Quad Channel Power Management IC for Ultra Compact Automotive Camera Module

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V_{IN}=10V, T_A=-40°C~150°C, typical values are tested under 25°C.

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT

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V_{IN}=10V, T_A=-40°C~125°C, unless otherwise noted.

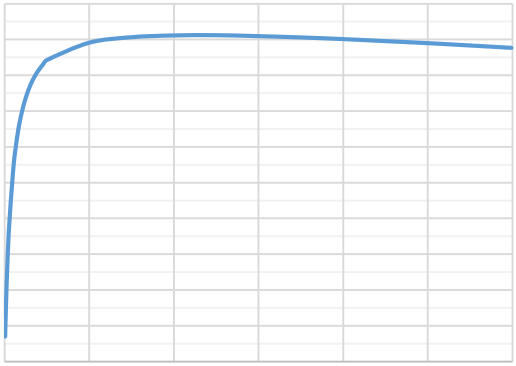

Figure 1. Buck1 Efficiency vs Load Current, V_{OUT1}=3.2V

Figure 2. Buck1 Efficiency vs Load Current, V_{OUT1}=3.0V

Figure 3. Buck2 Efficiency vs. Load Current, V_{OUT2}=1.8V

Figure 4. Buck3 Efficiency vs. Load Current, V_{OUT3}=1.2V

Figure 5. Buck3 Efficiency vs. Load Current, V_{OUT3}=1.5V

Figure 6. Buck1 Peak Current Limit vs. Temperature

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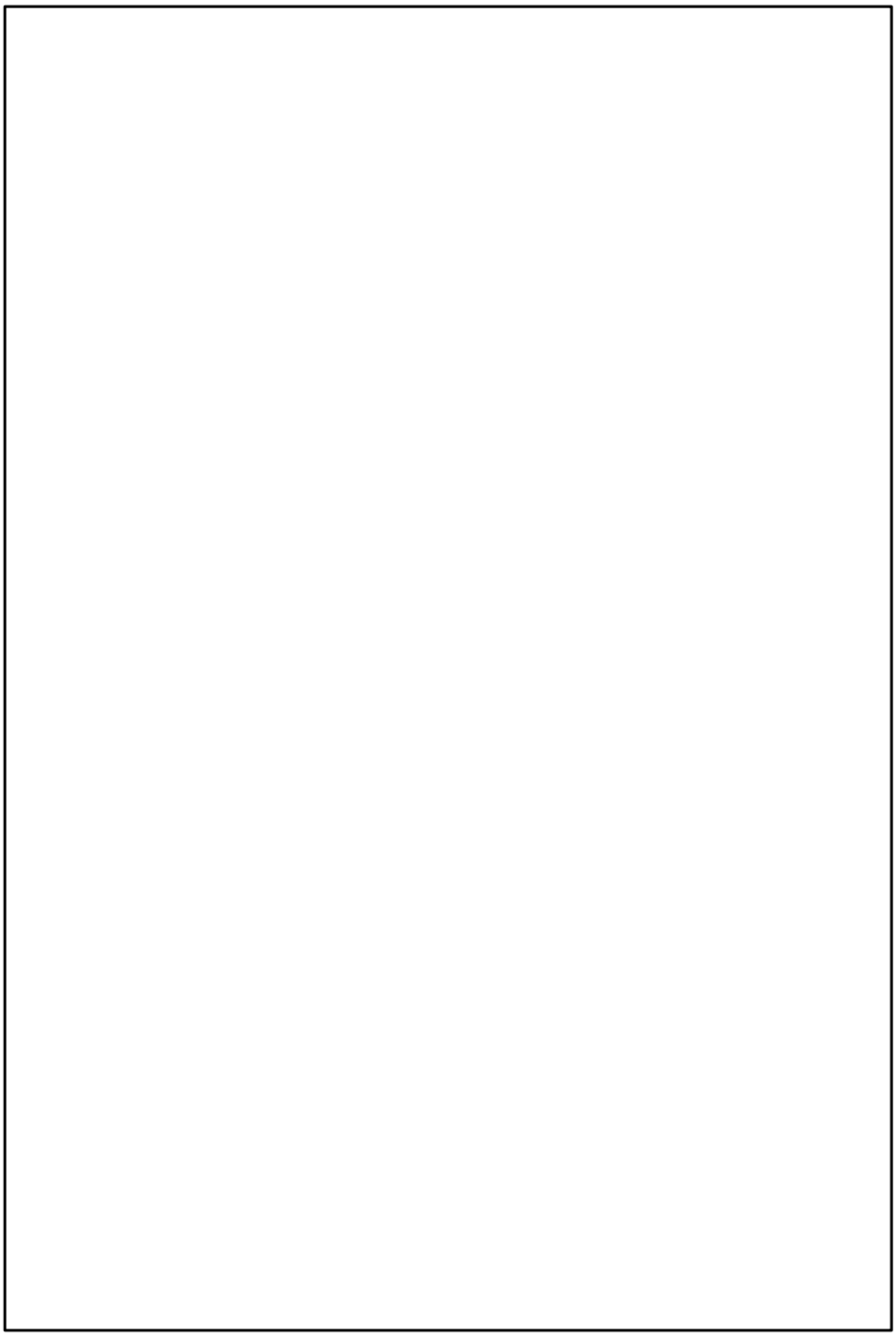

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Overview

The SCT61240Q is a highly integrated power management IC (PMIC) optimized for automotive camera system. It integrates three high efficiency synchronous BUCK converters (HVBUCK1, LVBUCK2, LVBUCK3), and a high-PSRR low noise LDO with OV/UV monitoring on all outputs.

