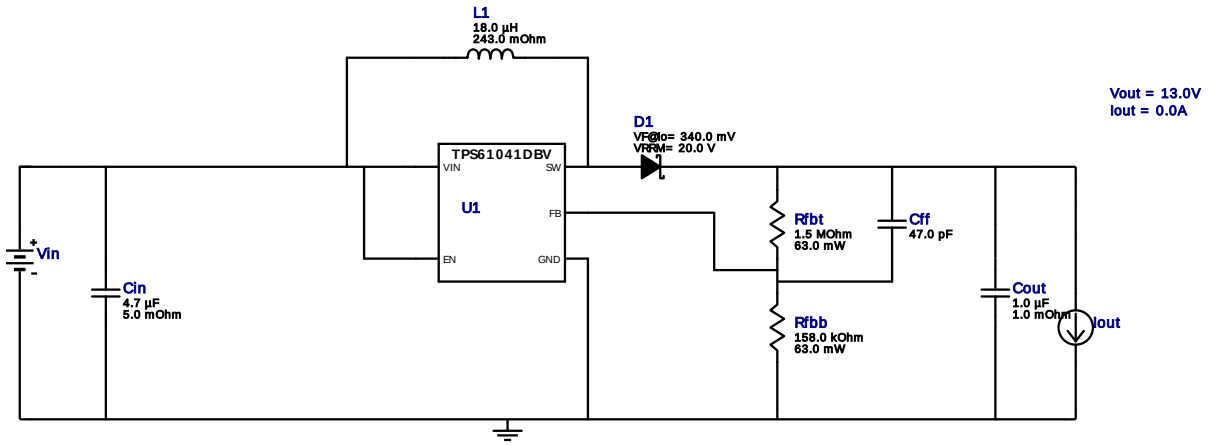
# WEBENCH® Design Report

VinMin = 2.7V
VinMax = 4.2V
Vout = 13.0V
Iout = 0.0A

Device = TPS61041DBVR
Topology = Boost
Created = 2018-03-16 15:57:16.140
BOM Cost = $1.01
BOM Count = 8
Total Pd = 0.0W

