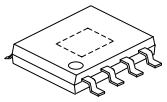
380KHz, 2.5A STEP-DOWN SWITCHING REGULATOR



HSOP-8

■ DESCRIPTION

The UTC **P1583** is a fixed 380kHz frequency, current mode, PWM controller. It achieves 2.5A 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 **P1583** 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 4 to 24V 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. An internal soft-start prevents the output voltage from overshoot as well as limiting the input current. 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 **P1583** provides fast transient respond and requires very few external devices for operation.

■ FEATURES

* 2.5A output current
* 380kHz frequency of operation
* 4V to 24V input voltage range
* 25μA shutdown supply current
* Output adjustable from 1.22 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

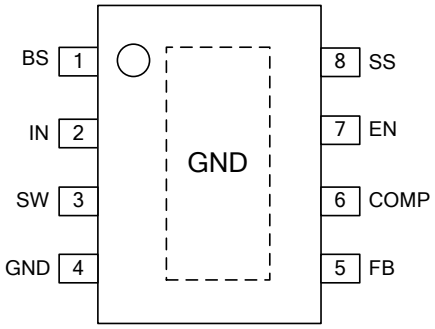
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
P1583L-SH2-R	P1583G-SH2-R	HSOP-8	Tape Reel

P1583L-SH2-R

(1)Packing Type	(1) T: Tube, R: Tape Reel
(2)Package Type	(2) SH2: HSOP-8
(3)Halogen Free	(3) L: Lead Free, G: Halogen Free

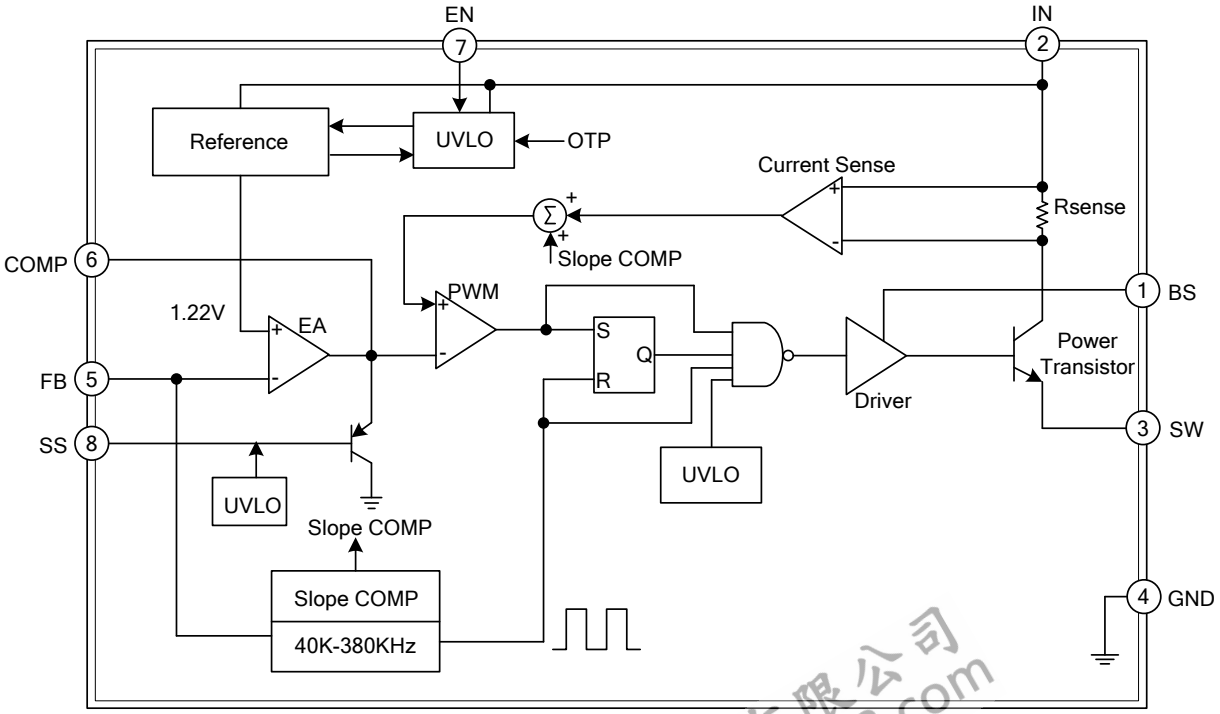
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	BS	Supply pin to the power transistor driver.
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.
7	EN	Regulator On/Off control pin.
8	SS	Soft start control input.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{IN}	28	V
Switch Voltage	V_{SW}	-1~V_{IN}+1	V
Boost Voltage	V_{BS}	V_{SW}+6	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
Lead Temperature	T_L	260	°C
Storage Temperature	T_{STG}	-65~+150	°C

Notes: 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.

