Over operating free-air temperature range unless otherwise noted

| 3 $ 5 $ 0 ( 7 ( 5 | ' ( ) , 1 , 7 , 2 1 | 0 , 1 | 0 $ ; | 8 1 , 7 |
|---|---|---|---|---|
| $V_{IN}$ | Input voltage range | 4.5 | 60 | V |
| $V_{OUT}$ | Output voltage range | 0.765 | 57 | V |
| $T_J$ | Operating junction temperature | -40 | 150 | °C |

| 3 $ 5 $ 0 ( 7 ( 5 | ' ( ) , 1 , 7 , 2 1 | 0 , 1 | 0 $ ; | 8 1 , 7 |
|---|---|---|---|---|
| $V_{ESD}$ | Human Body Model(HBM), per ANSI-JEDEC-JS-001-2014 specification, all pins(1) | -2 | | |

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved 

$V_{IN}$=24V, $T_J$=-40°C~125°C, typical value is tested under 25°C.

| 6<0%2 | 3$5$0(7(5 | 7(67 &21',7,21 | 0,1 7<3 0$; | 81,7 |
|---|---|---|---|---|

3RZHU 6XSSO\

$V_{IN}$

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved

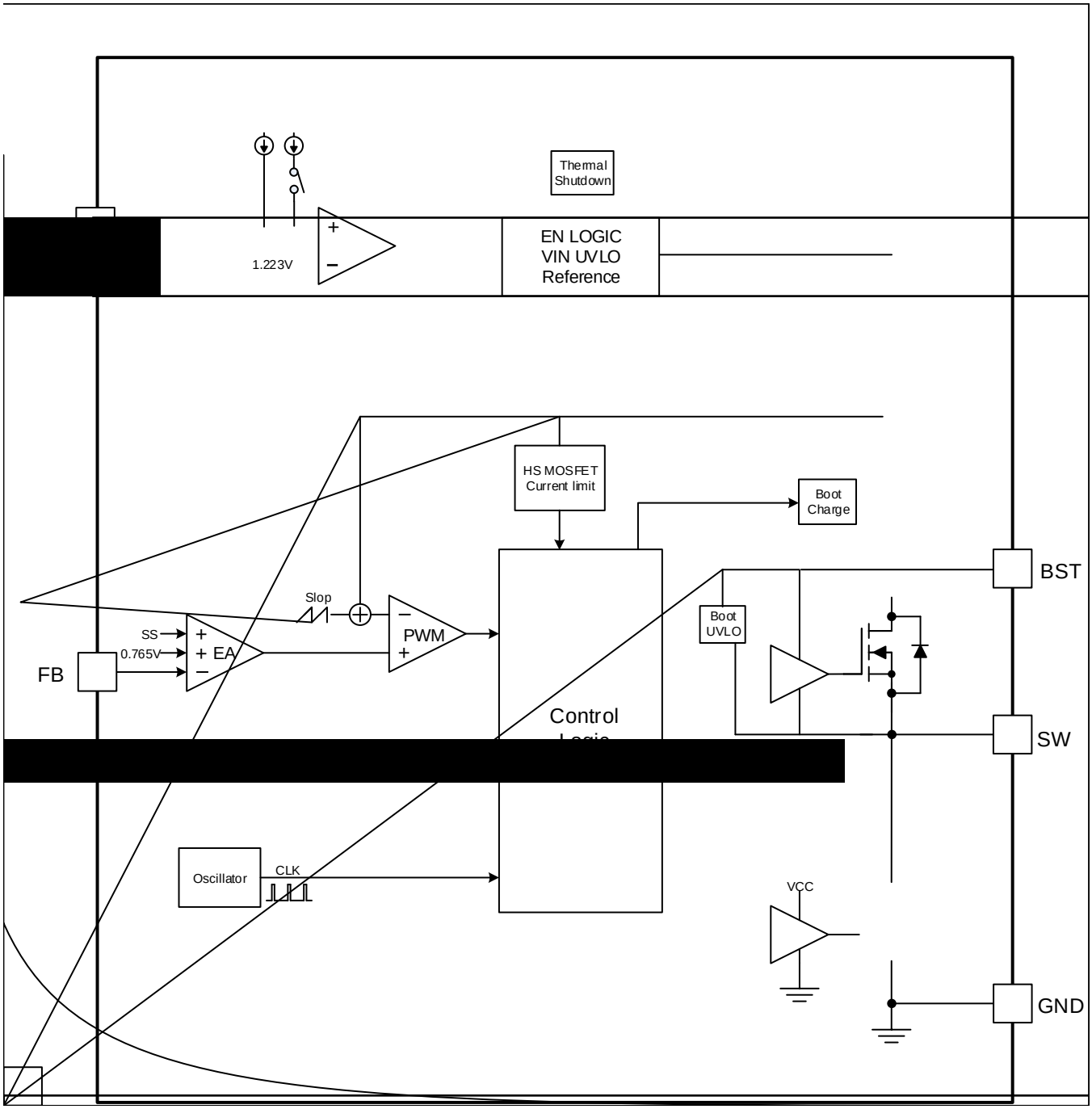



Figure 8. Functional Block Diagram

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved

(1)

