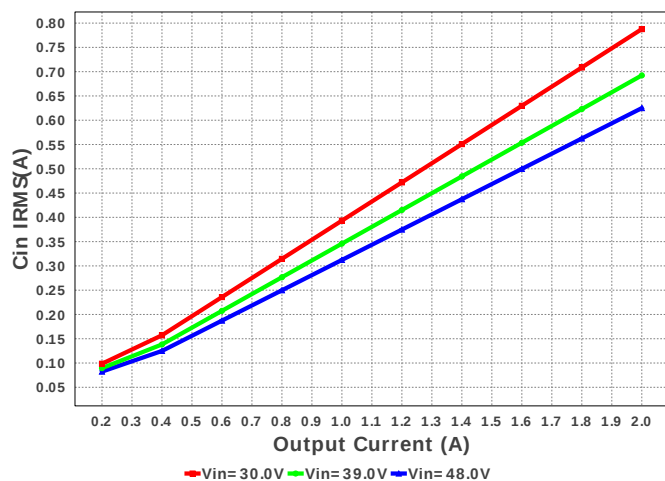


Device = LM5005MHX/NOPB  
Topology = Buck  
Created = 9/8/16 5:24:11 PM  
BOM Cost = \$2.98  
BOM Count = 15  
Total Pd = 2.42W

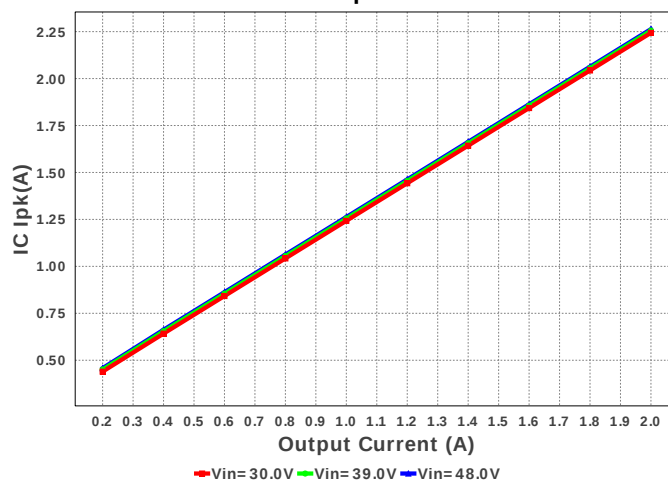
| #   | Name  | Manufacturer      | Part Number                     | Properties                                            | Qty | Price  | Footprint                                                                                                          |
|-----|-------|-------------------|---------------------------------|-------------------------------------------------------|-----|--------|--------------------------------------------------------------------------------------------------------------------|
| 9.  | L1    | Bourns            | SRR1210-330M                    | L= 33.0 $\mu$ H<br>DCR= 52.0 mOhm                     | 1   | \$0.44 | <br>SRR1210 196 mm <sup>2</sup> |
| 10. | Rcomp | Panasonic         | ERJ-6ENF8061V<br>Series= ERJ-6E | Res= 8.06 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%  | 1   | \$0.01 | <br>0805 7 mm <sup>2</sup>      |
| 11. | Rfb1  | Panasonic         | ERJ-6ENF1001V<br>Series= ERJ-6E | Res= 1000.0 Ohm<br>Power= 125.0 mW<br>Tolerance= 1.0% | 1   | \$0.01 | <br>0805 7 mm <sup>2</sup>      |
| 12. | Rfb2  | Panasonic         | ERJ-6ENF3091V<br>Series= ERJ-6E | Res= 3.09 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%  | 1   | \$0.01 | <br>0805 7 mm <sup>2</sup>      |
| 13. | Rt    | Panasonic         | ERJ-6ENF2052V<br>Series= ERJ-6E | Res= 20.5 kOhm<br>Power= 125.0 mW<br>Tolerance= 1.0%  | 1   | \$0.01 | <br>0805 7 mm <sup>2</sup>      |
| 14. | U1    | Texas Instruments | LM5005MHX/NOPB                  | Switcher                                              | 1   | \$1.75 | <br>MXA20A 71 mm <sup>2</sup>   |



