



## P1583

Preliminary

LINEAR INTEGRATED CIRCUIT

### 380KHZ, 2.5A STEP-DOWN SWITCHING REGULATOR

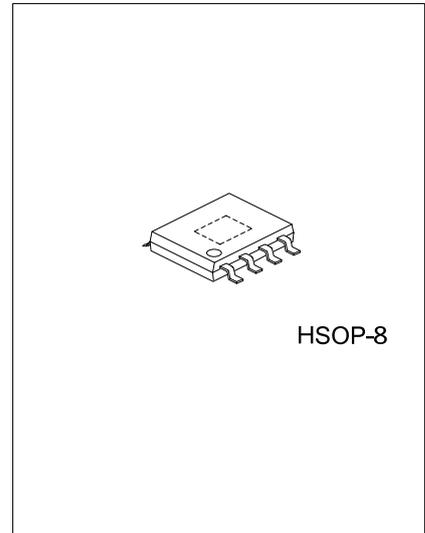
#### DESCRIPTION

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.



HSOP-8

#### FEATURES

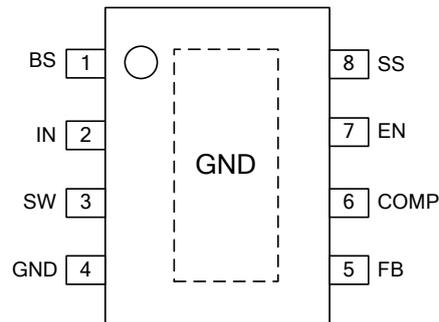
- \* 2.5A output current
- \* 380kHz frequency of operation
- \* 4V to 24V input voltage range
- \* 25µA shutdown supply current
- \* Output adjustable from 1.22 to 21V
- \* Frequency foldback at short circuit
- \* Thermal shutdown
- \* Under voltage lock output
- \* Current mode with low ESR output 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

<p>P1583L-SH2-R</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Halogen Free</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube, R: Tape Reel</li> <li>(2) SH2: HSOP-8</li> <li>(3) L: Lead Free, G: Halogen Free</li> </ul>
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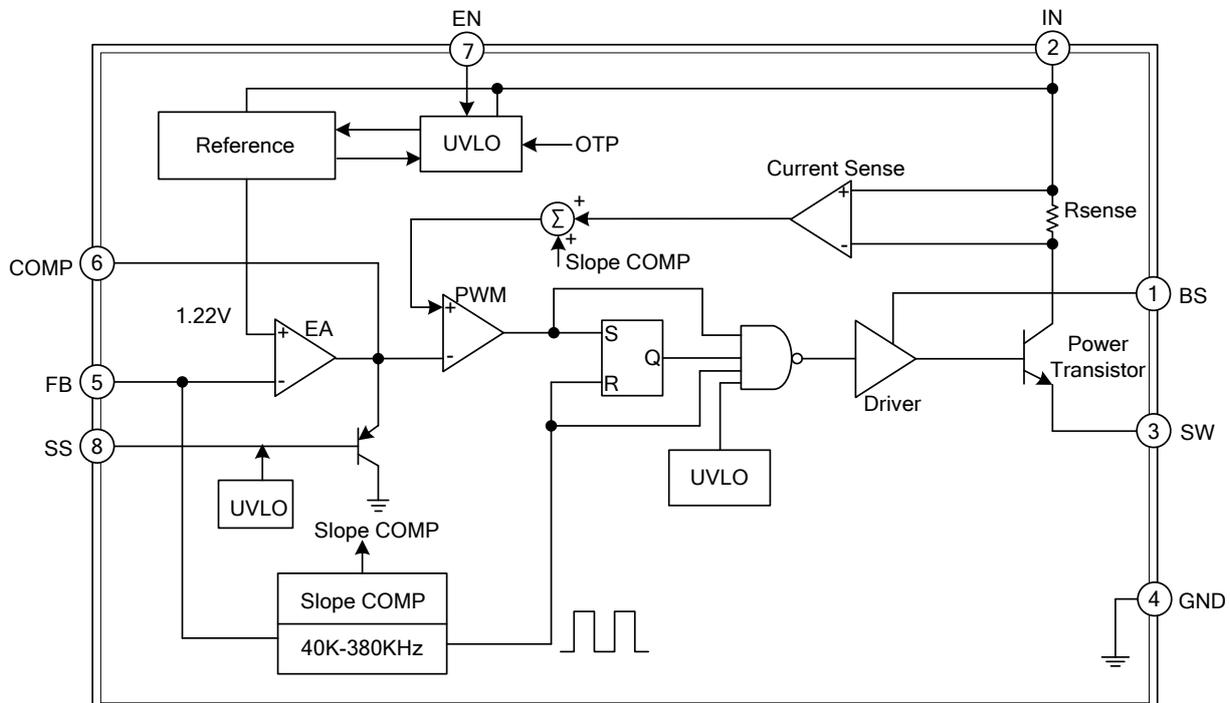
■ PIN CONFIGURATION



■ 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)

