



## P4596

Preliminary

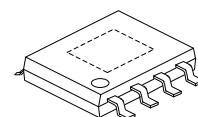
LINEAR INTEGRATED CIRCUIT

## PWM CONTROL 3A STEP-DOWN CONVERTER

### DESCRIPTION

The UTC **P4596** consists of 3A step-down switching regulator with PWM control which includes a reference voltage source, oscillation circuit, error amplifier, internal PMOS and etc.

The UTC **P4596** can provide low-ripple power, high efficiency, and excellent transient characteristics and an enable function, an over current protect function and a short circuit protect function are built inside. And the PWM control circuit can vary the duty ratio linearly from 100 down to 0%. This converter also includes an error amplifier circuit as well as a soft-start circuit that prevents overshoot at startup. These ICs can work as step-down switching regulators with the addition of an internal P-channel Power MOS, a coil and a diode connected externally. They provide such outstanding features: low current consumption. It is also suitable for the operation via an AC adapter because this converter can accommodate an input voltage up to 40V.



HSOP-8

### FEATURES

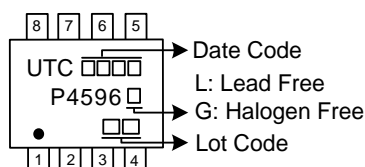
- \* Input voltage : 8V~40V
- \* Duty ratio : 0%~100% PWM control
- \* Enable with Soft-Start function
- \* Oscillation frequency can be set by outside resistance
- \* Current Limit, SCP and OTP

### ORDERING INFORMATION

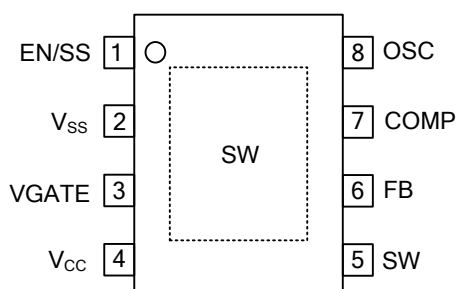
Ordering Number		Package	Packing
Lead Free	Halogen Free		
P4596L-SH2-R	P4596G-SH2-R	HSOP-8	Tape Reel

<p>P4596G-SH2-R</p> <ul style="list-style-type: none"><li>(1) Packing Type</li><li>(2) Package Type</li><li>(3) Green Package</li></ul>	<ul style="list-style-type: none"><li>(1) R: Tape Reel</li><li>(2) SH2: HSOP-8</li><li>(3) G: Halogen Free and Lead Free, L: Lead Free</li></ul>
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### MARKING



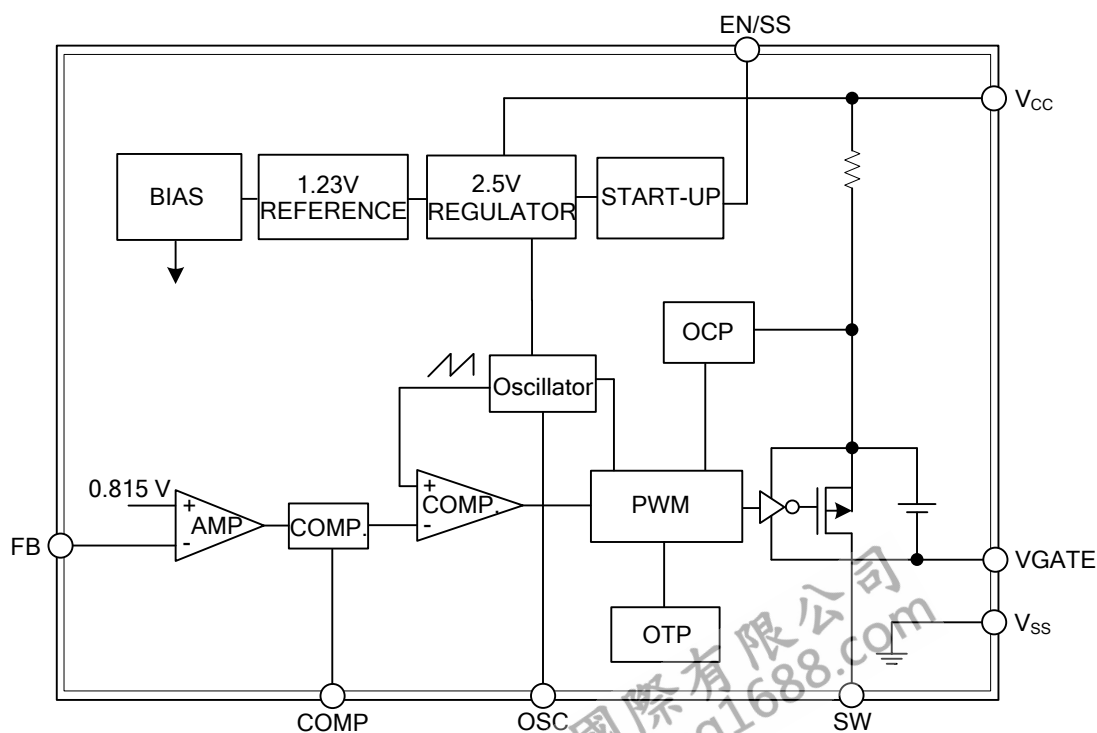
## PIN CONFIGURATION



## PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	EN/SS	Enable and Soft-start pin
2	V <sub>SS</sub>	Ground
3	VGATE	Driver GATE clamping pin.
4	V <sub>CC</sub>	IC power supply pin
5	SW	Switch pin.
6	FB	Feedback voltage
7	COMP	Compensation pin
8	OSC	Frequency Set Pin.

