



## P4596

Preliminary

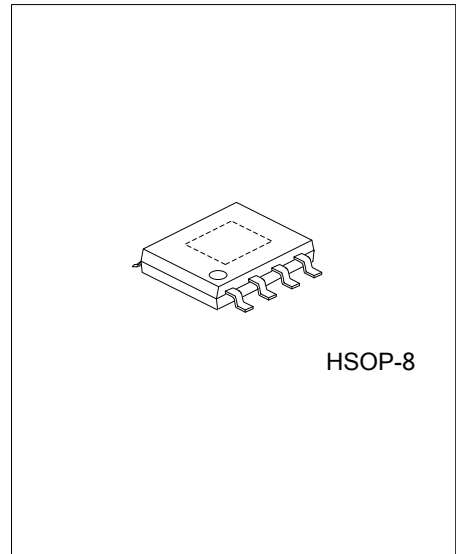
**LINEAR INTEGRATED CIRCUIT**

### 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.



#### 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

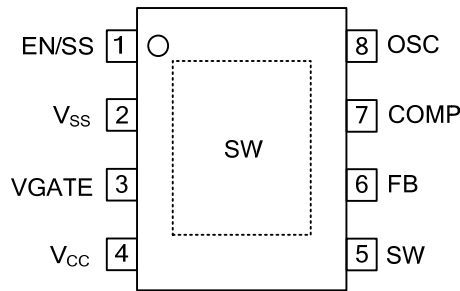
#### ORDERING INFORMATION

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

Note: xx: Output Voltage, refer to Marking Information.

<p>P4596L-xx-SH2-R</p> <p>(1) Packing Type (2) Package Type (3) Output Voltage Code (4) Halogen Free</p>	<p>(1) R: Tape Reel (2) SH2: HSOP-8 (3) xx: Refer to Marking Information (4) L: Lead Free, G: Halogen Free</p>
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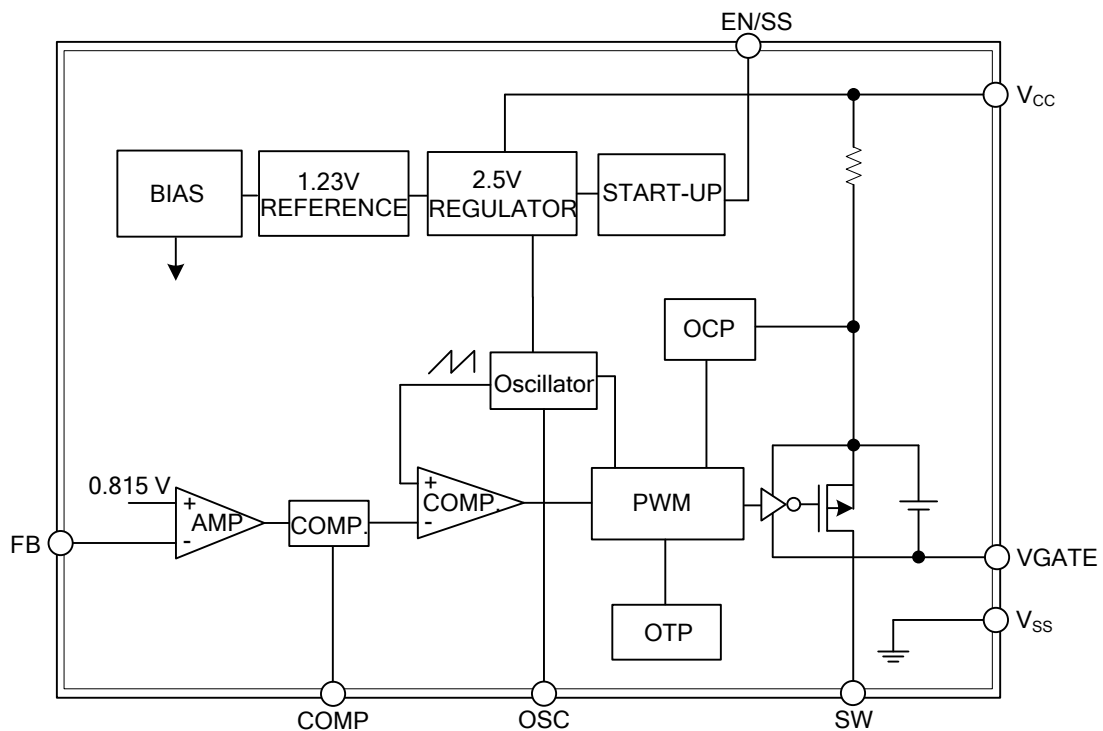
■ PIN CONFIGURATION



