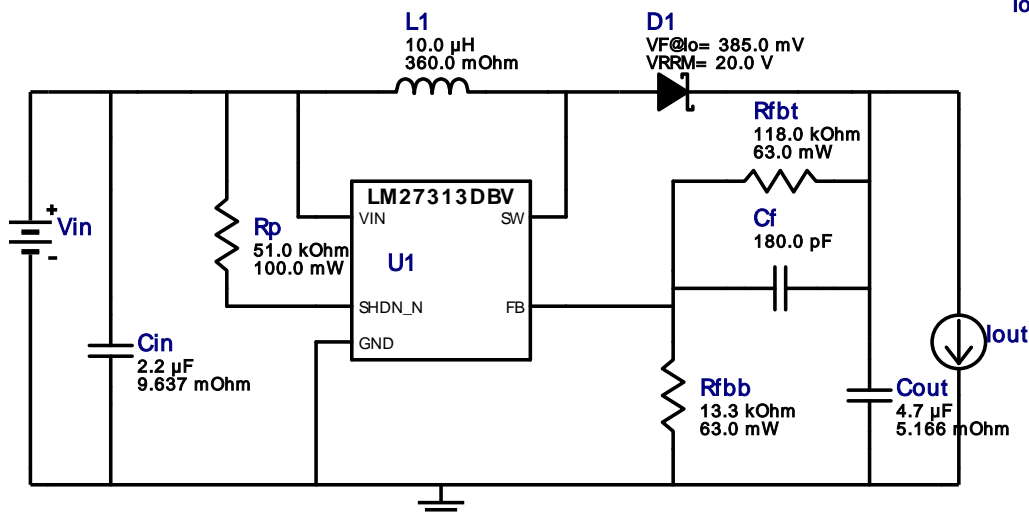


WEBENCH® Design Report


Design : 1181001/2 LM27313XMF/NOPB
LM27313XMF/NOPB 4.5V-5.5V to 12.00V @ 0.1A

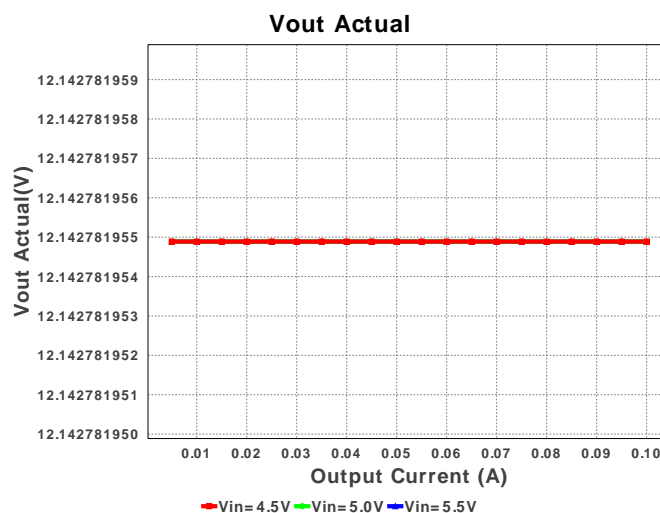
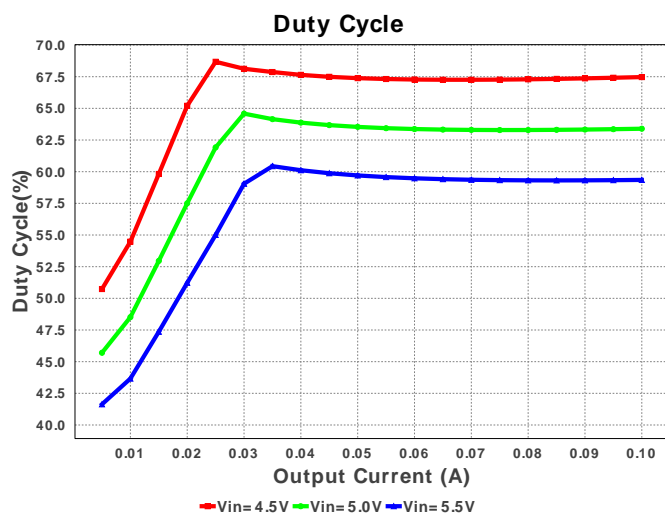
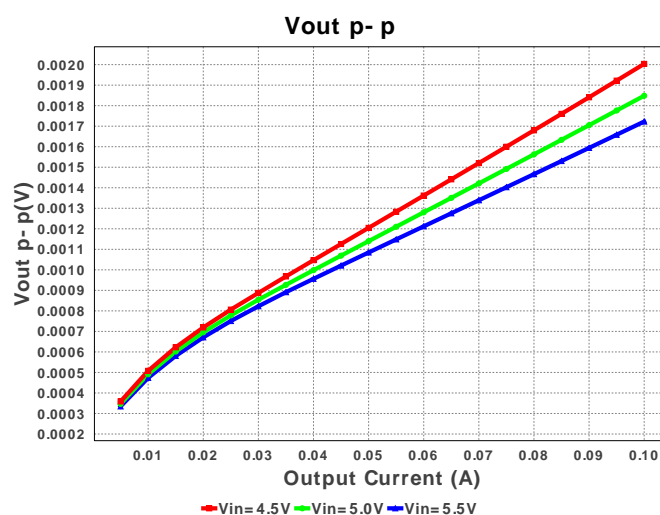
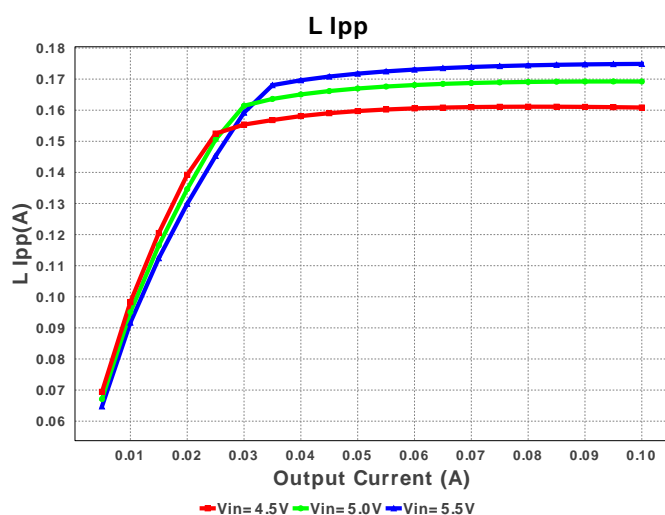
Vout = 12.0V
Iout = 0.1A

