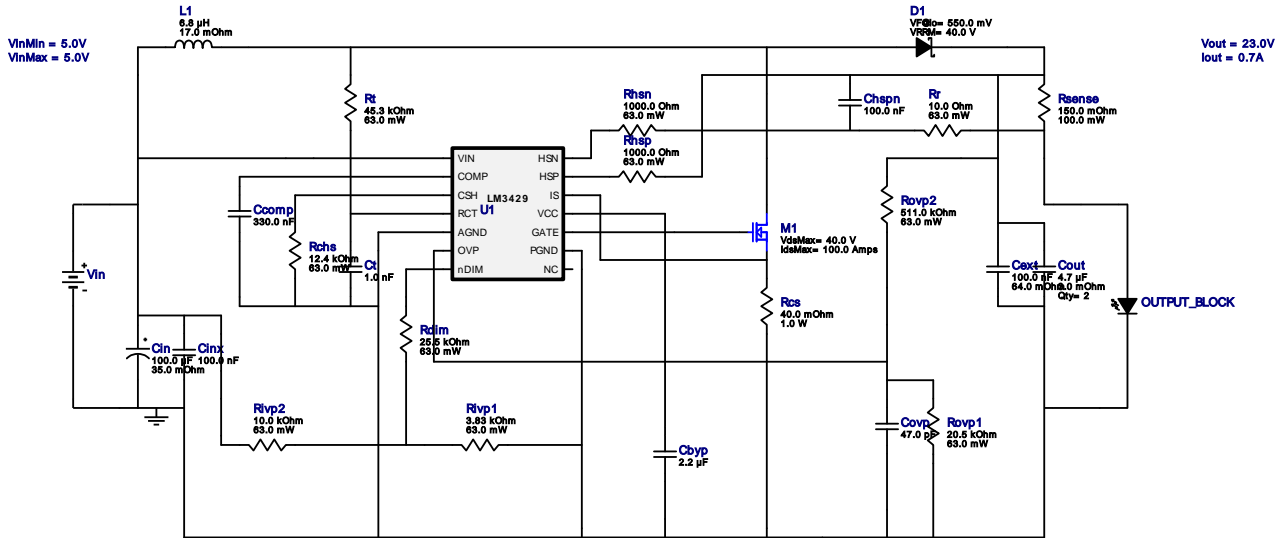


WEBENCH[®] Design Report

Design : 4425714/37 LM3429MH/NOPB
 LM3429MH/NOPB 5.0V-5.0V to 37.73V @ 0.6639684946236559A

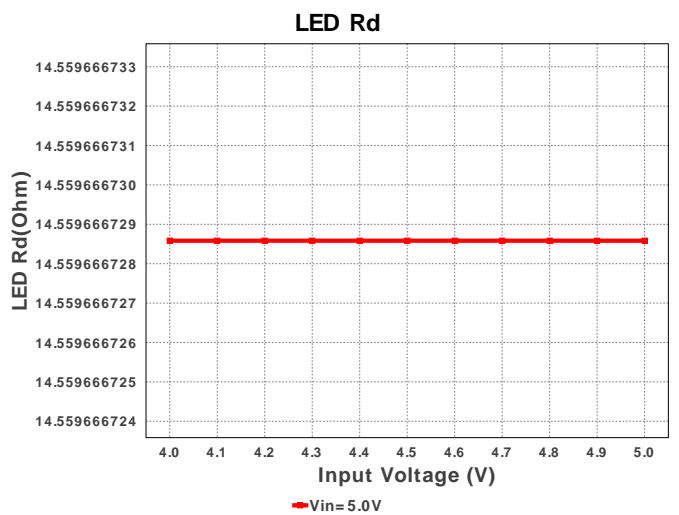