Design : 5281144/14 TPS61041DBVR
TPS61041DBVR 2.7V-4.2V to 13.00V @ 0.002A

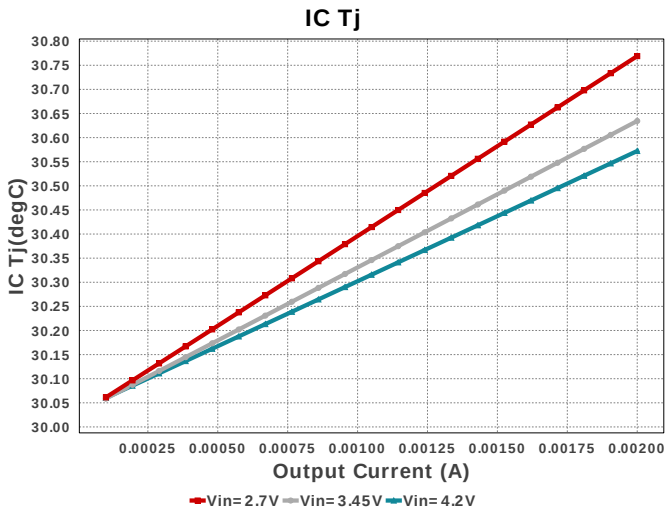


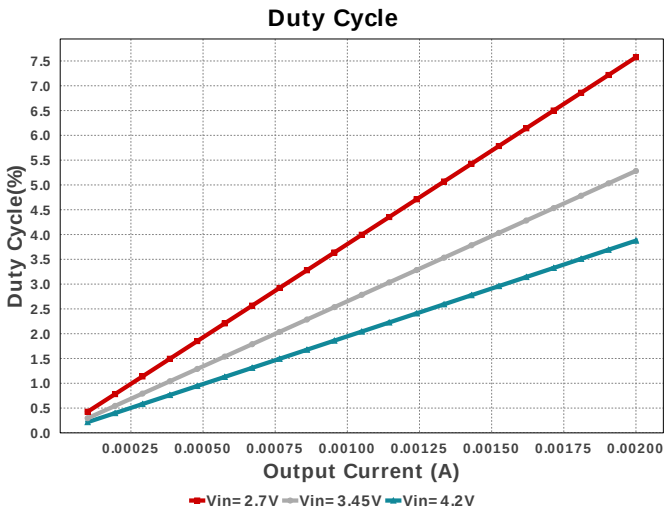

## My Comments

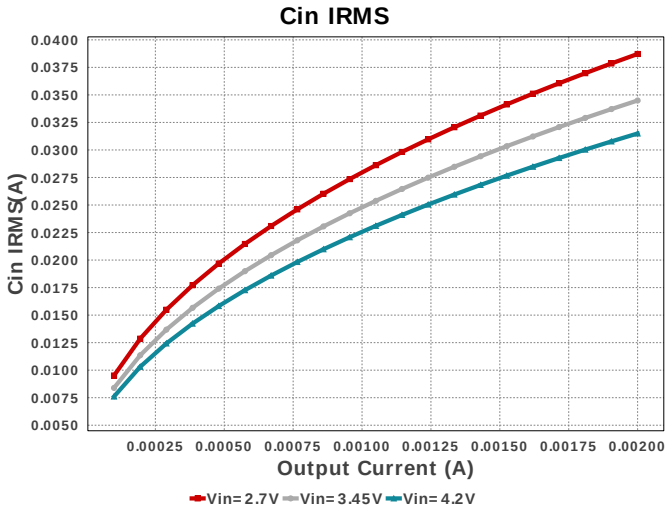
No comments

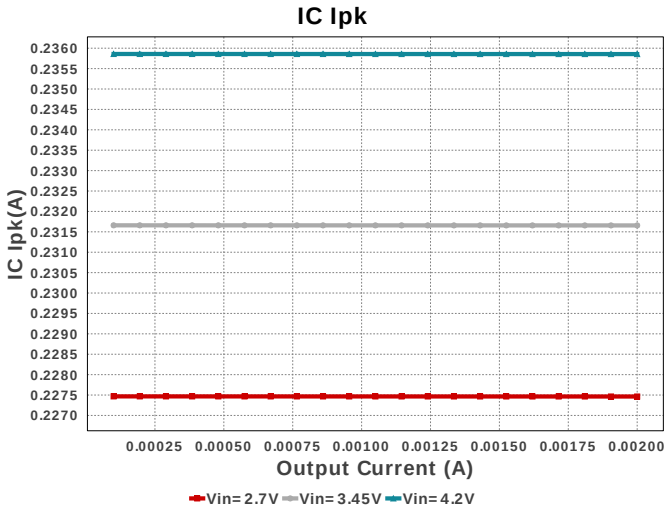
## Electrical BOM

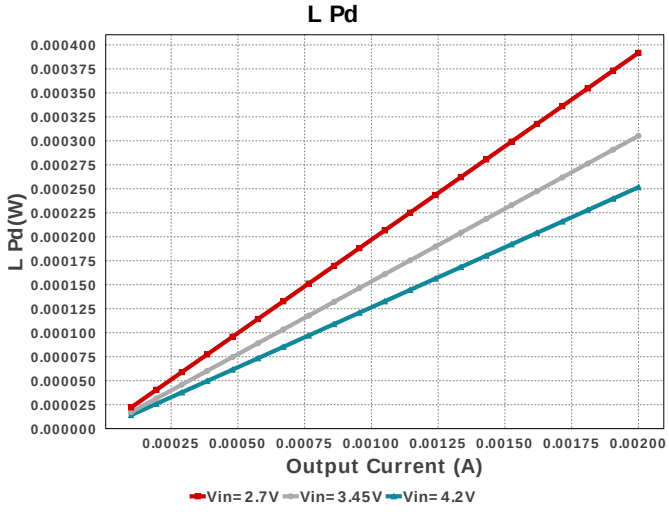
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|---|---|---|---|---|---|---|---|
| 1. | Cff | AVX | 06035A470KAT2A<br>Series= C0G/NP0 | Cap= 47.0 pF<br>VDC= 50.0 V<br>IRMS= 0.0 A | 1 | $0.01 | 0603 5 mm² |
| 2. | Cin | MuRata | GRM188R60J475KE19D<br>Series= X5R | Cap= 4.7 uF<br>ESR= 5.0 mOhm<br>VDC= 6.3 V<br>IRMS= 2.0 A | 1 | $0.02 | 0603 5 mm² |
