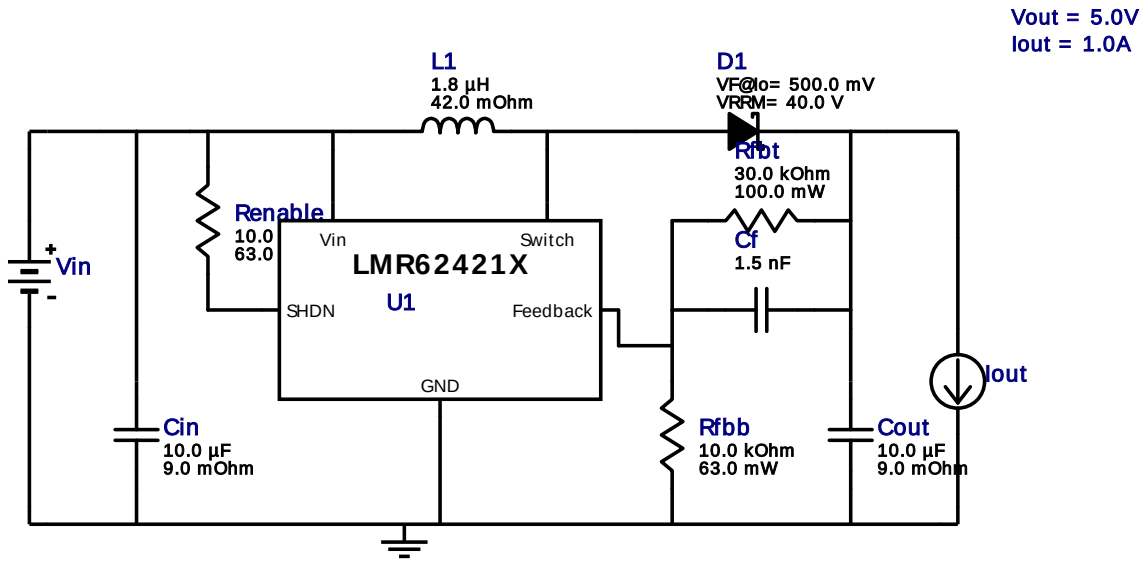
VinMin = 3.6V
VinMax = 4.2V
Vout = 5.0V
Iout = 1.0A

Device = LMR62421XSD/NOPB
Topology = Boost
Created = 7/12/16 11:32:18 PM
BOM Cost = $1.12
BOM Count = 9
Total Pd = 0.81W

