

Over-Voltage Protection IC

General Description

WP3883CL can disconnect the systems from its output pin (OUT) in case wrong input operating conditions are detected.

The system is positive overvoltage protected up to 28V. The internal overvoltage thresholds(OVLO) is fixed, and external OVLO setting also available. WP3883CL has internal thermal shutdown Protection and Input Voltage detection.

The device is packaged in advanced full-Green compliant Wafer Level Chip Scale Packaging (WLCSP6).

Applications

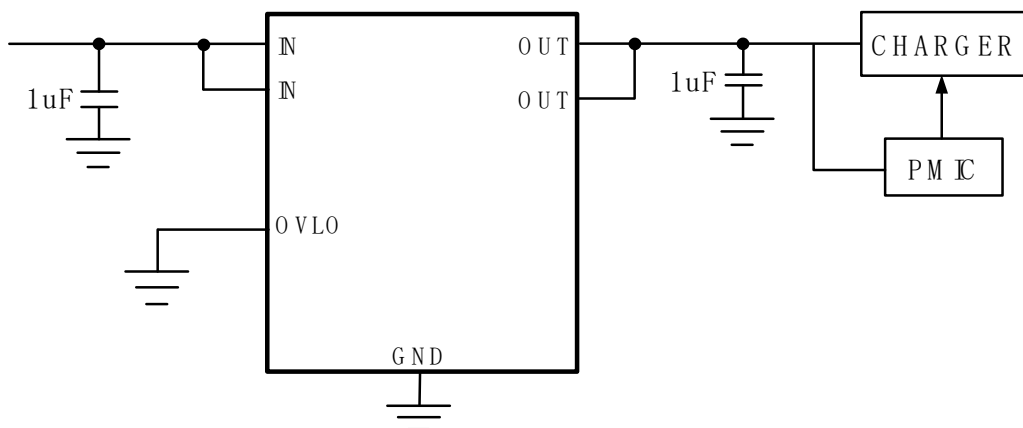
- Smartphones, Tablet PC
- HDD, Storage and Solid State Memory Devices
- Portable Media Devices, Laptop & MID

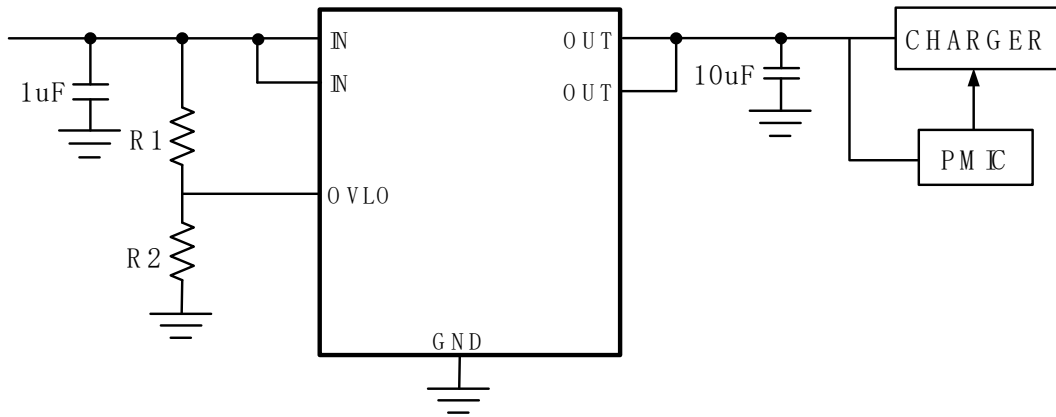
- SLR Digital Cameras
- GPS and Navigation Equipment
- Industrial Handheld and Enterprise Equipment

Features

- 4A Continuous Current Capability
- Typical R_{ON} : 29m Ω N-Channel MOSFET
- V_{IN} Operating Range: 2.5V to 28V
- Overvoltage Lockout: OVLO=6.8V(TYP)
- Overvoltage-Protection Response Time: 50ns(TYP)
- OVLO Threshold Range: +4V to +20V
- Startup Debounce Time: 15ms(TYP)
- Internal Thermal-Shutdown Protection
- ESD Protected:Human Body Model: JESD22-A114 (All pins) ± 2 KV
- WLCSP6 Package (ball pitch=0.4mm)

Typical Application

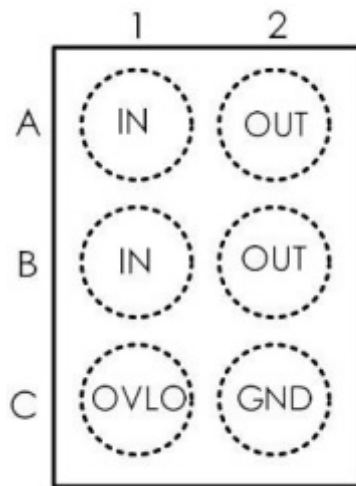




Note1: R₁ and R₂ are only required for adjustable OVLO; Otherwise OVLO is connected to GND.

Note2: Recommend $30K \leq R_2 \leq 51K$.

Pin Configuration



(TOP VIEW)

Pin Description

Pin Number	Pin Name	Description
A2, B2	OUT	Output Voltage. Output of internal switch. Connect OUT pins together for proper operation.
C2	GND	Ground. Connect GND pins together for proper operation.
A1, B1,	IN	Voltage Input. Connect IN pins together for proper operation.
C1	OVLO	External OVLO Adjustment. Connect OVLO to GND when using the internal threshold. Connect a resistor-divider to OVLO to set a different OVLO threshold; this external resistor-divider is completely independent of the internal threshold.

