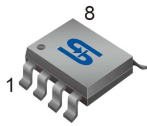


**SOP-8**

**Pin Definition:**

- |         |        |
|---------|--------|
| 1. FB   | 8. GND |
| 2. EN   | 7. GND |
| 3. Comp | 6. SW  |
| 4. Vcc  | 5. SW  |

### General Description

TS19377 consists of step-down switching regulator with PWM control. These device include a reference voltage source, oscillation circuit, error amplifier, internal PMOS and etc.

TS19377 provides low-ripple power, high efficiency, and excellent transient characteristics. The PWM control circuit is able to the duty ratio linearly from 0 up to 100%. An enable function, an over current protect function and short circuit protect function are built inside, and when OCP or SCP happens, the operation frequency will be reduced. Also, an internal compensation block is built in to minimum external component count.

With the addition of an internal P-channel Power MOS, a coil, capacitors, and a diode connected externally, these ICs can function as step-down switching regulators. They serve as ideal power supply units for portable devices when coupled with the SOP-8 package, providing such outstanding features as low current consumption. Since this converter can accommodate an input voltage up to 23V, it is also suitable for the operation via an AC adapter.

### Features

- Input Voltage Range 3.6V~23V
- Output voltage: 0.25V~Vcc
- 2A Switch Output Current
- Duty ratio: 0%~100% PWM control
- 330kHz Switching Frequency
- Enable/Disable Functions
- Current limit and Thermal Shutdown
- Short Circuit Protections
- Built-in Internal SW P-CH MOS

### Application

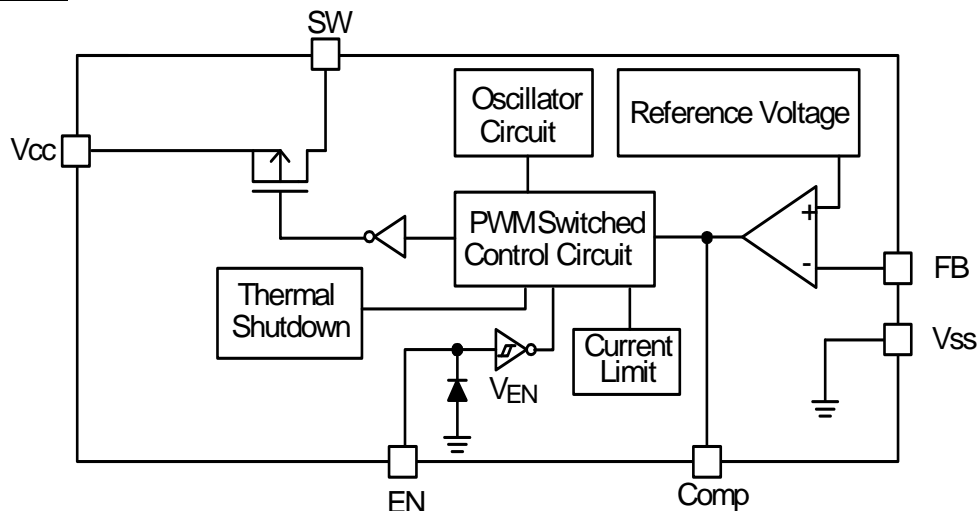
- White LED Backlighting
- White LED Driving
- Multiple LED Driving
- LED Lighting Equipment

