

1. General Description

WP1230 can disconnect the systems from its output pin (OUT) in case wrong input operating conditions are detected.

The range of input voltage is up to 32V. The internal overvoltage thresholds (OVLO) is 6.1V, WP1230 also has internal over temperature protect (OTP) function and it can monitor chip temperature to protect the device.

The device is packaged in advanced full-Green Packaging (SOT23).

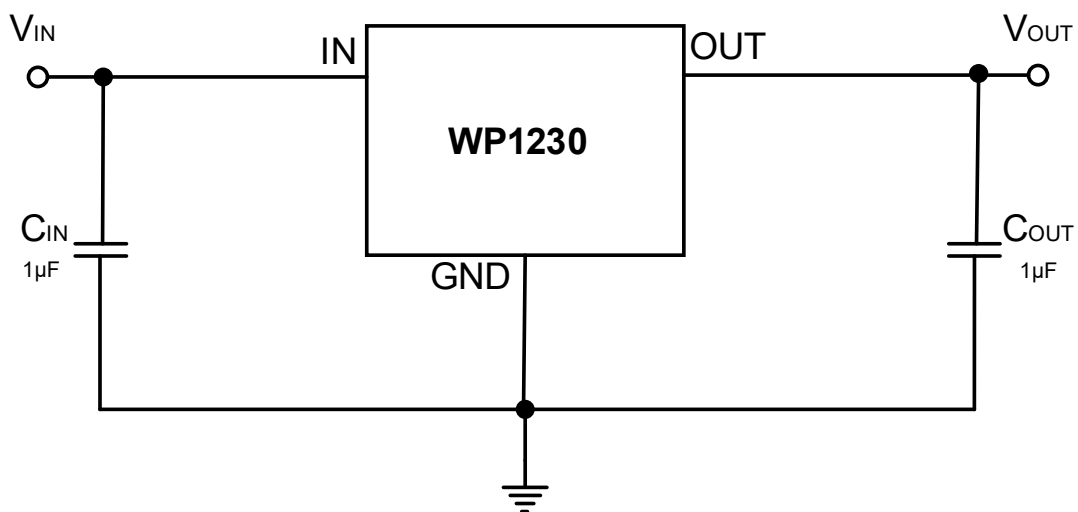
2. Features

- Typical $R_{DS(ON)}$: 230m Ω N-Channel MOSFET@5V/1A
- V_{IN} Range: 3.5V to 32V
- Internal Overvoltage Lockout: 6.1V(Typ.)
- Overvoltage-Protection Response Time: 50ns
- Startup Debounce Time: 15ms (Typ.)
- Internal Thermal-Shutdown Protection
- ESD Protected: Human Body Model: $\pm 2KV$ JESD22-A114 (All Pins)
- SOT23 Package

3. 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

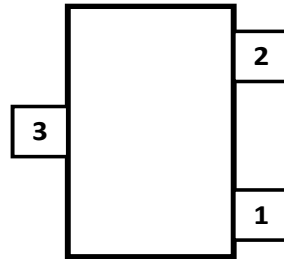
4. Typical Application



***NOTE:** 1. This electric circuit only supplies for reference.

2. For hot swap applications, the recommended capacitance at the input (C_{IN}) is 0.1µF.

5. Pin Configuration



SOT23

6. Pin Description

PIN NAME	PIN NUMBER	I/O	PIN FUNCTION
IN	1	I	Voltage Input.
GND	2	—	Ground. Connect GND pins together for proper operation.
OUT	3	O	Voltage Output.

7. Absolute Maximum Ratings

PARAMETER	RATING	UNIT
IN Voltage	-0.3 to 34	V
OUT Voltage	-0.3 to 6	V
Maximum Continuous Current	1(MAX)	A
Operating Temperature	-40 to 85	°C
Storage Temperature	-55 to 150	°C
Soldering Temperature (Reflow)	260	°C
Junction Temperature	150	°C

Note: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

8. ESD Ratings — JEDEC Specification

PARAMETER	RATING	UNIT
Electrostatic Discharge	Human-Body Model (HBM), Per JESD22-A114(All pins)	±2000 V

