## RECOMMENDED OPERATING CONDITIONS

Over operating free-air temperature range unless otherwise noted

| | | | | |
|---|---|---|---|---|
| $V_{IN}$ | Input voltage range | 2.8 | 6 | V |
| $V_{OUT}$ | Output voltage range | 0.6 | 5 | V |
| $T_J$ | Operating junction temperature | -40 | 150 | ℃ |

## ESD RATINGS

| | | | | |
|---|---|---|---|---|
| $V_{ESD}$ | Human Body Model (HBM), per ANSI-JEDEC-JS-001-2014 specification, all pins (1) | -3 | +3 | kV |
| | Charged Device Model (CDM), per ANSI-JEDEC-JS-002-2014specification, all pins (1) | -1 | +1 | kV |

(1) HBM and CDM stressing are done in accordance with the ANSI/ESDA/JEDEC JS-001-2014 specification.

## THERMAL INFORMATION

| | | | |
|---|---|---|---|
| $R_{\theta JA}$ | Junction to ambient thermal resistance(1) | 90.5 | |
| $\Psi_{JT}$ | Junction-to-top characterization parameter | 5.77 | |
| $\Psi_{JB}$ | | | ℃/W |

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## TYPICAL CHARACTERISTICS



Figure 1. Efficiency vs Load Current, Vout=1.2V



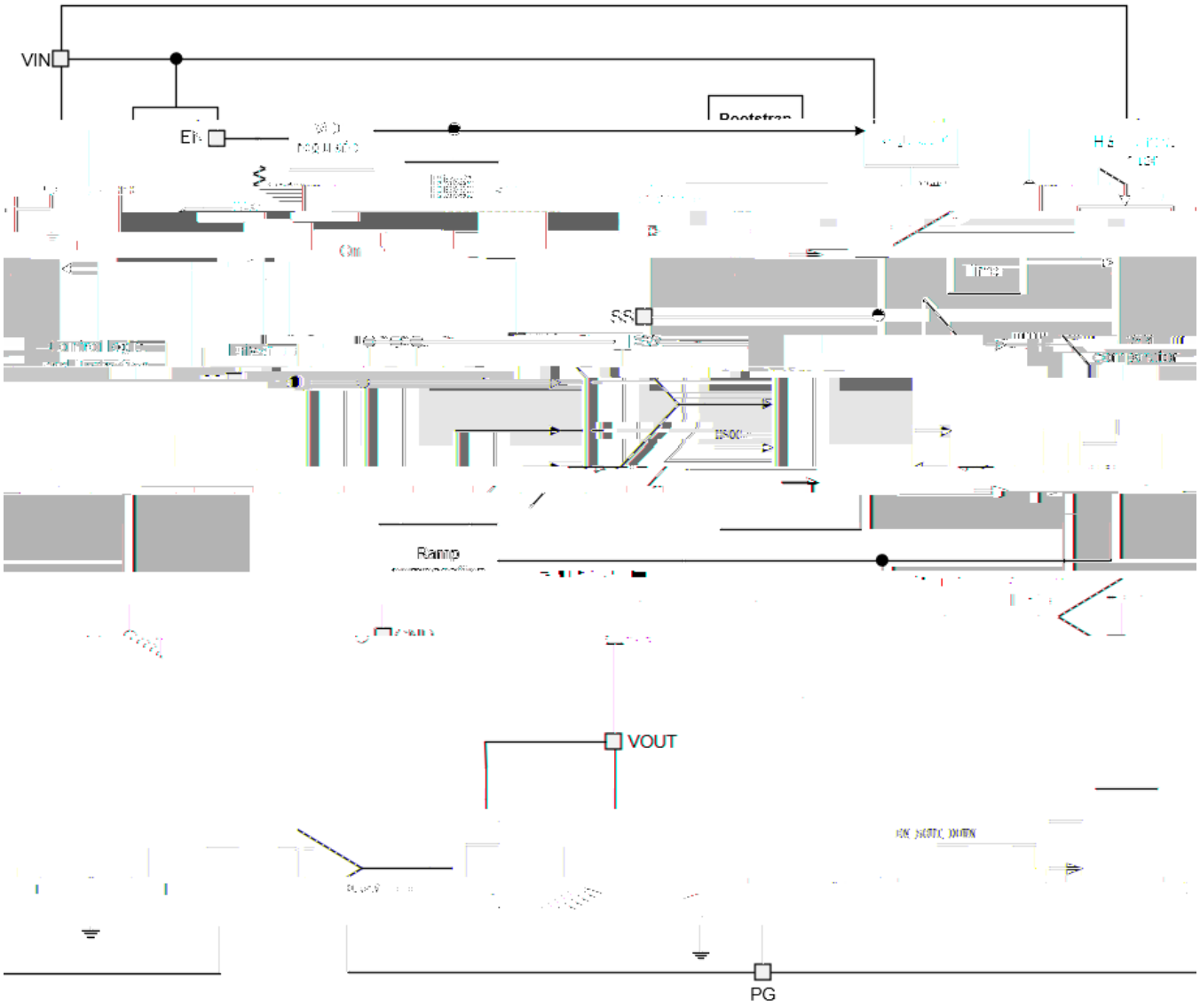
Figure 2. Efficiency vs Load Current, Vout=1.8V