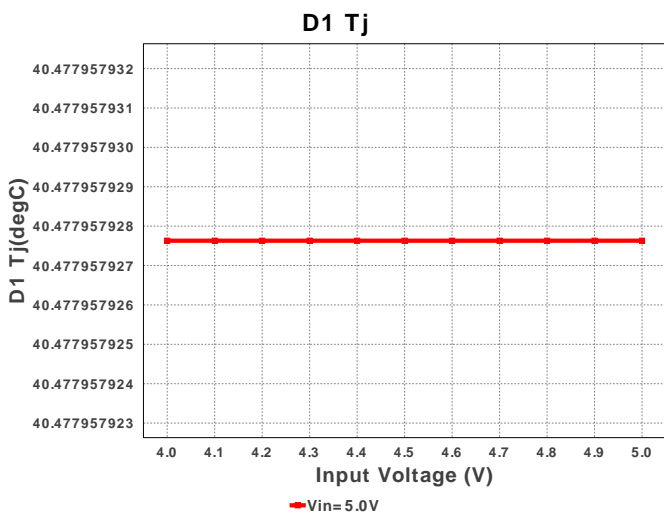
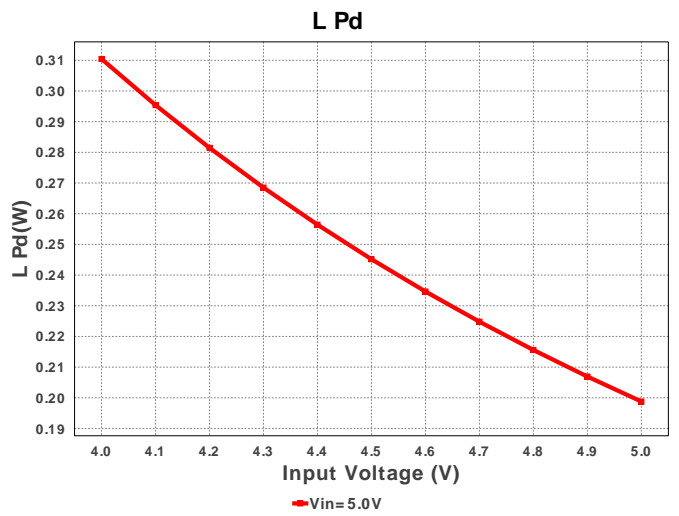
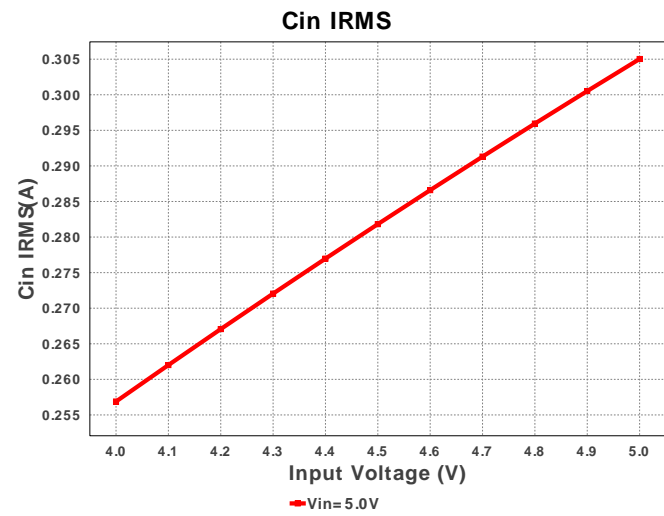
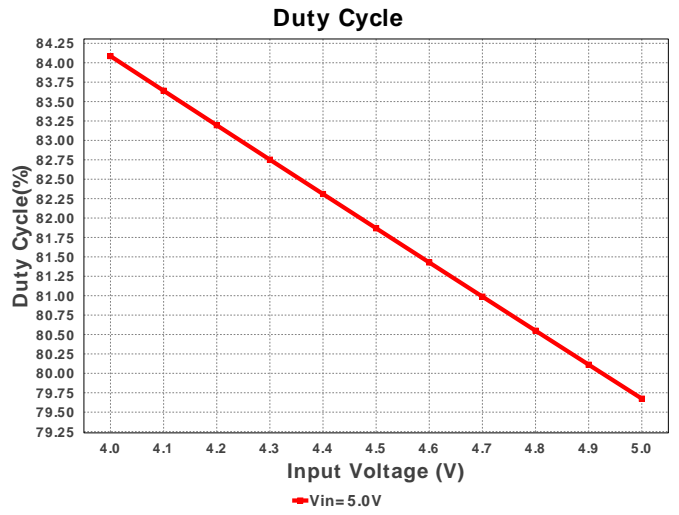
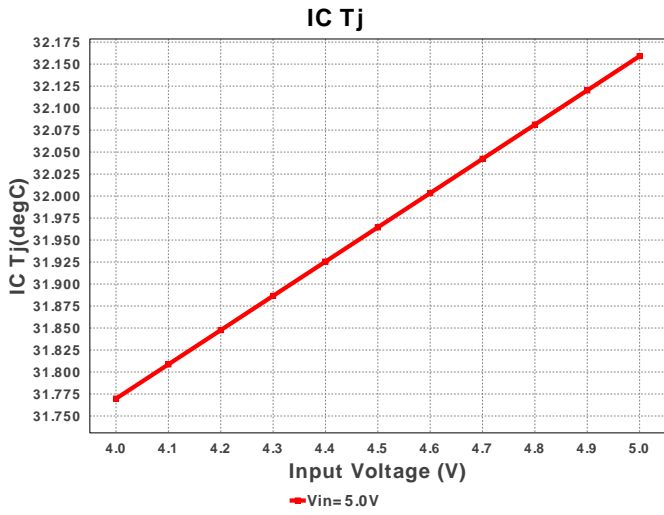