VOUT1 is the output of BUCK1, which is powered from VIN (Power Over Coax) and can output 1.2A continuous current with the output voltage set to LDOOUT+300mV/500mV or fixed 3.3V.

VOUT2 is the output of BUCK2, which is powered from VOUT1 and can output 600mA continuous current with the output voltage fixed to 1.8V.

VOUT3 is the output of BUCK3, which is powered from VOUT1 and can output 1.2A continuous current with the output voltage set to 1.1V/1.2V/1.3V/1.5V through RSET PIN for different sensors.

LDOOUT is the output of LDO, which is powered from VOUT1 (need to connect LDOIN to VOUT1) and can output 300mA continuous current with the output voltage set to 2.7V/2.8V/2.9V/3.3V through RSET PIN for different sensors.

With a compact QFN2.5x3.5 package, the SCT61240Q greatly reduces external components count and PCB space.

VIN and EN UVLO

When the VIN pin voltage rises above 3.8V and the EN pin voltage exceeds the enable threshold of 1.2V, the device is enabled. And the device disables when the VIN pin voltage falls below 3.8V or when the EN pin voltage is below 1.1V.

l An internal 10MΩ resistor pu8 ( )11Fff>BDC **A**.627gnBDC -0.002 Tcc 0.002 Tw [(e)-7.1 (153.2 ()-2.N)-14.9 (p)-12. (et)-1.1 (a

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Under Voltage Protection

If an output falls below the under voltage protection threshold, all outputs will shut off for the hiccup time. When hiccup ends, the normal power up sequence will start again according to the SEQ and RSET setting. When entry hiccup, the output discharge will operate during the hiccup time.

Over Current Protection (OCP)

For the three bucks and LDO, the SCT61240Q provides both peak and valley current limit designed to limit the peak/valley inductor current to ensure that the switching currents remain within the device capabilities during overload conditions or during an output short circuit.

When the HS-FET turns on, the chip monitors the increased IL through the relevant operating main power switch. Once the peak IL exceeds the peak current limit threshold, the HS-FET turns off immediately, and the LS-FET turns on to conduct and decrease IL. The HS-FET does not turn on again until IL falls below the valley current limit threshold. If the feedback voltage makes EA's output level triggers the high clamp limit consecutively in a settled cycle, an over-current (OC) fault is reported and OCP is activated, all outputs will shut off for the hiccup time. When hiccup ends, the normal power up sequence will start again according to the SEQ and RSET setting.

Power Good

The PG pin is a push-pull output. It goes to logic high when the device is powered on, and all outputs are within the power good range, and no faults reported. The high output level can be programmed to either 3.3V or 1.8V.

PG will assert low when any of below events occur:

- Buck1's output is out of power good range or VOUT OV/UV range or OCP
- Buck2's output is out of power good range or VOUT OV/UV range or OCP
- Buck3's output is out of power good range or VOUT OV/UV range or OCP
- LDO's output is out of power good range or VOUT OV/UV range or OCP

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the reference voltage takes over.

Frequency Spread Spectrum

To meet CISPR and automotive EMI compliances, the SCT61240Q implements 0 ’5Rƒqö "• à , G–8C(’ "ƒqab(1ž @ , G–N2

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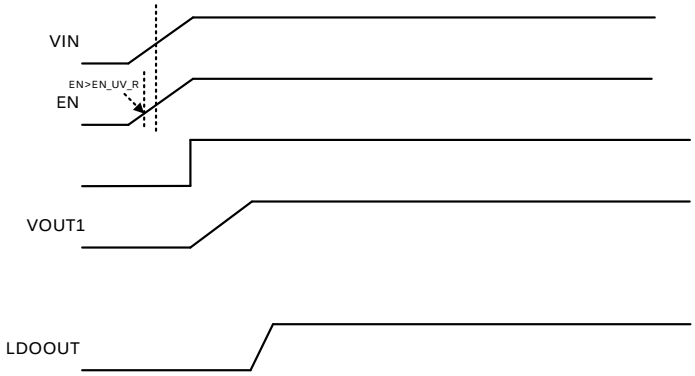

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- $V_{IN(max)}$ is the maximum input voltage
- $I_{OUT(max)}$ is the maximum DC load current
- LIR is coefficient of I_{LPP} to I_{OUT}

The total current flowing through the inductor is the inductor ripple current plus the output current. When selecting an inductor, choose its rated current especially the saturation current larger than its peak operation current and RMS current also not be exceeded. T

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Application Waveforms (continued)

Vin=10V, RSET=SEQ=8kΩ, V_{OUT1}=3.0V, V_{OUT2}=1.8V, V_{OUT3}=1.2V, V_{OUT4}=2.7V,unless otherwise noted

Figure 21. Buck2 Over Current Protection
(0.6A to hard short)

Figure 22. Buck2 Over Current Release
(hard short to 0.6A)

Figure 23. Buck3 Over Current Protection
(1.2A to hard short)

Figure 24. Buck3 Over Current Release
(hard short to 1.2A)

O v 1

Figure 25. LDO Over Current Protection
(0.3A to hard short)

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