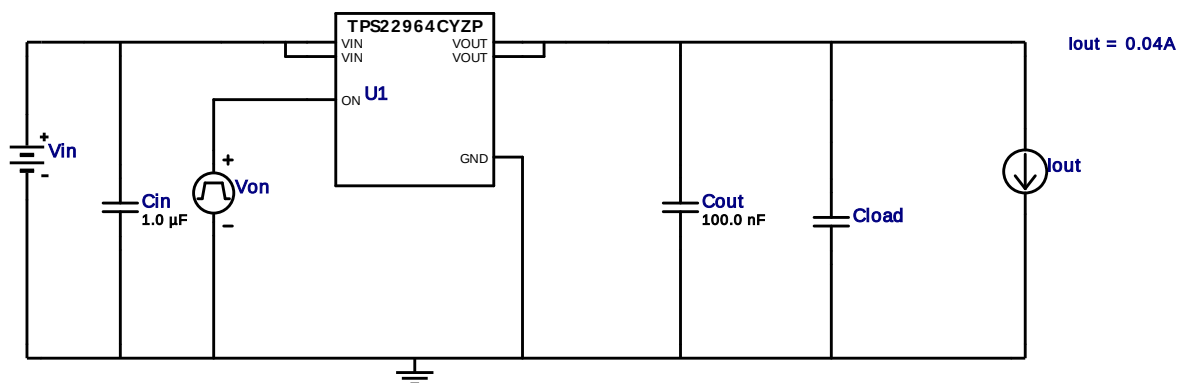


## WEBENCH® Design Report

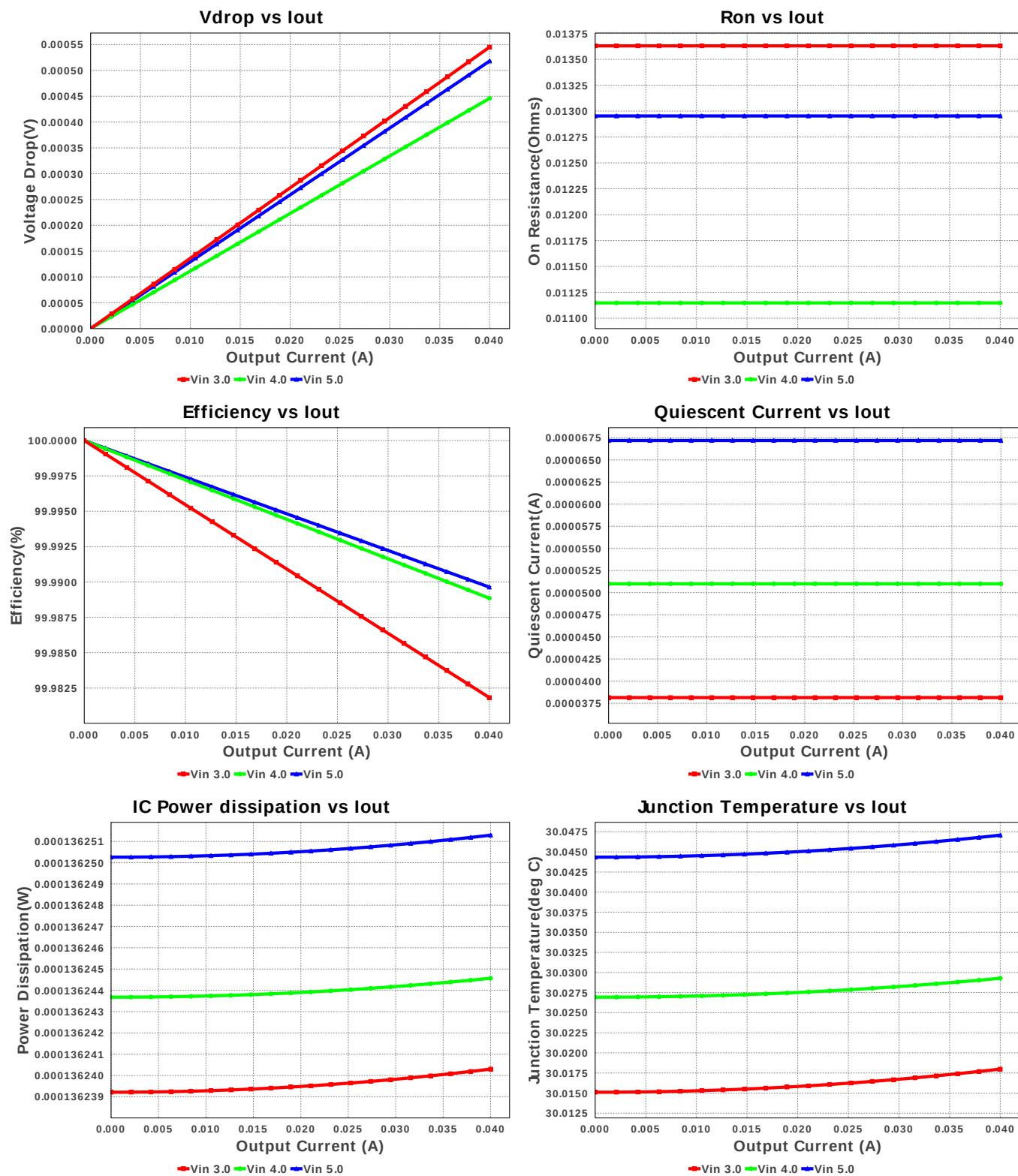
Design : 4801058/8 TPS22964CZP  
 Design 8 - TPS22964CZP



1. To limit the voltage drop on the input supply caused by transient in-rush currents when the switch turns on into a discharged load capacitor or a short circuit, it is generally recommended to have a capacitor of at least  $C_{load} \times 10$  between VIN and GND.