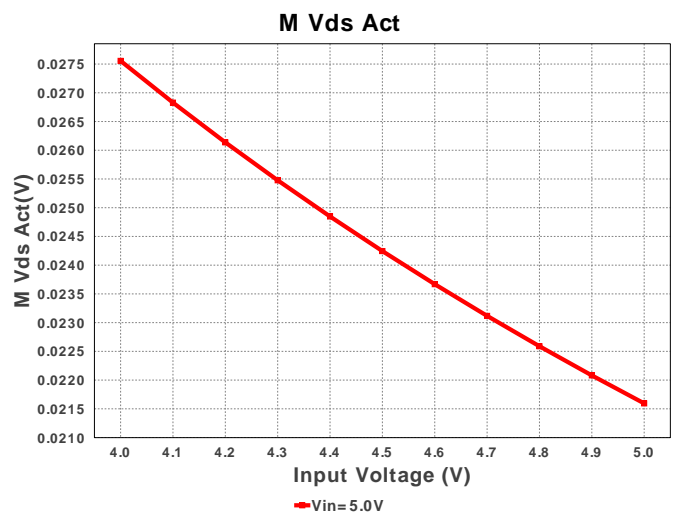
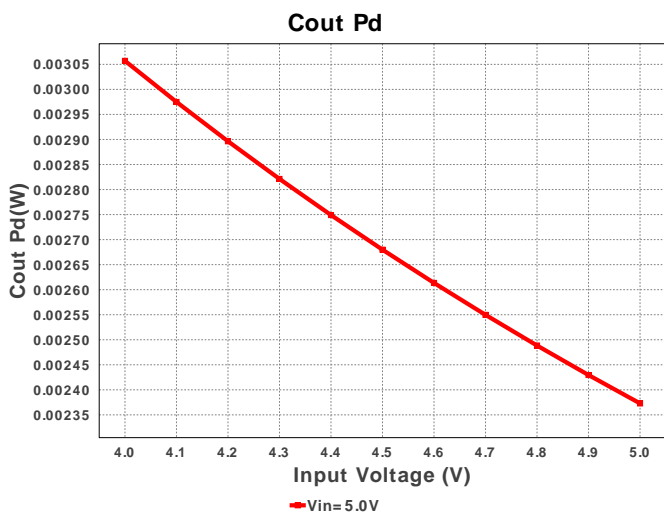
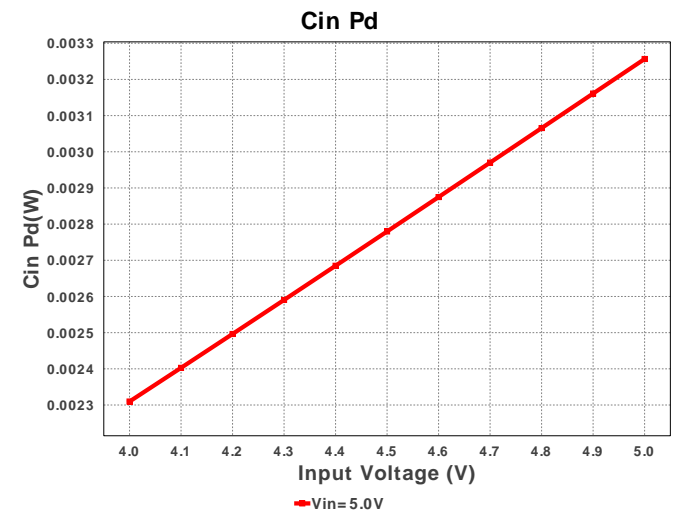
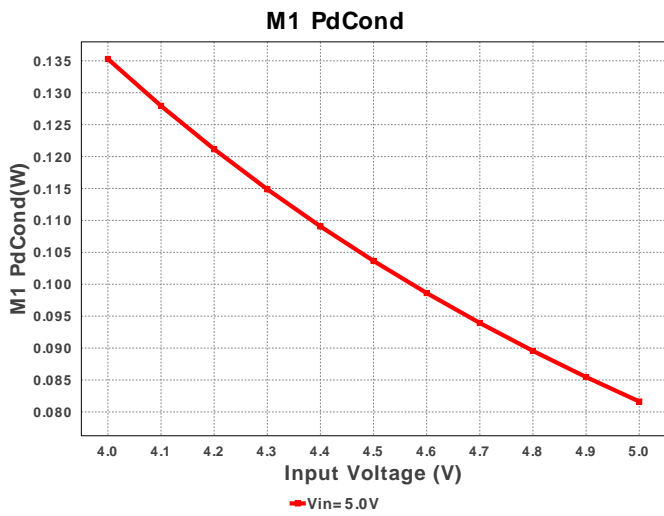
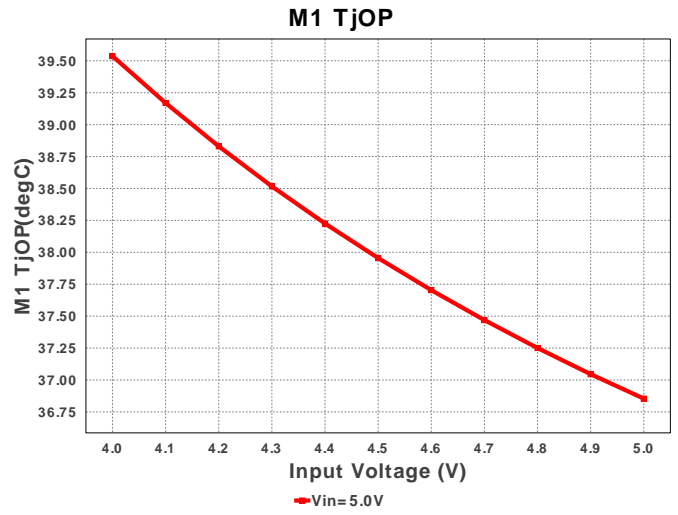
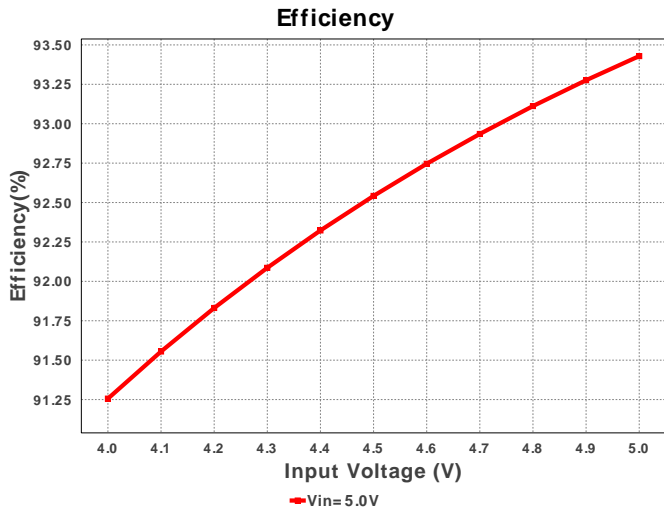
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application. View WEBENCH(R) Disclaimer.