| 3. | Cout | Taiyo Yuden | GMK212B7105KG-T<br>Series= X7R | Cap= 1.0 uF<br>ESR= 1.0 mOhm<br>VDC= 35.0 V<br>IRMS= 0.0 A | 1 | $0.04 | 0805 7 mm² |
| 4. | D1 | Fairchild Semiconductor | MBR1020VL | VF@Io= 340.0 mV<br>VRRM= 20.0 V | 1 | $0.07 | SOD-123F 12 mm² |
| 5. | L1 | Coilcraft | LPS4018-183MRB | L= 18.0 µH<br>DCR= 243.0 mOhm | 1 | $0.35 | LPS4018 24 mm² |
| 6. | Rfbb | Vishay-Dale | CRCW0402158KFKED<br>Series= CRCW..e3 | Res= 158.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0% | 1 | $0.01 | 0402 3 mm² |
| 7. | Rfbt | Vishay-Dale | CRCW04021M50FKED<br>Series= CRCW..e3 | Res= 1.5 MOhm<br>Power= 63.0 mW<br>Tolerance= 1.0% | 1 | $0.01 | 0402 3 mm² |
| 8. | U1 | Texas Instruments | TPS61041DBVR | Switcher | 1 | $0.50 | DBV0005A 15 mm² |