# WEBENCH® Design Report

Design : 3893481/30 LMR62421XSD/NOPB
LMR62421XSD/NOPB 3.6V-4.2V to 5.00V @ 1.0A



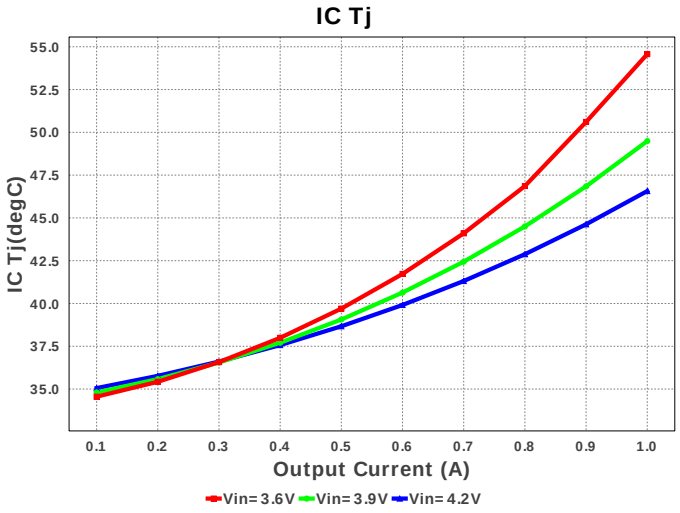

## My Comments

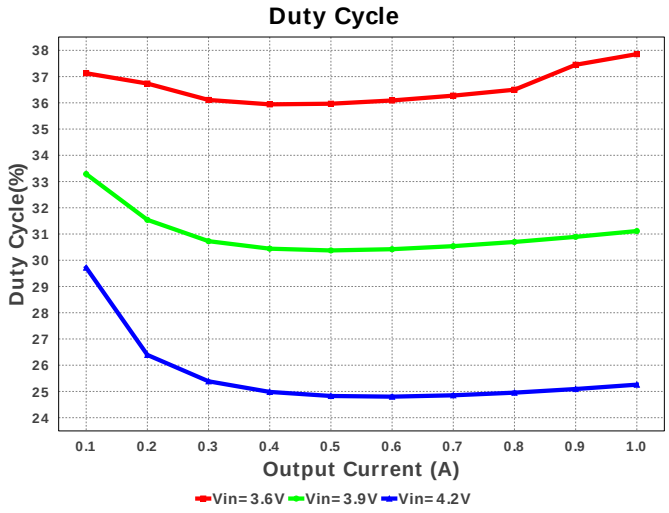
32

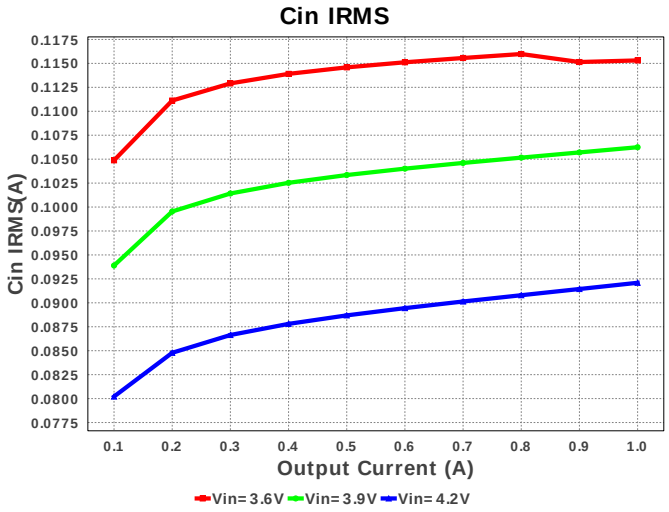
## Electrical BOM

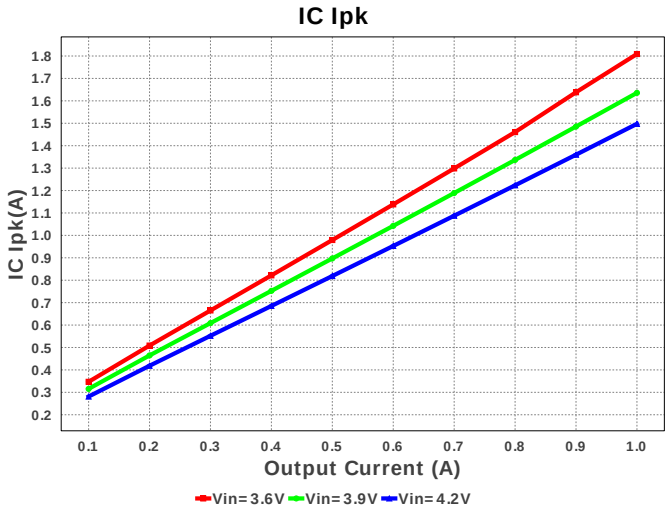
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|---|---|---|---|---|---|---|---|
| 1. | Cf | Yageo America | CC0805KRX7R9BB152<br>Series= X7R | Cap= 1.5 nF<br>VDC= 50.0 V<br>IRMS= 0.0 A | 1 | $0.01 | 0805 7 mm² |
| 2. | Cin | MuRata | GRM188R60J106ME47D<br>Series= X5R | Cap= 10.0 uF<br>ESR= 9.0 mOhm<br>VDC= 6.3 V<br>IRMS= 2.74 A | 1 | $0.02 | 0603 5 mm² |
| 3. | Cout | MuRata | GRM188R60J106ME47D<br>Series= X5R | Cap= 10.0 uF<br>ESR= 9.0 mOhm<br>VDC= 6.3 V<br>IRMS= 2.74 A | 1 | $0.02 | 0603 5 mm² |
| 4. | D1 | Diodes Inc. | B340A-13-F | VF@Io= 500.0 mV<br>VRRM= 40.0 V | 1 | $0.11 | SMA 37 mm² |
| 5. | L1 | Bourns | SDR0403-1R8ML | L= 1.8 µH<br>DCR= 42.0 mOhm | 1 | $0.18 | SDR0403 28 mm² |
| 6. | Renable | 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 mm² |
| 7. | Rfbb | 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 mm² |
| 8. | Rfbt | Yageo America | RC0603FR-0730KL<br>Series= ? | Res= 30.0 kOhm<br>Power= 100.0 mW<br>Tolerance= 1.0% | 1 | $0.01 | 0603 5 mm² |