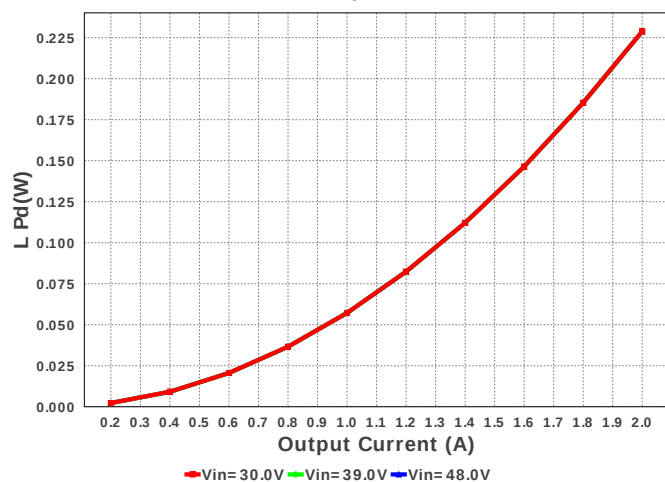
Cin IRMS



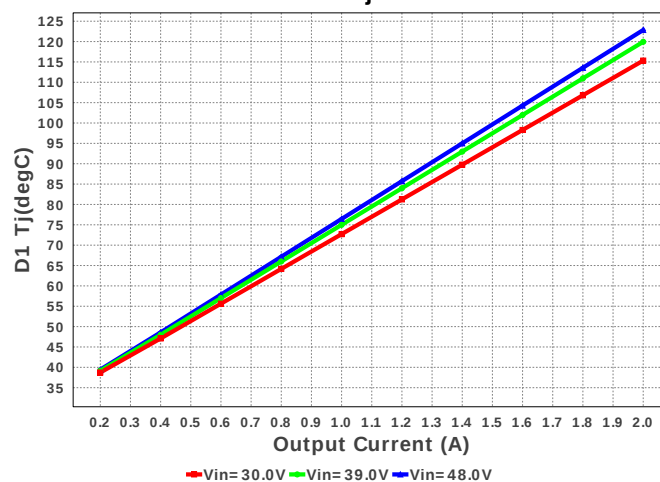
IC Ipk



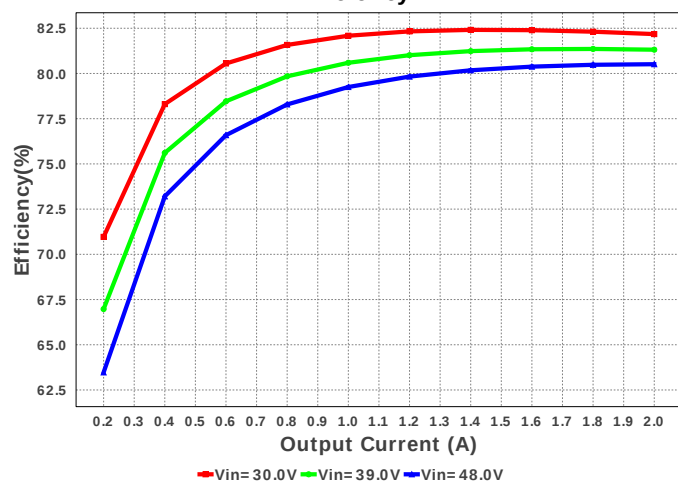
L Pd