### Ordering Information

Part No.	Package	Packing
TS19377CS RLG	SOP-8	2.5Kpcs / 13" Reel

**Note:** "G" denotes Halogen Free Product.

### Block Diagram



### Absolute Maximum Rating

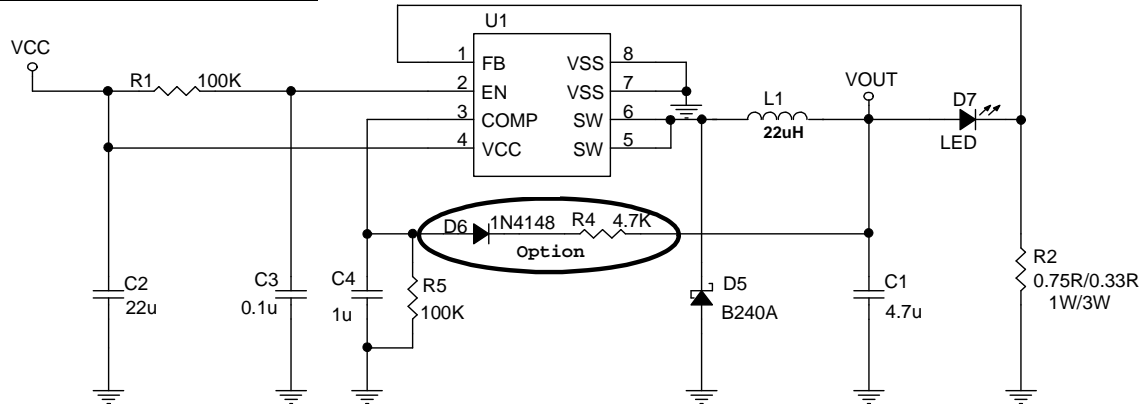
Parameter	Symbol	Limit	Unit
V <sub>CC</sub> Pin Voltage	V <sub>CC</sub>	V <sub>SS</sub> - 0.3 to V <sub>SS</sub> + 25	V
Feedback Pin Voltage	V <sub>FB</sub>	V <sub>SS</sub> - 0.3 to V <sub>CC</sub>	V
ON/OFF Pin Voltage	V <sub>EN</sub>	V <sub>SS</sub> - 0.3 to V <sub>CC</sub> + 0.3	V
Switch Pin Voltage	V <sub>SW</sub>	V <sub>SS</sub> - 0.3 to V <sub>CC</sub> + 0.3	V
Power Dissipation	PD	Internally limited	mW
Storage Temperature Range	T <sub>ST</sub>	-40 to +150	°C
Operating Temperature Range	T <sub>OP</sub>	-40 to +125	°C
Operating Supply Voltage	V <sub>OP</sub>	+3.6 to +23	V
Thermal Resistance from Junction to case	θ <sub>JC</sub>	25	°C/W

### Electrical Specifications (V<sub>IN</sub>=12V, T<sub>A</sub>=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Feedback Voltage	V <sub>FB</sub>	I <sub>OUT</sub> =0.2A	0.24	0.25	0.26	V
Quiescent Current	I <sub>CCQ</sub>	V <sub>FB</sub> =1.2V force driver off	--	3	5	mA
Feedback Bias Current	I <sub>FB</sub>	I <sub>OUT</sub> =0.1A	--	0.1	0.5	uA
Shutdown Supply Current	I <sub>SD</sub>	V <sub>EN</sub> =0V	--	2	10	uA
Switch Current	I <sub>SW</sub>		2.5	--	--	A
Line Regulation	ΔV <sub>OUT</sub> /V <sub>OUT</sub>	V <sub>CC</sub> =5V~23V, I <sub>OUT</sub> =0.2A	--	1	2	%
Load Regulation	ΔV <sub>OUT</sub> /V <sub>OUT</sub>	I <sub>OUT</sub> =0.1 to 2A	--	0.2	0.5	%
Oscillation Frequency	F <sub>OSC</sub>		260	330	400	KHz
EN Pin Logic input threshold voltage	V <sub>SH</sub>	High (regulator ON)	2.0	--	--	V
	V <sub>SL</sub>	Low (regulator OFF)	--	--	0.8	
EN Pin Input Current	I <sub>SH</sub>	V <sub>EN</sub> =2.5V (ON)	--	20	--	uA
	I <sub>SL</sub>	V <sub>EN</sub> =0.3V (OFF)	--	-10	--	uA
Internal MOSFET R <sub>DS(ON)</sub>	R <sub>DS(ON)</sub>	V <sub>CC</sub> =5V, V <sub>FB</sub> =0V	--	100	140	mΩ
		V <sub>CC</sub> =12V, V <sub>FB</sub> =0V	--	70	100	
Efficiency	EFFI	V <sub>OUT</sub> = 5V	I <sub>OUT</sub> =1A	--	91	%
			I <sub>OUT</sub> =2A	--	91	
Thermal shutdown Temp	T <sub>SD</sub>		--	140	--	°C

### Typical Application Circuit

#### A: 1W/3W LED\*1 for DC Input

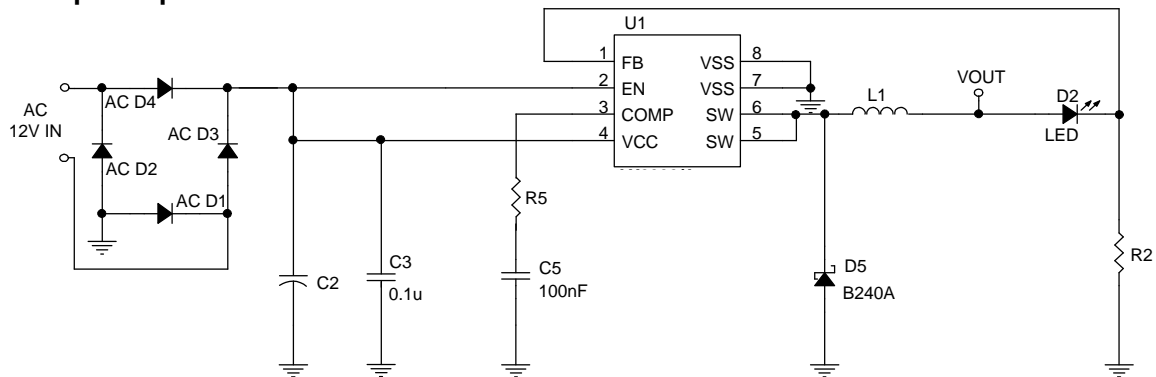


#### Recommend Bill of Material:

$I_{LED}$	R2		C2	R5	L1
350mA	0.715Ω	87.5mW	100uF	0.22K	68uH
750mA	0.333Ω	189mW	220uF	0.47K	
1000mA	0.250Ω	250mW	330uF	0.47K	