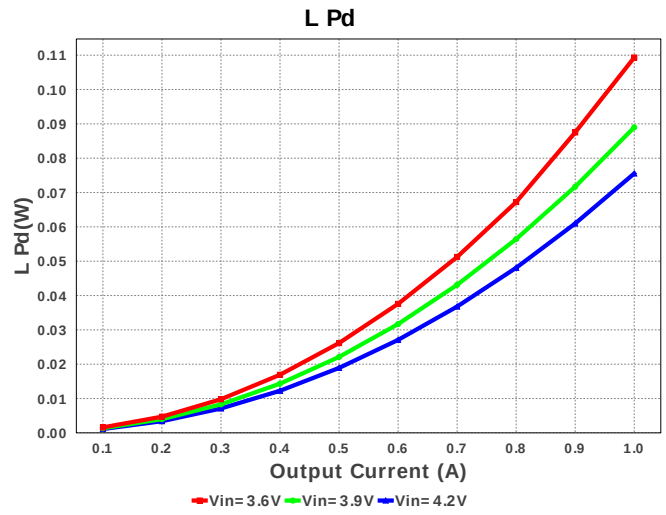
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|---|---|---|---|---|---|---|---|
| 9. | U1 | Texas Instruments | LMR62421XSD/NOPB | Switcher | 1 | $0.75 | SDE06A 16 mm$^2$ |