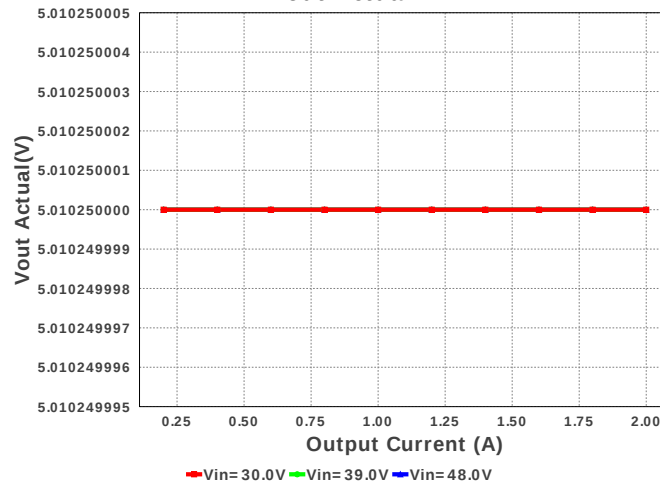
D1 Tj

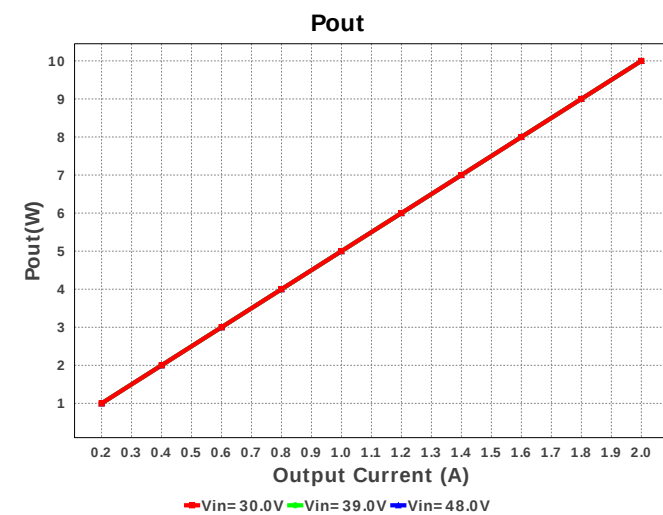
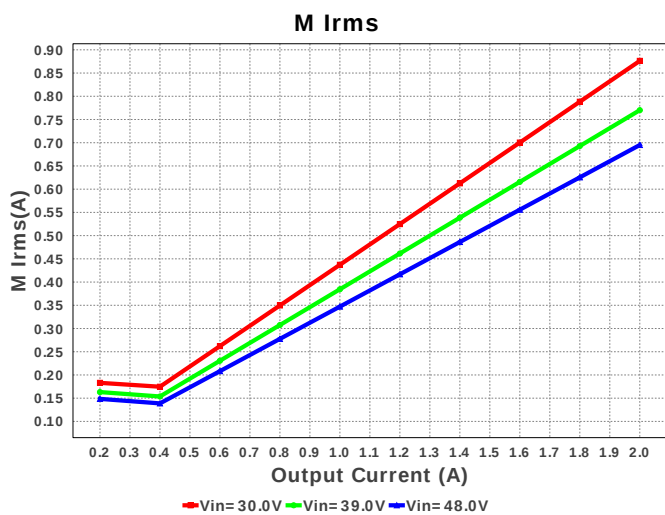
