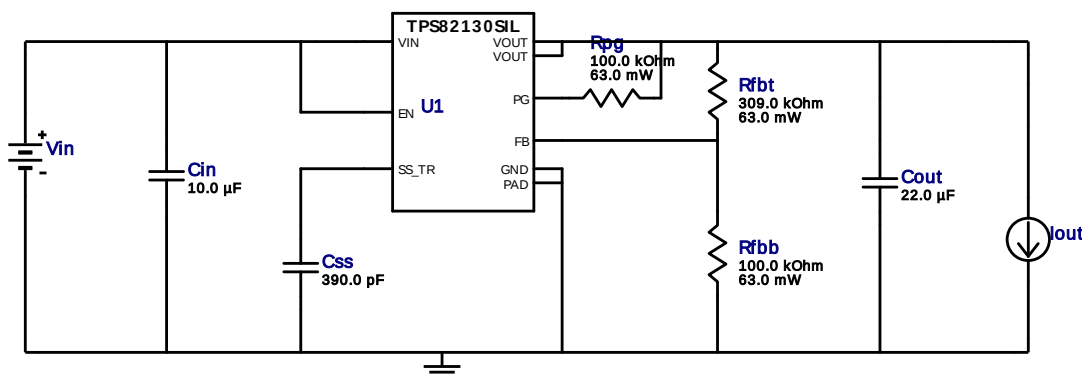


## WEBENCH® Design Report

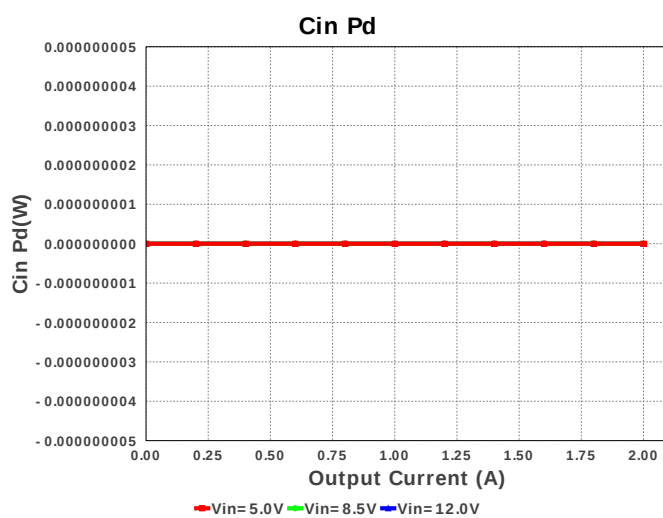
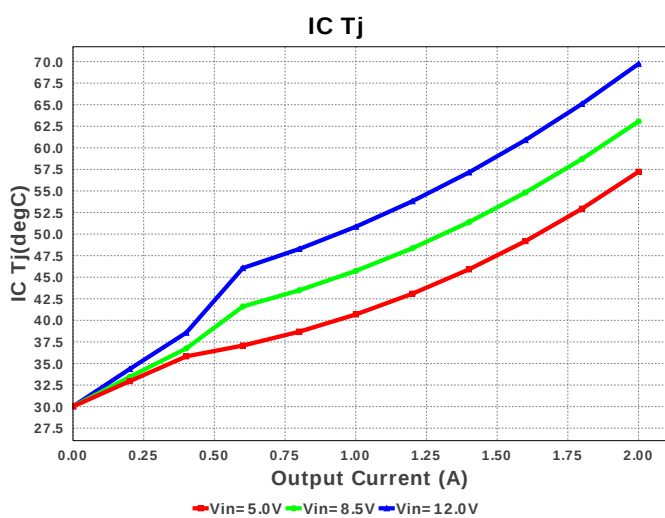
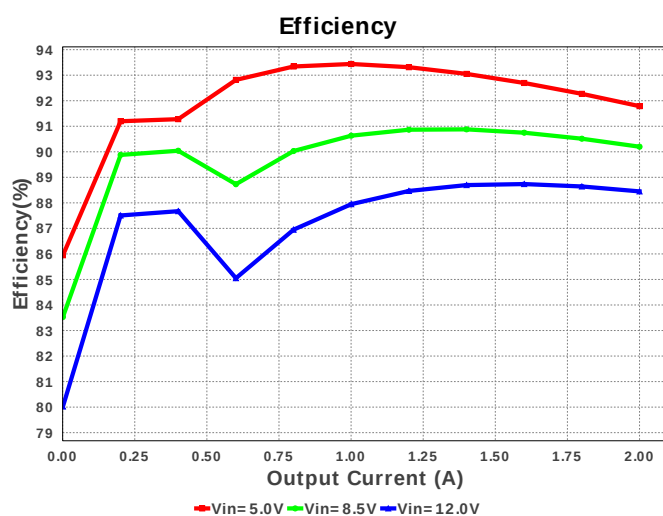