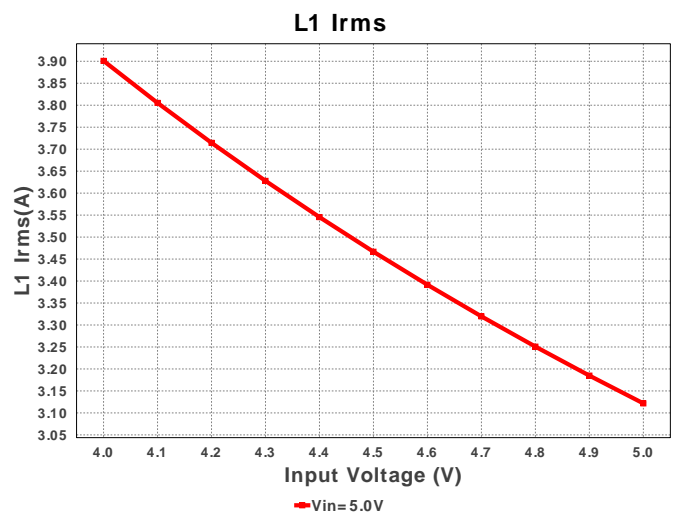
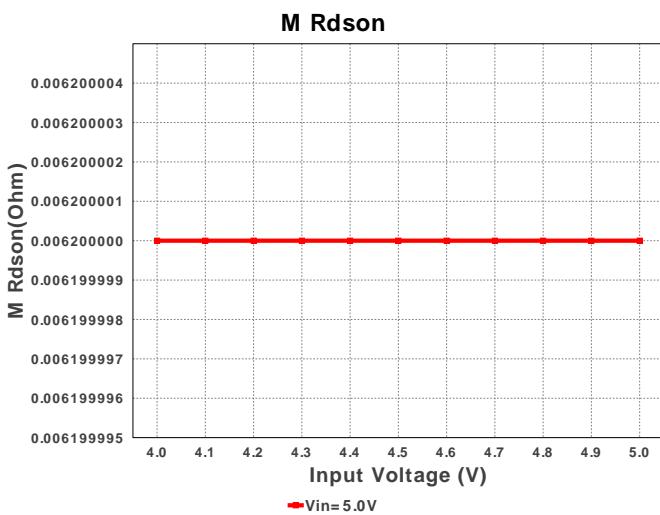
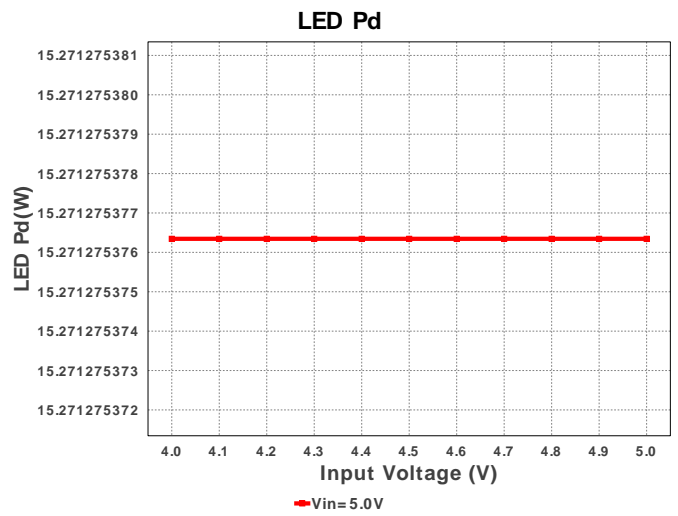
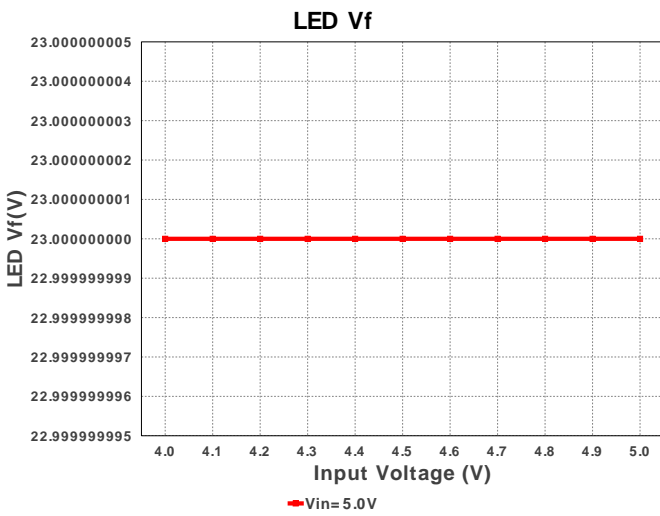
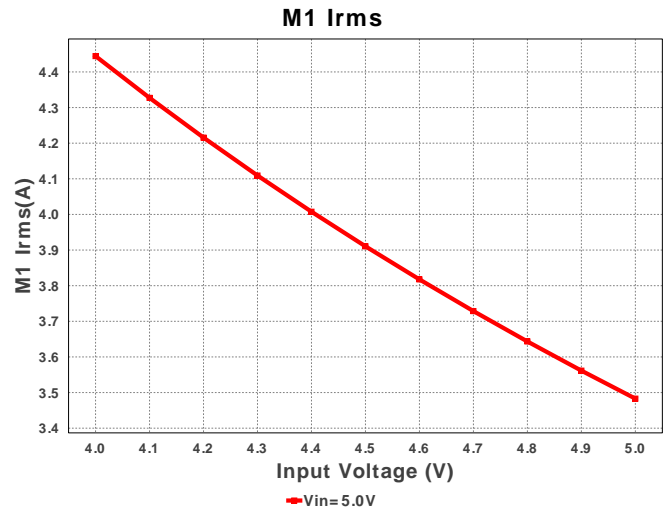
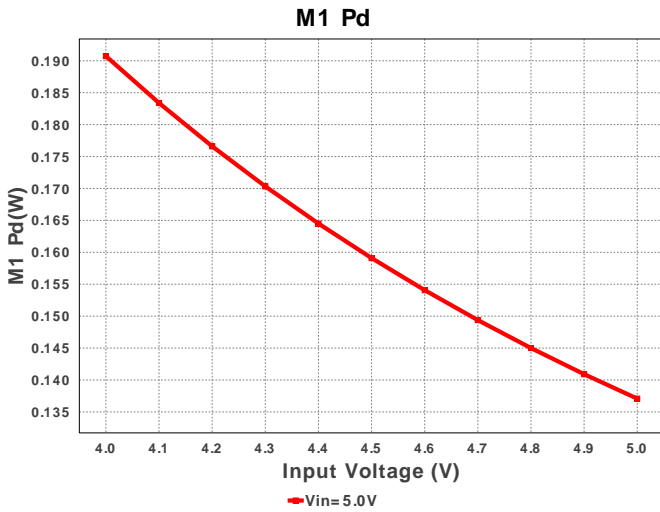
Electrical BOM