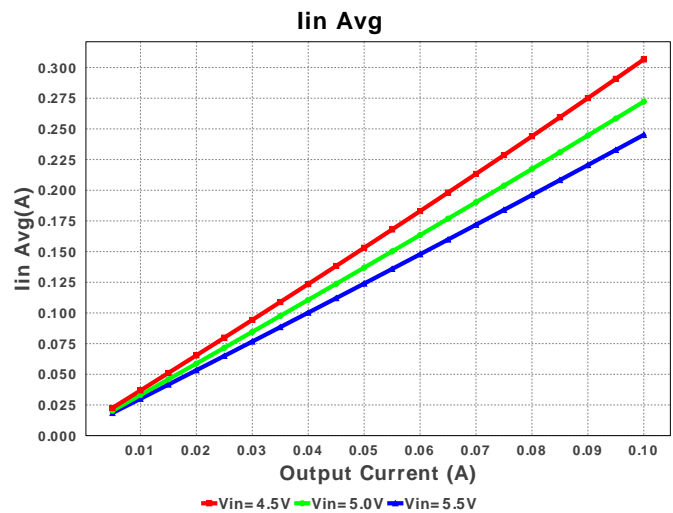
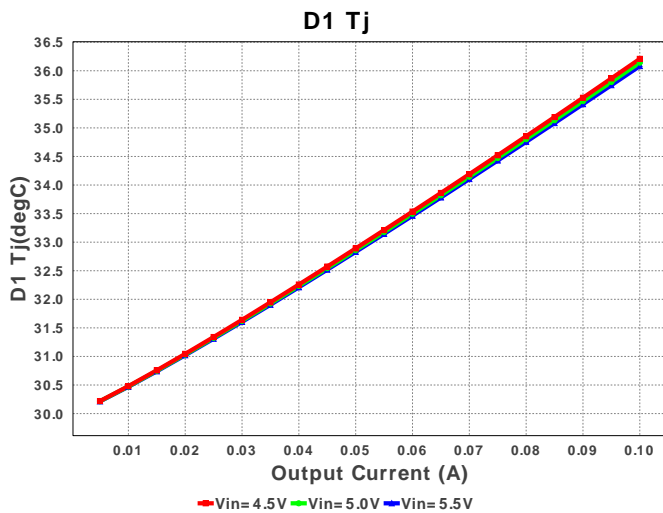
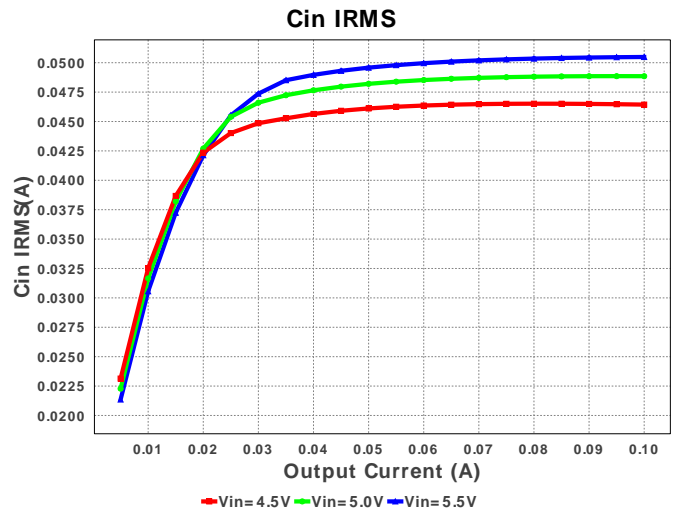