Figure 3. Line Regulation, IoTm0 g0 G[oTm0 g0 C

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## FUNCTIONAL BLOCK DIAGRAM

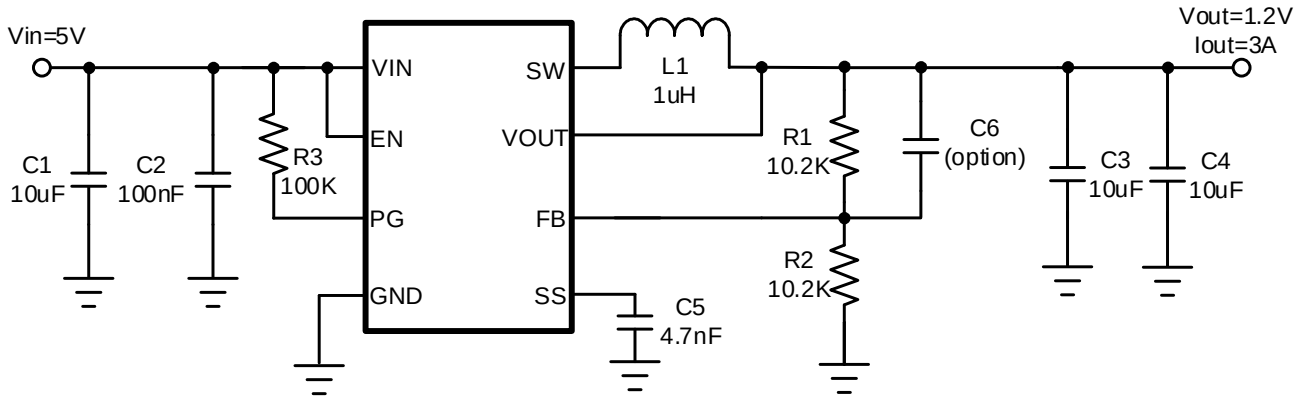



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The SCT2132Q has one power good (PG) output to in24D 6/ID 24347e or70(o(utpe)4-14243i())on(od)4( )-a4(u)ft-6(e)4))-3( )-t

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## APPLICATION INFORMATION




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The output voltage is set by an external resistor divider R1 and R2 in typical application schematic. Recommended R2 resistance is 10.2KΩ. Use Equation 4 to calculate R1.