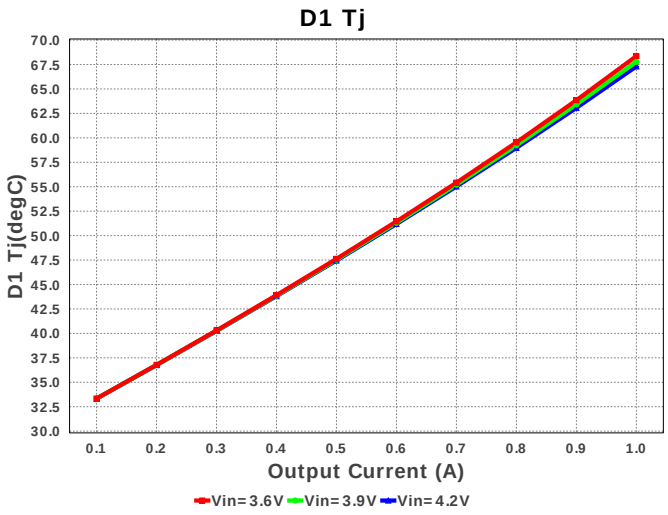


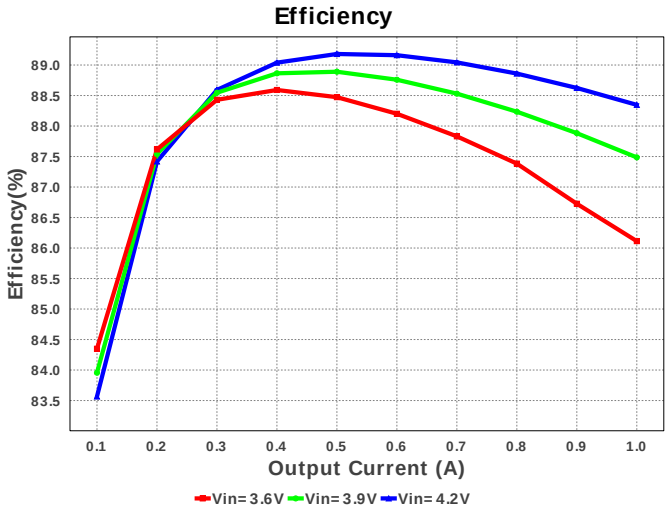



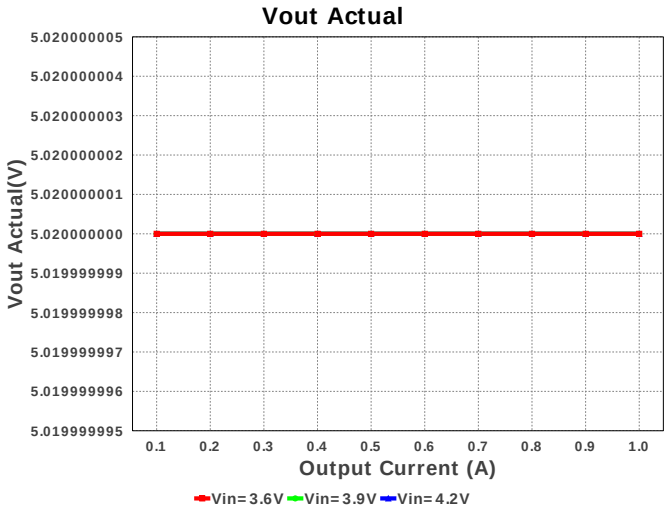



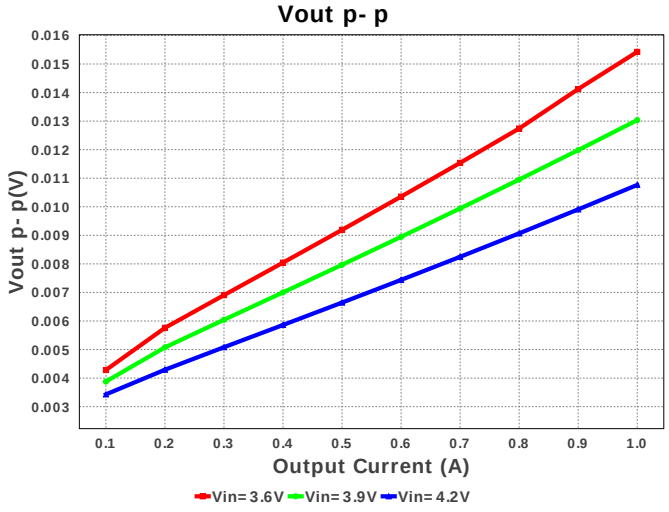



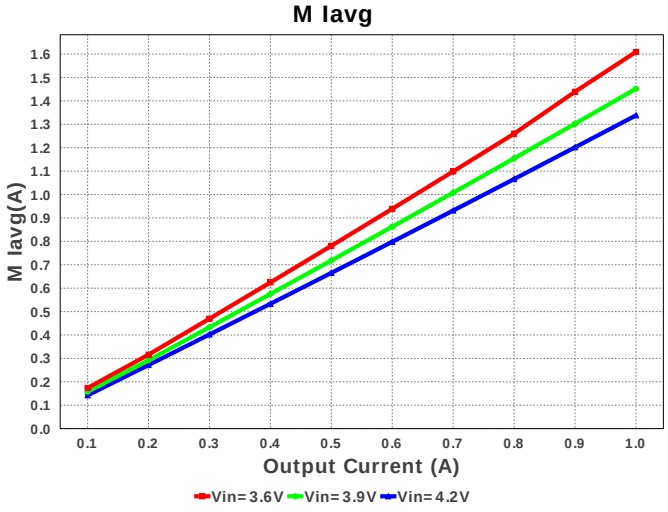


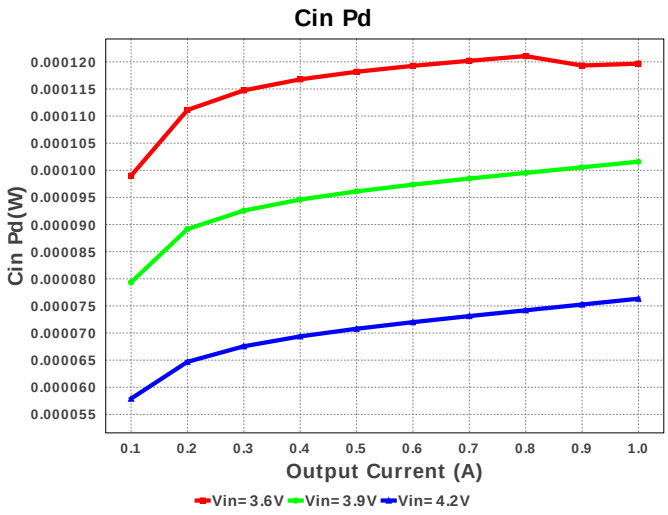



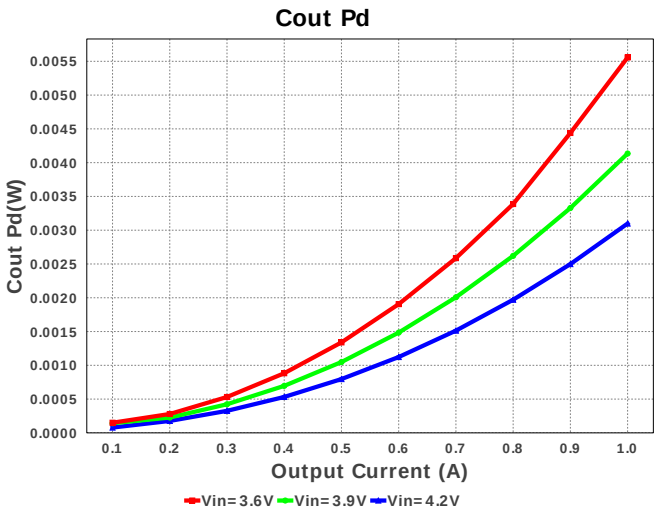



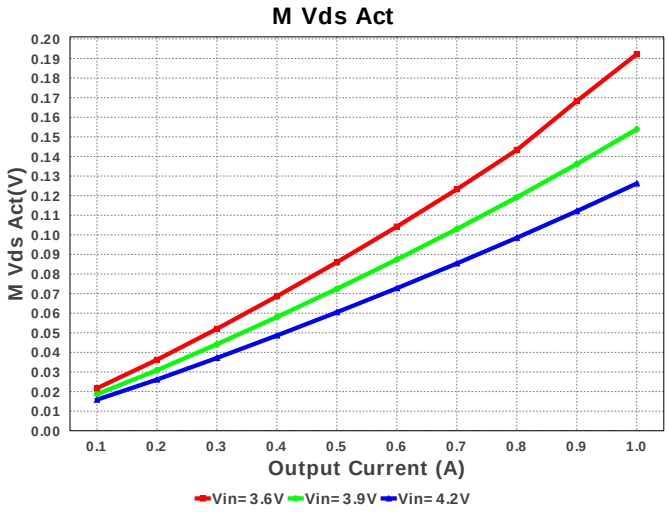



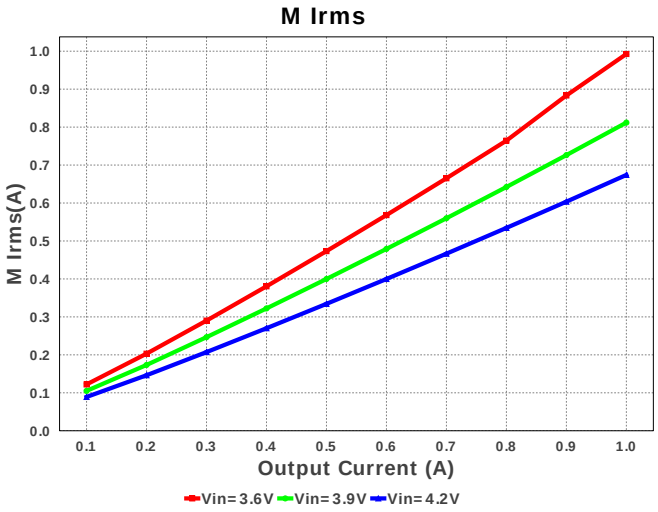



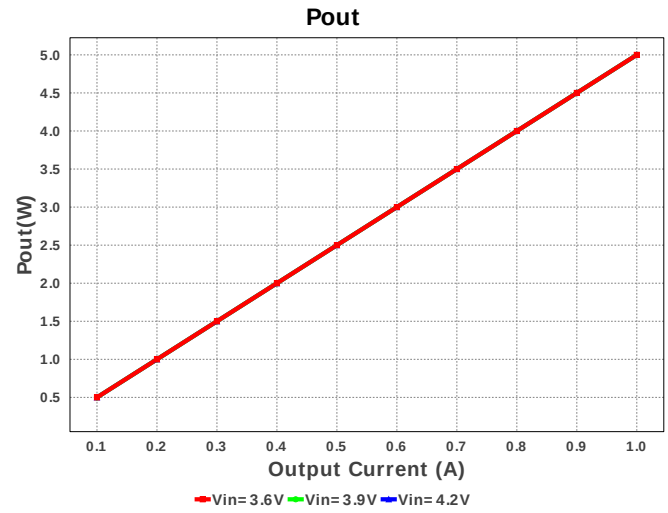



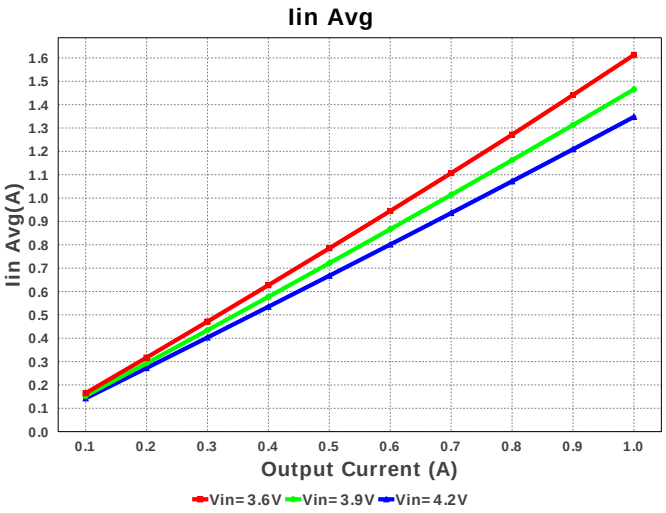


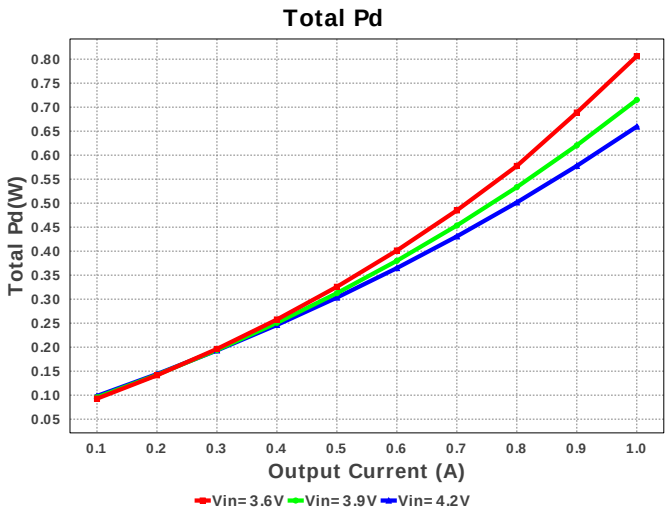



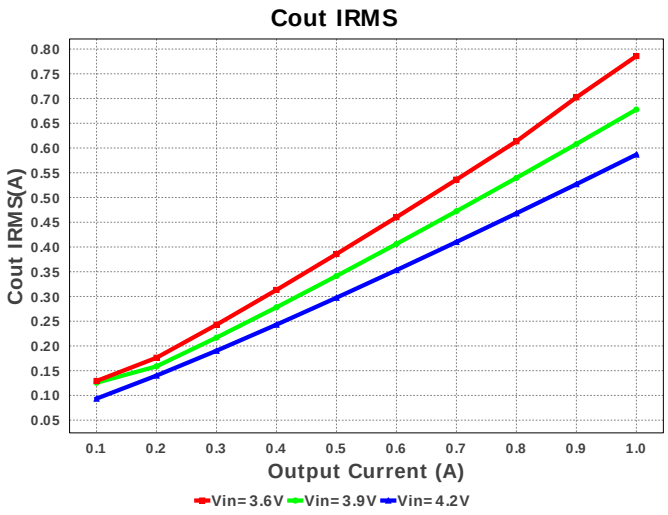



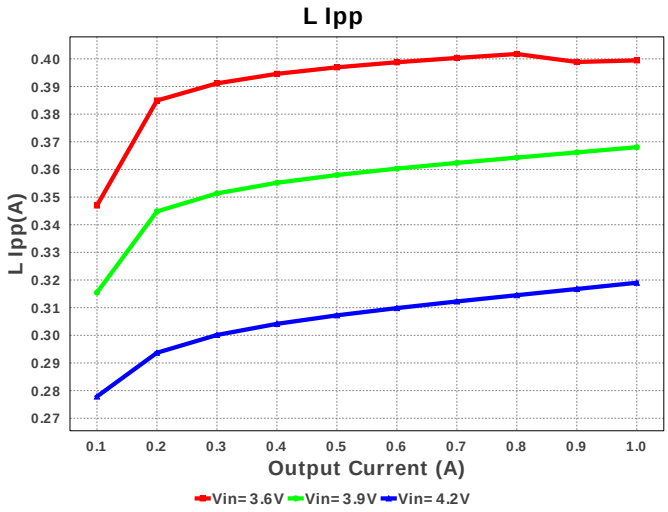



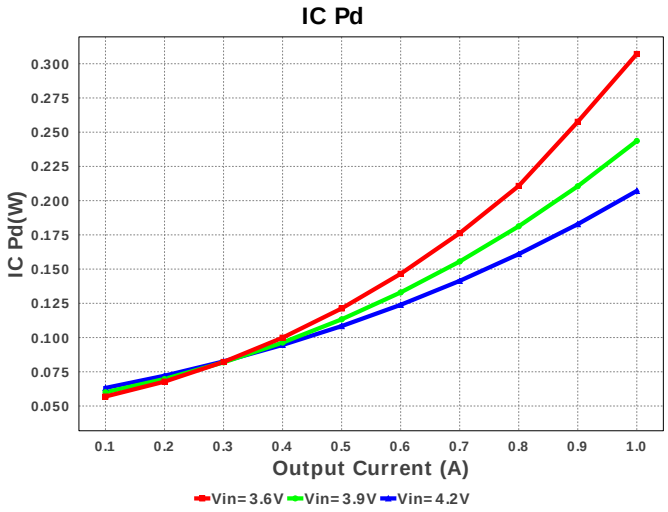



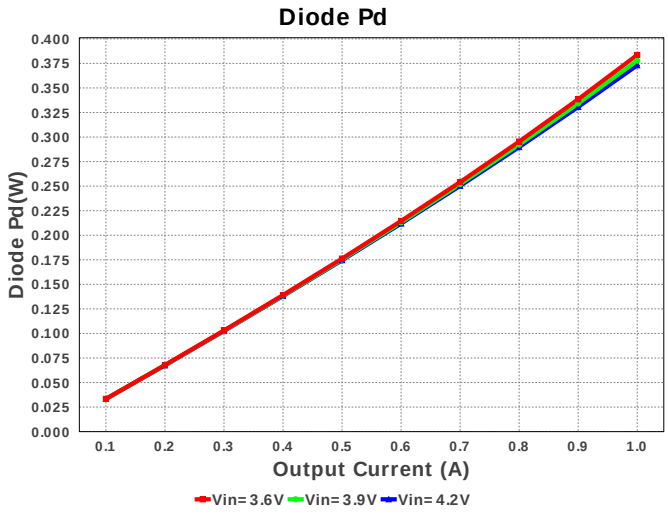






