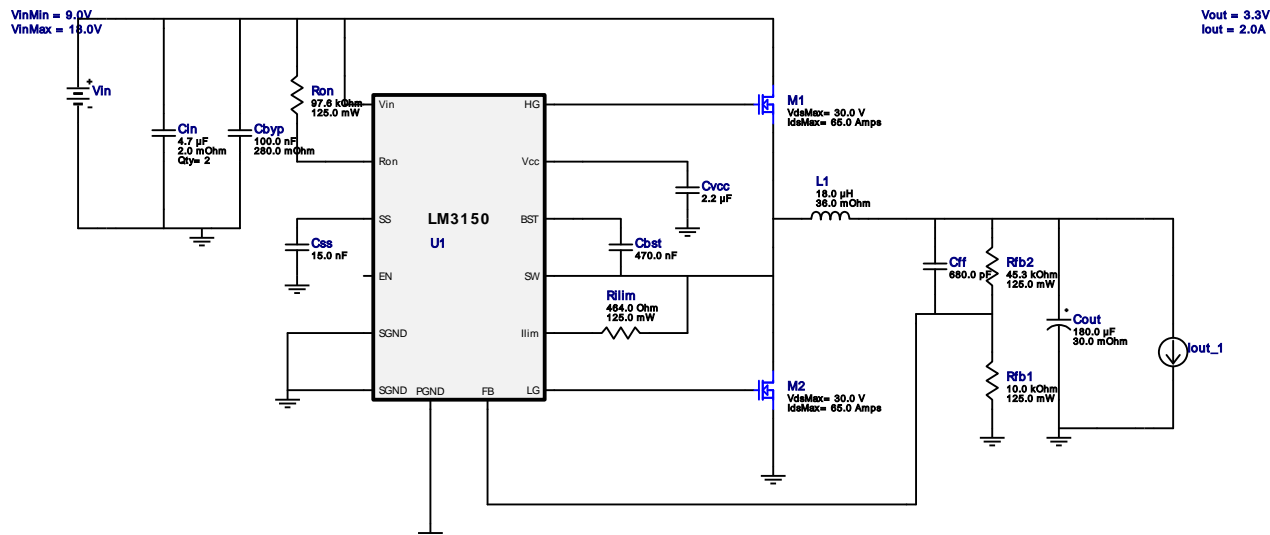


WEBENCH® Design Report

Design : 3997477/93 LM3150MH/NOPB
LM3150MHX/NOPB 9.0V-18.0V to 3.3V @ 2.0A








VinMin = 9.0V
VinMax = 18.0V
Vout = 3.3V
Iout = 2.0A

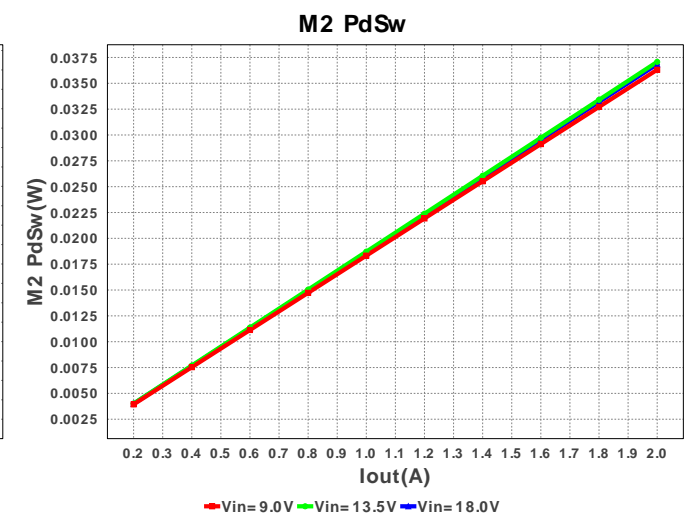
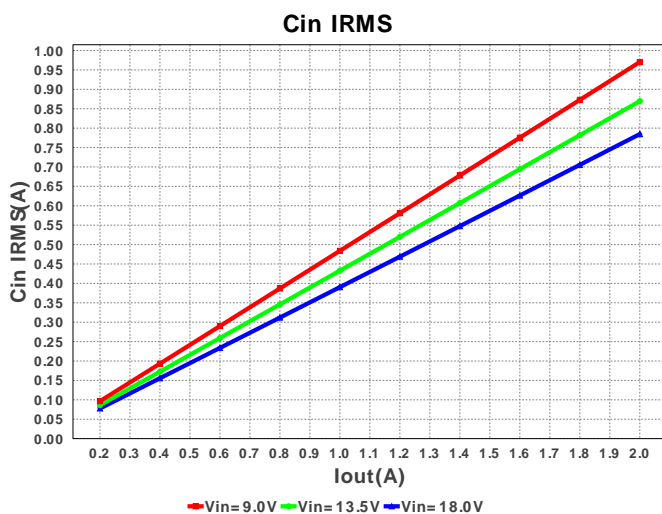