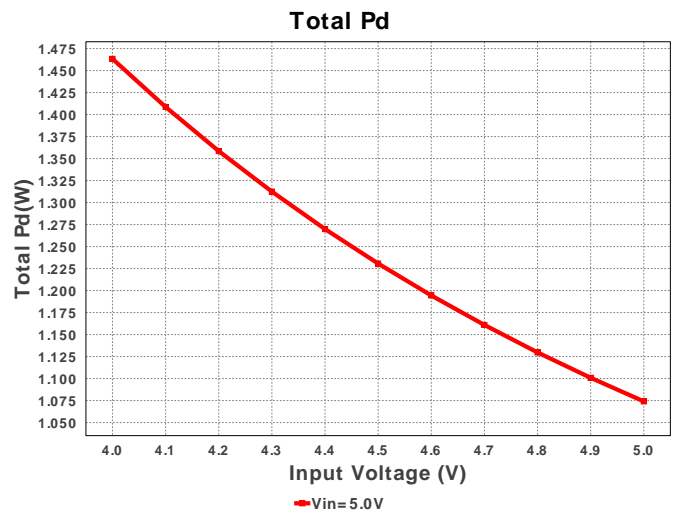
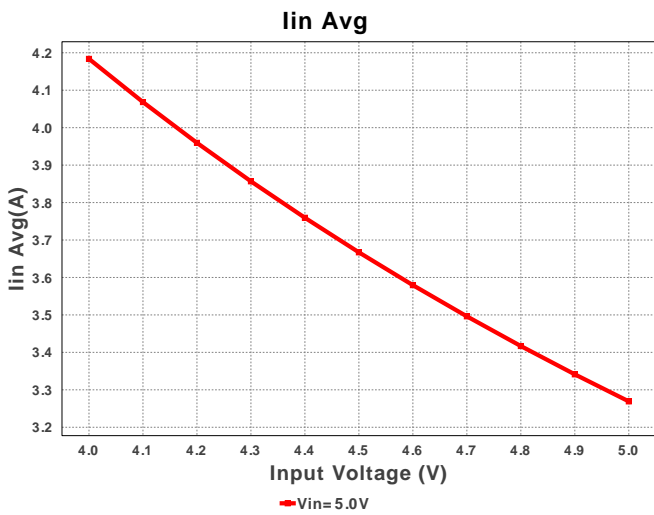
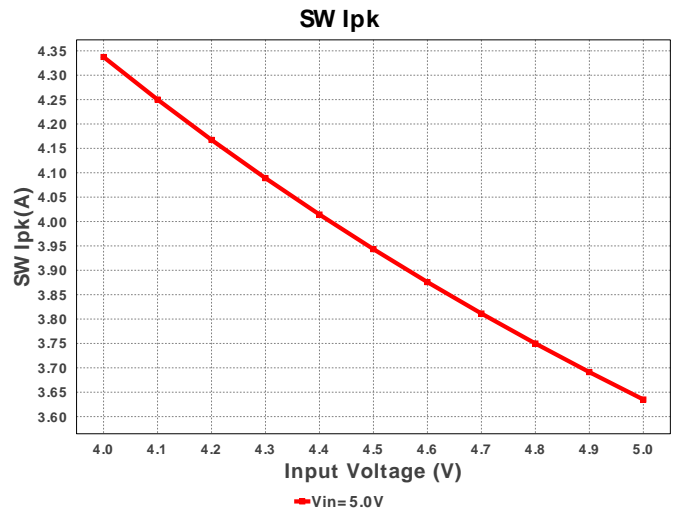
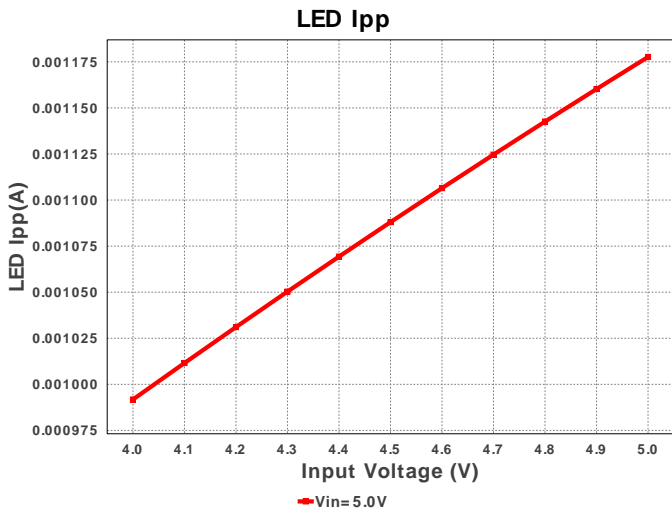
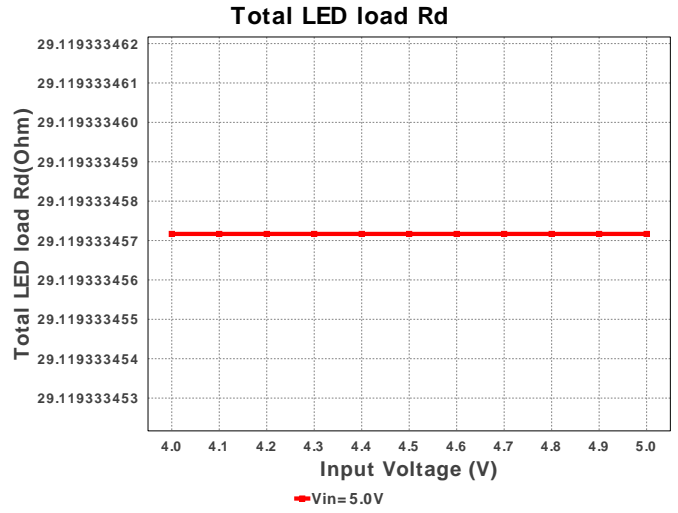
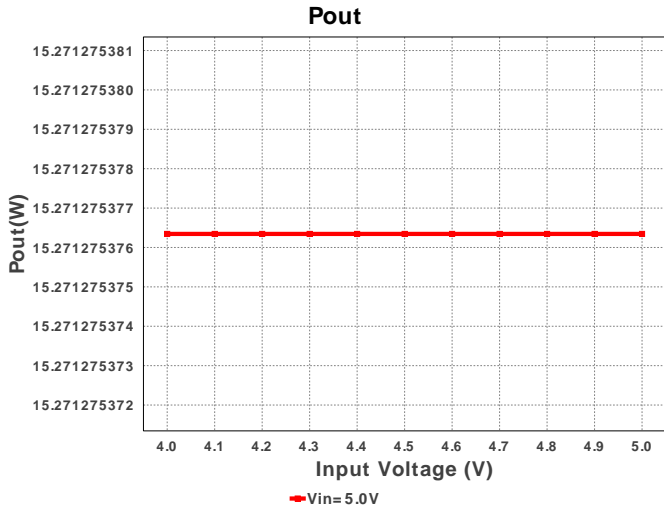
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|----|-------|---------------|--------------------------------------|--|-----|--------|----------------------------|
| 1. | Cbyp | Taiyo Yuden | EMK212B7225KG-T Series= X7R | Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A | 1 | \$0.03 | 0805 7 mm ² |
| 2. | Ccomp | MuRata | GRM155R61A334KE15D Series= X5R | Cap= 330.0 nF VDC= 10.0 V IRMS= 0.0 A | 1 | \$0.01 | 0402 3 mm ² |
| 3. | Cext | Kemet | C0805C104K5RACTU Series= X7R | Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A | 1 | \$0.01 | 0805 7 mm ² |
| 4. | Chspn | MuRata | GRM21BR71E104KA01L Series= X7R | Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A | 1 | \$0.01 | 0805 7 mm ² |
| 5. | Cin | Panasonic | 8TPE100MAZB Series= TPE | Cap= 100.0 uF ESR= 35.0 mOhm VDC= 8.0 V IRMS= 1.4 A | 1 | \$0.48 | 3528-21 17 mm ² |
| 6. | Cinx | MuRata | GRM155R61A104KA01D Series= X5R | Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A | 1 | \$0.01 | 0402 3 mm ² |
| 7. | Cout | MuRata | GRM31CR71H475KA12L Series= X7R | Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A | 2 | \$0.07 | 1206 11 mm ² |
| 8. | Covp | Kemet | C0805C470K5GACTU Series= C0G/NP0 | Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A | 1 | \$0.01 | 0805 7 mm ² |
| 9. | Ct | Yageo America | CC0805JRNPO9BN102 Series= C0G/NP0 | Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A | 1 | \$0.01 | 0805 7 mm ² |