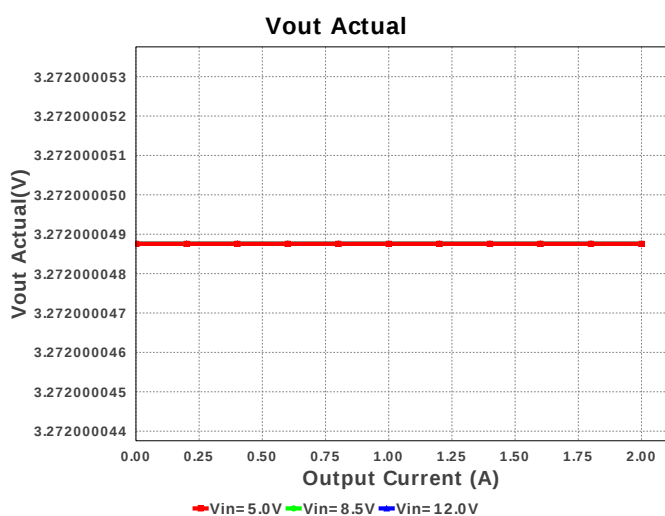
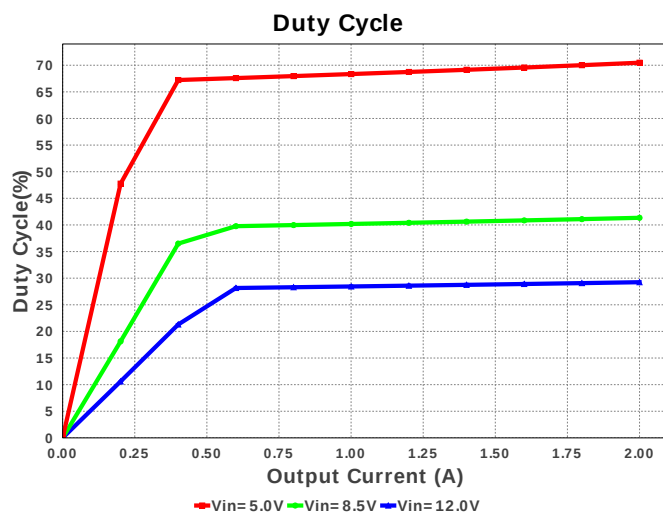
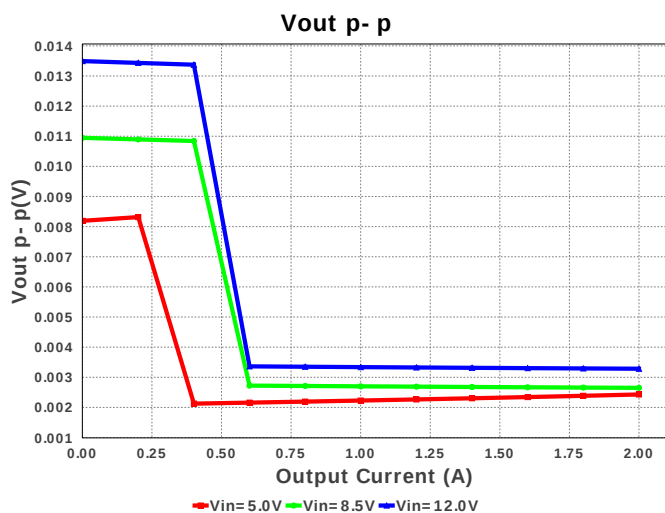
Design : 4755248/2 TPS82130SILR  
TPS82130SILR 5.0V-12.0V to 3.30V @ 2.0A