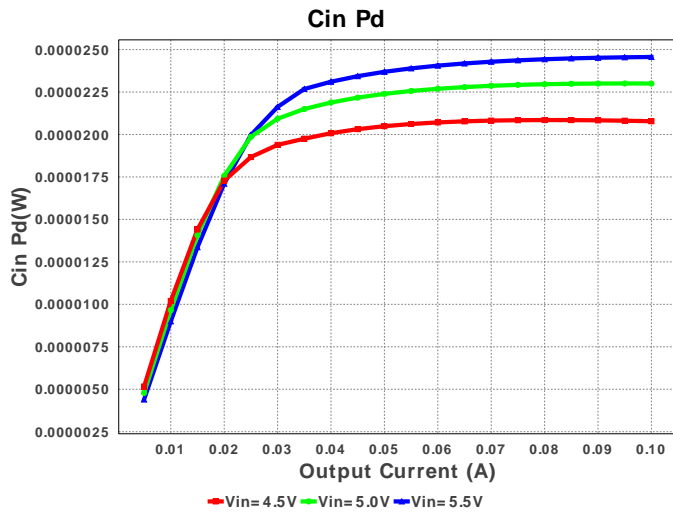
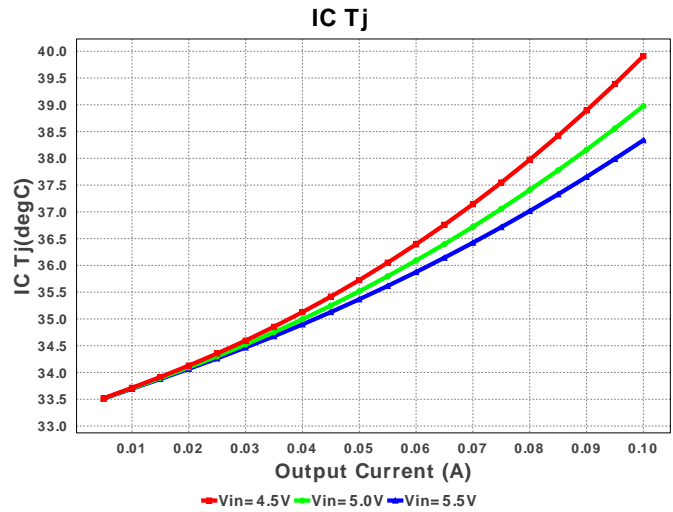
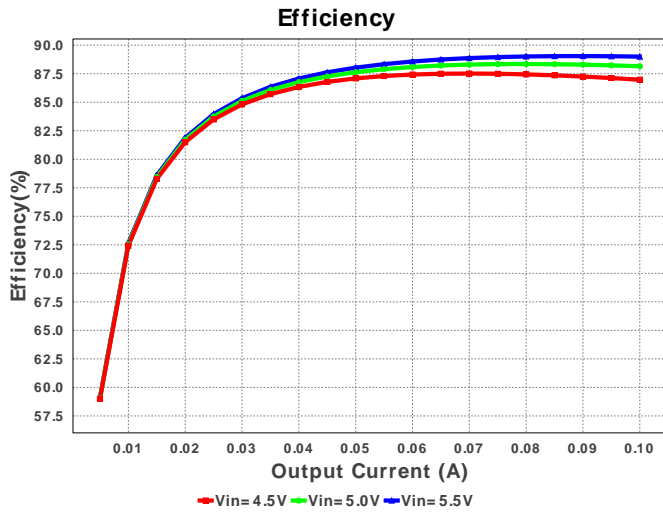


