RECOMMENDED OPERATING CONDITIONS

Over operating free-air temperature range unless otherwise noted

3$5$0(7(5	'(),17,21	0,1	0$;	81,7
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

ESD RATINGS

3$5$0(7(5	'(),17,21	0,1	0$;	81,7
V_{ESD}	Human Body Model(HBM), per ANSI-JEDEC-JS-001-2014 specification, all pins(1)	-2		

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ELECTRICAL CHARACTERISTICS

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}

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TYPICAL CHARACTERISTICS

Figure 2.

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FUNCTIONAL BLOCK DIAGRAM

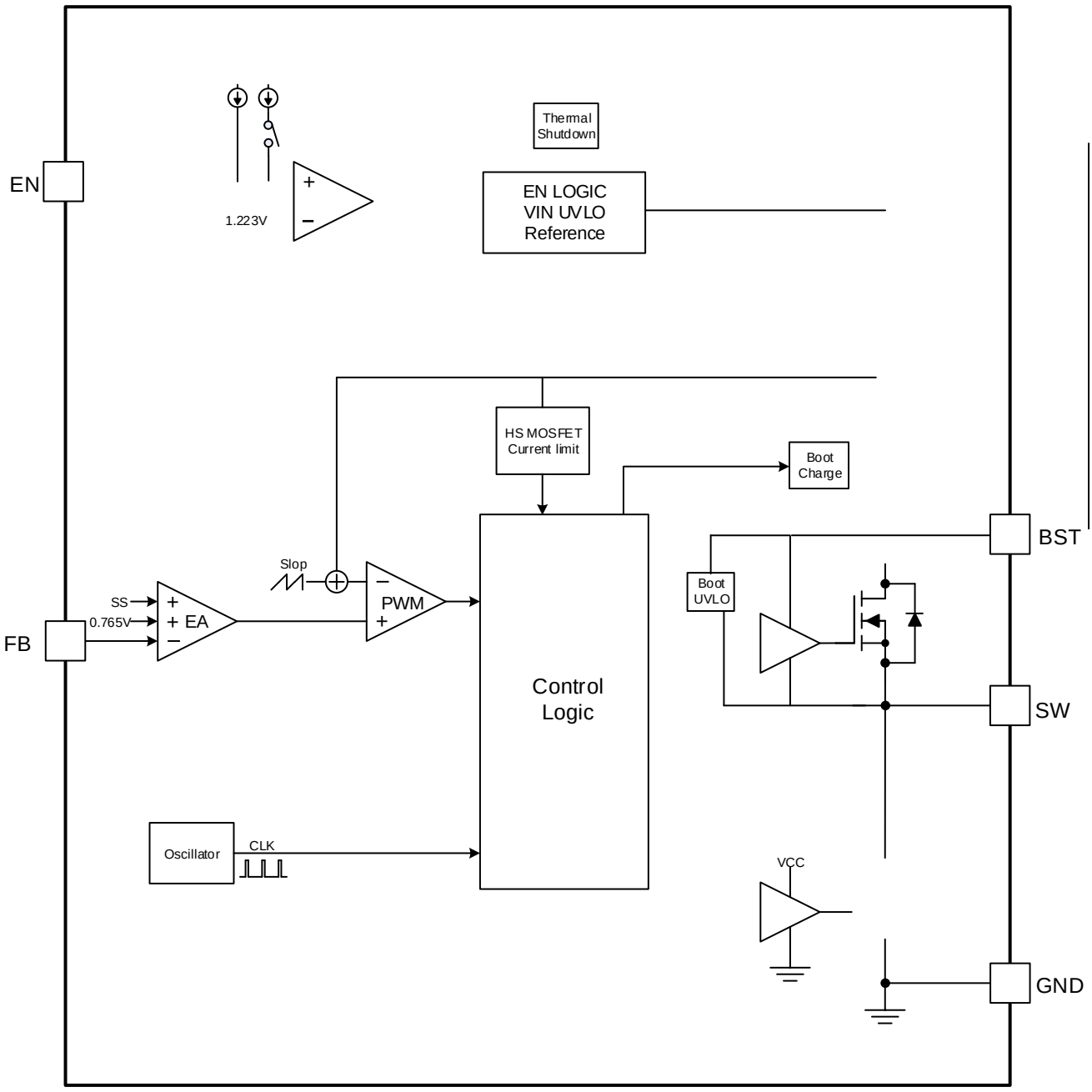

Figure 8. Functional Block Diagram

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OPERATION

2 Y H U Y L H Z

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(1)

(2)

where

V_{rise} is rising threshold of Vin UVLO

V_{fall} is falling threshold of Vin UVLO

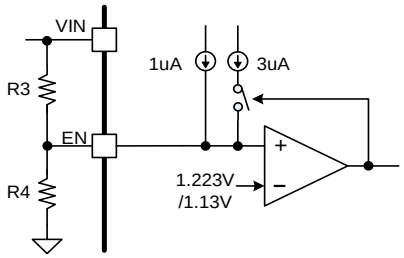

Figure 9. System UVLO by enable divide

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

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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 HLQPWL 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 osc

the junction temperature exceeds 173 , the internal thermal sensor stops power MOSFETs switching. When the junction temperature falls below 163 , the device restarts with internal soft start phase.