Absolute Maximum Ratings

SYMBOL	Parameter	MIN	MAX	Unit
V_{IN}	V_{IN} to GND	-0.3	36	V
V_{OUT}	V_{OUT} to GND	-0.3	28	V
V_{OVLO}	OVLO to GND	-0.3	7	V
I_{SW1}	Maximum Continuous Current of switch IN-OUT		4	A
I_{SW2}	Maximum Peak Current of switch IN-OUT(10ms)		6	A
PD	Power Dissipation at $T_A = +70^{\circ}C$		1000	mW
T_{STG}	Storage Junction Temperature	-65	+150	$^{\circ}C$
T_A	Operating Temperature Range	-40	+85	$^{\circ}C$
T_{Store}	Soldering Temperature (reflow)		+260	$^{\circ}C$
T_J	Junction Temperature		+150	$^{\circ}C$

Electrical Characteristics

($T_A=25\text{ }^\circ\text{C}$, $V_{IN}=5\text{V}$, unless otherwise noted)

SYMBOL	Parameter	Test Condition	Min	Typ	Max	Unit
Basic Operation						
V_{IN}	Input Voltage		2.5		28	V
I_{IN}	V_{IN} Quiescent Current	$V_{IN}=5\text{V}$, OUT floating		90		μA
R_{ON}	On-Resistance of Switch IN-OUT	$V_{IN}=5\text{V}$, $I_{OUT}=1\text{A}$		29	45	$\text{m}\Omega$
V_{OVLO}	Overvoltage protect of V_{IN}	V_{IN} rise up	6.6	6.8	7.0	V
	Overvoltage protect hysteresis of V_{IN}			0.2		V
	Adjustable OVLO Threshold Range		4		20	V
V_{OVLO_TH}	OVLO Set Threshold		1.18	1.2	1.22	V
V_{OVLO_SELECT}	External OVLO Select Threshold		0.2		0.3	V
V_{UVLO_R}	Unnder Voltage Lockout Threshold			2.0		V
	Thermal Shutdown			155		$^\circ\text{C}$
	Thermal-shutdown Hysteresis			20		$^\circ\text{C}$
Dynamic Characteristics: see figure						
t_{DEB}	Debounce time	Time from $2.1\text{V} < V_{IN} < V_{OVLO}$ to $V_{OUT} = 10\%$ of V_{IN}		15		ms
t_{ON}	Switch Turn-on time	$R_L=100\Omega$, $C_L=22\mu\text{F}$, V_{OUT} from $0.1 \times V_{IN}$ to $0.9 \times V_{IN}$		2		ms
t_{OFF_RES}	Switch turn-off response time	$V_{IN} > V_{OVLO}$ to V_{OUT} stop rising		50		ns

NOTE:

1:Guaranteed by characterization and design.

Functional Description

The OVP switch with overvoltage protection feature a low 29mΩ (TYP) on-resistance (R_{ON}) internal FET and protect low-voltage systems against voltage faults up to 28V_{DC}. If the input voltage (V_{IN}) exceeds 6.8V, the internal FET is quickly turned off to prevent damage to the protected downstream components.

The overvoltage protection threshold can also be adjusted by external resistors when input (OVLO) is set higher than 0.3V.

$$V_{IN_OVLO} = V_{OVLO_TH} * (1+R_1/R_2)$$

$$V_{OVLO_TH} = 1.2V \text{ (TYP)}$$

The internal FET turns off when the junction temperature exceeds +155°C (TYP). The device exits thermal shutdown after the junction

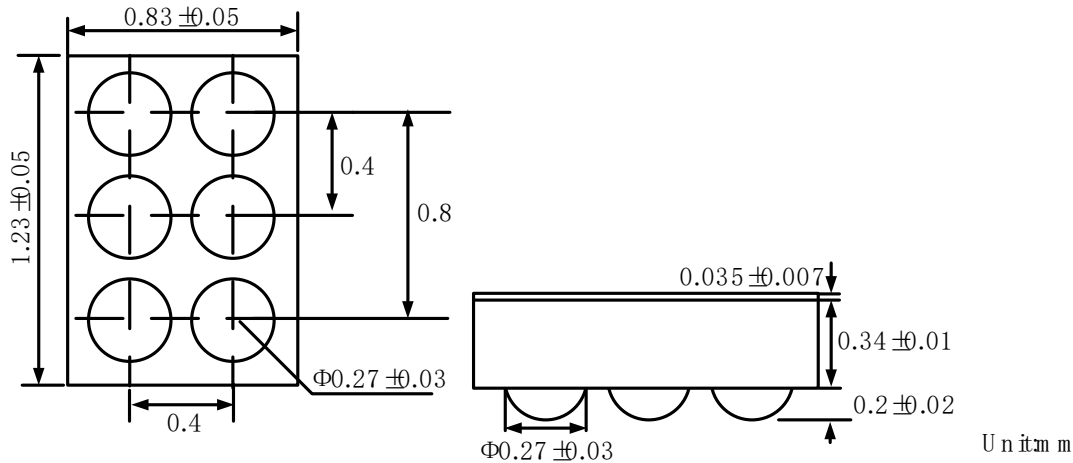
temperature cools by 20°C (TYP).

Input Capacitor

To limit the voltage drop on the input supply caused by transient inrush current when the switch turns on into a discharged load capacitor or short-circuit, a capacitor 1μF or larger must be placed between the V_{IN} and GND pins.

Output Capacitor

A 1μF or larger capacitor should be placed between the OUT and GND pins.

Package Information

Ordering Information

Part Number	Package	Packing Quantity	Marking
WP3883CL	WLCSP6	3k/Reel	WP3883CL XXXXX

Contact Information

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For additional information, please contact your local Sales Representative.

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Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.

Users should verify actual device performance in their specific applications.