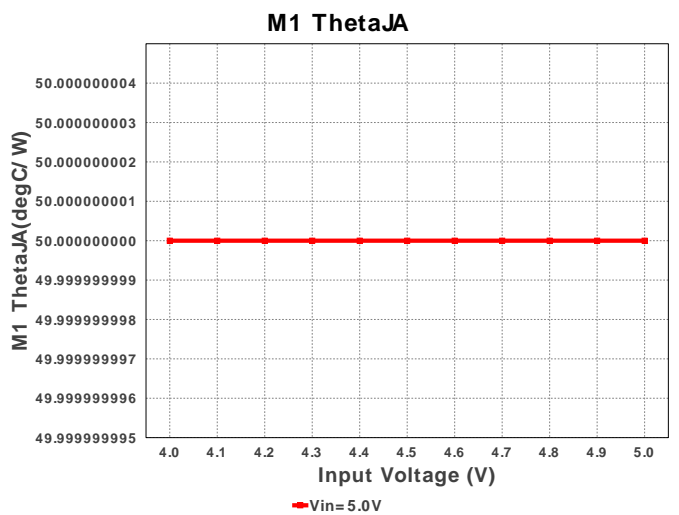
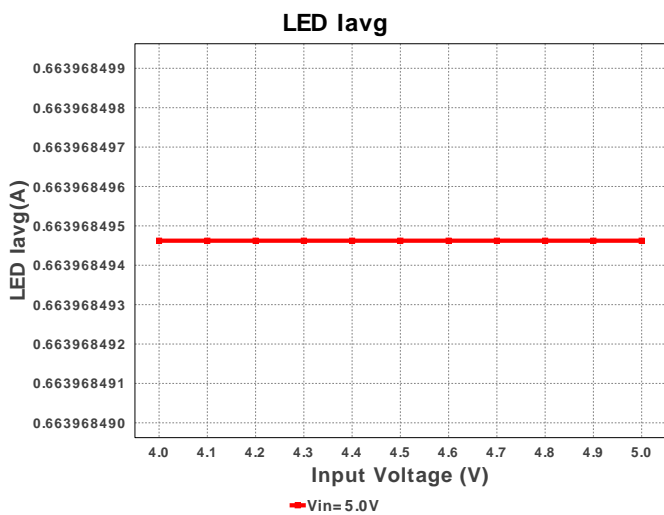
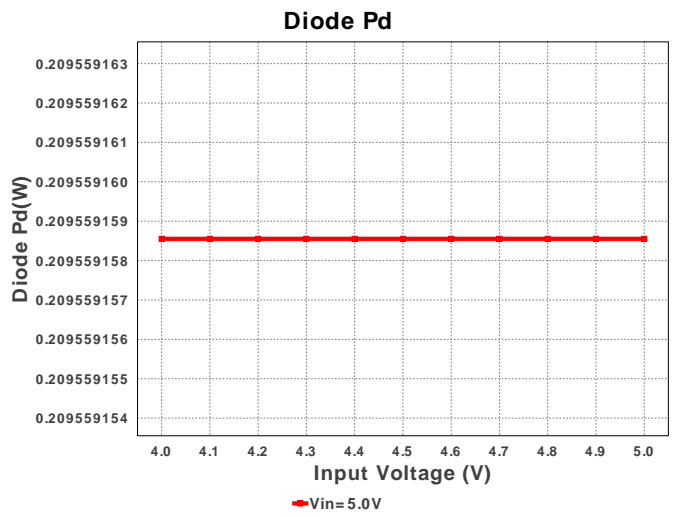
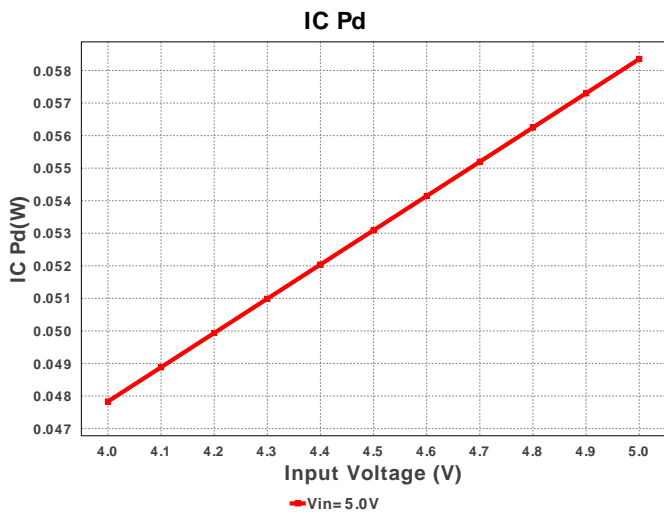
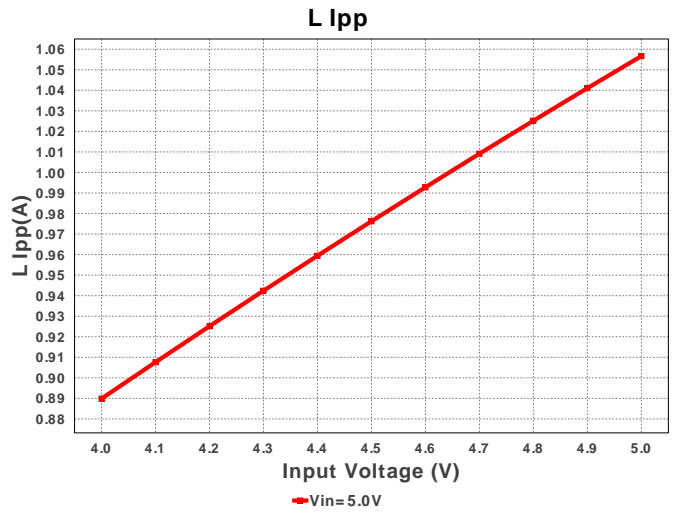
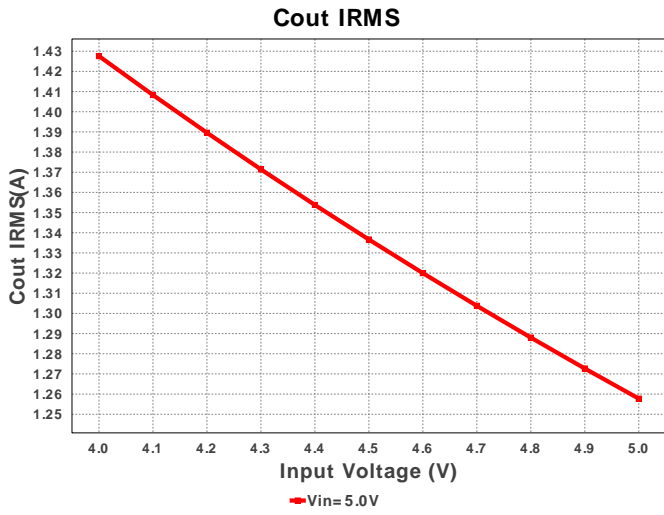
| # | Name | Manufacturer | Part Number | Properties | Qty | Price | Footprint |
|-----|--------|---------------------------|--------------------------------------|---|-----|--------|--|
| 10. | D1 | Diodes Inc. | B540C-13-F | VF@Io= 550.0 mV VRRM= 40.0 V | 1 | \$0.17 |  SMC 83 mm ² |
| 11. | D_LED | Cree | XHP50A-00-0000-0D00J40E2LED | | 2 | \$6.54 |  xlampxhp 0 mm ² |
| 12. | L1 | Bourns | SDR1307-6R8ML | L= 6.8 µH DCR= 17.0 mOhm | 1 | \$0.35 |  SDR1307 227 mm ² |
| 13. | M1 | Texas Instruments | CSD18503Q5A | VdsMax= 40.0 V IdsMax= 100.0 Amps | 1 | \$0.73 |  TRANS_NexFET_Q5A 55 mm ² |
| 14. | Rchs | Vishay-Dale | CRCW040212K4FKED Series= CRCW..e3 | Res= 12.4 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 15. | Rcs | Stackpole Electronics Inc | CSRN2010FK40L0 Series= ? | Res= 40.0 mOhm Power= 1.0 W Tolerance= 1.0% | 1 | \$0.15 |  2010 32 mm ² |
