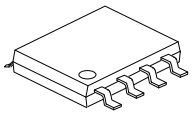
P2583 *LINEAR INTEGRATED CIRCUIT*

380KHz, 3A STEP-DOWN SWITCHING REGULATOR



SOP-8

■ DESCRIPTION

The UTC **P2583** is a fixed 380kHz frequency, current mode, PWM controller with an internal power MOSFET. It achieves 3A continuous output current over a wide input supply range with excellent load and line regulation. Equipped with an external compensation pin, this device offers user flexibility in determining loop dynamic.

The UTC **P2583** integrates controls, monitoring and protection functions into a single 8-pin package to provide a low cost and perfect power solution. The device provides wide 3.6V to 28V operating input range, also highly efficient with peak operating efficiency at 90%.

An Under- Voltage-Lock-Output (UVLO) circuit monitors the Vin supply voltage to prevent wrong logic controls. An internal 1.222V reference provides low output voltage down to 1.22V for further applications. The controller's over-current protection monitors the output current by using the voltage drop across a current sensing resistor. Additional under voltage protections monitor the voltage on FB pin for short-circuit protections.

The UTC **P2583** provides fast transient respond and requires very few external devices for operation.

■ FEATURES

* 3A Output Current
* V_{in}=3.6V,V_{out}=2.5V,I_{load_max} up to 3A
* 380kHz frequency of operation
* 3.6V to 28V Input Voltage Range
* 25μA Shutdown Supply Current
* Output Adjustable from 1.22V to 21V
* Frequency FoldBack at Short Circuit
* Thermal Shutdown
* Under Voltage Lock Output
* Current Mode with Low ESR Output Ceramic Capacitors
* Up to 90% Efficiency

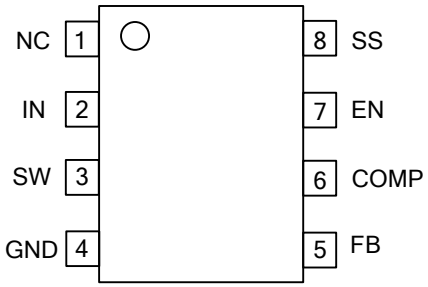
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
P2583L-S08-R	P2583G-S08-R	SOP-8	Tape Reel
P2583L-S08-T	P2583G-S08-T	SOP-8	Tube