#### B: 1W/3W LED\*1 for AC Input

❖ No output Capacitor



$I_{LED}$	R2		C2	R5	L1
350mA	0.715Ω	87.5mW	100uF	0.22K	68uH
750mA	0.333Ω	189mW	220uF	0.47K	
1000mA	0.250Ω	250mW	330uF	0.47K	

### Function Descriptions

#### PWM Control

The TS19377 consists of DC/DC converters that employ a pulse-width modulation (PWM) system. In converters of the TS19377, the pulse width varies in a range from 0 to 100%, according to the load current. The ripple voltage produced by the switching can easily be removed through a filter because the switching frequency remains constant. Therefore, these converters provide a low-ripple power over broad ranges of input voltage and load current.

#### Setting $I_{LED}$ Current

Application circuit item shows the basic application circuit with TS19377 adjustable output version. The external resistor sets the LED output current according to the following formula:

$$I_{LED} = (0.25V/R2)$$

Resistor select for LED output current setting

$I_{LED}$	R2	
350mA	0.715Ω	87.5mW
750mA	0.333Ω	189mW
1000mA	0.250Ω	250mW

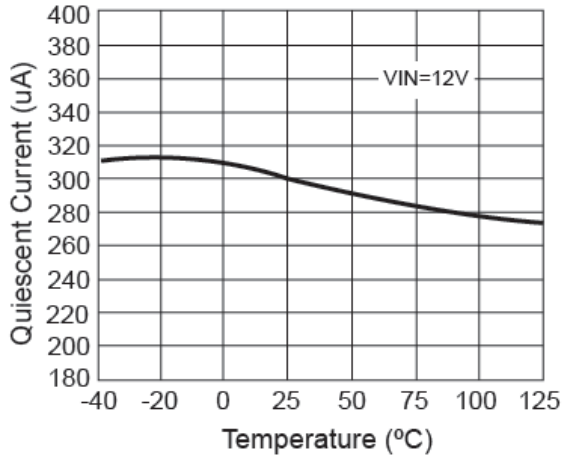
#### RDS<sub>(ON)</sub> Current Liming

The current limit threshold is setting by the internal circuit.

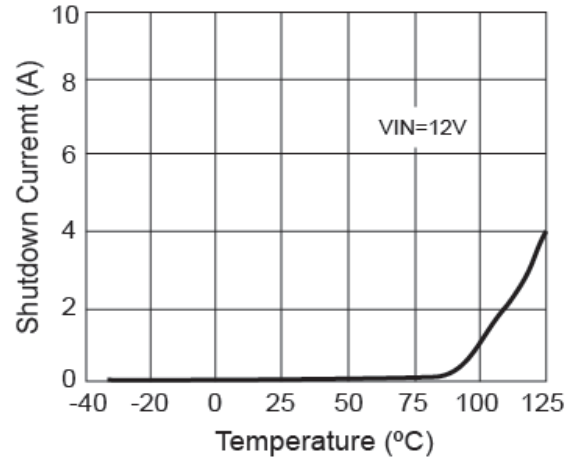
#### Compensation

Please refer the table of application circuit. For DC input, the option circuit for compensation is connecting R4 and a 1N4148 diode to  $V_{OUT}$ . In order to protect short circuit and thermal shutdown release for LED.