(4)

where:

- $V_{REF}$ is the feedback reference voltage, typical 0.6V

| | | |
|---|---|---|
| 1.2 V | 10.2 KΩ | 10.2 KΩ |
| 1.8 V | 20 KΩ | 10.2 KΩ |
| 3.3 V | | |

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(7)

(8)

Where:

- $I_{LPEAK}$ is the inductor peak current.
- $I_{OUT}$ is the DC load current.
- $I_{LPP}$ is the inductor peak-to-peak current.
- $I_{LRMS}$ is the inductor RMS current.

In overloading or load transient conditions, the inductor peak current can increase up to the switch current limit of the device which is typically 4.5A. The most conservative approach is to choose an inductor with a saturation current rating greater than 4.5A. Because of the maximum $I_{LPEAK}$ limited by device, the maximum output current that the SCT2132Q can deliver also depends on the inductor current ripple. Thus, the maximum desired output current also affects the selection of inductance. The smaller inductor results in larger inductor current ripple leading to a lower maximum output current.

The input current to the step-down DCDC converter is discontinuous, therefore it requires a capacitor to supply the AC current to the step-down DCDC converter while maintaining the DC input voltage. Use capacitors with low ESR for better performance. Ceramic capacitors with X5R or X7R dielectrics are usually suggested because of their low ESR and small temperature coefficients, and it is strongly recommended to use another lower value capacitor (e.g., 0.1uF) with small package size (0603) to filter high frequency switching noise. Place the small size capacitor as close to VIN and GND pins as possible.

The voltage rating of the input capacitor must be greater than the maximum input voltage. And the capacitor must also have a ripple current rating greater than the maximum input current ripple. The RMS current in the input capacitor can be calculated using Equation 9.

(9)

The worst case condition occurs at $V_{IN}=2*V_{OUT}$, where:

(10)

For simplification, choose an input capacitor with an RMS current rating greater than half of the maximum load current.

When selecting ceramic capacitors, it needs to consider the effective value of a capacitor decreasing as the DC bias voltage across a capacitor increasing.

The input capacitance value determines the input ripple voltage of the regulator. The input voltage ripple can be calculated using Equation 11 and the maximum input voltage ripple occurs at 50% duty cycle.

(11)

For this example, 10μF, X7R ceramic capacitors rated for 16 V in parallel are used. And a 0.1 μF for high-frequency filtering capacitor is placed as close as possible to the device pins.

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The selection of output capacitor will affect ou

The output ripple is essentially composed of t
the Equivalent Series Resistance ESR of the o
charging and discharging the output capacitors.
capacitor like ceramic capacitor. For ceramic capacitors, the capacitance dominates the output ripple. For simplification, the output voltage ripple can be estimated by Equation 12 desir..99.96 TfQ EMC /Span <</MCID 149 475/Lang

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the Equivalent

$V_{IN}$=5V, $V_{OUT}$=1.2V, unless otherwise noted

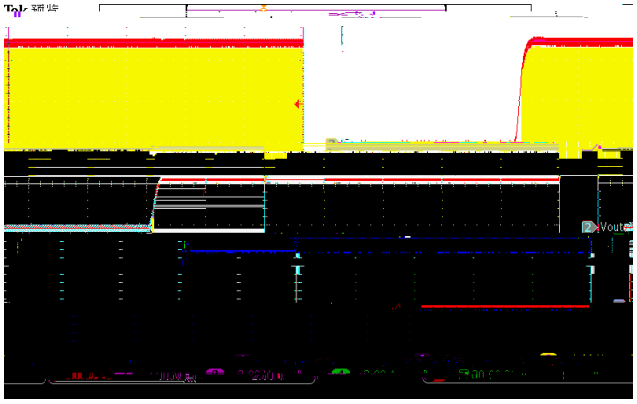


Figure 9. Power up ($I_{LOAD}$=3A)