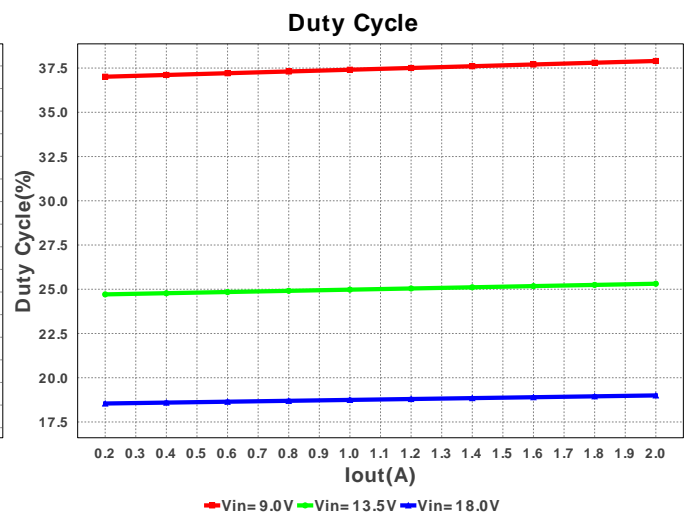
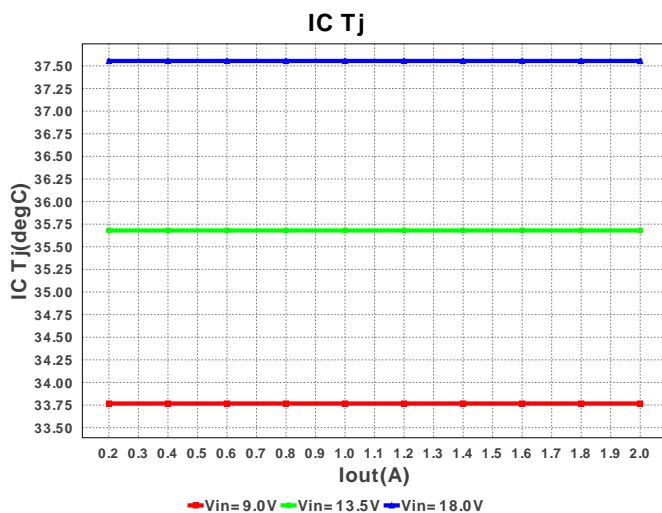
Device = LM3150MH/NOPB
Topology = Buck
Created = 6/5/14 6:54:54 AM
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Footprint = 614.0mm2
BOM Count = 16
Total Pd = 0.43W