9. Electrical Characteristics

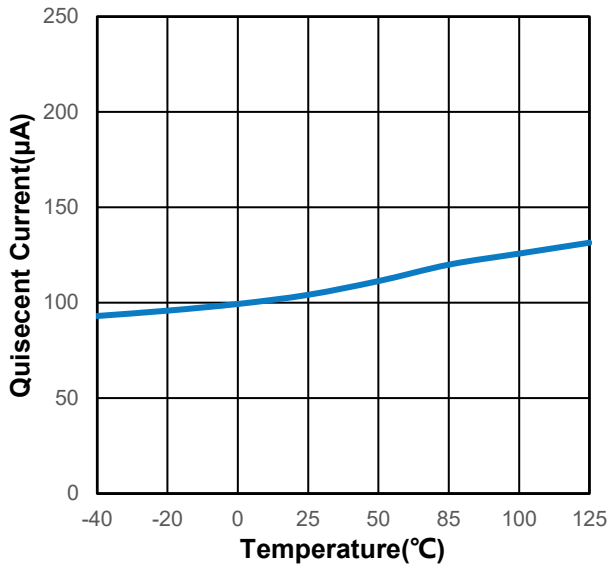
(Over operating free-air temperature range, unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
Basic Operation						
V_{IN}	Input Voltage		3.5		32	V
I_{IN}	V_{IN} Quiescent Current	$V_{IN}=5V$, OUT Floating		120		μA
R_{ON}	On-Resistance of Switch IN-OUT	$V_{IN}=5V$, $I_{OUT}=1A$		230		m Ω
V_{OVLO}	OVP Trip Level	V_{IN} Rising	5.8	6.1	6.4	V
$V_{OVLO-HYS}$	Hysteresis of OVP Trip Level	V_{IN} Falling		0.15		V
V_{UVLO_R}	Under Voltage Lockout Threshold	V_{IN} Rising		3		V
Over Temperature Protection (OTP)						
T_{SD}	Thermal Shutdown	$V_{IN}=5V$		150		$^{\circ}C$
ΔT_{SD}	Thermal Shutdown Hysteresis	$V_{IN}=5V$		20		$^{\circ}C$
Dynamic Characteristics						
t_{DEB}	Debounce Time	Time from $2.5V < V_{IN} < V_{OVLO}$ to $V_{OUT} = 10\%$ of V_{IN}		15		ms
t_{ON}	Switch Turn-on Time	$R_L=100\Omega$, $C_L=22\mu F$, V_{OUT} from $10\%V_{IN}$ to $90\%V_{IN}$		0.3		ms
$t_{OFF_RES}^{[1]}$	Switch Turn-off Response Time	$V_{IN} > V_{OVLO}$ to V_{OUT} Stop Rising		50		ns

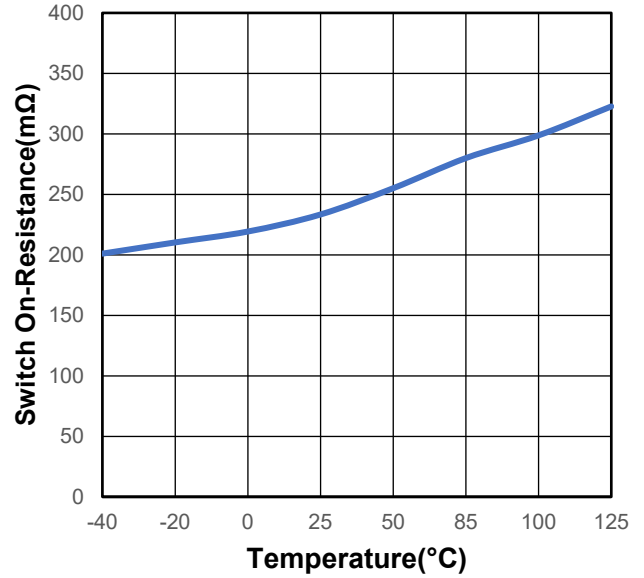
Note[1]: Guaranteed by characterization testing and design.

10. Typical Performance Characteristics

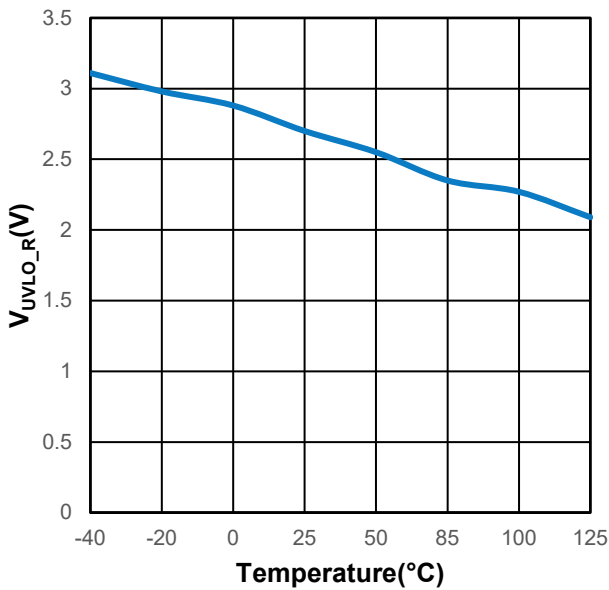
($V_{IN} = 5V$, $T_A = 25^\circ C$, $C_1 = 1\mu F$, $C_2 = 1\mu F$, unless otherwise noted)