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APPLICATION INFORMATION

7\SLFDO $SSOLFDWLRQ

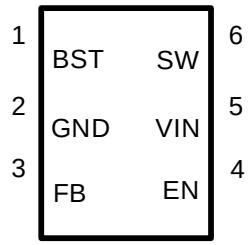

Figure 10. SCT2601 Design Example, 5V Output with Programmable UVLO

'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

S{

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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 9DOXH&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 9R/RWDXW

An external voltage divider network of R_3 from the input to EN pin and R_4 from EN pin to the ground can set the input voltage's Under Voltage Lock-Out (UVLO) threshold. The UVLO has two thresholds, one for power up when the

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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 0.39W.

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

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also urnput

$ 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 11 L J H U Y

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$SSOLFDWLRQ :DYHIRUPV FRQWLQXHG

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

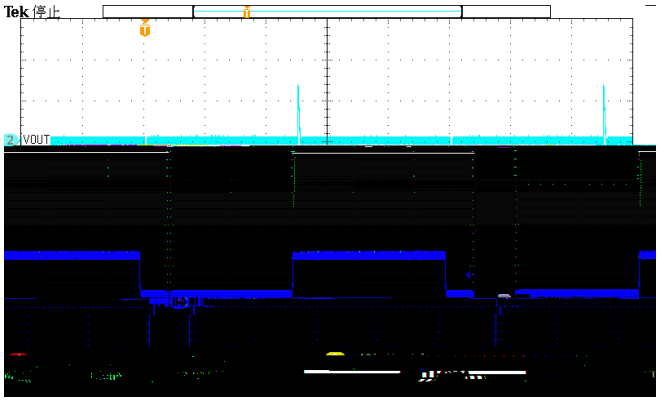

Figure 17. Load Transient (0.06A-0.54A, 1.6A/us)

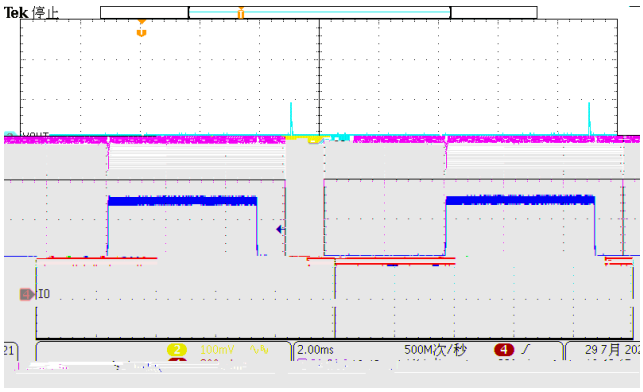

Figure 18. Load Transient (0.15A-0.45A, 1.6A/us)

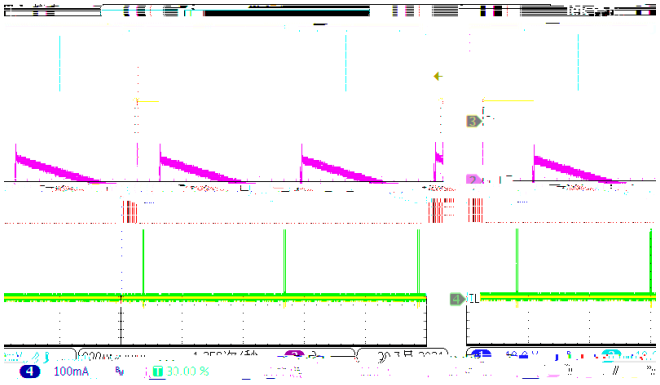

Figure 19. Output Ripple (Iload=0A)

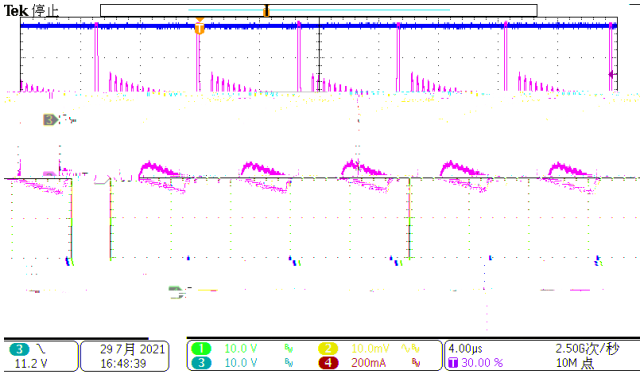

Figure 20. Output Ripple (Iload=10mA)

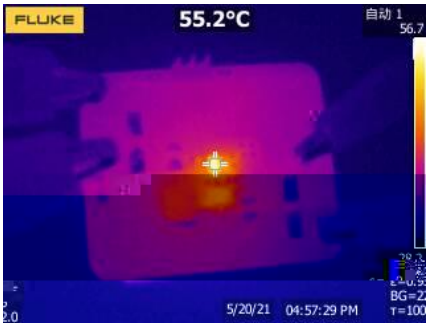

Figure 21. Output Ripple (Iload=0.6A)

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

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/D\RXW *XLGHOLQH

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7KHUPDO &RQVLGHUDWLRQV

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

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PACKAGE INFORMATION

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.