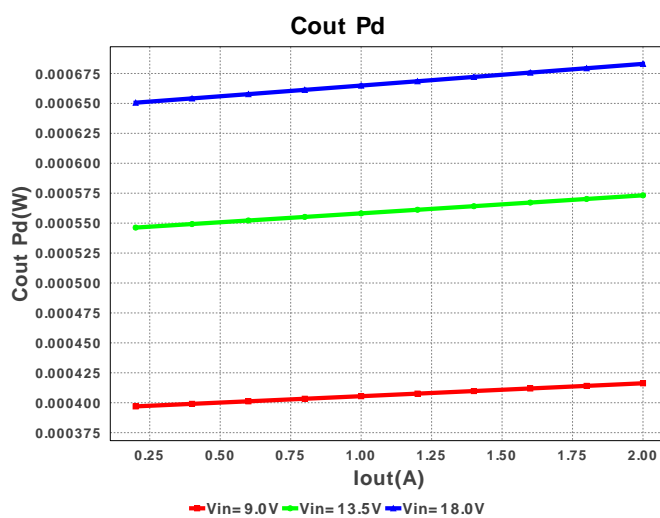
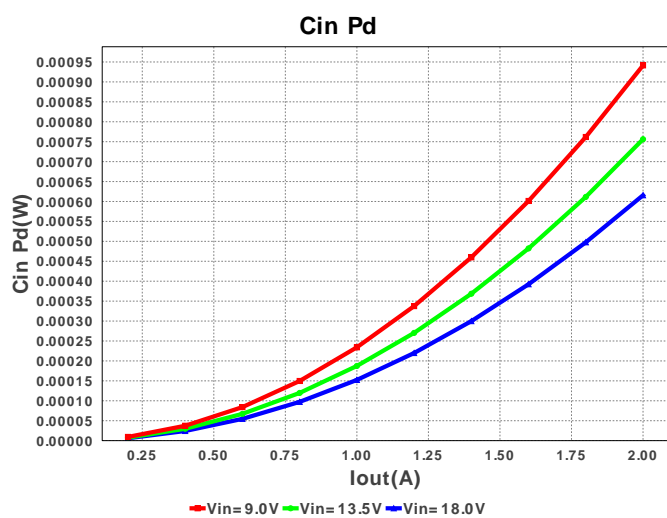
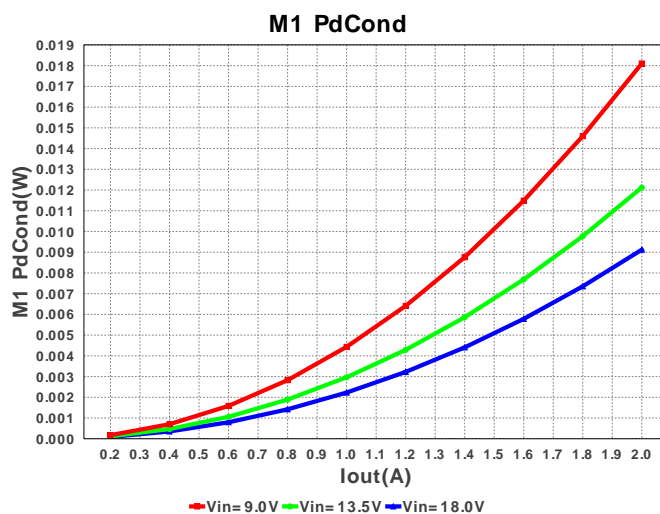
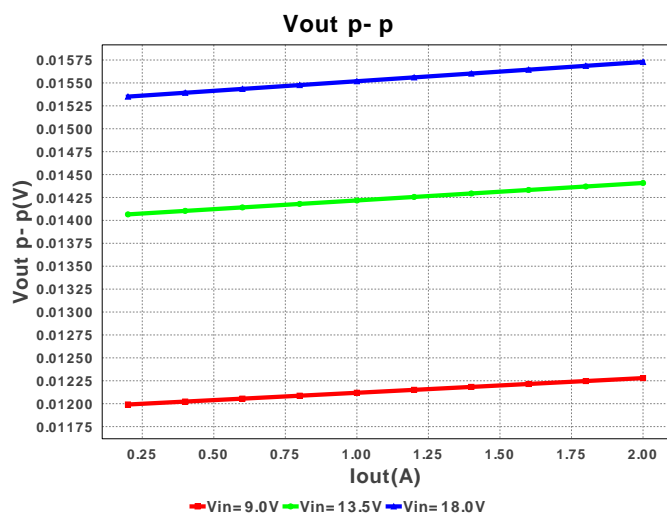
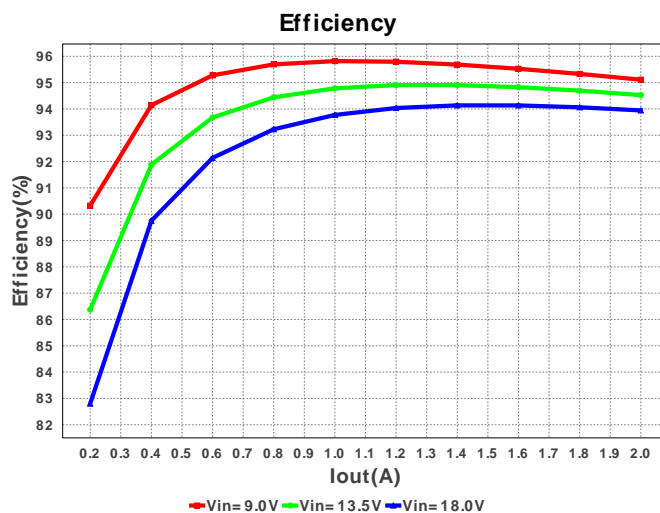
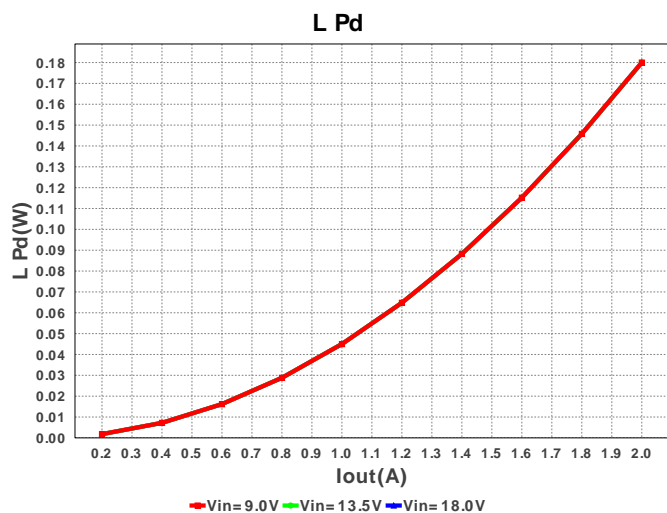