| 16. | Rdim | Vishay-Dale | CRCW040225K5FKED Series= CRCW..e3 | Res= 25.5 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 17. | Rhsn | Vishay-Dale | CRCW04021K00FKED Series= CRCW..e3 | Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 18. | Rhsp | Vishay-Dale | CRCW04021K00FKED Series= CRCW..e3 | Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 19. | Rivp1 | Vishay-Dale | CRCW04023K83FKED Series= CRCW..e3 | Res= 3.83 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 20. | Rivp2 | Vishay-Dale | CRCW040210K0FKED Series= CRCW..e3 | Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 21. | Rovp1 | Vishay-Dale | CRCW040220K5FKED Series= CRCW..e3 | Res= 20.5 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 22. | Rovp2 | Vishay-Dale | CRCW0402511KFKED Series= CRCW..e3 | Res= 511.0 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 23. | Rr | Vishay-Dale | CRCW040210R0FKED Series= CRCW..e3 | Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 24. | Rsense | Panasonic | ERJ-3RSFR15V Series= ERJ-3R | Res= 150.0 mOhm Power= 100.0 mW Tolerance= 1.0% | 1 | \$0.03 |  0603 5 mm ² |
| 25. | Rt | Vishay-Dale | CRCW040245K3FKED Series= CRCW..e3 | Res= 45.3 kOhm Power= 63.0 mW Tolerance= 1.0% | 1 | \$0.01 |  0402 3 mm ² |
| 26. | U1 | Texas Instruments | LM3429MH/NOPB | Switcher | 1 | \$1.20 |  MXA14A 59 mm ² |