(2)

where

$V_{rise}$ is rising threshold of Vin UVLO

$V_{fall}$ is falling threshold of Vin UVLO

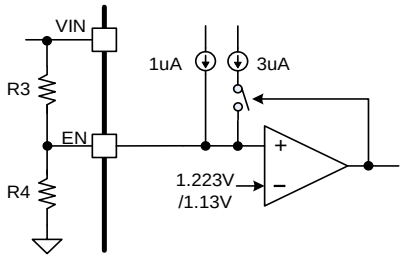



Figure 9. System UVLO by enable divide

2 X W S X W  9 R O W D J H

The SCT2601 regulates the internal reference voltage at 0.765V with 2.5% tolerance over the operating temperature and voltage range. The output voltage is set by a resistor divider from the output node to the FB pin. It is

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved

power-up and power-down application, the off-time of the high side MOSFET starts to approach the minimum value. Without LDO operation mode, beyond this point the switching may become erratic and/or the output voltage will fall out of regulation. To avoid this problem, the SCT2601 LDO mode automatically reduces the switching frequency to increase the effective duty cycle and maintain regulation.

2 Y H&X U U H/HQPW W

The SCT2601 implements over current protection with fold back current limit. The SCT2601 cycle-by-cycle limits high-side MOSFET peak current to avoid inductor current running away during unexpected overload or output hard short condition.

When overload or hard short happens, the converter cannot provide output current to satisfy loading requirement. The inductor current is clamped at over current limitation. Thus, the output voltage drops below regulated voltage with FB voltage less than internal reference voltage continuously.

The SCT2601 implements frequency fold back to protect the converter in unexpected overload or output hard short condition at higher switching frequencies and input voltages. The oscillh Ė Ŏ ! ! ch ɔ A =ξ r

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved 

## 7\SLFDO $SSOLFDWLRQ

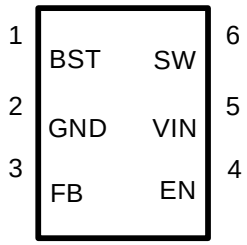



Figure 10. SCT2601 Design Example, 5V Output with Programmable UVLO

'HVLJQ UDPHWHUV

| 'HVLJQ UDPHWHUV | ([DPSOH 9DOXH |
|---|---|
| Input Voltage | 24V Normal |
| Output Voltage | 5V |
| Maximum Output Current | 0.6A |
| Switching Frequency | 700 KHz |
| Output voltage ripple (peak to peak) | 10mV |
| Transient Response 0.15A to 0.45A load step | ΔVout = 100mV |

Starx ꢀ M

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved 

2XWSXW 9ROWDJH

The output voltage is set by an external resistor divider R1 and R2 in typical application schematic. Recommended R6 resistance is 10.2KΩ. Use equation 5 to calculate R1.

—— (5)

where:

$V_{REF}$ is the feedback reference voltage, typical 0.765V

7DEOH 5 9DOXHU RPPRQ 2XWSXW 9RO\
5RRP 7HPSHUDWXUH

| 9287 | 5 | 5 |
|---|---|---|
| 2.5V | 23.2 KΩ | 10.2 KΩ |
| 3.3V | 34.0 KΩ | 10.2 KΩ |
| 5V | 56.2 KΩ | 10.2 KΩ |
| 12 V | 147 KΩ | 10.2 KΩ |
| 24V | 309 KΩ | 10.2 KΩ |
| 36V | 464 KΩ | 10.2 KΩ |
| 48V | 634 KΩ | 10.2 KΩ |

8QGHU 9ROWDJH

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved

 © 2021

The B360A-13-F diode has a junction capacitance of 200 pF. Using Equation 12, the total loss in the diode at the maximum input voltage is 0.39 W.

If the power supply spends a significant amount of time at light load currents or in sleep mode, consider using a diode which has a low leakage current and slightly higher forward voltage drop.