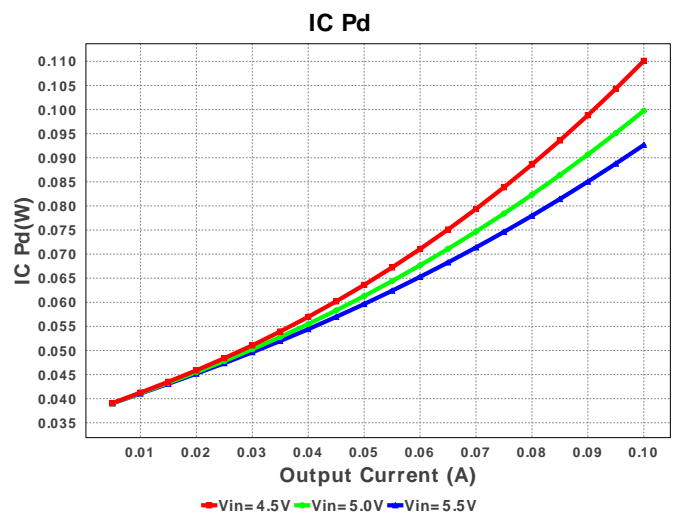
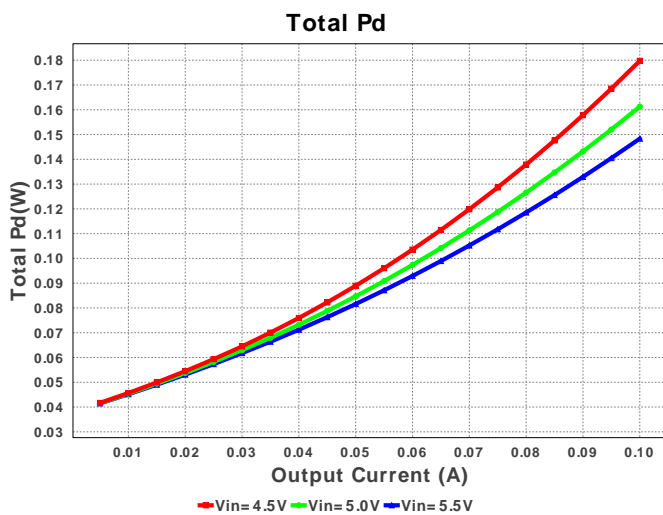
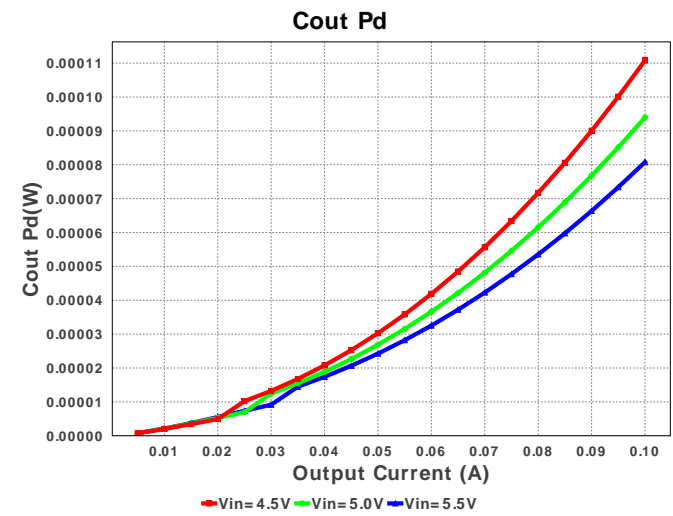
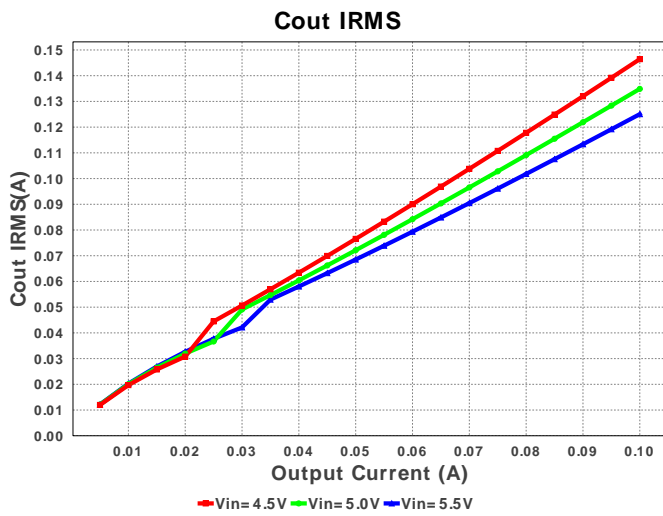
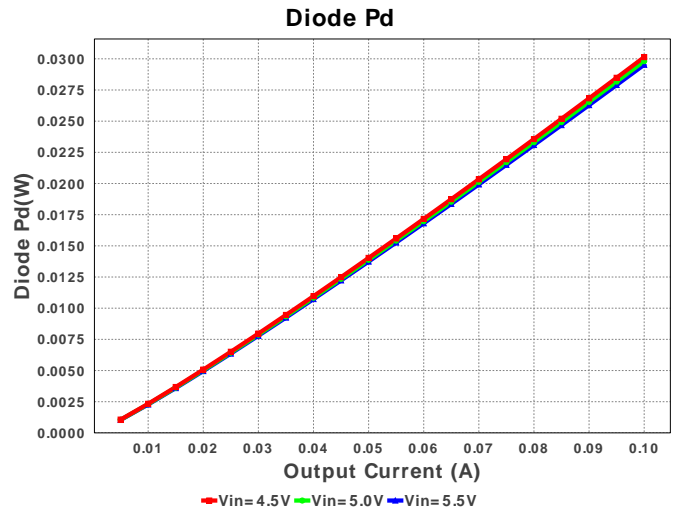
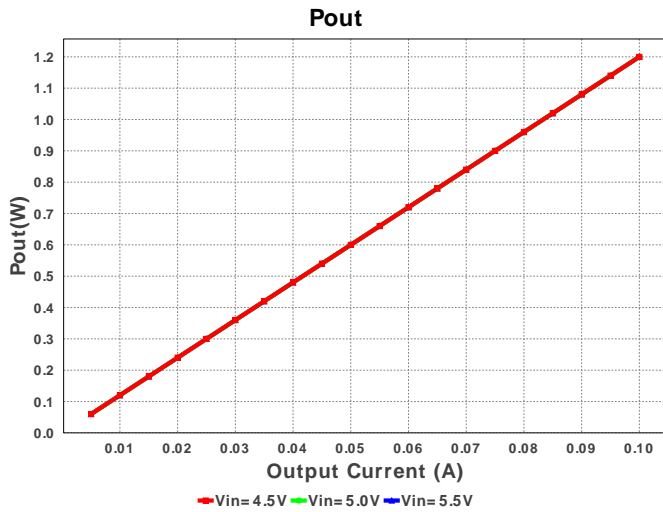
Electrical BOM

