Over voltage protector

Description

The P14C13 is an Over-Voltage-Protection (OVP) load switch with fixed 6.0V OVLO threshold voltage. The device will switch off internal MOSFET to disconnect IN to OUT to protect load when any of input voltage over the threshold. The Over temperature protection (OTP) function monitors chip temperature to protect the device.

The P14C13 is available in Green SOT23 package.

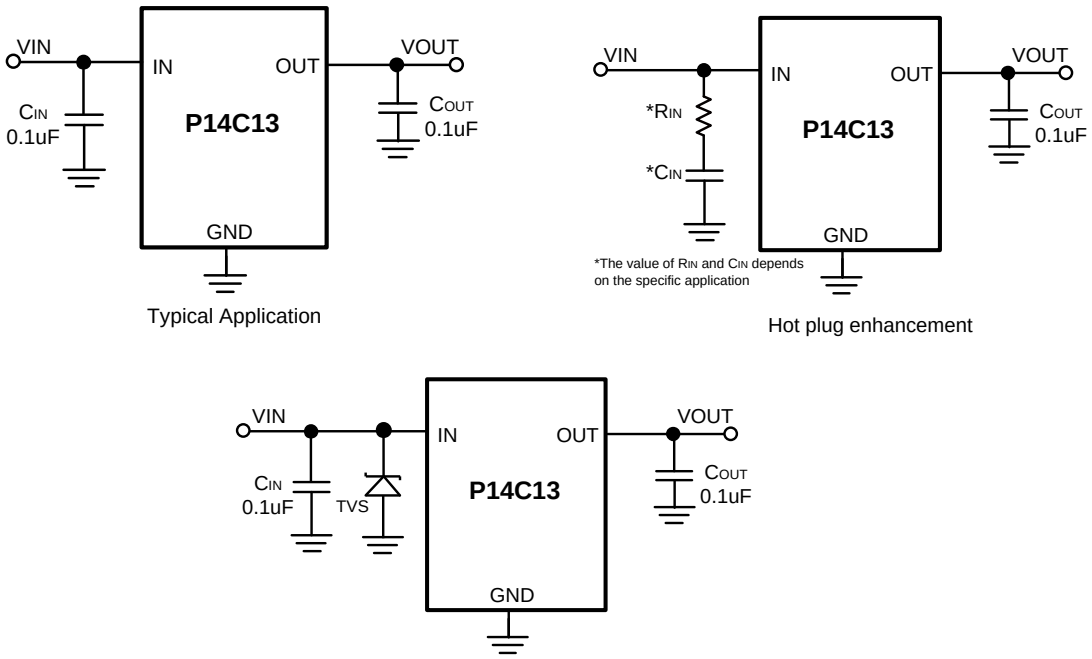


Figure 1: Application Circuit

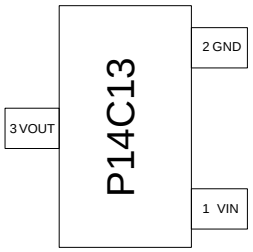


Figure 2: Pin order and Marking (Top view)

Feature

- Maximum input voltage : 32V
- Ultra fast OVP response time: 50ns (Typ.)
- Fixed OVLO threshold voltage**:** 6.0V,±3%
- 250mΩ on resistance
- Under voltage Lockout
- Thermal Shutdown
- Available in Green SOT23 Package

Application

- TWS
- Portable Media Players
- Low-Power Handheld Devices

Pin Definitions

Pin No.	Symbol	Descriptions
1	IN	Switch Input and Device Power Supply.
2	GND	Ground Terminal.
3	OUT	Switch output Terminal.

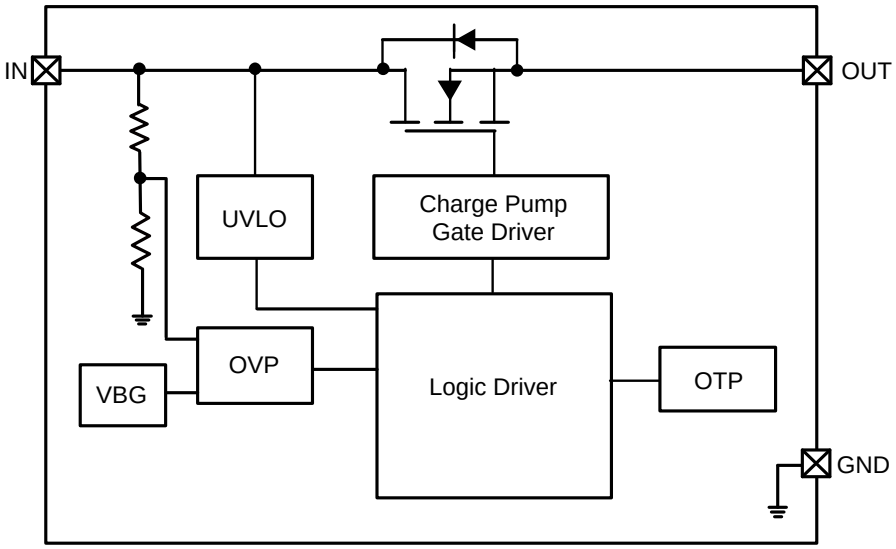


Figure 3: IC Block Diagram

Ordering Information

ORDER NUMBER	MARKING	PACKAGE	Q'TY/BY REEL
P14C13	P14C13	SOT23	3000 / Tape & Reel

Absolute maximum rating

Parameter(Note1)	Symbol	Value	Units
Input voltage (IN pin)	V_{IN}	-0.3 ~ 32	V
Output voltage (OUT pin)	V_{OUT}	-0.3 ~ 6.0	V
Junction temperature	T_J	150	℃
Lead temperature(10s)	T_L	260	℃
Storage temperature	Tstg	-55~150	℃
Thermal Resistance	θ_{JA}	270	℃/W
ESD Ratings	HBM	±2000	V
	CDM	±500	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