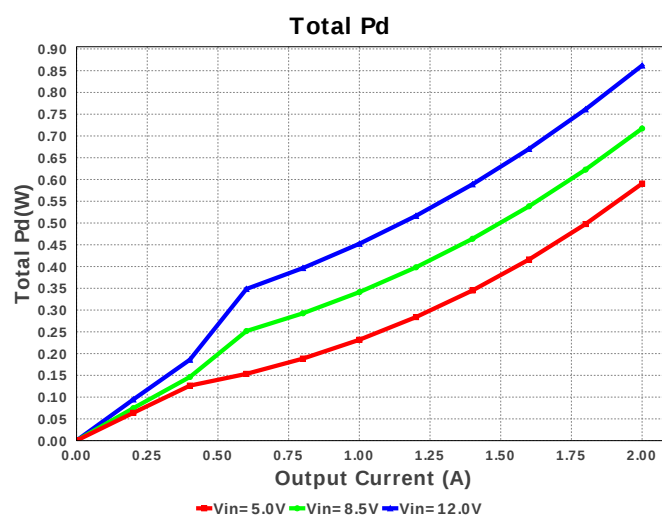
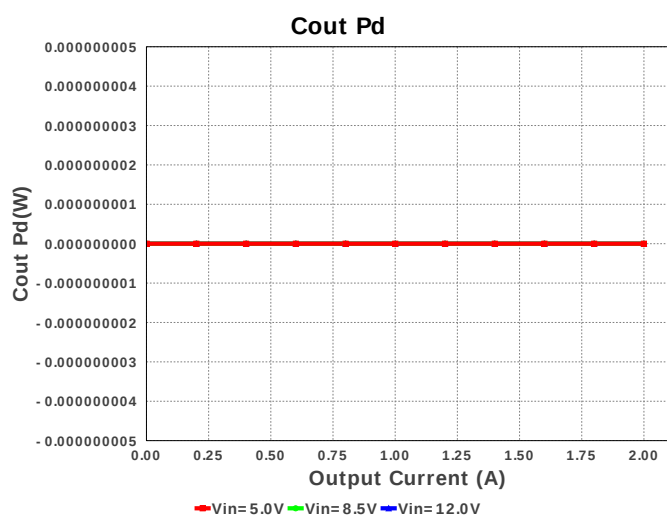
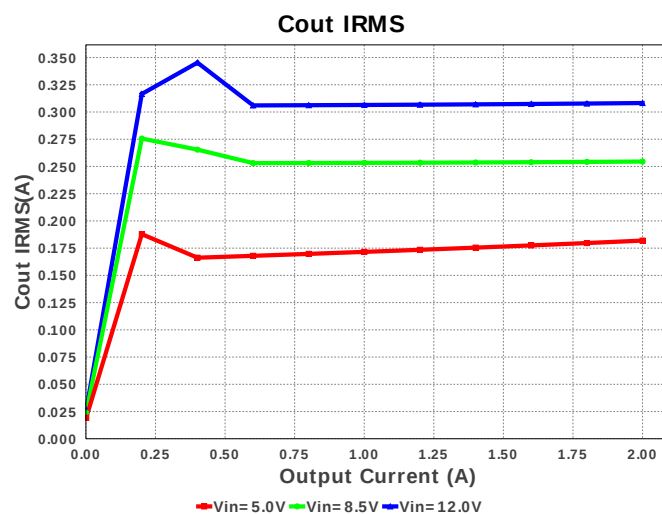