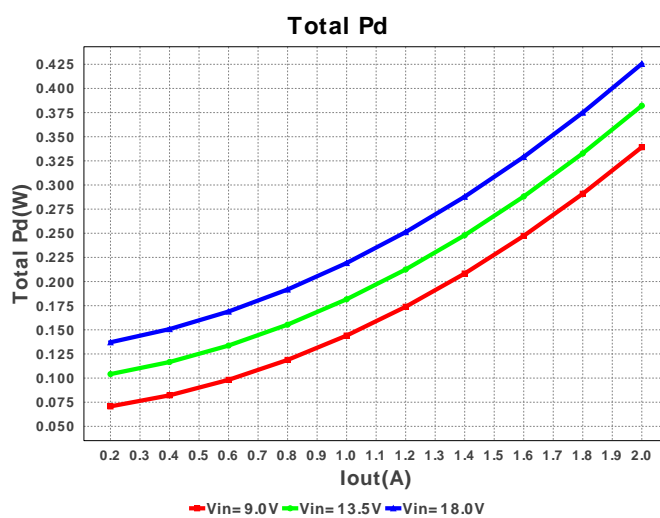
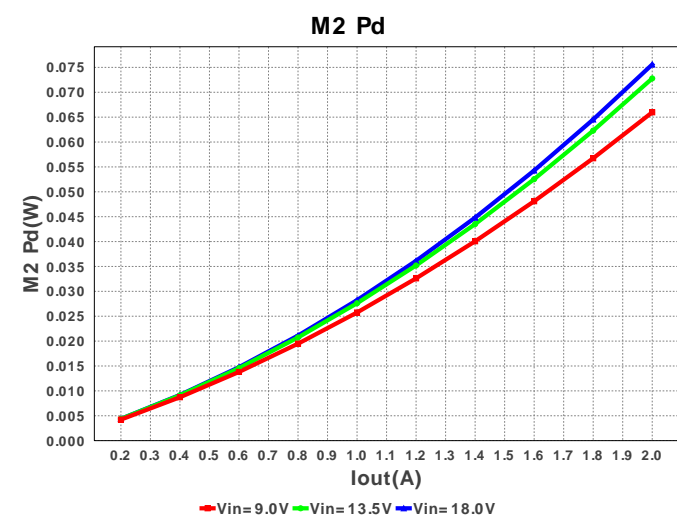
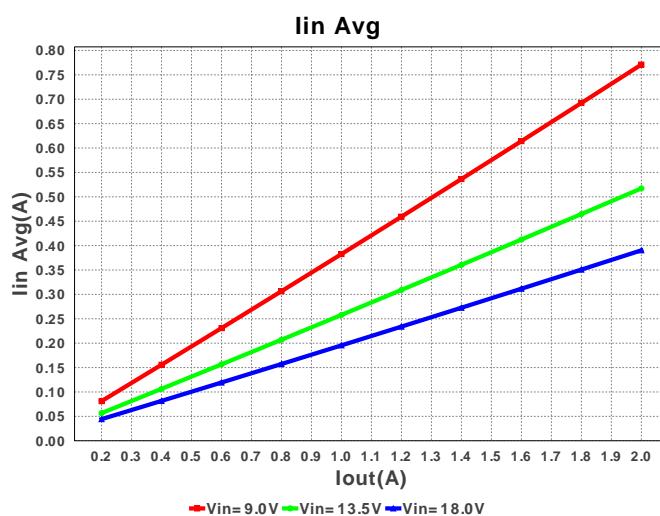
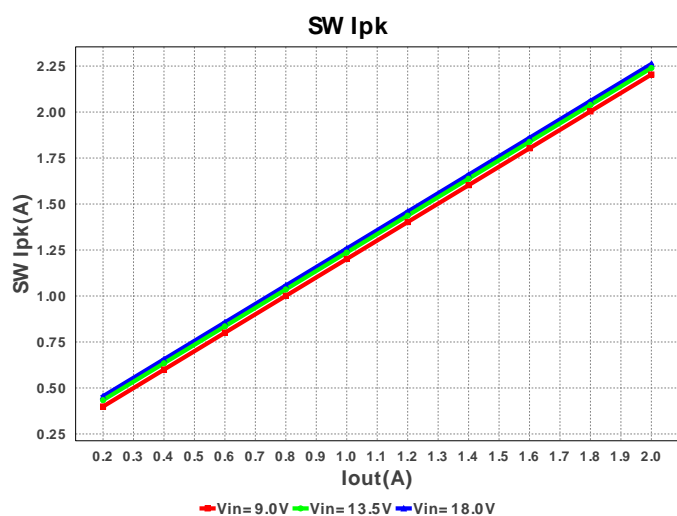
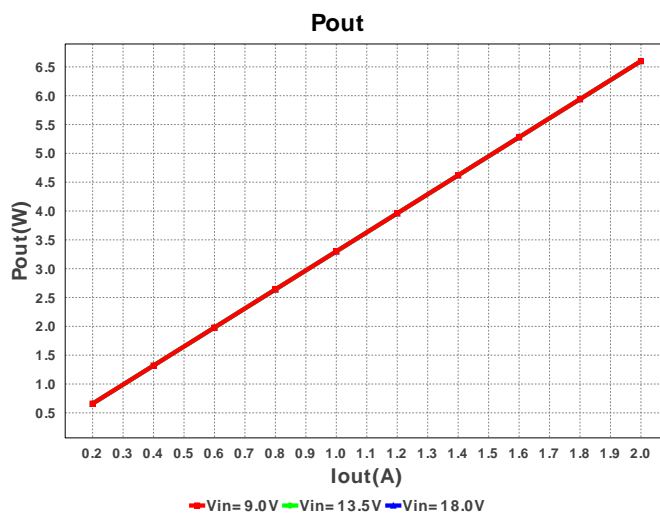
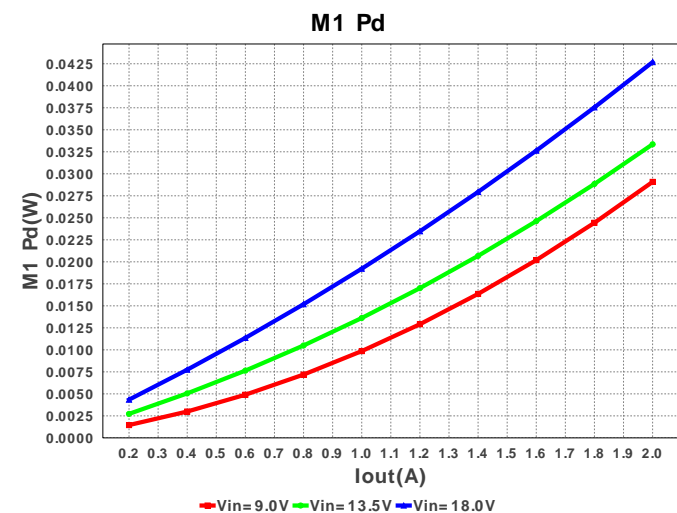
Electrical BOM