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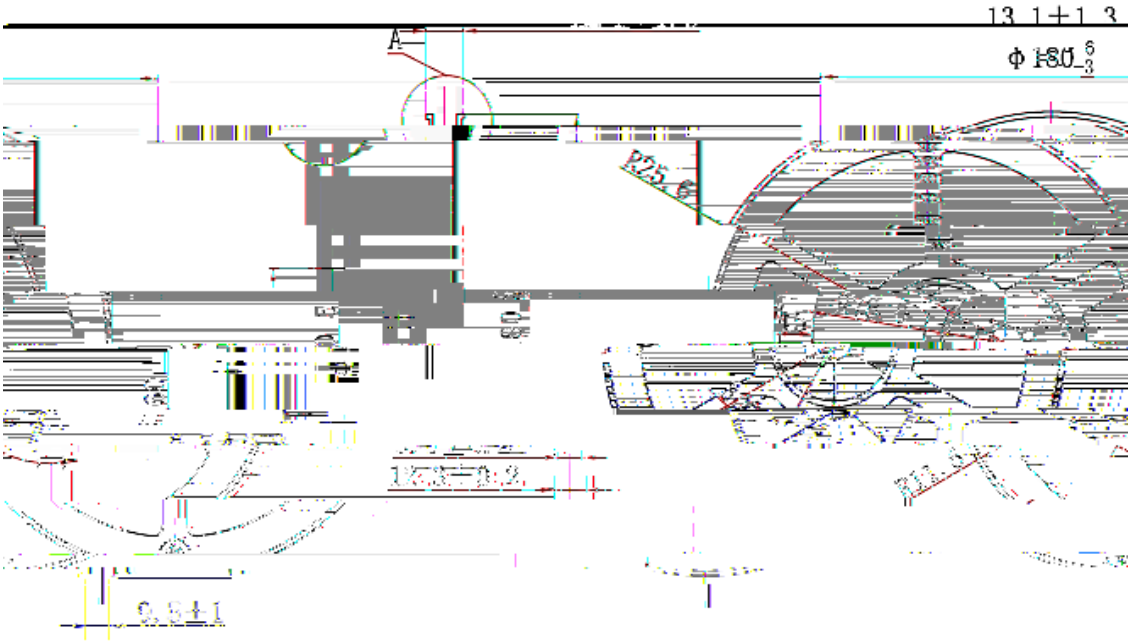
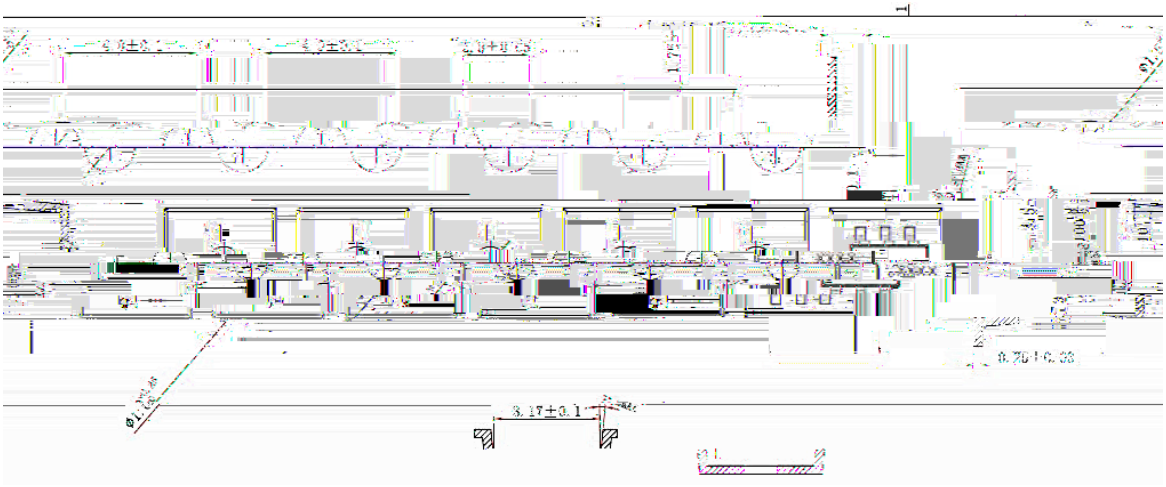
TAPE AND REEL INFORMATION





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

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