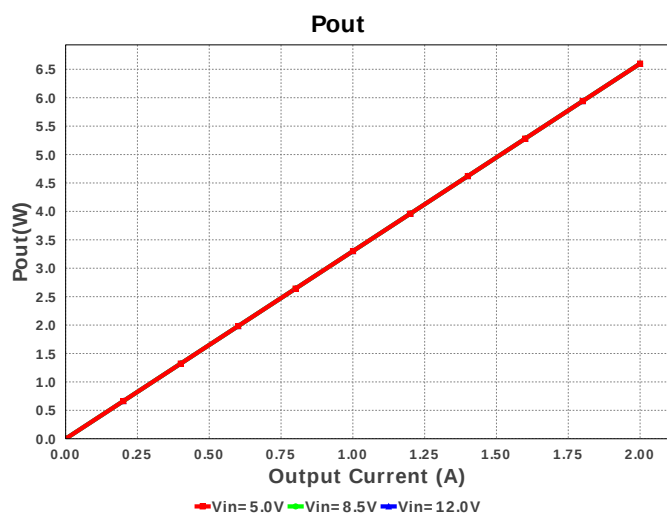
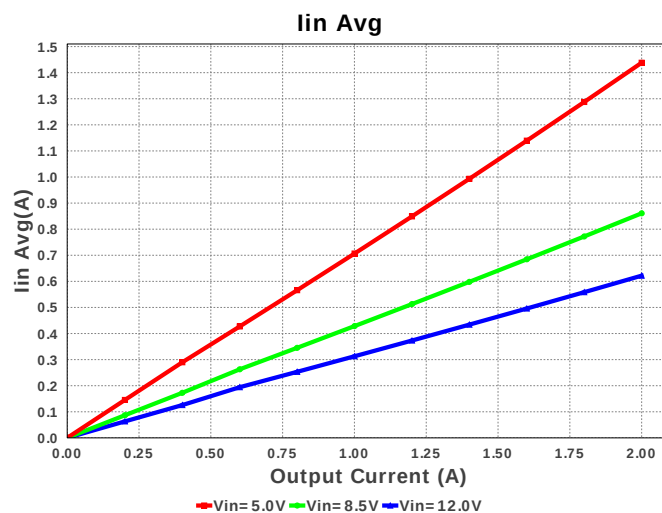
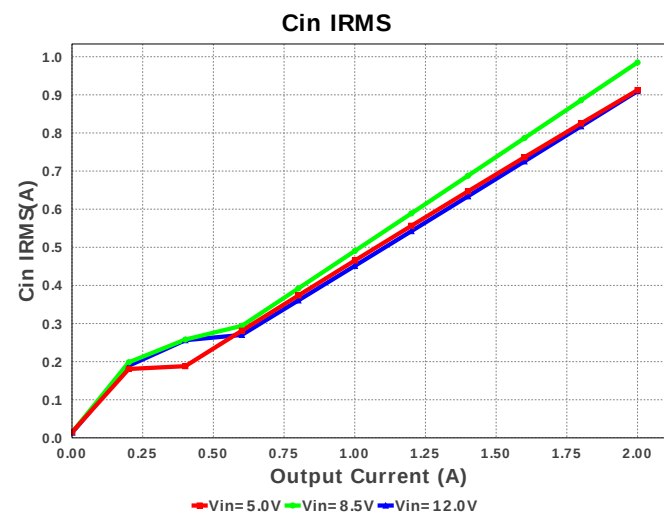
Vout = 3.3V  
Iout = 2.0A