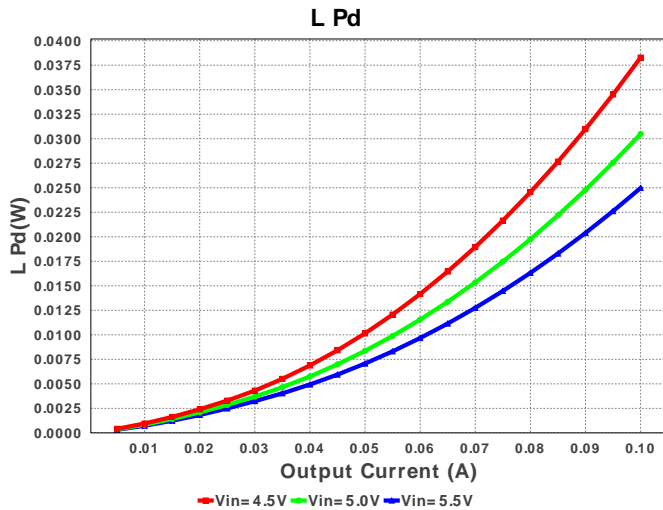
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|----|------|------------------|--------------------------------------|--|-----|--------|--|
| 1. | Cf | Kemet | C0805C181K5GACTU Series= C0G/NP0 | Cap= 180.0 pF VDC= 50.0 V IRMS= 0.0 A | 1 | \$0.01 |  0805 7 mm ² |
| 2. | Cin | MuRata | GRM188R61A225KE34D Series= X5R | Cap= 2.2 uF ESR= 9.637 mOhm VDC= 10.0 V IRMS= 1.24283 A | 1 | \$0.02 |  0603 5 mm ² |
| 3. | Cout | MuRata | GRM21BC81E475KA12L Series= X6S | Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A | 1 | \$0.02 |  0805 7 mm ² |
| 4. | D1 | ON Semiconductor | MBR0520LT1G | VF@Io= 385.0 mV VRRM= 20.0 V | 1 | \$0.06 |  SOD-123 13 mm ² |
| 5. | L1 | Taiyo Yuden | CBC2518T100M | L= 10.0 uH DCR= 360.0 mOhm | 1 | \$0.06 |  CBC2518 10 mm ² |
| 6. | Rfbb | Vishay-Dale | CRCW040213K3FKED Series= CRCW..e3 | Res= 13.3 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 7. | Rfbb | Vishay-Dale | CRCW0402118KFKED Series= CRCW..e3 | Res= 118.0 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 8. | Rp | Yageo America | RC0603FR-0751KL Series= ? | Res= 51.0 kOhm Power= 100.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0603 5 mm ² |

| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|----|------|-------------------|-----------------|------------|-----|--------|---|
| 9. | U1 | Texas Instruments | LM27313XMF/NOPB | Switcher | 1 | \$0.60 |  DBV0005A 15 mm ² |









Operating Values

| # | Name | Value | Category | Description |
|-----|----------------|----------------------|----------|--|
| 1. | Cin IRMS | 46.437 mA | Current | Input capacitor RMS ripple current |
| 2. | Cout IRMS | 146.432 mA | Current | Output capacitor RMS ripple current |
| 3. | Iin Avg | 306.61 mA | Current | Average input current |
| 4. | L Ipp | 160.86 mA | Current | Peak-to-peak inductor ripple current |
| 5. | BOM Count | 9 | General | Total Design BOM count |
| 6. | FootPrint | 67.0 mm ² | General | Total Foot Print Area of BOM components |
| 7. | Frequency | 1.6 MHz | General | Switching frequency |
| 8. | Pout | 1.2 W | General | Total output power |
| 9. | Total BOM | \$0.8 | General | Total BOM Cost |
| 10. | D1 Tj | 36.208 degC | Op_Point | D1 junction temperature |
| 11. | Vout Actual | 12.143 V | Op_Point | Vout Actual calculated based on selected voltage divider resistors |
| 12. | Duty Cycle | 67.47 % | Op_point | Duty cycle |
| 13. | Efficiency | 86.973 % | Op_point | Steady state efficiency |
| 14. | IC Tj | 39.909 degC | Op_point | IC junction temperature |
| 15. | IOUT_OP | 100.0 mA | Op_point | Iout operating point |
| 16. | VIN_OP | 4.5 V | Op_point | Vin operating point |
| 17. | Vout p-p | 2.004 mV | Op_point | Peak-to-peak output ripple voltage |
| 18. | Cin Pd | 20.781 μW | Power | Input capacitor power dissipation |
| 19. | Cout Pd | 110.771 μW | Power | Output capacitor power dissipation |
| 20. | Diode Pd | 30.137 mW | Power | Diode power dissipation |
| 21. | IC Pd | 110.103 mW | Power | IC power dissipation |
| 22. | L Pd | 38.276 mW | Power | Inductor power dissipation |
| 23. | Total Pd | 179.739 mW | Power | Total Power Dissipation |
| 24. | Vout Tolerance | 1.816 % | | Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable |

Design Inputs

| # | Name | Value | Description |
|----|---------|---------|------------------------|
| 1. | Iout | 100.0 m | Maximum Output Current |
| 2. | VinMax | 5.5 | Maximum input voltage |
| 3. | VinMin | 4.5 | Minimum input voltage |
| 4. | Vout | 12.0 | Output Voltage |
| 5. | base_pn | LM27313 | Base Product Number |
| 6. | source | DC | Input Source Type |
| 7. | Ta | 30.0 | Ambient temperature |

Design Assistance

1. **LM27313** Product Folder : <http://www.ti.com/product/LM27313> : contains the data sheet and other resources.

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