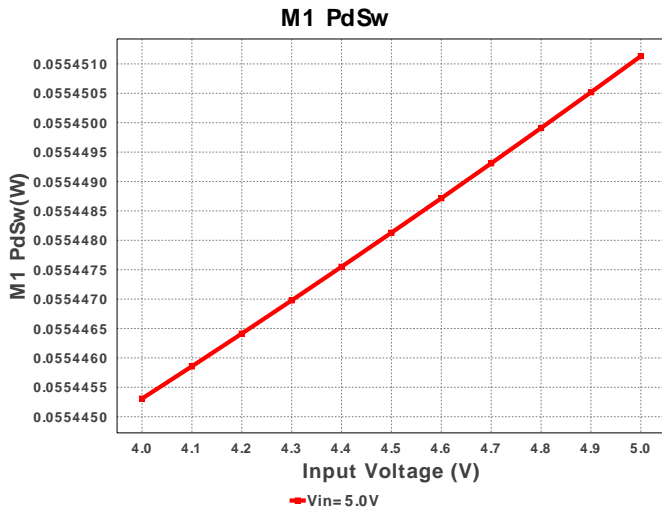












Operating Values

| # | Name | Value | Category | Description |
|-----|-------------------|-----------------------|----------|---|
| 1. | Cin IRMS | 336.251 mA | Current | Input capacitor RMS ripple current |
| 2. | Cout IRMS | 1.671 A | Current | Output capacitor RMS ripple current |
| 3. | Iin Avg | 5.527 A | Current | Average input current |
| 4. | L Ipp | 1.165 A | Current | Peak-to-peak inductor ripple current |
| 5. | L1 Irms | 5.129 A | Current | Inductor ripple current |
| 6. | LED Iavg | 663.968 mA | Current | LED Average Current |
| 7. | LED Ipp | 1.298 mA | Current | LED Ripple Current |
| 8. | M1 Irms | 5.931 A | Current | M1 MOSFET Irms |
| 9. | SW Ipk | 5.7 A | Current | Peak switch current |
| 10. | BOM Count | 28 | General | Total Design BOM count |
| 11. | FootPrint | 569.0 mm ² | General | Total Foot Print Area of BOM components |
| 12. | Frequency | 546.358 kHz | General | Switching frequency |
| 13. | IC Tolerance | 25.0 mV | General | IC Feedback Tolerance |
| 14. | M Rdson | 6.8 mOhm | General | Drain-Source On-resistance |
| 15. | M Vds Act | 40.334 mV | General | M Vds |
| 16. | M1 ThetaJA | 50.0 degC/W | General | MOSFET junction-to-ambient thermal resistance |
| 17. | Pout | 25.048 W | General | Total output power |
| 18. | Total BOM | \$16.52 | General | Total BOM Cost |
| 19. | D1 Tj | 47.961 degC | Op_Point | D1 junction temperature |
| 20. | Vout OP | 37.725 V | Op_Point | Operational Output Voltage |
| 21. | Duty Cycle | 87.946 % | Op_point | Duty cycle |
| 22. | Efficiency | 90.638 % | Op_point | Steady state efficiency |
| 23. | IC Tj | 33.36 degC | Op_point | IC junction temperature |
| 24. | ICThetaJA | 37.0 degC/W | Op_point | IC junction-to-ambient thermal resistance |
| 25. | IOUT_OP | 663.968 mA | Op_point | Iout operating point |
| 26. | LED Rd | 14.56 Ohm | Op_point | LED DynamicResistance |
| 27. | LED Vf | 37.725 V | Op_point | Total LED Forward Calculated Voltage |
| 28. | M1 TjOP | 48.412 degC | Op_point | M1 MOSFET junction temperature |
| 29. | VIN_OP | 5.0 V | Op_point | Vin operating point |
| 30. | Cin Pd | 3.957 mW | Power | Input capacitor power dissipation |
| 31. | Cout Pd | 4.186 mW | Power | Output capacitor power dissipation |
| 32. | Diode Pd | 359.225 mW | Power | Diode power dissipation |
| 33. | IC Pd | 90.808 mW | Power | IC power dissipation |
| 34. | L Pd | 536.68 mW | Power | Inductor power dissipation |
| 35. | LED Pd | 25.048 W | Power | LED Power Dissipation |
| 36. | M1 Pd | 368.24 mW | Power | M1 MOSFET total power dissipation |
| 37. | M1 PdCond | 261.643 mW | Power | M1 MOSFET conduction losses |
| 38. | M1 PdSw | 106.597 mW | Power | M1 MOSFET switching losses |
| 39. | Total Pd | 2.587 W | Power | Total Power Dissipation |
| 40. | Total LED load Rd | 29.119 Ohm | Unknown | Total LED Load DynamicResistance |

Design Inputs

| # | Name | Value | Description |
|----|-------------|------------|------------------------------------|
| 1. | Iout | 700.0 m | Maximum Output Current |
| 2. | Iout1 | 700.0 m | Output Current #1 |
| 3. | VinMax | 5.0 | Maximum input voltage |
| 4. | VinMin | 5.0 | Minimum input voltage |
| 5. | Vout | 23.0 | Output Voltage |
| 6. | Vout1 | 23.0 | Output Voltage #1 |
| 7. | application | LED_DRIVER | LED Application |
| 8. | base_pn | LM3429 | Texas Instruments Base Part Number |

| # | Name | Value | Description |
|-----|----------------|-------------------------|---------------------------|
| 9. | isLEDArchitect | N | LED Architect Project |
| 10. | ledparallel | 1.0 | Number of LED in parallel |
| 11. | ledpartnumber | XHP50A-00-0000-0D00141E | LED Part number |
| 12. | ledseries | 2.0 | Number of LED in series |
| 13. | line_fsw | 60.0 | AC Line Frequency |
| 14. | source | DC | Input Source Type |
| 15. | ta | 30.0 | Ambient temperature |

Design Assistance

1. LM3429 Product Folder : <http://www.ti.com/product/LM3429> : 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.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).