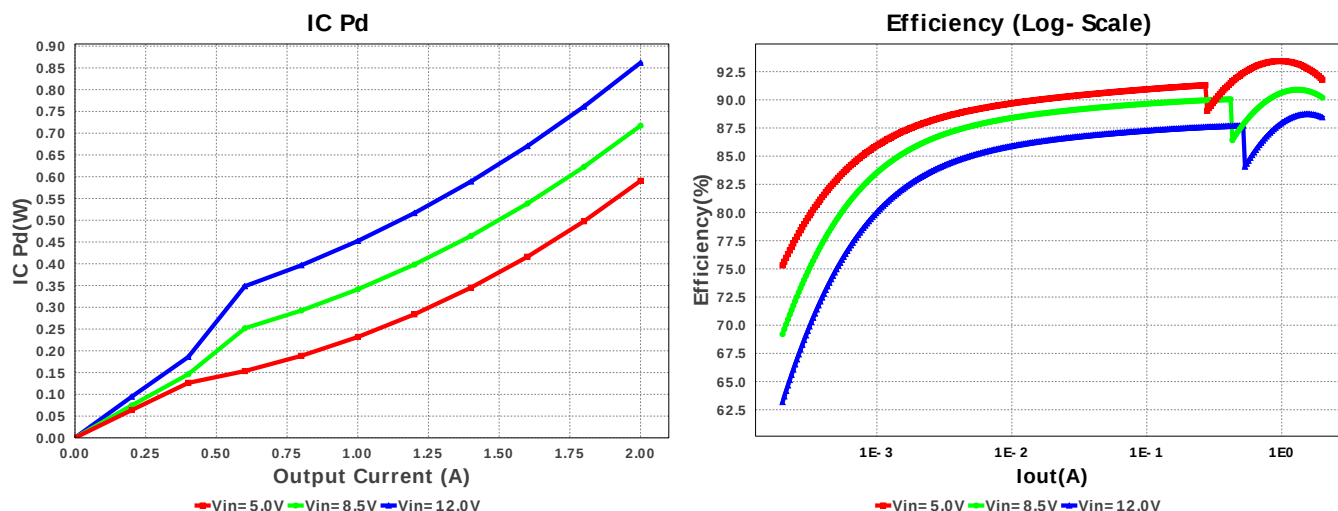


## Electrical BOM

| #  | Name | Manufacturer      | Part Number                          | Properties                                           | Qty | Price  | Footprint                                                                                                                |
|----|------|-------------------|--------------------------------------|------------------------------------------------------|-----|--------|--------------------------------------------------------------------------------------------------------------------------|
| 1. | Cin  | Taiyo Yuden       | TMK316BJ106KL-T<br>Series= X5R       | Cap= 10.0 uF<br>VDC= 25.0 V<br>IRMS= 0.0 A           | 1   | \$0.05 | <br>1206 11 mm <sup>2</sup>         |
| 2. | Cout | Taiyo Yuden       | JMK212BJ226MG-T<br>Series= X5R       | Cap= 22.0 uF<br>VDC= 6.3 V<br>IRMS= 0.0 A            | 1   | \$0.05 | <br>0805 7 mm <sup>2</sup>          |
| 3. | Css  | Yageo America     | CC0805KRX7R9BB391<br>Series= X7R     | Cap= 390.0 pF<br>VDC= 50.0 V<br>IRMS= 0.0 A          | 1   | \$0.01 | <br>0805 7 mm <sup>2</sup>          |
| 4. | Rfbb | Vishay-Dale       | CRCW0402100KFKED<br>Series= CRCW..e3 | Res= 100.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0% | 1   | \$0.01 | <br>0402 3 mm <sup>2</sup>          |
| 5. | Rfbt | Vishay-Dale       | CRCW0402309KFKED<br>Series= CRCW..e3 | Res= 309.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0% | 1   | \$0.01 | <br>0402 3 mm <sup>2</sup>          |
| 6. | Rpg  | Vishay-Dale       | CRCW0402100KFKED<br>Series= CRCW..e3 | Res= 100.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0% | 1   | \$0.01 | <br>0402 3 mm <sup>2</sup>          |
| 7. | U1   | Texas Instruments | TPS82130SILR                         | Switcher                                             | 1   | \$2.35 | <br>SIL0008D_SMD 15 mm <sup>2</sup> |