■ RECOMMENDED OPERATING CONDITIONS (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	4~24	V
Ambient Operating Temperature	T_A	-40~+125	°C

Note: 1. The device is not guaranteed to function outside its operating rating.

■ PACKAGE THERMAL CHARACTERISTICS (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance	θ_{JA}	105	°C/W
Thermal Resistance	θ_{JC}	50	°C/W

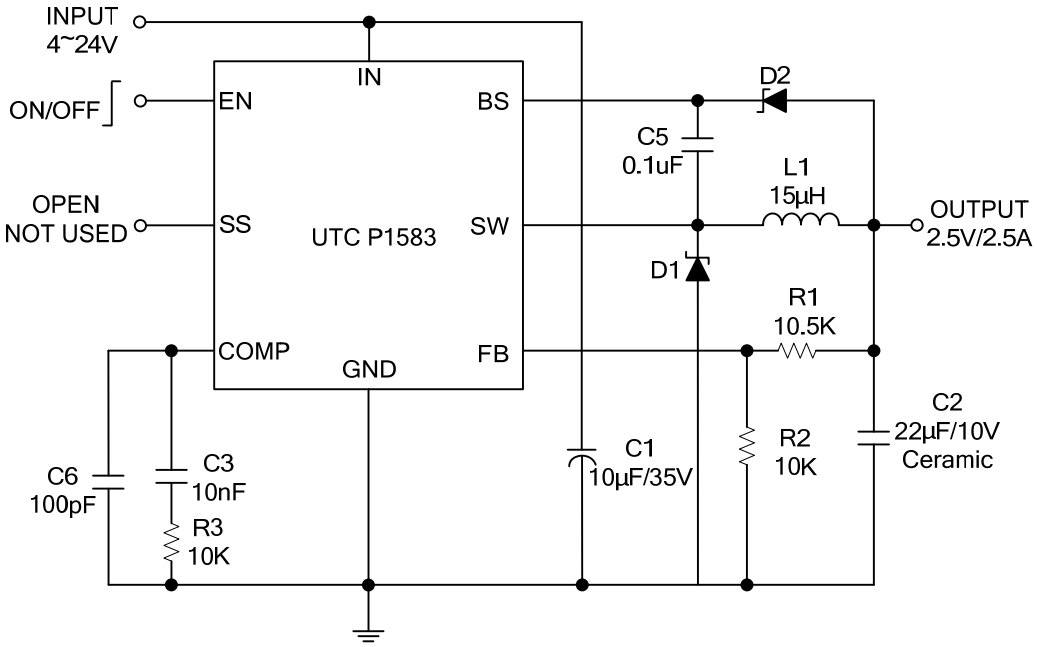
Note: 1. Measured on approximately 1” square of 1 oz. Copper surrounding device leads.

■ 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
Upper Switch Leakage	I_{LEAK}	V_{EN}=0V, V_{SW} =0V		0	10	μA
Current Limit	I_{LIMIT}		2.4	3.0	3.6	A
Current Limit Gain. Output Current to Comp Pin Voltage				2.5		A/V
Oscillator Frequency	F_{OSC}		342	380	418	KH_Z
Short Circuit Frequency	F_{OSC_SHORT}	V_{FB}=0V	20	40		KH_Z
Maximum Duty Cycle	D_{MAX}	V_{FB}=1.0V	90	95		%
Minimum Duty Cycle	D_{MIN}	V_{FB}=1.5V			0	%
Enable Threshold	V_{EN}	I_{CC}>100μA		1.0	1.3	V
Enable Pull Up Current	I_{UP}	V_{EN}=0V		0.7		μA
Under Voltage Lockout Threshold Rising				1.2		V
Supply Current (Shutdown)	I_{SD}	V_{EN}≤0.4V		23	36	μA
Supply Current (Quiescent)	I_Q	V_{EN}≥2.6V; V_{FB}=1.4V		1.5	2	mA
Collector-Emitter Saturation Voltage	V_{CESAT}	I_{OUT}=2A		400	600	mV
Thermal Shutdown				160		°C

■ TYPICAL APPLICATION CIRCUIT

UTC **P1583** with Murata 22μF / 10V Ceramic Output Capacitor



■ LOW VIN APPLICATION CIRCUIT

UTC **P1583** with Murata 22μF / 10V Ceramic Output Capacitor