## Operating Values

| # | Name | Value | Category | Description |
|---|---|---|---|---|
| 1. | Cin IRMS | 115.311 mA | Current | Input capacitor RMS ripple current |
| 2. | Cout IRMS | 785.76 mA | Current | Output capacitor RMS ripple current |
| 3. | IC Ipk | 1.809 A | Current | Peak switch current in IC |
| 4. | Iin Avg | 1.613 A | Current | Average input current |
| 5. | L Ipp | 399.45 mA | Current | Peak-to-peak inductor ripple current |
| 6. | M Iavg | 1.609 A | Current | MOSFET Average current |
| 7. | M Irms | 992.602 mA | Current | MOSFET RMS current |
| 8. | BOM Count | 9 | General | Total Design BOM count |
| 9. | FootPrint | 108.0 $mm^2$ | General | Total Foot Print Area of BOM components |
| 10. | Frequency | 1.6 MHz | General | Switching frequency |
| 11. | IC Tolerance | 25.0 mV | General | IC Feedback Tolerance |

| # | Name | Value | Category | Description |
|---|---|---|---|---|
| 12. | M Vds Act | 192.223 mV | General | Voltage drop across the MosFET |
| 13. | Pout | 5.0 W | General | Total output power |
| 14. | Total BOM | $1.12 | General | Total BOM Cost |
| 15. | D1 Tj | 68.36 degC | Op_Point | D1 junction temperature |
| 16. | Vout Actual | 5.02 V | Op_Point | Vout Actual calculated based on selected voltage divider resistors |
| 17. | Vout OP | 5.0 V | Op_Point | Operational Output Voltage |
| 18. | Cross Freq | 23.3 kHz | Op_point | Bode plot crossover frequency |