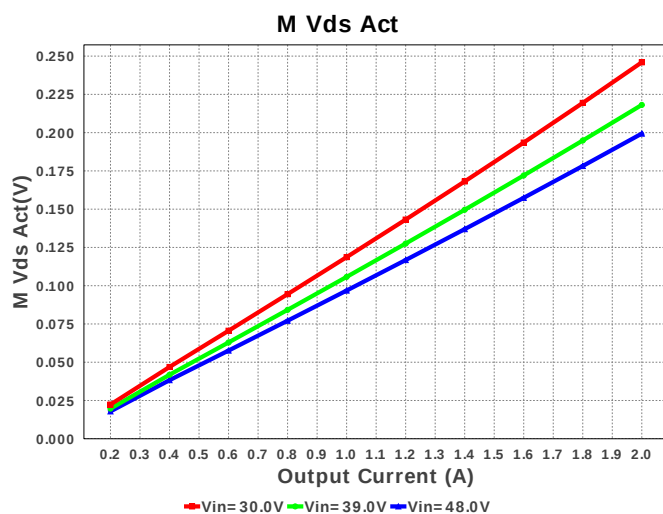
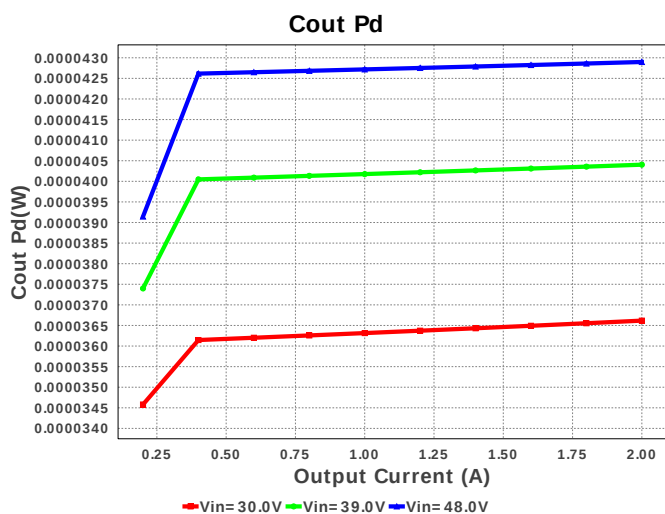
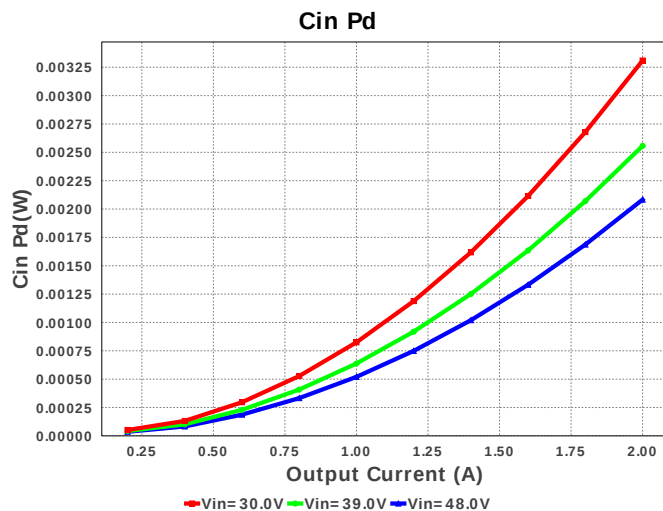
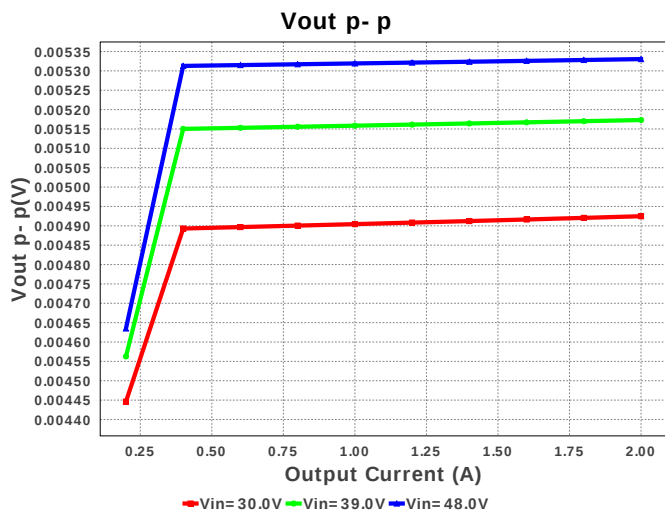