■ 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 ( $T_A=25^\circ\text{C}$ )

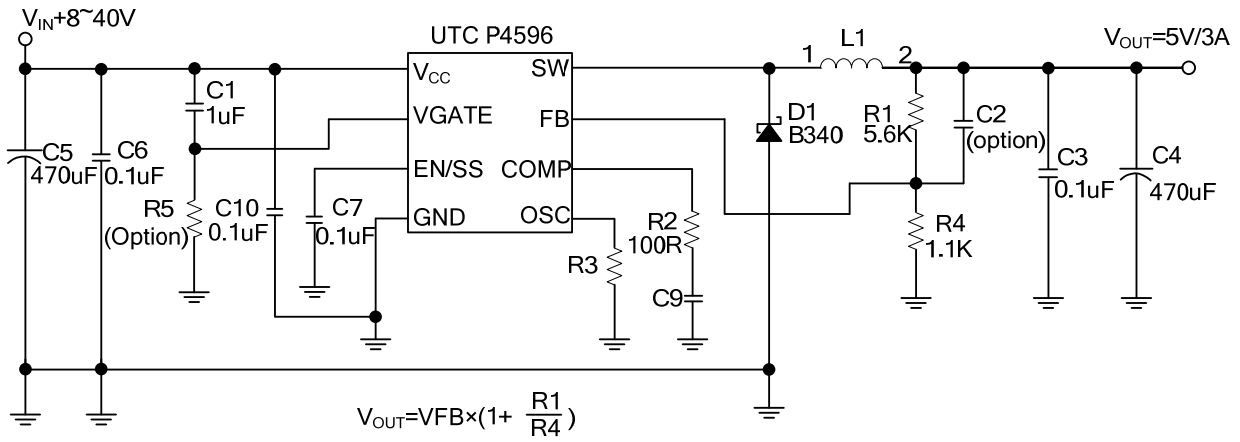
PARAMETER	SYMBOL	RATINGS	UNIT
VCC Pin Voltage	$V_{CC}$	$V_{SS}-0.3\sim V_{SS}+45$	V
Feedback Pin Voltage	$V_{FB}$	$V_{SS}-0.3\sim 6$	V
EN/SS Pin Voltage	$V_{EN/SS}$	$V_{SS}-0.3\sim 6$	V
OSC Pin Voltage	$V_{OSC}$	$V_{SS}-0.3\sim 3$	V
COMP Pin Voltage	$V_{COMP}$	$V_{SS}-0.3\sim 6$	V
VGATE Pin Voltage	$V_{GATE}$	$V_{SS}-0.3\sim V_{CC}$	V
Switch Pin Voltage	$V_{SW}$	$V_{SS}-0.3\sim V_{CC}+0.3$	V
Power Dissipation	$P_D$	Internally limited	mW
Operating Supply Voltage	$V_{OP}$	8~40	V
Junction Temperature	$T_J$	-40~+125	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-65~+150	$^\circ\text{C}$

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.

■ ELECTRICAL CHARACTERISTICS ( $V_{CC}=12\text{V}$ ,  $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Feedback Voltage	$V_{FB}$	$V_{CC}=10\text{V}\sim 30\text{V}$ , $I_{OUT}=0\sim 2\text{A}$ $T_J=-20^\circ\text{C}\sim 125^\circ\text{C}$	0.800	0.815	0.830	V
Quiescent Current	$I_{CCQ}$	$V_{FB}=1\text{V}$		3	6	mA
Feedback Bias Current	$I_{FB}$	$I_{OUT}=0.1\text{A}$		0.1		$\mu\text{A}$
Shutdown Supply Current	$I_{SD}$	$V_{EN/SS}=0\text{V}$	10	56	300	$\mu\text{A}$
Current Limit	$I_{CL}$		3.5			A
Adjustable Frequency Range	$F_{OSC}$		50		380	KHz
Short Frequency	$F_{OSC1}$	$V_{CC}=10\text{V}\sim 30\text{V}$	45	50	55	KHz
EN/SS Pin Shutdown Logic Input Threshold Voltage	$V_{ENL}$				0.8	V
EN/SS Pull High Current	$I_{EN/SS}$	$V_{EN/SS}=0\text{V}$		8		$\mu\text{A}$
Internal MOSFET $R_{DS(on)}$	$R_{DS(on)}$	$V_{CC}=12\text{V}$ , $V_{FB}=0\text{V}$		80	180	m $\Omega$

■ TYPICAL APPLICATION CIRCUIT



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