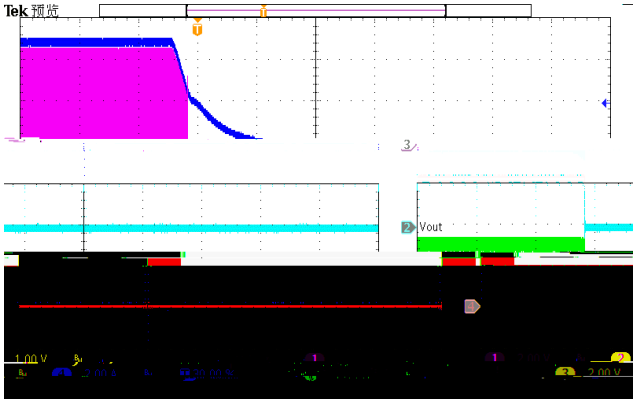



Figure 10. Power down ($I_{LOAD}$=3A)

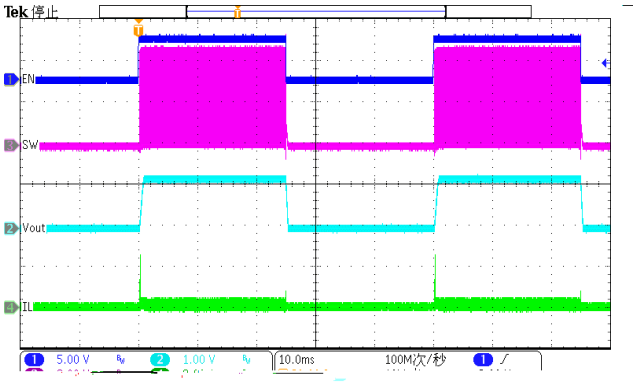



Figure 11. EN toggle ($I_{LOAD}$=0.1A)



Figure 12. EN toggle ($I_{LOAD}$=3A)

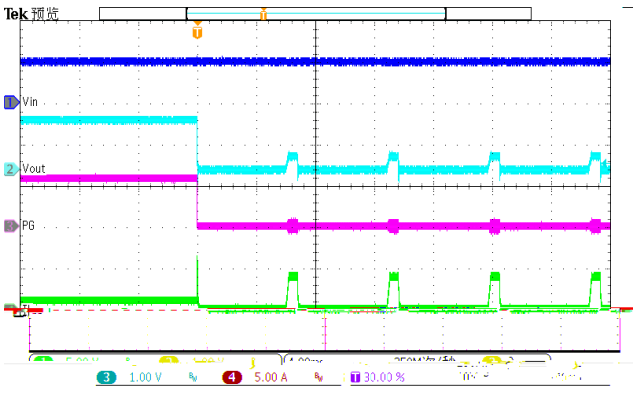



Figure 13. Over Current Protection (1A to hard short)