## BLOCK DIAGRAM



# ■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
VCC Pin Voltage	V <sub>CC</sub>	V <sub>SS</sub> -0.3 ~ V <sub>SS</sub> +40	V
Feedback Pin Voltage	V <sub>FB</sub>	V <sub>SS</sub> -0.3 ~ 6	V
EN/SS Pin Voltage	V <sub>EN/SS</sub>	V <sub>SS</sub> -0.3 ~ 6	V
OSC Pin Voltage	V <sub>OSC</sub>	V <sub>SS</sub> -0.3 ~ 3	V
COMP Pin Voltage	V <sub>COMP</sub>	V <sub>SS</sub> -0.3 ~ 6	V
VGATE Pin Voltage	V <sub>GATE</sub>	V <sub>SS</sub> -0.3 ~ V <sub>CC</sub>	V
Switch Pin Voltage	V <sub>SW</sub>	V <sub>SS</sub> - 0.3 ~ V <sub>CC</sub> + 0.3	V
Power Dissipation	P <sub>D</sub>	0.7	W
Operating Supply Voltage	V <sub>OP</sub>	8 ~ 40	V
Junction Temperature	T <sub>J</sub>	-40 ~ +125	°C
Storage Temperature	T <sub>STG</sub>	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

# ■ THERMAL DATA

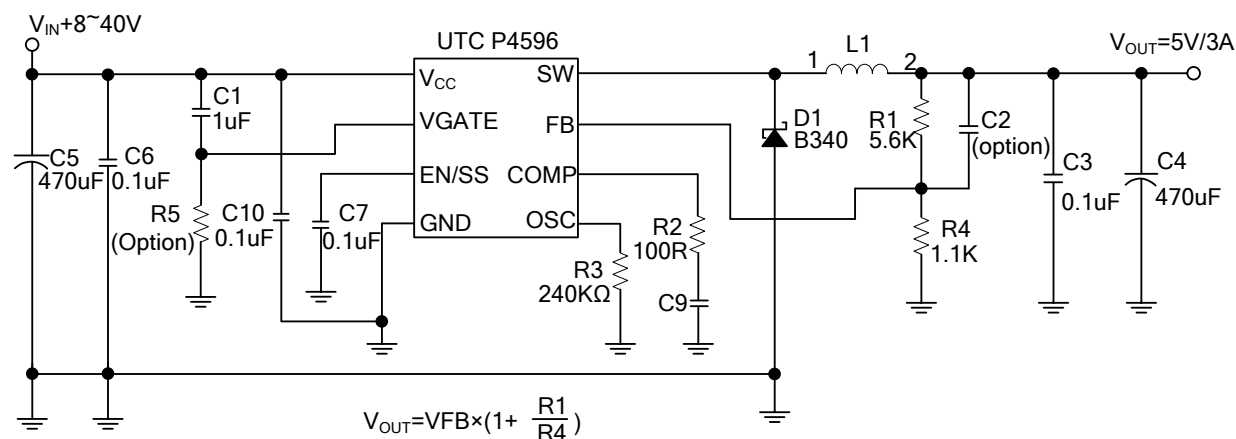
PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ <sub>JA</sub>	143	°C/W
Junction to Case	θ <sub>JC</sub>	45	°C/W

Note: Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board.

# ■ ELECTRICAL CHARACTERISTICS (V<sub>CC</sub>=12V, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Feedback Voltage	V <sub>FB</sub>	V <sub>CC</sub> =10V~30V, I <sub>OUT</sub> =0~2A T <sub>J</sub> =-20°C~125°C	0.790	0.815	0.840	V
Quiescent Current	I <sub>CCQ</sub>	V <sub>FB</sub> =1V		3	6	mA
Feedback Bias Current	I <sub>FB</sub>			0.1		μA
Shutdown Supply Current	I <sub>SD</sub>	V <sub>EN/SS</sub> =0V	10	56	300	μA
Current Limit	I <sub>CL</sub>		3.5			A
Adjustable Frequency Range	F <sub>OSC</sub>	R3=240KΩ		200		KHz
Short Frequency	F <sub>OSC1</sub>	V <sub>CC</sub> =10V~30V		50		KHz
EN/SS Pin Shutdown Logic Input Threshold Voltage	V <sub>ENL</sub>				0.8	V
EN/SS Pull High Current	I <sub>EN/SS</sub>	V <sub>EN/SS</sub> =0V		8		μA
Internal MOSFET R <sub>DS(on)</sub>	R <sub>DS(on)</sub>	V <sub>CC</sub> =12V, V <sub>FB</sub> =0V		80	180	mΩ

# ■ TYPICAL APPLICATION CIRCUIT



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