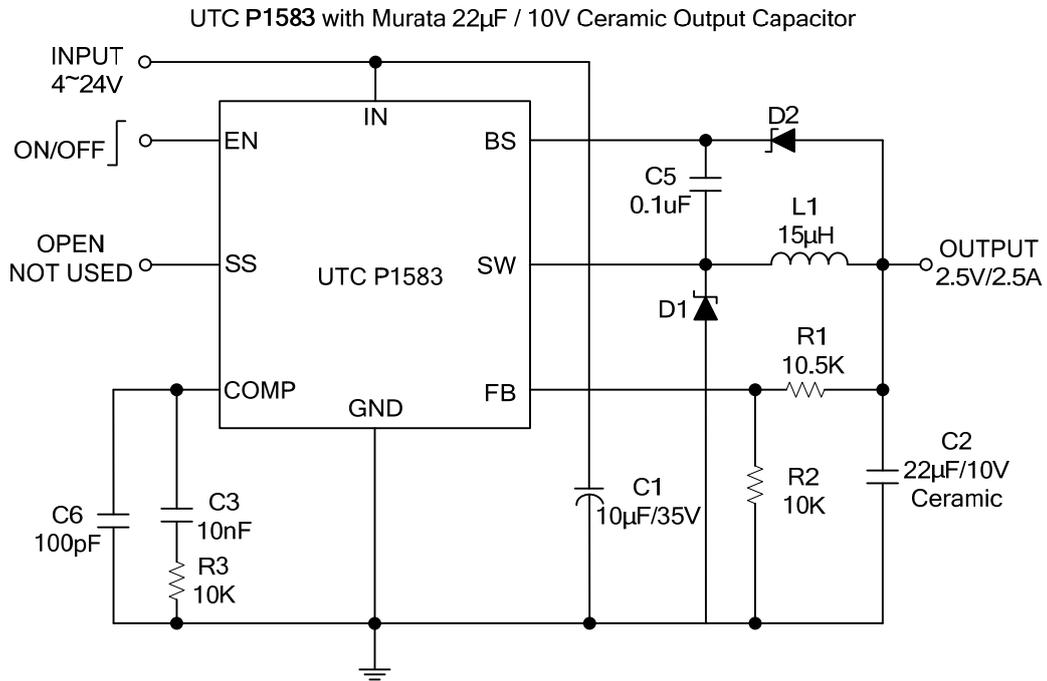
PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance	$\theta_{JA}$	105	°C/W
Thermal Resistance	$\theta_{JC}$	50	°C/W

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

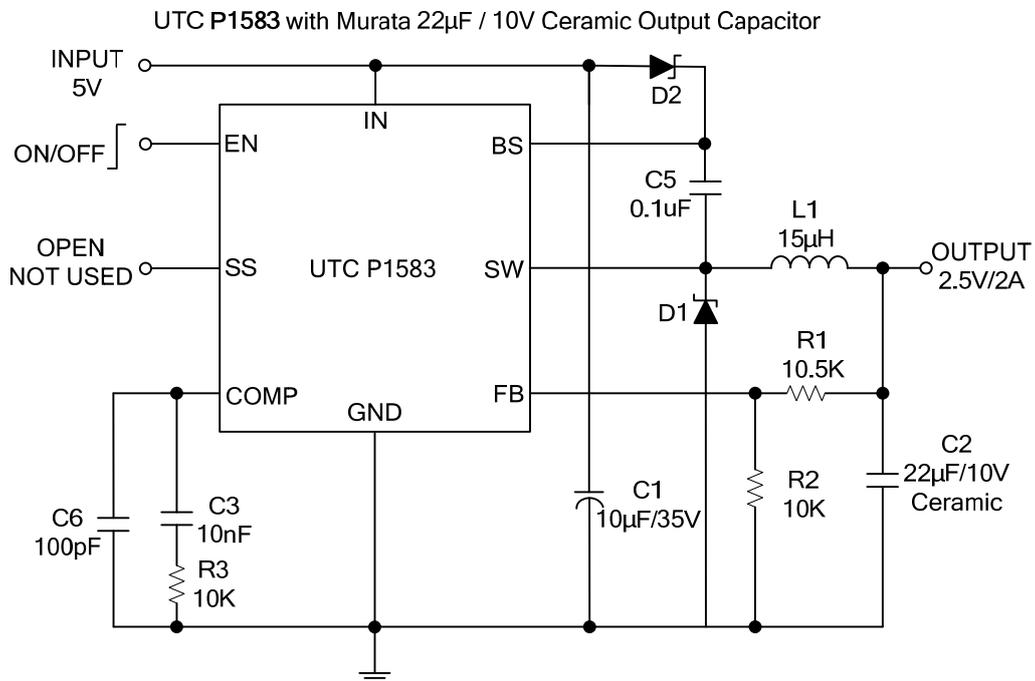
### ■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified $V_{IN}=12V$ , $T_A=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Feedback Voltage	$V_{FB}$	$4.75V \leq V_{IN} \leq 25V$ , $V_{COMP} < 2V$	1.198	1.222	1.246	V
Upper Switch Leakage	$I_{LEAK}$	$V_{EN}=0V$ , $V_{SW}=0V$		0	10	$\mu A$
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	KHz
Short Circuit Frequency	$F_{OSC\_SHORT}$	$V_{FB}=0V$	20	40		KHz
Maximum Duty Cycle	$D_{MAX}$	$V_{FB}=1.0V$	90	95		%
Minimum Duty Cycle	$D_{MIN}$	$V_{FB}=1.5V$			0	%
Enable Threshold	$V_{EN}$	$I_{CC} > 100\mu A$		1.0	1.3	V
Enable Pull Up Current	$I_{UP}$	$V_{EN}=0V$		0.7		$\mu A$
Under Voltage Lockout Threshold Rising				1.2		V
Supply Current (Shutdown)	$I_{SD}$	$V_{EN} \leq 0.4V$		23	36	$\mu A$
Supply Current (Quiescent)	$I_Q$	$V_{EN} \geq 2.6V$ ; $V_{FB}=1.4V$		1.5	2	mA
Collector-Emitter Saturation Voltage	$V_{CESAT}$	$I_{OUT}=2A$		400	600	mV
Thermal Shutdown				160		°C

■ TYPICAL APPLICATION CIRCUIT



■ LOW VIN APPLICATION CIRCUIT



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