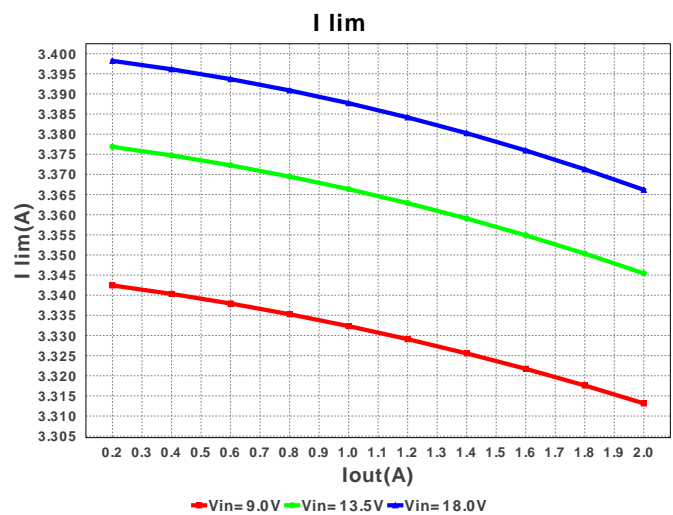
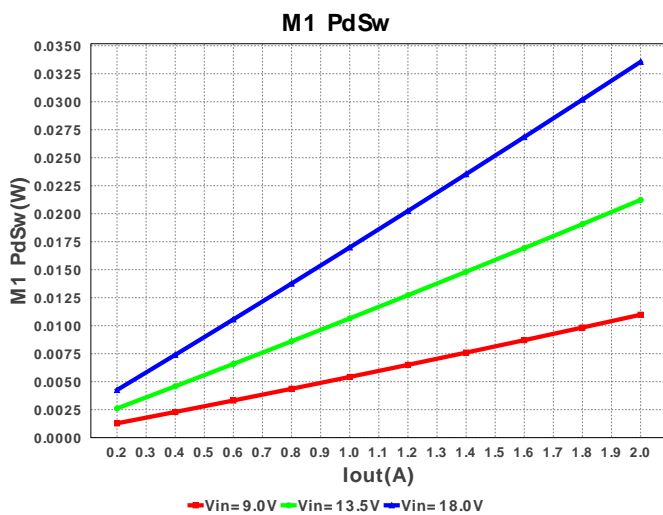
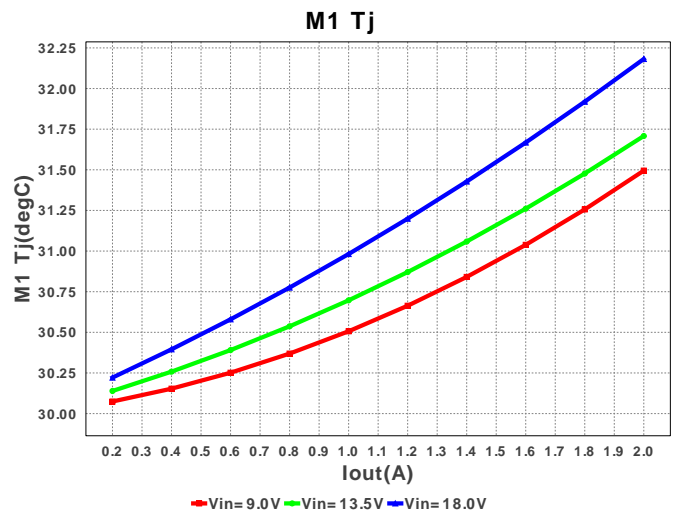
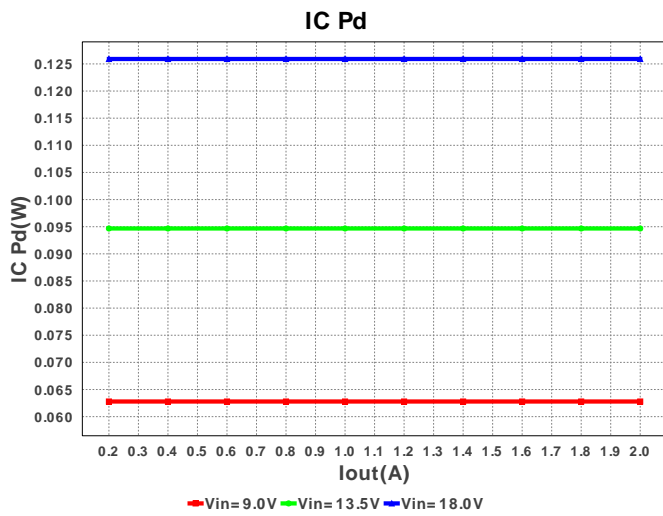
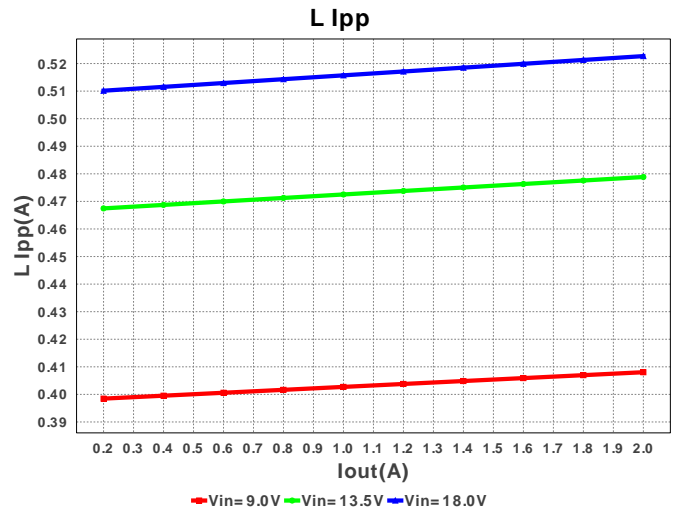
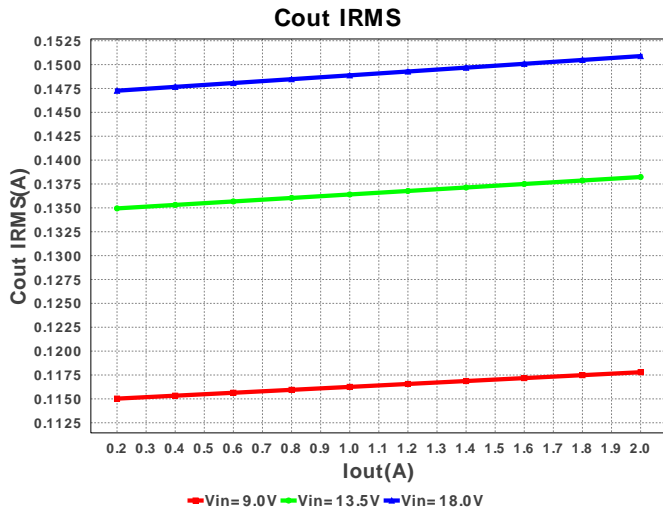
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|----|------|---------------|-----------------------------------|--|-----|--------|--|
| 1. | Cbst | Taiyo Yuden | EMK212B7474KD-T Series= X7R | Cap= 470.0 nF VDC= 16.0 V IRMS= 0.0 A | 1 | \$0.02 |  0805 7mm2 |
| 2. | Cbyp | AVX | 08053C104KAT2A Series= X7R | Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A | 1 | \$0.01 |  0805 7mm2 |
| 3. | Cff | Yageo America | CC0805KRX7R9BB681 Series= X7R | Cap= 680.0 pF VDC= 50.0 V IRMS= 0.0 A | 1 | \$0.01 |  0805 7mm2 |
| 4. | Cin | MuRata | GRM21BR61E475MA12L Series= X5R | Cap= 4.7 µF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A | 2 | \$0.06 |  0805 7mm2 |
| 5. | Cout | Panasonic | 16SVP180MX Series= 261 | Cap= 180.0 µF ESR= 30.0 mOhm VDC= 16.0 V IRMS= 3.02 A | 1 | \$0.29 |  SM_RADIAL_10AMM 160mm2 |
| 6. | Css | Yageo America | CC0805KRX7R9BB153 Series= X7R | Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A | 1 | \$0.01 |  0805 7mm2 |
| 7. | Cvcc | Taiyo Yuden | EMK212B7225KG-T Series= X7R | Cap= 2.2 µF VDC= 16.0 V IRMS= 0.0 A | 1 | \$0.03 |  0805 7mm2 |
| 8. | L1 | Bourns | SRR1260-180M | L= 18.0 µH DCR= 36.0 mOhm | 1 | \$0.41 |  SRR1260 210mm2 |