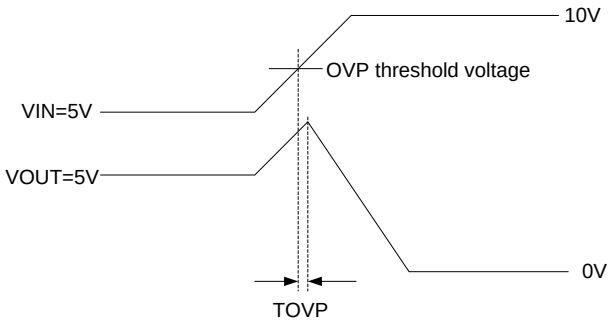
Parameter	Symbol	Value	Units
Input voltage	V_{IN}	3.5~32	V
MAX Continuous Output current	I_{OUT}	1.0	A
Ambient operating temperature	Topr	-40~85	℃

Electrical Characteristics

（T_A=25℃，V_{IN}=5V，C_{IN}=0.1uF，C_{OUT}=0.1uF，unless otherwise specified.）

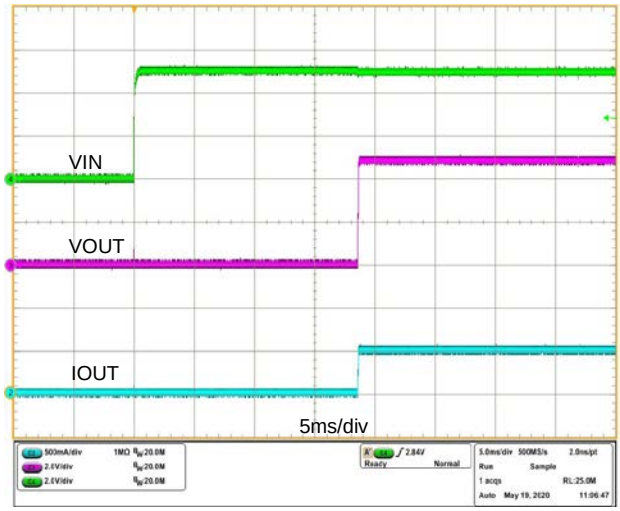
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input voltage range	V_{IN}		3.5		32	V
Quiescent current	I_Q	NO Load, V_{IN}=5V		120	240	uA
Over voltage quiescent current	I_{Q_OVP}	NO Load, V_{IN}=30V		200		uA
On resistance	R_{on}	V_{IN}=5V, I_{OUT}=1.0A		250		mΩ
OVP response time	t_{OVP}	V_{IN} rising, C_{IN}=C_L=0pF (Note2)		50		ns
OVP voltage	V_{OVLO}	VIN rising	5.82	6.0	6.18	V
UVLO threshold voltage	V_{UVLO}	VIN rising		2.5		V
UVLO hysteresis voltage	V_{UVLO_HYS}	VIN falling		30		mV
Start up delay time	t_D		10	18	30	ms
Turn On Time	t_{ON}	VOUT=VIN*10% to VOUT=VIN*90%		40		us
OTP threshold temperature	T_{OTP}	VIN=5V		150		℃
OTP hysteresis temperature	T_{HYS}	VIN=5V		20		℃

Note 2: Guaranteed by design



OVP response time test

Typical Operating Performance



Power on Response(Rout=10Ω)

Function Descriptions

1. Under-voltage Lockout (UVLO)

The under-voltage lockout (UVLO) circuit disables the power switch until the input voltage reaches the UVLO turn on threshold. Built-in hysteresis prevents unwanted on and off cycling because of input voltage droop during turn on.

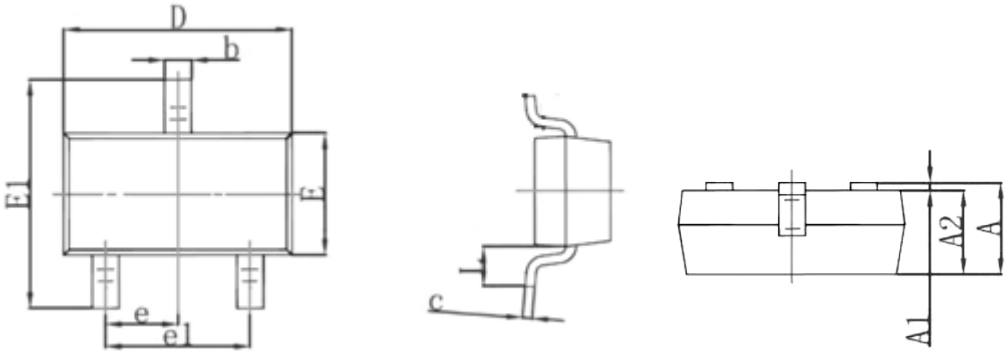
2. Over-voltage Lockout (OVLO)

When VIN exceeds the OVP threshold voltage, the over-voltage lockout (OVLO) circuit turns off the protected power switch.

3. Over Temperature Protection (OTP)

The P14C13 monitors its own internal temperature to prevent thermal failures. The chip turns off the power MOSFET when the internal temperature reaches 150°C, and will resume after the internal temperature is cooled down below 20°C.

Product dimension (SOT23)



Dim	Millimeters		
	Min.	Typ.	Max.
A	0.90	1.00	1.15
A1	0.00	0.05	0.10
A2	0.89	1.00	1.11
b	0.30	0.40	0.50
c	0.08	0.13	0.18
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.10	2.30	2.55
e	0.95 Typ.		
e1	1.78	1.90	2.04
L	0.550 Ref.		

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