P2583G-S08-R
(1)Packing Type
(2)Package Type
(3)Halogen Free

(1) R: Tape Reel, T: Tube
(2) S08: SOP-8
(3) G: Halogen Free, L: Lead Free

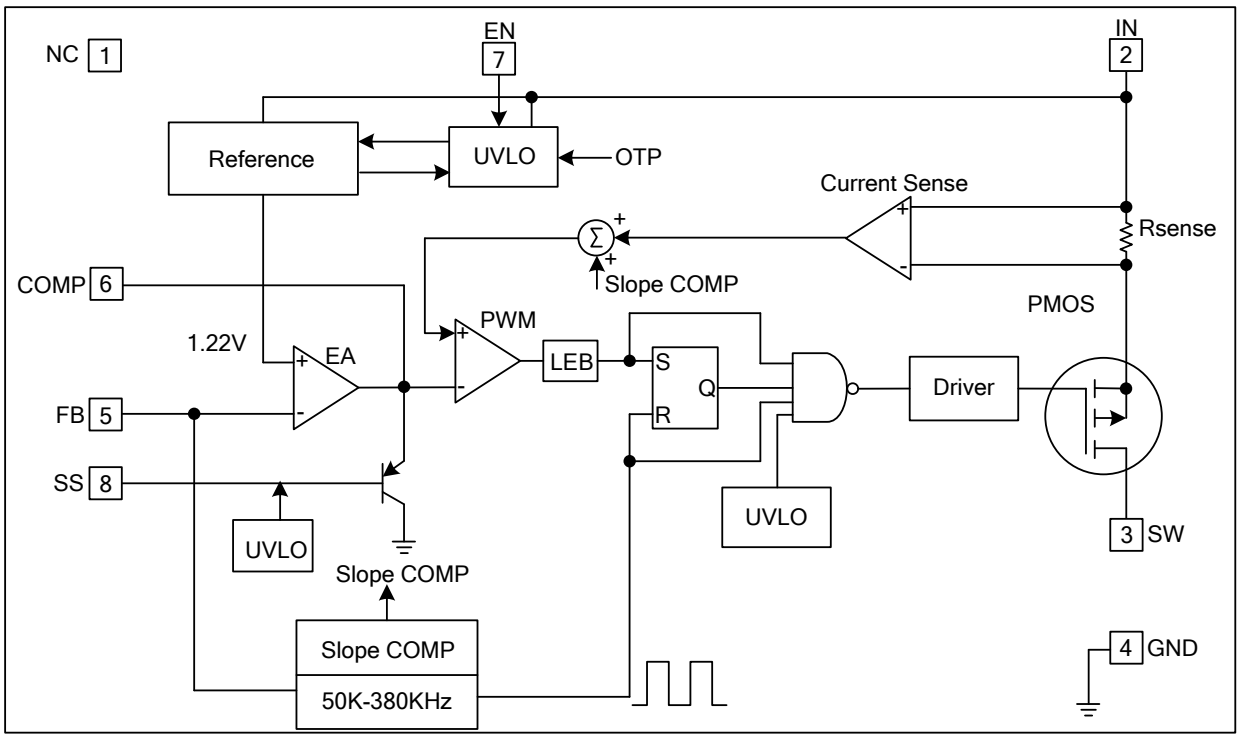
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	NC	NC
2	IN	Power Supply pin.
3	SW	Power Switch Output pin.
4	GND	Ground pin.
5	FB	The output voltage feedback pin. It is also the inverting input of the error amplifier.
6	COMP	Compensation pin. It is also the output of the internal error amplifier. (1). A RC network at this pin compensates the control loop. (2). The voltage at this pin controls the peak current of the internal switch.
7	EN	Regulator On/Off Control pin. Leave EN unconnected if unused. A low input at EN turns on the converter, and a high input turns it off.
8	SS	Soft Start

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Note 2)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{IN}	28	V
Switch Voltage	V_{SW}	-1~ V_{IN}+1	V
Feedback Voltage	V_{FB}	-0.3~6	V
Enable/UVLO Voltage	V_{EN}	-0.3~6	V
Comp Voltage	V_{COMP}	-0.3~6	V
Sync Voltage	V_{SYNC}	-0.3~6	V
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65~+150	°C

Note:1. 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.
2. Exceeding these ratings may damage the device.

■ RECOMMENDED OPERATING CONDITIONS (Note 3)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	3.6~28	V
Ambient Operating Temperature	T_A	-40 ~ +125	°C

Note: 3. The device is not guaranteed to function outside its operating rating.

■ PACKAGE THERMAL CHARACTERISTICS (Note 4)

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	105	°C/W
Junction to Case	θ_{JC}	50	°C/W

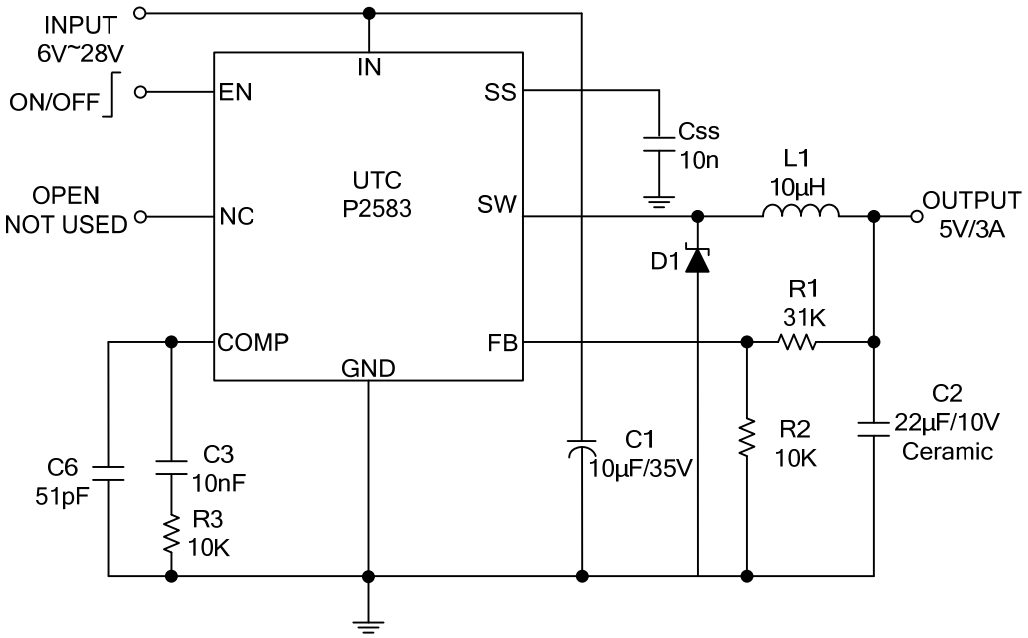
Note: 4. Measured on approximately 1” square of 1 oz. Copper surrounding device leads.