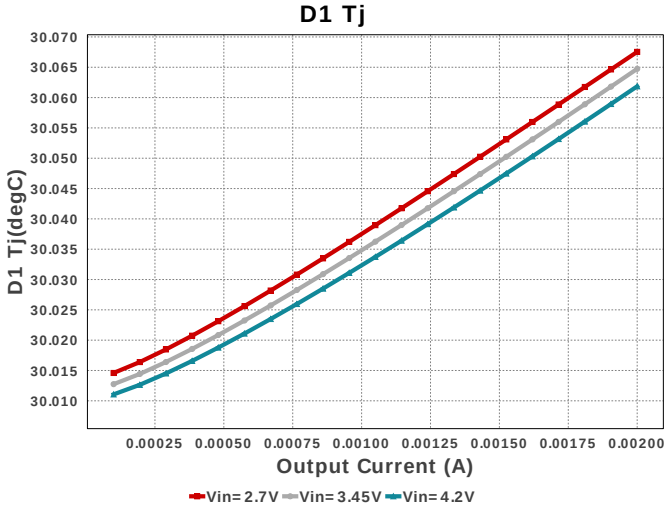


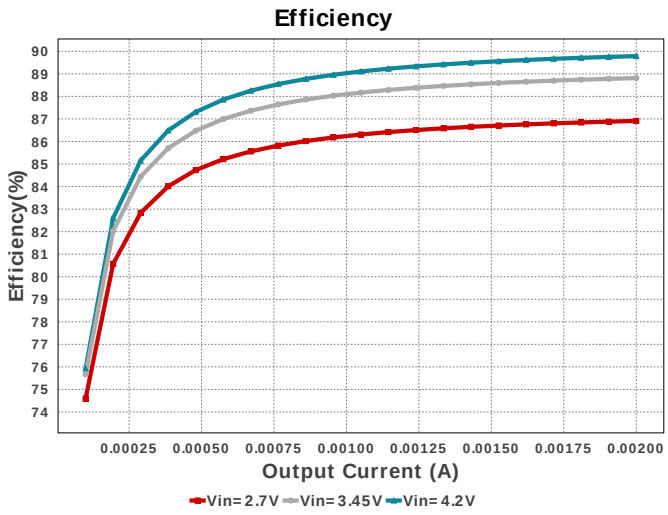



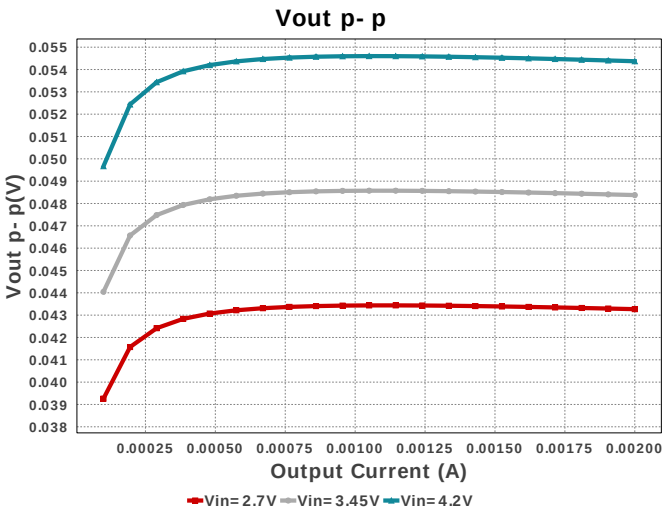



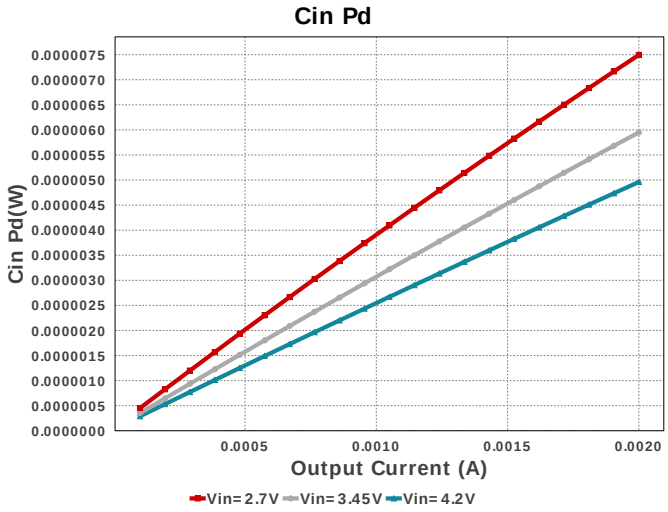



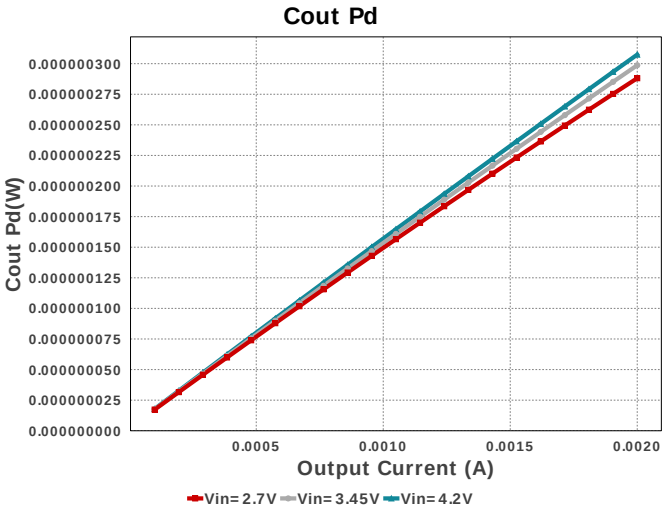



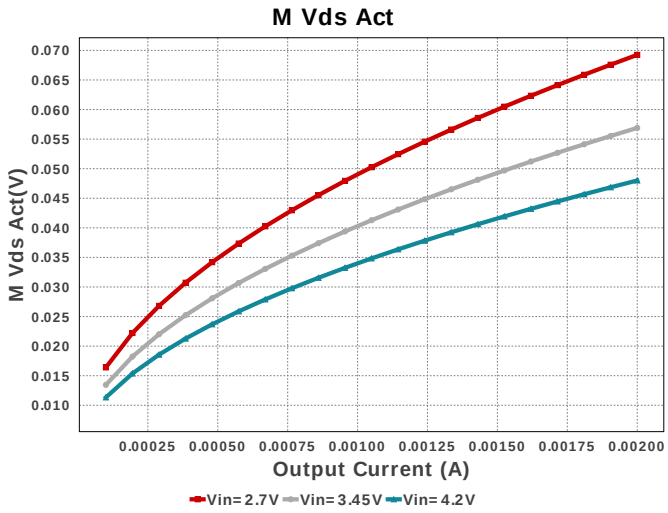



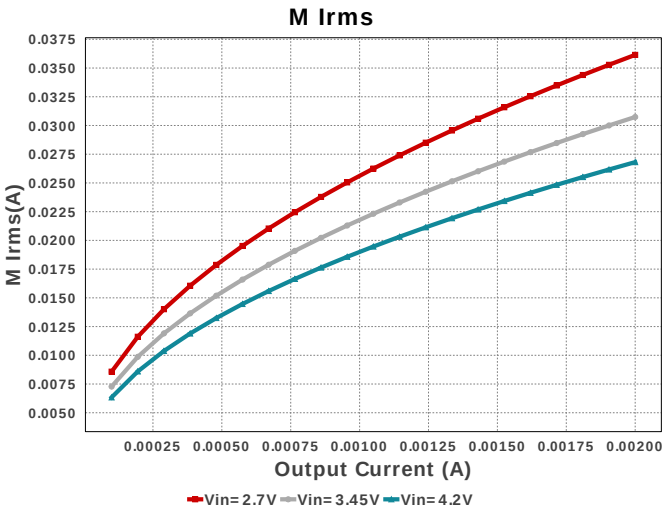


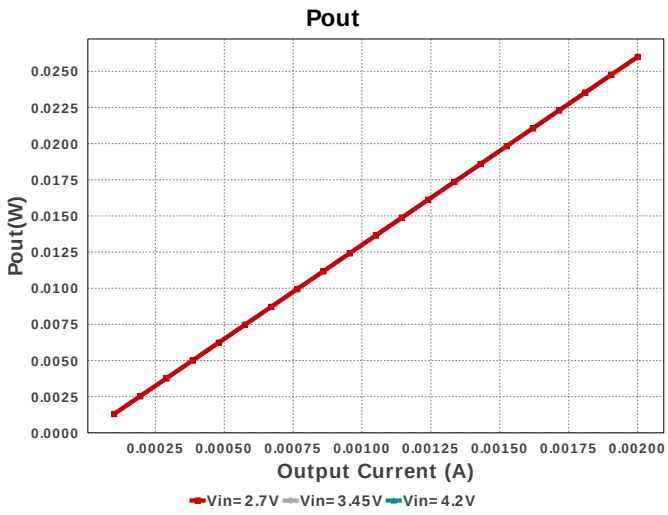



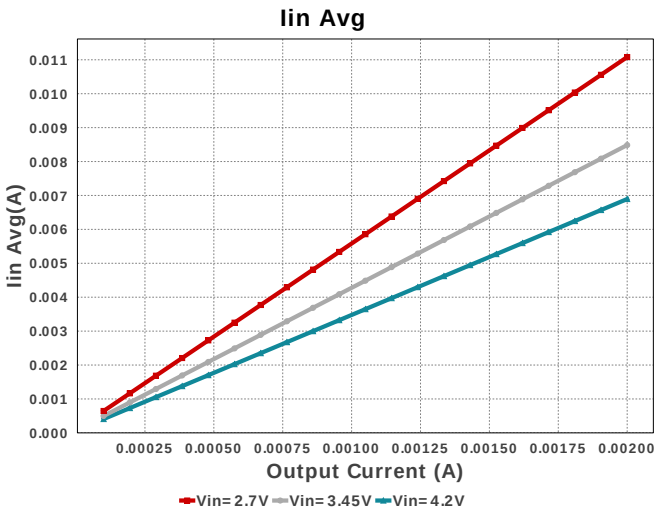



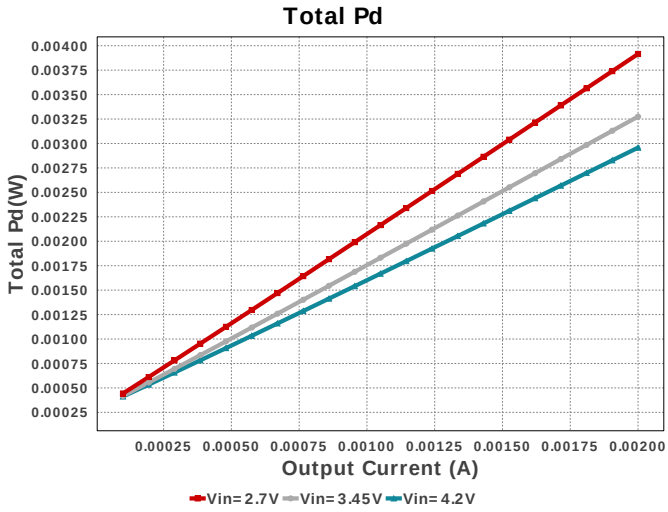



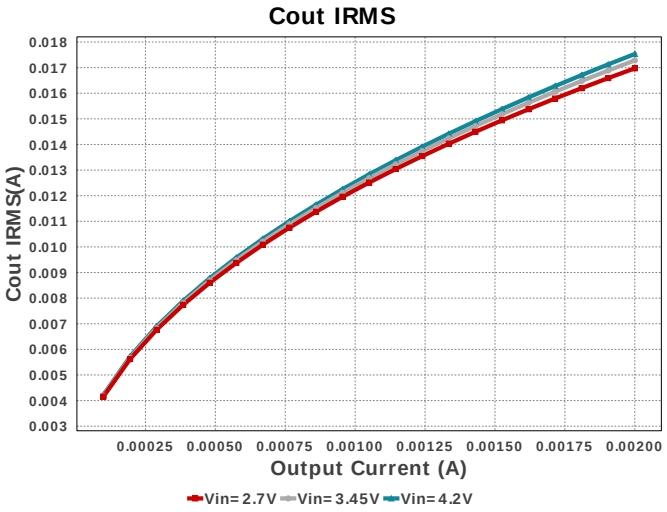



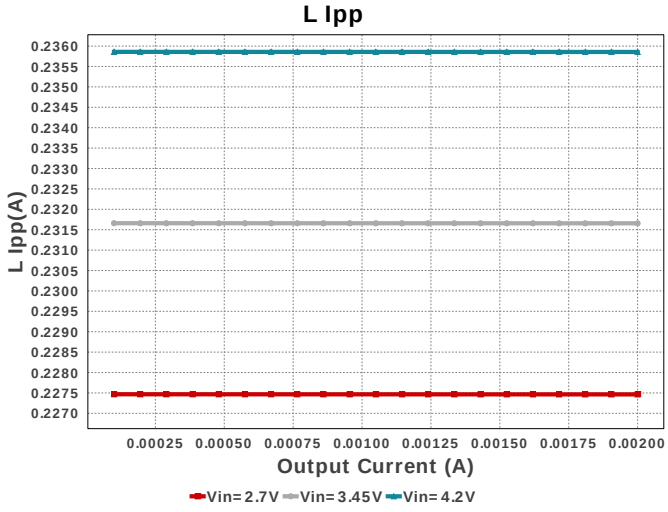



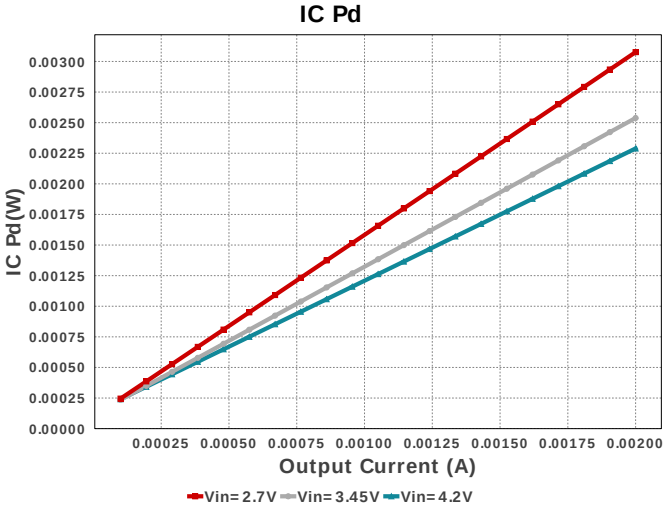


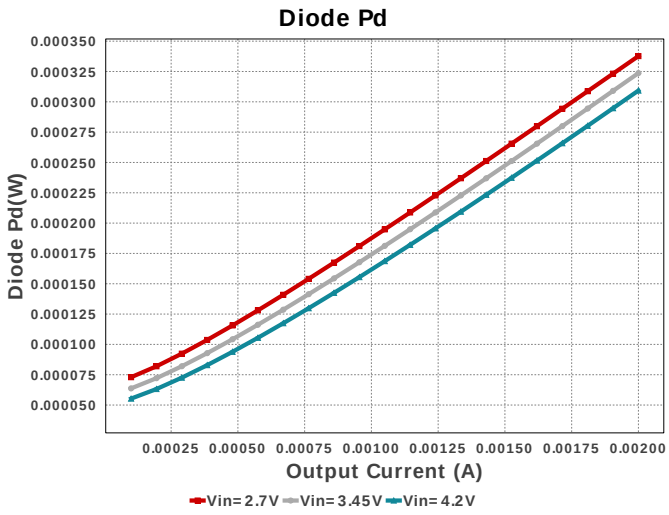



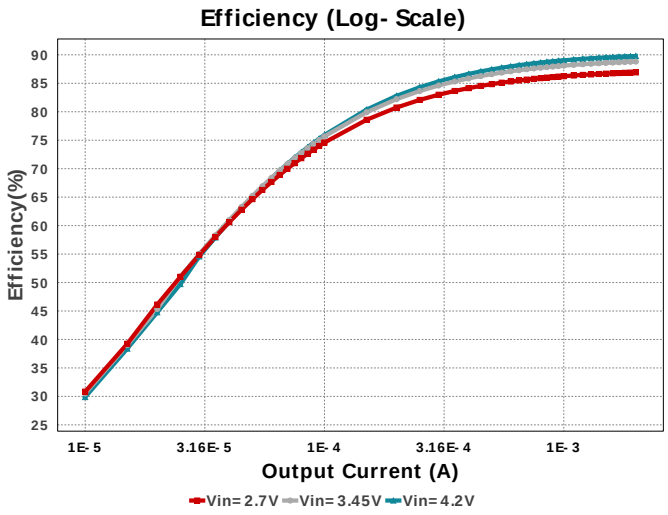






## Operating Values

| # | Name | Value | Category | Description |
|---|---|---|---|---|
| 1. | Cin IRMS | 38.717 mA | Current | Input capacitor RMS ripple current |
| 2. | Cout IRMS | 16.974 mA | Current | Output capacitor RMS ripple current |