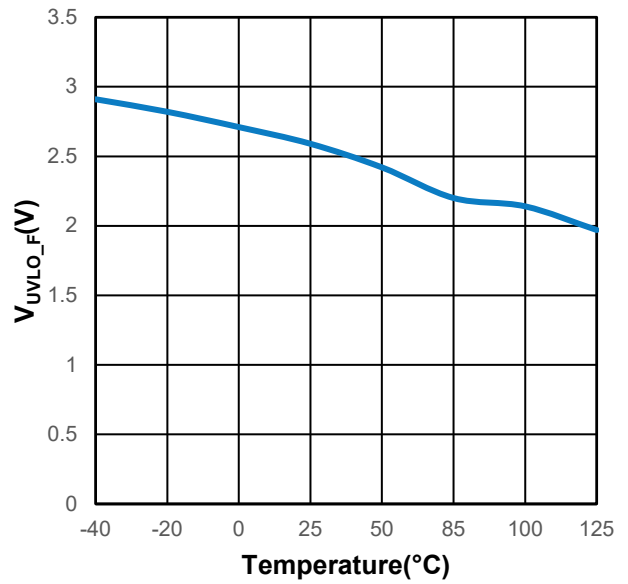
Quiescent Current vs. Ambient Temperature



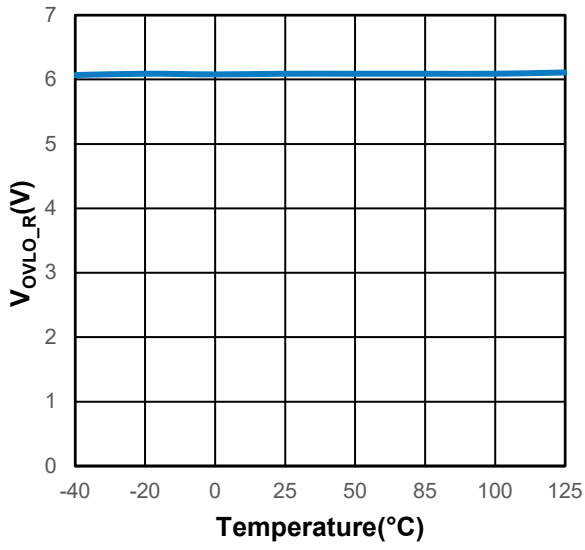
On-Resistance vs. Ambient Temperature



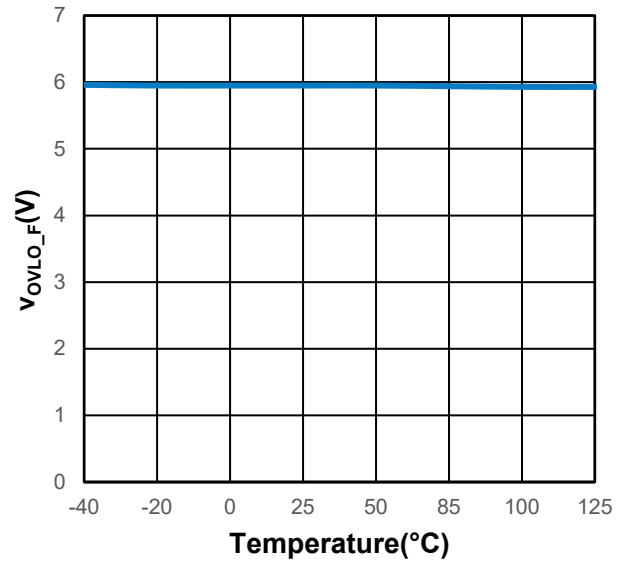
V_{UVLO_R} vs. Ambient Temperature



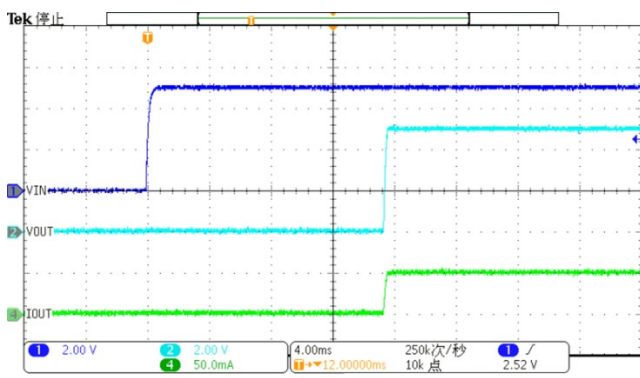
V_{UVLO_F} vs. Ambient Temperature



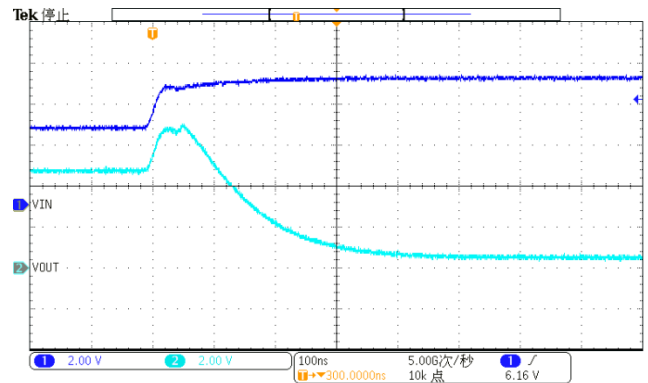
V_{OVLO_R} vs. Ambient Temperature



V_{OVLO_F} vs. Ambient Temperature



t_{DEB} & t_{ON}



t_{OFF_RES}

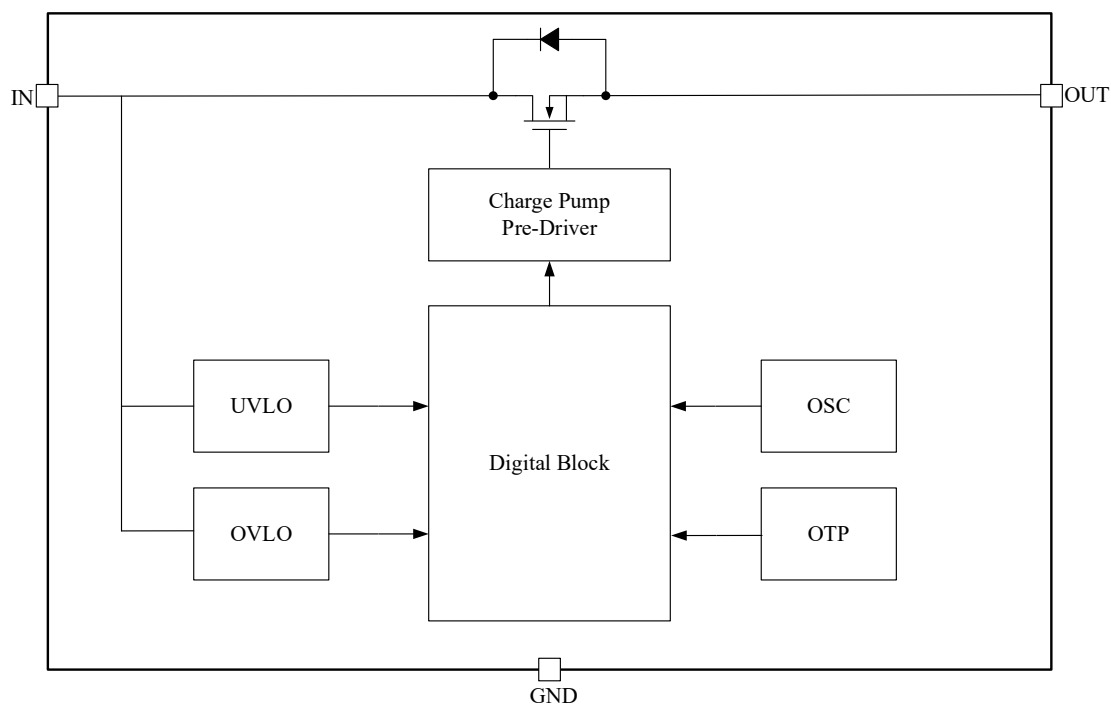
11. Function Description

11.1 Overview

The WP1230 with overvoltage protection features a low 230mΩ (Typ.) $R_{DS(ON)}$ of internal FET and protects low-voltage systems against voltage faults up to 32V_{DC}. If the V_{IN} exceeds 6.1V, the internal FET is quickly turned off to prevent the downstream components from damage.

The internal FET turns off when the junction temperature exceeds +150°C (Typ.). The device exits thermal shutdown after the junction is cooled down by 20°C (Typ.).

11.2 Block Diagram



11.3 Feature Description

11.3.1 Under Voltage Lock Out (UVLO)

The under-voltage lockout (UVLO) circuits disable the WP1230 until the input voltage reaches the UVLO turn-on threshold.