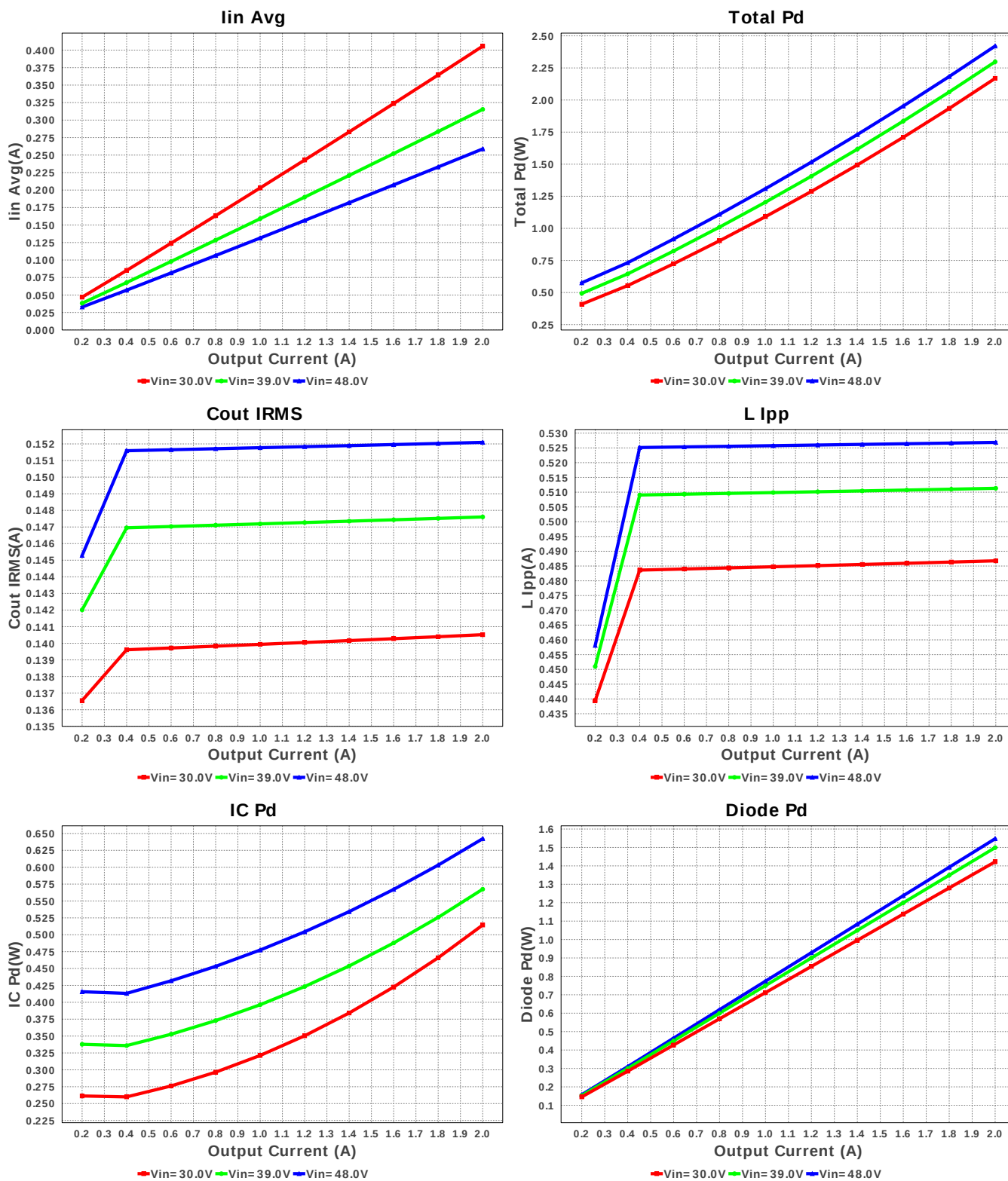
Efficiency



Vout Actual







## Operating Values

| #   | Name         | Value                 | Category | Description                             |
|-----|--------------|-----------------------|----------|-----------------------------------------|
| 1.  | Cin IRMS     | 624.942 mA            | Current  | Input capacitor RMS ripple current      |
| 2.  | Cout IRMS    | 152.092 mA            | Current  | Output capacitor RMS ripple current     |
| 3.  | IC Ipk       | 2.262 A               | Current  | Peak switch current in IC               |
| 4.  | Iin Avg      | 258.76 mA             | Current  | Average input current                   |
| 5.  | L Ipp        | 526.86 mA             | Current  | Peak-to-peak inductor ripple current    |
| 6.  | M1 Irms      | 695.089 mA            | Current  | Q lavg                                  |
| 7.  | BOM Count    | 15                    | General  | Total Design BOM count                  |
| 8.  | FootPrint    | 410.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components |
| 9.  | Frequency    | 298.73 kHz            | General  | Switching frequency                     |
| 10. | IC Tolerance | 18.0 mV               | General  | IC Feedback Tolerance                   |
| 11. | M Vds Act    | 199.368 mV            | General  | Voltage drop across the MosFET          |

| #   | Name           | Value          | Category | Description                                                                                |
|-----|----------------|----------------|----------|--------------------------------------------------------------------------------------------|
| 12. | Mode           | CCM            | General  | Conduction Mode                                                                            |
| 13. | Pout           | 10.0 W         | General  | Total output power                                                                         |
| 14. | Total BOM      | \$2.98         | General  | Total BOM Cost                                                                             |
| 15. | D1 Tj          | 122.845 degC   | Op_Point | D1 junction temperature                                                                    |
| 16. | Vout Actual    | 5.01 V         | Op_Point | Vout Actual calculated based on selected voltage divider resistors                         |
| 17. | Vout OP        | 5.0 V          | Op_Point | Operational Output Voltage                                                                 |