(12)

### ,QSXW &DSDFLWRU 6HOHFWLRQ

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

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved

$ S S O L F D W L R Q : D Y H I R U P V

Vin=24V, Vout=5V, unless otherwise noted

Figure 1 1L H U Y

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved

## $SSOLFDWLRQ :DYHIRUPV FRQWLQXHG

Vin=24V, Vout=5V, unless otherwise noted

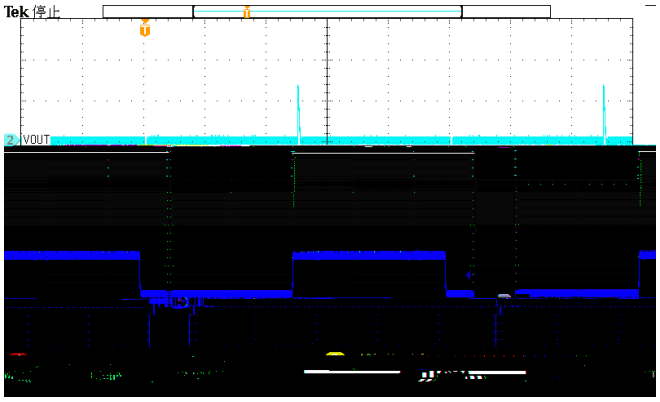



Figure 17. Load Transient (0.06A-0.54A, 1.6A/us)

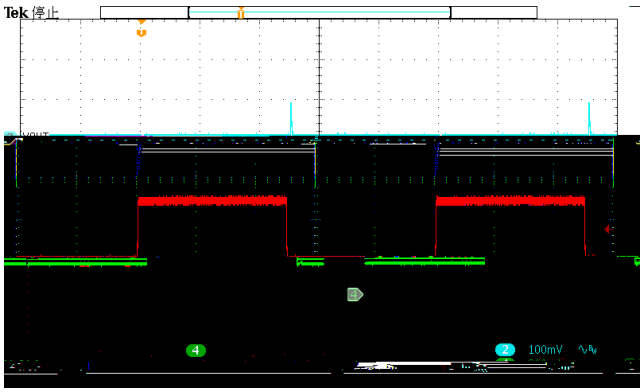



Figure 18. Load Transient (0.15A-0.45A, 1.6A/us)

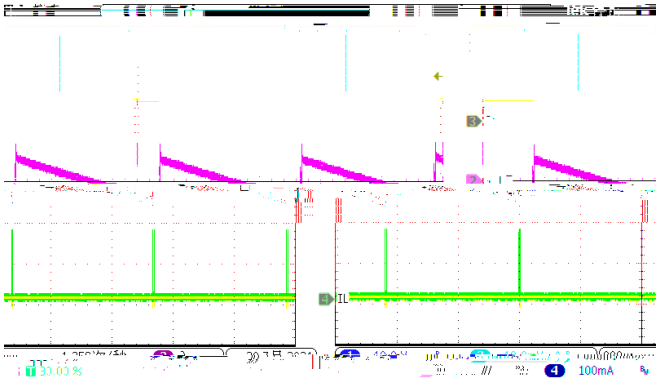



Figure 19. Output Ripple (Iload=0A)

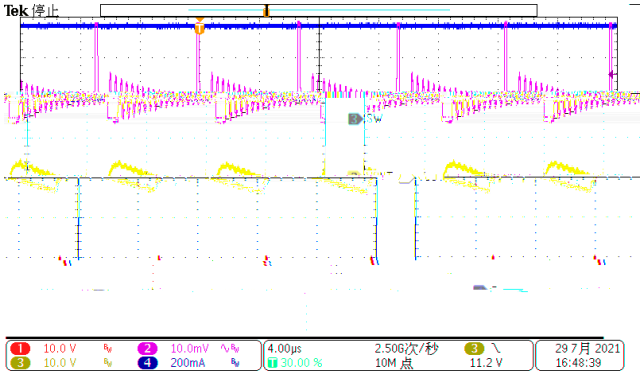



Figure 20. Output Ripple (Iload=10mA)




Figure 21. Output Ripple (Iload=0.6A)

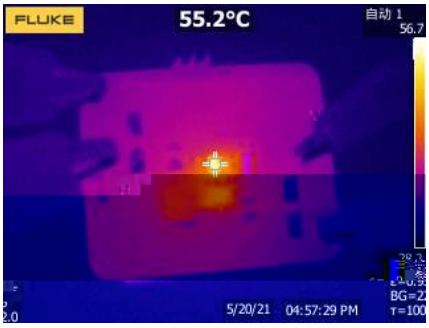



Figure 22. Thermal, 24VIN, 5Vout, 0.6A

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved 

/D\RXW *XLGHOLQH

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved

## 7KHUPDO &RQVLGHUDWLRQV

The maximum IC junction temperature should be restricted to 125°C under normal operating conditions. Calculate the maximum allowable dissipation, P