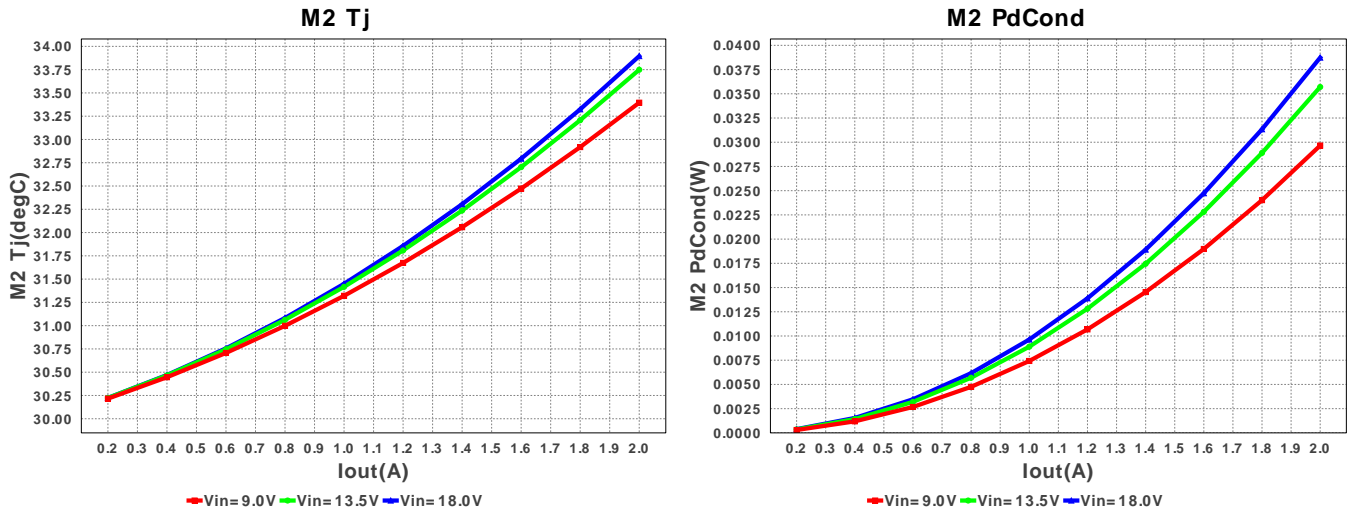
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|-----|-------|-------------------|--------------------------------------|--|-----|--------|--|
| 9. | M1 | Texas Instruments | CSD17507Q5A | VdsMax= 30.0 V IdsMax= 65.0 Amps | 1 | \$0.34 |  TRANS_NexFET_Q5A 55mm2 |
| 10. | M2 | Texas Instruments | CSD17507Q5A | VdsMax= 30.0 V IdsMax= 65.0 Amps | 1 | \$0.34 |  TRANS_NexFET_Q5A 55mm2 |
| 11. | Rfb1 | Panasonic | ERJ-6ENF1002V Series= 225 | Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0805 7mm2 |
| 12. | Rfb2 | Panasonic | ERJ-6ENF4532V Series= 225 | Res= 45.3 kOhm Power= 125.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0805 7mm2 |
| 13. | Rilim | Vishay-Dale | CRCW0805464RFKEA Series= CRCW..e3 | Res= 464.0 Ohm Power= 125.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0805 7mm2 |
| 14. | Ron | Panasonic | ERJ-6ENF9762V Series= 225 | Res= 97.6 kOhm Power= 125.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0805 7mm2 |
| 15. | U1 | Texas Instruments | LM3150MHX/NOPB | Switcher | 1 | \$1.55 |  MXA14A 59mm2 |