### Electrical BOM

| #  | Name | Manufacturer      | Part Number                       | Properties                                 | Qty | Price  | Footprint                   |
|----|------|-------------------|-----------------------------------|--------------------------------------------|-----|--------|-----------------------------|
| 1. | Cin  | Kemet             | C0603C105Z9VACTU<br>Series= Y5V   | Cap= 1.0 uF<br>VDC= 6.3 V<br>IRMS= 0.0 A   | 1   | \$0.01 | 0603 5 mm <sup>2</sup>      |
| 2. | Cout | MuRata            | GRM155R60J104KA01D<br>Series= X5R | Cap= 100.0 nF<br>VDC= 6.3 V<br>IRMS= 0.0 A | 1   | \$0.01 | 0402 3 mm <sup>2</sup>      |
| 3. | Cout | MuRata            | GRM155R60J104KA01D<br>Series= X5R | Cap= 100.0 nF<br>VDC= 6.3 V<br>IRMS= 0.0 A | 1   | \$0.01 | 0402 3 mm <sup>2</sup>      |
| 4. | U1   | Texas Instruments | TPS22964CZP                       | Switcher                                   | 1   | \$0.28 | YZP0006AF 5 mm <sup>2</sup> |



## Operating Values

| #   | Name           | Value                | Category | Description                             |
|-----|----------------|----------------------|----------|-----------------------------------------|
| 1.  | BOM Count      | 4                    | General  | Total Design BOM count                  |
| 2.  | FootPrint      | 15.0 mm <sup>2</sup> | General  | Total Foot Print Area of BOM components |
| 3.  | Inrush Current | 80.0 mA              | General  | User entered Inrush Current             |
| 4.  | Pout           | 199.979 mW           | General  | Total output power                      |
| 5.  | Total BOM      | \$0.31               | General  | Total BOM Cost                          |
| 6.  | Clload Act     | 200.0 nF             | Op_Point | Clload (Actual)                         |
| 7.  | Ron Act        | 12.953 mOhm          | Op_Point | Ron (Actual)                            |
| 8.  | SlewRate Act   | 4.305 mV/us          | Op_Point | Change in volt per unit time            |
| 9.  | Trise Act      | 929.033 μs           | Op_Point | Rise time                               |
| 10. | Vdrop Act      | 518.122 μV           | Op_Point | Voltage drop                            |

| #   | Name                   | Value           | Category | Description                                                                             |
|-----|------------------------|-----------------|----------|-----------------------------------------------------------------------------------------|
| 11. | DC Load Fall Time      | 54.925 $\mu$ s  | Op_point | Fall time calculated with the DC load attached. Considering only CLoad + Cout and RLoad |
| 12. | DC Load Inrush Current | 32.861 mA       | Op_point | Inrush current calculated with the DC load connected                                    |
| 13. | Efficiency             | 99.99 %         | Op_point | Steady state efficiency                                                                 |
| 14. | IC Tj                  | 30.047 degC     | Op_point | IC junction temperature                                                                 |
| 15. | IOUT_OP                | 40.0 mA         | Op_point | Iout operating point                                                                    |
| 16. | No Load Fall Time      | NaN s           | Op_point |                                                                                         |
| 17. | No Load Inrush Current | 32.861 mA       | Op_point | Inrush current calculated with the DC load not connected                                |
| 18. | VIN_OP                 | 5.0 V           | Op_point | Vin operating point                                                                     |
| 19. | Total Pd               | 356.685 $\mu$ W | Power    | Total Power Dissipation                                                                 |

## Design Inputs

| #   | Name           | Value     | Description                               |
|-----|----------------|-----------|-------------------------------------------|
| 1.  | Iout           | 40.0 m    | Maximum Output Current                    |
| 2.  | Iout           | 40.0 m    | Maximum Output Current                    |
| 3.  | VinMax         | 5.0       | Maximum input voltage                     |
| 4.  | VinMin         | 3.0       | Minimum input voltage                     |
| 5.  | base_pn        | TPS22964C | Base Product Number                       |
| 6.  | cload          | 100.0 n   | Minimum load capacitance user requirement |
| 7.  | inrush_Current | 80.0 m    | Inrush current                            |
| 8.  | source         | DC        | Input Source Type                         |
| 9.  | Ta             | 30.0      | Ambient temperature                       |
| 10. | vdrop_max      | 200.0 m   | Maximum voltage drop user requirement     |

## Design Assistance

1. **TPS22964C** Product Folder : <http://www.ti.com/product/tps22964c> : contains the data sheet and other resources.

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