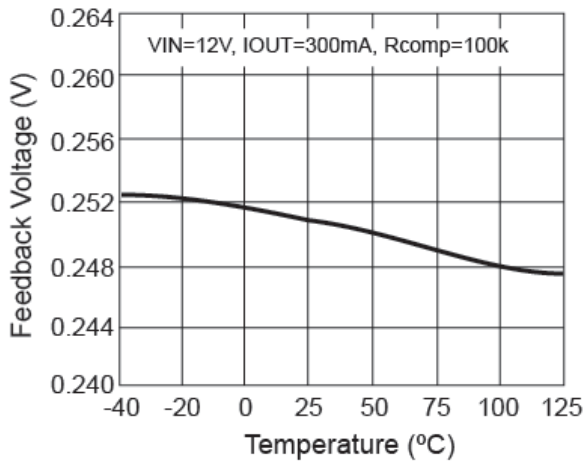
**Electrical Characteristics Curve**



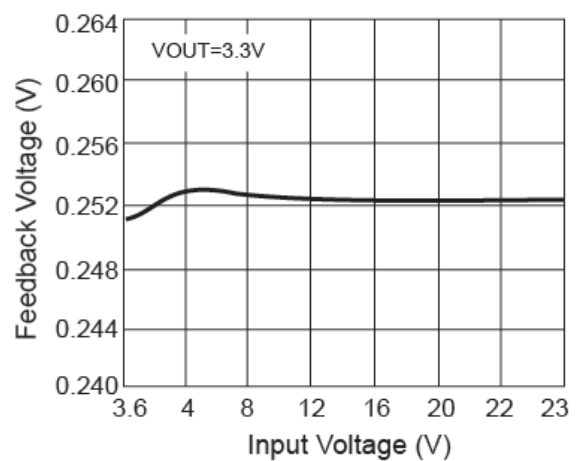
**Figure 1. Quiescent Current vs. Temperature**



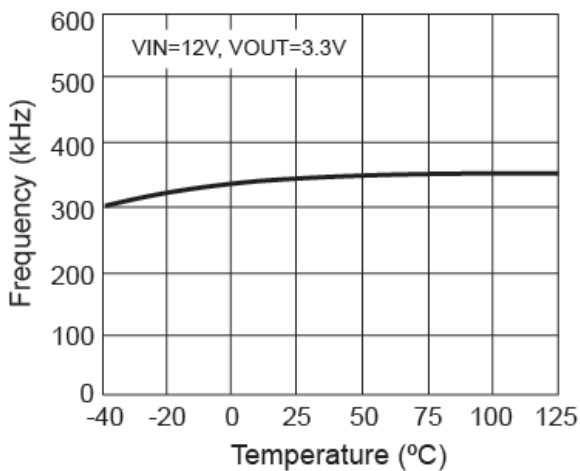
**Figure 2. Shutdown Current vs. Temperature**



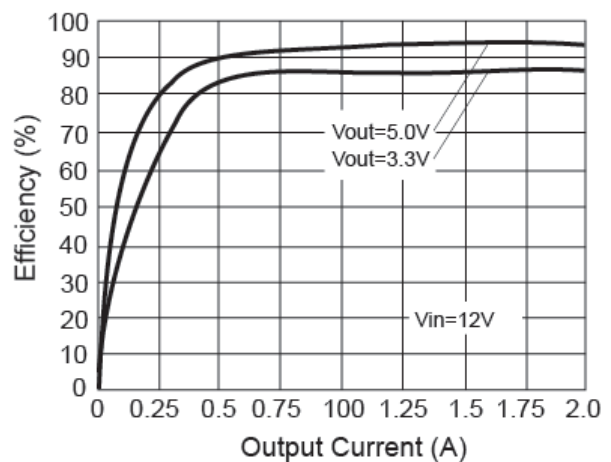
**Figure 3. Feedback Voltage vs. Temperature**



**Figure 4. Feedback Voltage vs. Input Voltage**

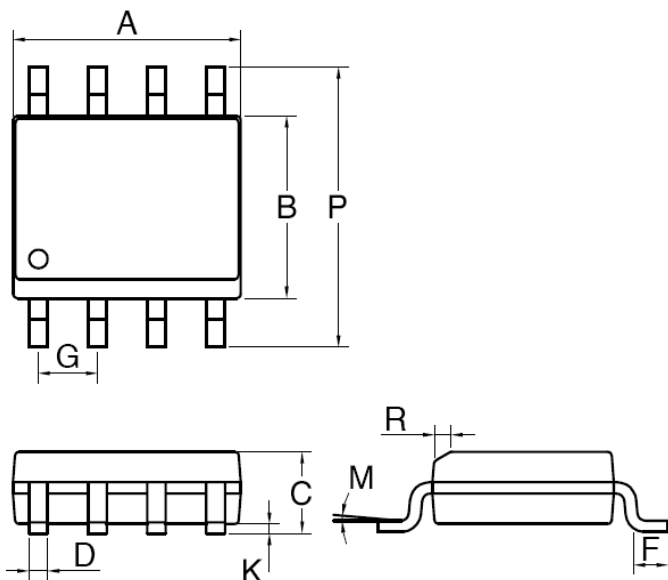


**Figure 5. Frequency vs. Temperature**



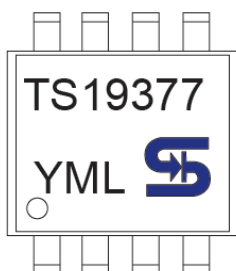
**Figure 6. Efficiency vs. Output Current**

### SOP-8 Mechanical Drawing



SOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27BSC		0.05BSC	
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

### Marking Diagram



- Y** = Year Code
- M** = Month Code for Halogen Free Product  
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
- L** = Lot Code

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