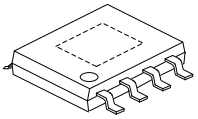
PWM CONTROL 3A STEP-DOWN CONVERTER



HSOP-8

■ 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

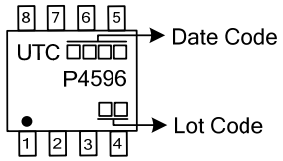
* Input voltage：8V~40V
* Duty ratio：0%~100% PWM control
* Enable with Soft-Start function
* Oscillation frequency can be set by outside resistance
* Current Limit, SCP and OTP

■ ORDERING INFORMATION

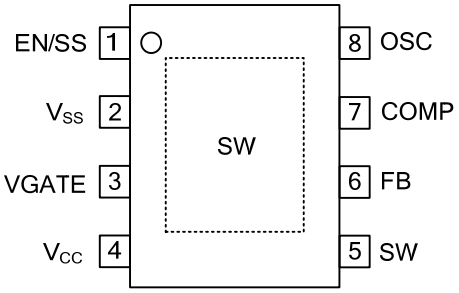
Ordering Number	Package	Packing
P4596G-SH2-R	HSOP-8	Tape Reel

P4596G-SH2-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) SH2: HSOP-8 (3) G: Halogen Free and Lead Free

■ MARKING



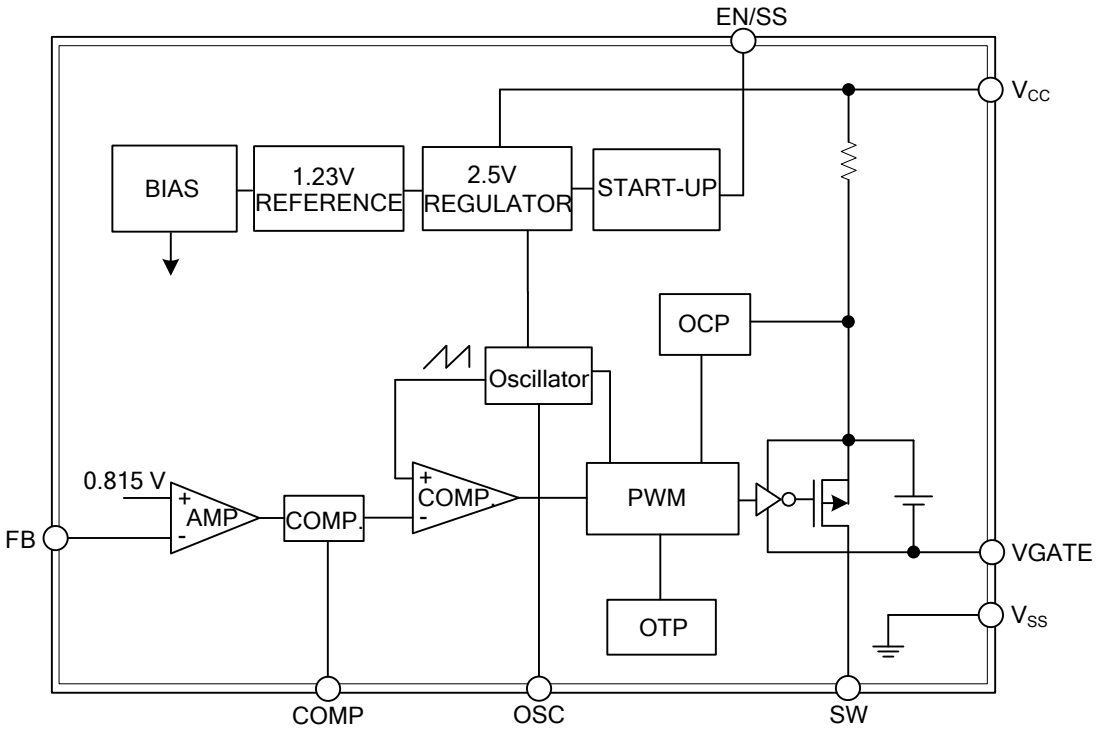
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	EN/SS	Enable and Soft-start pin
2	V_{SS}	Ground
3	VGATE	Driver GATE clamping pin.
4	V_{CC}	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°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
VCC Pin Voltage	V_{CC}	V_{SS}-0.3 ~ V_{SS}+40	V
Feedback Pin Voltage	V_{FB}	V_{SS}-0.3 ~ 6	V
EN/SS Pin Voltage	$V_{EN/SS}$	V_{SS}-0.3 ~ 6	V
OSC Pin Voltage	V_{OSC}	V_{SS}-0.3 ~ 3	V
COMP Pin Voltage	V_{COMP}	V_{SS}-0.3 ~ 6	V
VGATE Pin Voltage	V_{GATE}	V_{SS}-0.3 ~ V_{CC}	V
Switch Pin Voltage	V_{SW}	V_{SS} - 0.3 ~ V_{CC} + 0.3	V
Power Dissipation	P_D	0.7	W
Operating Supply Voltage	V_{OP}	8 ~ 40	V
Junction Temperature	T_J	-40 ~ +125	°C
Storage Temperature	T_{STG}	-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_{JA}	143	°C/W
Junction to Case	θ_{JC}	45	°C/W

Note: Surface mounted on 1 in^2 copper pad of FR4 board.

■ ELECTRICAL CHARACTERISTICS (V_{CC}=12V, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Feedback Voltage	V_{FB}	V_{CC}=10V~30V, I_{OUT}=0~2A T_J=-20°C~125°C	0.800	0.815	0.830	V
Quiescent Current	I_{CCQ}	V_{FB}=1V		3	6	mA
Feedback Bias Current	I_{FB}	I_{OUT}=0.1A		0.1		μA
Shutdown Supply Current	I_{SD}	$V_{EN/SS}$=0V	10	56	300	μA
Current Limit	I_{CL}		3.5			A
Adjustable Frequency Range	F_{OSC}	R3=240KΩ		200		KHz
Short Frequency	F_{OSC1}	V_{CC}=10V~30V		50		KHz
EN/SS Pin Shutdown Logic Input Threshold Voltage	V_{ENL}				0.8	V
EN/SS Pull High Current	$I_{EN/SS}$	$V_{EN/SS}$=0V		8		μA
Internal MOSFET R_{DSON}	R_{DSON}	V_{CC}=12V, V_{FB}=0V		80	180	mΩ

■ TYPICAL APPLICATION CIRCUIT