| 3. | IC Ipk | 227.464 mA | Current | Peak switch current in IC |
| 4. | Iin Avg | 11.08 mA | Current | Average input current |
| 5. | L Ipp | 227.46 mA | Current | Peak-to-peak inductor ripple current |
| 6. | M1 Irms | 36.146 mA | Current | Q Iavg |
| 7. | BOM Count | 8 | General | Total Design BOM count |
| 8. | FootPrint | 73.0 $mm^2$ | General | Total Foot Print Area of BOM components |
| 9. | Frequency | 45.415 kHz | General | Switching frequency |
| 10. | IC Tolerance | 25.0 mV | General | IC Feedback Tolerance |
| 11. | M Vds Act | 69.243 mV | General | Voltage drop across the MosFET |
| 12. | Mode | DCM | General | Conduction Mode |
| 13. | Mode | DCM | General | PWM/PFM Mode |
| 14. | Pout | 26.0 mW | General | Total output power |
| 15. | Total BOM | $1.01 | General | Total BOM Cost |
| 16. | D1 Tj | 30.068 degC | Op Point | D1 junction temperature |
| 17. | Duty Cycle | 7.576 % | Op Point | Duty cycle |
| 18. | Efficiency | 86.912 % | Op Point | Steady state efficiency |
| 19. | IC Tj | 30.769 degC | Op Point | IC junction temperature |
| 20. | ICThetaJA | 250.0 degC/W | Op Point | IC junction-to-ambient thermal resistance |
| 21. | IOUT_OP | 2.0 mA | Op Point | Iout operating point |
| 22. | VIN_OP | 2.7 V | Op Point | Vin operating point |
| 23. | Vout Actual | 12.939 V | Op Point | Vout Actual calculated based on selected voltage divider resistors |
| 24. | Vout OP | 13.0 V | Op Point | Operational Output Voltage |
| 25. | Vout Tolerance | 3.892 % | Op Point | Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable |
| 26. | Vout p-p | 43.268 mV | Op Point | Peak-to-peak output ripple voltage |
| 27. | Cin Pd | 7.495 µW | Power | Input capacitor power dissipation |
| 28. | Cout Pd | 288.101 nW | Power | Output capacitor power dissipation |
| 29. | Diode Pd | 337.692 µW | Power | Diode power dissipation |
| 30. | IC Pd | 3.076 mW | Power | IC power dissipation |
| 31. | L Pd | 391.716 µW | Power | Inductor power dissipation |
| 32. | Total Pd | 3.915 mW | Power | Total Power Dissipation |

## Design Inputs

| # | Name | Value | Description |
|---|---|---|---|
| 1. | Iout | 2.0 m | Maximum Output Current |
| 2. | VinMax | 4.2 | Maximum input voltage |
| 3. | VinMin | 2.7 | Minimum input voltage |
| 4. | Vout | 13.0 | Output Voltage |
| 5. | base_pn | TPS61041 | Base Product Number |
| 6. | source | DC | Input Source Type |
| 7. | Ta | 30.0 | Ambient temperature |

## Design Assistance

1. **TPS61041** Product Folder : http://www.ti.com/product/TPS61041 : contains the data sheet and other resources.