## Operating Values

| #   | Name                | Value                | Category | Description                                                                                |
|-----|---------------------|----------------------|----------|--------------------------------------------------------------------------------------------|
| 1.  | Cin IRMS            | 909.743 mA           | Current  | Input capacitor RMS ripple current                                                         |
| 2.  | Cout IRMS           | 308.235 mA           | Current  | Output capacitor RMS ripple current                                                        |
| 3.  | Iin Avg             | 621.83 mA            | Current  | Average input current                                                                      |
| 4.  | BOM Count           | 7                    | General  | Total Design BOM count                                                                     |
| 5.  | FootPrint           | 49.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components                                                    |
| 6.  | Frequency           | 2.166 MHz            | General  | Switching frequency                                                                        |
| 7.  | Pout                | 6.6 W                | General  | Total output power                                                                         |
| 8.  | Total BOM           | \$2.49               | General  | Total BOM Cost                                                                             |
| 9.  | ICThetaJA Effective | 46.1 degC/W          | Op_Point | Effective IC Junction-to-Ambient Thermal Resistance                                        |
| 10. | Vout Actual         | 3.272 V              | Op_Point | Vout Actual calculated based on selected voltage divider resistors                         |
| 11. | Vout OP             | 3.3 V                | Op_Point | Operational Output Voltage                                                                 |
| 12. | Duty Cycle          | 29.241 %             | Op_point | Duty cycle                                                                                 |
| 13. | Efficiency          | 88.449 %             | Op_point | Steady state efficiency                                                                    |
| 14. | IC Tj               | 69.734 degC          | Op_point | IC junction temperature                                                                    |
| 15. | IOUT_OP             | 2.0 A                | Op_point | Iout operating point                                                                       |
| 16. | VIN_OP              | 12.0 V               | Op_point | Vin operating point                                                                        |
| 17. | Vout p-p            | 3.284 mV             | Op_point | Peak-to-peak output ripple voltage                                                         |
| 18. | Cin Pd              | 0.0 W                | Power    | Input capacitor power dissipation                                                          |
| 19. | Cout Pd             | 0.0 W                | Power    | Output capacitor power dissipation                                                         |
| 20. | IC Pd               | 861.909 mW           | Power    | IC power dissipation                                                                       |
| 21. | Total Pd            | 861.931 mW           | Power    | Total Power Dissipation                                                                    |
| 22. | Vout Tolerance      | 4.445 %              |          | Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable |

## Design Inputs

| #  | Name    | Value    | Description            |
|----|---------|----------|------------------------|
| 1. | Iout    | 2.0      | Maximum Output Current |
| 2. | VinMax  | 12.0     | Maximum input voltage  |
| 3. | VinMin  | 5.0      | Minimum input voltage  |
| 4. | Vout    | 3.3      | Output Voltage         |
| 5. | base_pn | TPS82130 | Base Product Number    |
| 6. | source  | DC       | Input Source Type      |
| 7. | Ta      | 30.0     | Ambient temperature    |

## Design Assistance

1. Feature Highlights: DCS-Control(TM) Architecture with up to 3A output current, Power module with integrated inductor, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 5V, Optional softstart capacitor for slow startup, Power Save Mode for light load efficiency, 100% duty cycle for lowest dropout, PG=Low when device is in shutdown through EN or Thermal Shutdown
2. **TPS82130** Product Folder : <http://www.ti.com/product/TPS82130> : contains the data sheet and other resources.

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

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