| 18. | Duty Cycle     | 12.079 %       | Op_point | Duty cycle                                                                                 |
| 19. | Efficiency     | 80.512 %       | Op_point | Steady state efficiency                                                                    |
| 20. | IC Tj          | 55.687 degC    | Op_point | IC junction temperature                                                                    |
| 21. | ICThetaJA      | 40.0 degC/W    | Op_point | IC junction-to-ambient thermal resistance                                                  |
| 22. | IOUT_OP        | 2.0 A          | Op_point | Iout operating point                                                                       |
| 23. | VIN_OP         | 48.0 V         | Op_point | Vin operating point                                                                        |
| 24. | Vout p-p       | 5.33 mV        | Op_point | Peak-to-peak output ripple voltage                                                         |
| 25. | Cin Pd         | 2.083 mW       | Power    | Input capacitor power dissipation                                                          |
| 26. | Cout Pd        | 42.898 $\mu$ W | Power    | Output capacitor power dissipation                                                         |
| 27. | Diode Pd       | 1.547 W        | Power    | Diode power dissipation                                                                    |
| 28. | IC Pd          | 642.182 mW     | Power    | IC power dissipation                                                                       |
| 29. | L Pd           | 228.8 mW       | Power    | Inductor power dissipation                                                                 |
| 30. | Total Pd       | 2.421 W        | Power    | Total Power Dissipation                                                                    |
| 31. | Vout Tolerance | 3.018 %        |          | Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable |

## Design Inputs

| #  | Name    | Value  | Description            |
|----|---------|--------|------------------------|
| 1. | Iout    | 2.0    | Maximum Output Current |
| 2. | VinMax  | 48.0   | Maximum input voltage  |
| 3. | VinMin  | 30.0   | Minimum input voltage  |
| 4. | Vout    | 5.0    | Output Voltage         |
| 5. | base_pn | LM5005 | Base Product Number    |
| 6. | source  | DC     | Input Source Type      |
| 7. | Ta      | 30.0   | Ambient temperature    |

## Design Assistance

1. **LM5005 Product Folder** : <http://www.ti.com/product/LM5005> : contains the data sheet and other resources.

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