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved 

TOP VIEW

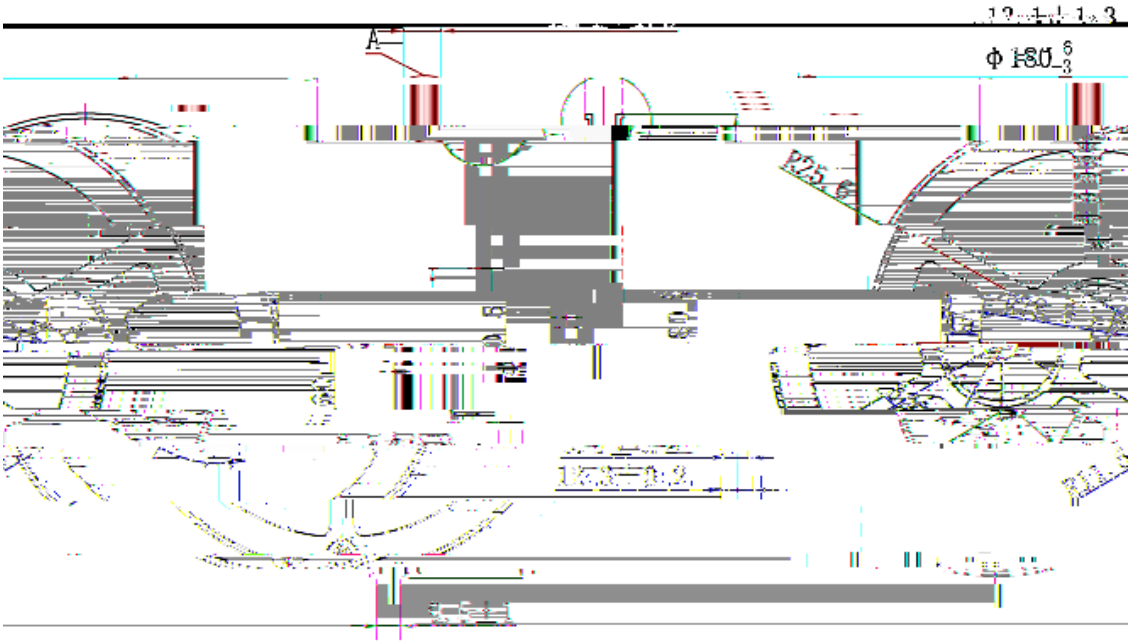
BOTTOM VIEW

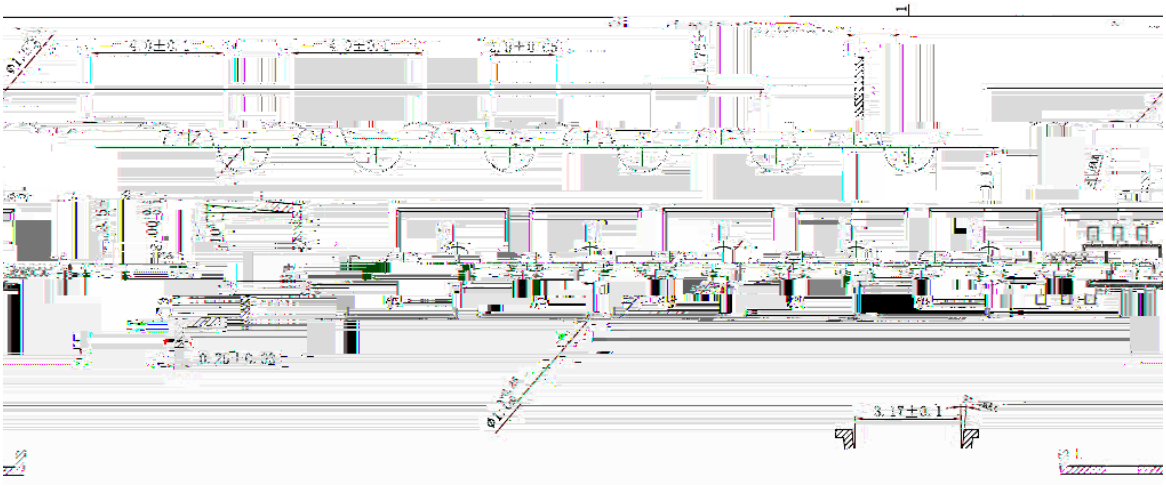
SIDE VIEW

1 2 7 (

1. Drawing proposed to be made a JEDEC package outline MO-220 variation.
2. Drawing not to scale.
3. All linear dimensions are in millimeters.
4. Thermal pad shall be soldered on the board.
5. Dimensions of exposed pad on bottom of package do not include mold flash.
6. Contact PCB board fabrication for minimum solder mask web tolerances between the pins.

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved





) H H G L' QU H F W L R Q

 © 2021 Silicon Content Technology Co., Ltd. All Rights Reserved 