11.3.2 Over Temperature Protection (OTP)

The WP1230 monitors its own internal temperature to prevent thermal failures. The device turns off the internal FET when the junction temperature reaches 150°C. The device will resume after the junction is cooled down by 20°C.

11.3.3 Input Over Voltage Protection (OVP)

If the input voltage exceeds the WP1230 rising trip level, the switch will be turned off in about 50ns. The switch will remain off until V_{IN} falls below the WP1230 falling trip level.

12. Application and Implementation

12.1 Selection of Input Capacitor

To limit the voltage drops on the input supply caused by transient inrush current, a capacitor must be placed between the IN and GND pins.

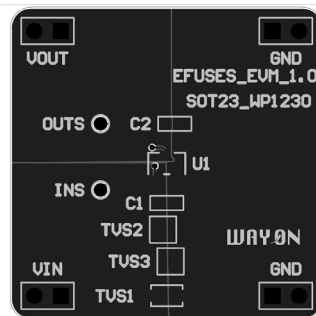
12.2 Selection of Output Capacitor

A capacitor should be placed between the OUT and GND pins.

13. Layout

This device is a protection device, and is meant to protect down-stream circuitry from hazardous voltages. Potentially, high voltages may be applied to this IC. It has to be ensured that the edge-to-edge clearances of PCB traces satisfy the design rules for high voltages. C_{IN} and C_{OUT} must be located close to the IC.

13.1 Layout Example



14. Evaluation Modules

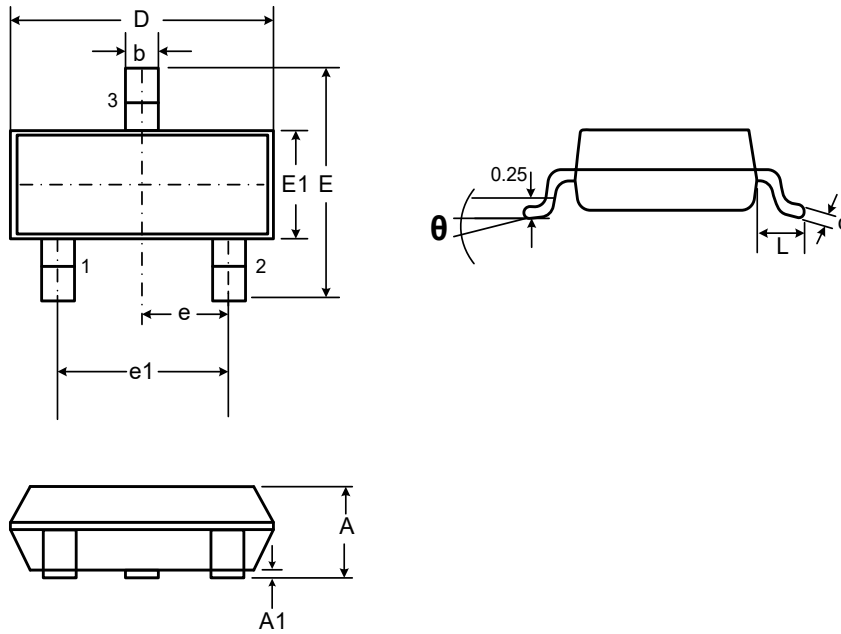
Evaluation Modules (EVMs) are available to help evaluate initial circuit performance. We have evaluation modules for different packages, you can contact us by phone or address at the end to get the evaluation module or schematic.

The module names are listed in the table below.

Name	Package	Evaluation Module
WP1230	SOT23	EFUSES_EVM_V1.0 SOT23_WP1230

15. Package Information

SOT-23



SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.025	1.15
A1	0.00	0.05	0.10
b	0.30	0.40	0.50
c	0.07	0.11	0.15
D	2.80	2.92	3.04
E	2.25	2.445	2.64
E1	1.20	1.30	1.40
e	0.95 BSC		
e1	1.80	1.90	2.00
L	0.55REF		
θ	0°	4°	8°

16. Ordering Information

PART NUMBER	PACKAGE	PACKING QUANTITY	MARKING*
WP1230-S30R	SOT23	3k/Reel	WP1230 XXXX

* XXXX is variable.

STATEMENTS

WAY-ON provides data sheets based on the actual performance of the device, and users should verify actual device performance in their specific applications. The device characteristics and parameters in this data sheet can and do vary from application to application, and actual device performance may change over time. This information is intended for developers designing with WAY-ON products. Users are responsible for selecting the appropriate WAY-ON product for their application and for designing and verifying the application to ensure that your application meets the appropriate standards or other requirements, and users are responsible for all consequences. Specifications are subject to change without notice.

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For additional information, please contact your local Sales Representative.

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