| 19. | Duty Cycle | 37.856 % | Op_point | Duty cycle |
| 20. | Efficiency | 86.113 % | Op_point | Steady state efficiency |
| 21. | IC Tj | 54.569 degC | Op_point | IC junction temperature |
| 22. | ICThetaJA | 80.0 degC/W | Op_point | IC junction-to-ambient thermal resistance |
| 23. | IOUT_OP | 1.0 A | Op_point | Iout operating point |
| 24. | Phase Marg | 92.861 deg | Op_point | Bode Plot Phase Margin |
| 25. | VIN_OP | 3.6 V | Op_point | Vin operating point |
| 26. | Vout p-p | 15.425 mV | Op_point | Peak-to-peak output ripple voltage |
| 27. | Cin Pd | 119.669 µW | Power | Input capacitor power dissipation |
| 28. | Cout Pd | 5.557 mW | Power | Output capacitor power dissipation |
| 29. | Diode Pd | 383.604 mW | Power | Diode power dissipation |
| 30. | IC Pd | 307.116 mW | Power | IC power dissipation |
| 31. | L Pd | 109.312 mW | Power | Inductor power dissipation |
| 32. | Total Pd | 806.34 mW | Power | Total Power Dissipation |
| 33. | Vout Tolerance | 3.537 % | | 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 | 4.2 | Maximum input voltage |
| 3. | VinMin | 3.6 | Minimum input voltage |
| 4. | Vout | 5.0 | Output Voltage |
| 5. | base_pn | LMR62421X | Texas Instruments Base Part Number |
| 6. | source | DC | Input Source Type |
| 7. | ta | 30.0 | Ambient temperature |

## Design Assistance

1. LMR62421X Product Folder : http://www.ti.com/product/LMR62421 : contains the data sheet and other resources.