Operating Values

| # | Name | Value | Category | Description |
|-----|--------------|-----------------|----------|---|
| 1. | Cin IRMS | 784.605 mA | Current | Input capacitor RMS ripple current |
| 2. | Cout IRMS | 150.89 mA | Current | Output capacitor RMS ripple current |
| 3. | I lim | 3.365 A | Current | Current limit threshold |
| 4. | Iin Avg | 390.37 mA | Current | Average input current |
| 5. | L Ipp | 522.699 mA | Current | Peak-to-peak inductor ripple current |
| 6. | SW Ipk | 2.261 A | Current | Peak switch current |
| 7. | BOM Count | 16 | General | Total Design BOM count |
| 8. | FootPrint | 614.0 mm2 | General | Total Foot Print Area of BOM components |
| 9. | Frequency | 296.86 kHz | General | Switching frequency |
| 10. | IC Tolerance | 12.0 mV | General | IC Feedback Tolerance |
| 11. | Pout | 6.6 W | General | Total output power |
| 12. | Total BOM | \$3.17 | General | Total BOM Cost |
| 13. | Duty Cycle | 19.0 % | Op_point | Duty cycle |
| 14. | Efficiency | 93.929 % | Op_point | Steady state efficiency |
| 15. | IC Tj | 38.184 degC | Op_point | IC junction temperature |
| 16. | IOUT_OP | 2.0 A | Op_point | Iout operating point |
| 17. | M1 Tj | 32.182 degC | Op_point | M1 MOSFET junction temperature |
| 18. | M2 Tj | 33.953 degC | Op_point | M2 MOSFET junction temperature |
| 19. | VIN_OP | 18.0 V | Op_point | Vin operating point |
| 20. | Vout p-p | 15.729 mV | Op_point | Peak-to-peak output ripple voltage |
| 21. | Cin Pd | 615.605 μ W | Power | Input capacitor power dissipation |
| 22. | Cout Pd | 683.035 μ W | Power | Output capacitor power dissipation |
| 23. | IC Pd | 125.908 mW | Power | IC power dissipation |
| 24. | L Pd | 180.0 mW | Power | Inductor power dissipation |
| 25. | M1 Pd | 42.69 mW | Power | M1 MOSFET total power dissipation |
| 26. | M1 PdCond | 9.125 mW | Power | M1 MOSFET conduction losses |
| 27. | M1 PdSw | 33.565 mW | Power | M1 MOSFET switching losses |
| 28. | M2 Pd | 76.716 mW | Power | M2 MOSFET total power dissipation |
| 29. | M2 PdCond | 38.744 mW | Power | M2 MOSFET conduction losses |
| 30. | M2 PdSw | 37.972 mW | Power | M2 MOSFET switching losses |
| 31. | Total Pd | 426.589 mW | Power | Total Power Dissipation |

Design Inputs

| # | Name | Value | Description |
|-----|-----------|-------------|------------------------------------|
| 1. | Iout | 2.0 A | Maximum Output Current |
| 2. | Iout1 | 2.0 Amps | Output Current #1 |
| 3. | SoftStart | 1.0 ms | Soft Start Time (ms) |
| 4. | VinMax | 18.0 V | Maximum input voltage |
| 5. | VinMin | 9.0 V | Minimum input voltage |
| 6. | Vout | 3.3 V | Output Voltage |
| 7. | Vout1 | 3.3 Volt | Output Voltage #1 |
| 8. | base_pn | LM3150 | Texas Instruments Base Part Number |
| 9. | source | DC | Input Source Type |
| 10. | ta | 30.0 degC | Ambient temperature |
| 11. | userfsw | 277.593 kHz | Customer Selected Frequency |

Design Assistance

1. LM3150 Product Folder : <http://www.ti.com/product/lm3150> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

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

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