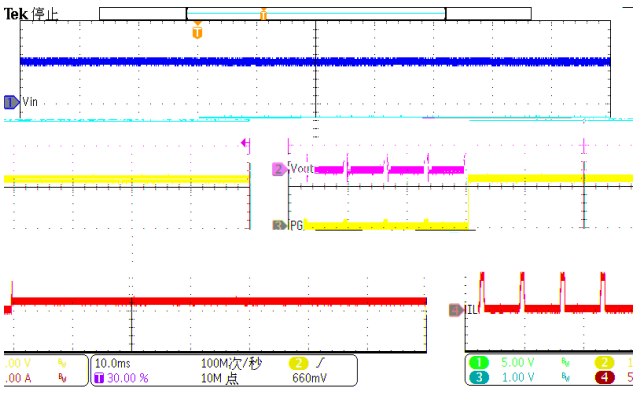


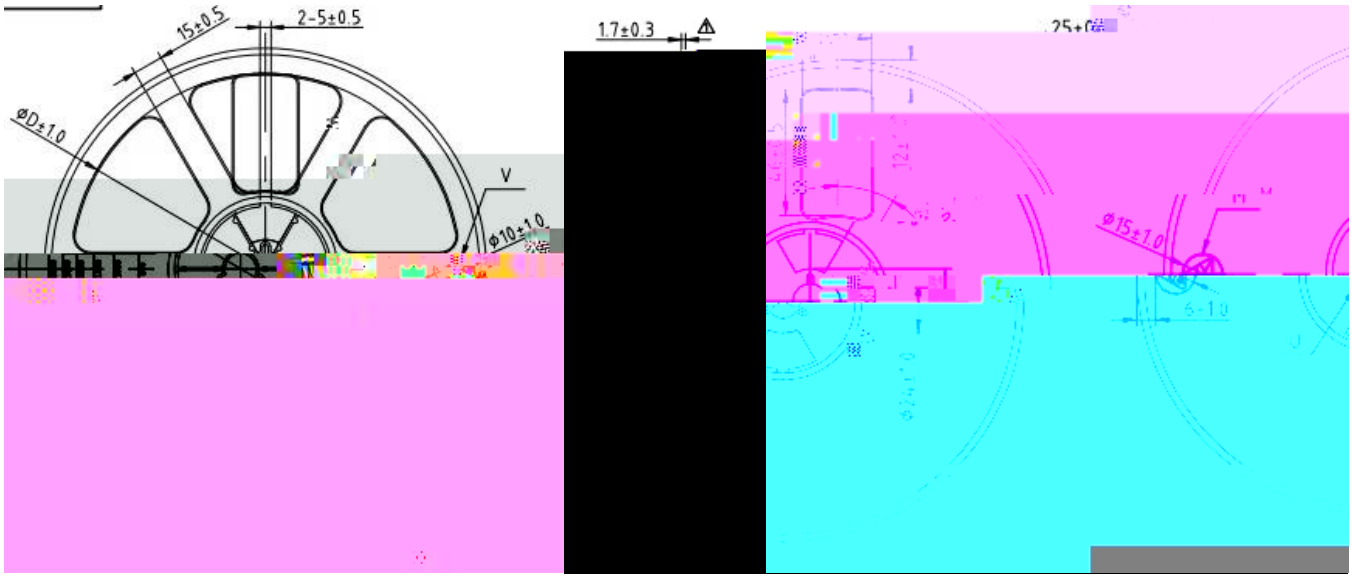

Figure 14. Over Current Release (hard short to 1A)

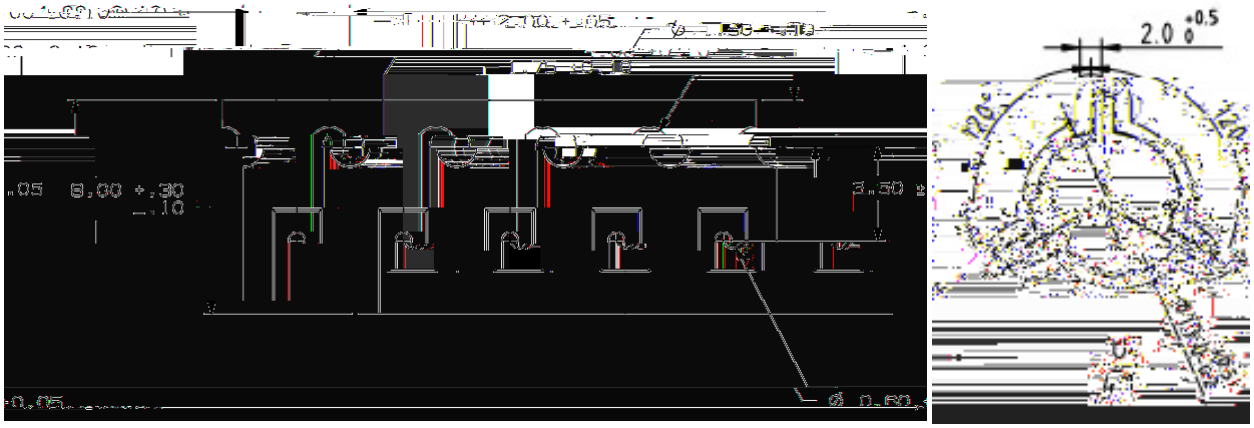
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Figure 15.

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# TAPE AND REEL INFORMATION







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