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

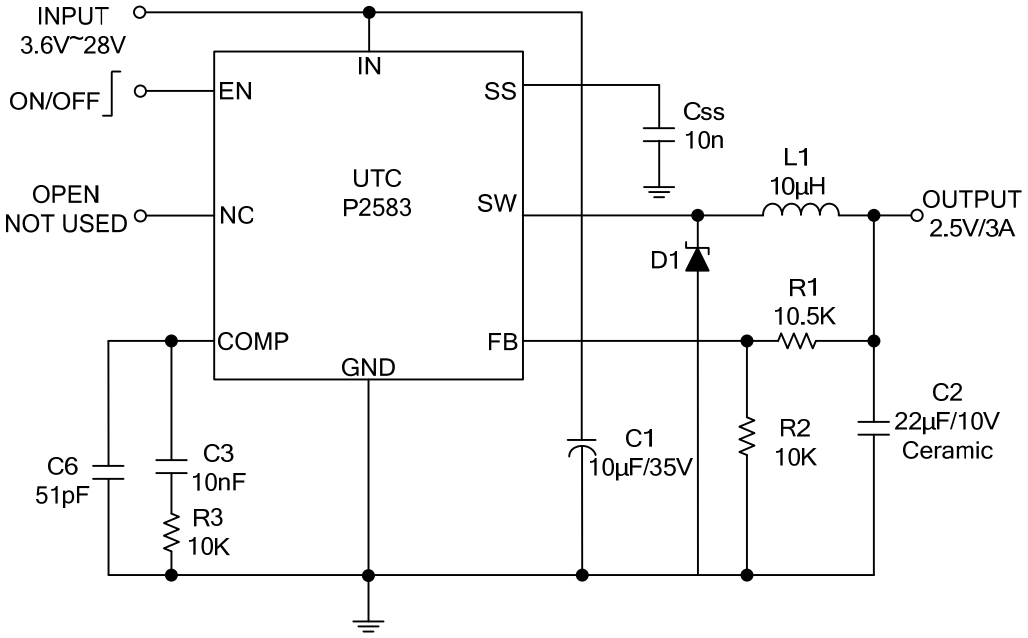
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Feedback Voltage	V_{FB}	4.75V ≤ V_{IN} ≤ 25V, V_{COMP} < 2V	1.198	1.222	1.246	V
Switch On Resistance	R_{SW}			0.11		Ω
Upper Switch Leakage	$I_{O(OFF)}$	V_{EN} =0V, V_{SW} =0V		0	15	μA
Current Limit	I_{LIMIT}		3.3			A
Current Limit Gain. Output Current to Comp Pin Voltage				5.5		A/V
Error Amplifier Transconductance		ΔI_C =±10μA	500	800	1100	μA/V
Oscillator Frequency	F		342	380	418	KH_Z
Short Circuit Frequency	F	V_{FB}=0V	25	50	75	KH_Z
Maximum Duty Cycle	D_{MAX}	V_{FB} =1.0V		90		%
Minimum Duty Cycle	D_{MIN}	V_{FB} =1.5V			0	%
Enable Threshold	V_{EN}	I_{CC} > 100μA		1.2		V
Enable Pull Up Current	I_{EN}	V_{EN} =0V		1.5		μA
Supply Current (quiescent)	I_{CC}	V_{EN} ≥2.6V; V_{FB} =1.4V		2.2	3.5	mA
Shutdown Current	I_{SD}	V_{EN} =0V		20	35	μA
Thermal Shutdown	T			160		°C

■ TYPICAL APPLICATION CIRCUIT

P2583 with Murata 22µF / 10V Ceramic Output Capacitor



P2583 with Murata 22µF / 10V Ceramic Output Capacitor



■ TYPICAL CHARACTERISTICS