

**Description**

The P14C5N is an Over-Voltage-Protection (OVP) load switch with adjustable 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. When the OVLO input set below the external OVLO select voltage, the P14C5N automatically chooses the internal fixed OVLO threshold voltage. The over voltage protection threshold voltage can be adjusted with external resistor divider and the OVLO threshold voltage range is 4.5V~24V. The Over temperature protection (OTP) function monitors chip temperature to protect the device. The OCP function turns off OUTPUT if the load current is over the threshold and recovers automatically. The P14C5N is available in DFN2x2-8L. Standard products are Pb-free and Halogen-free.

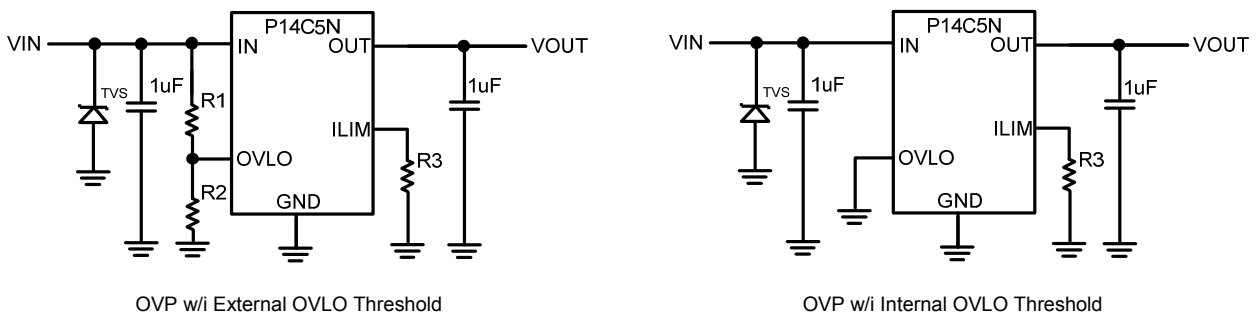


Figure 1: Typical Application

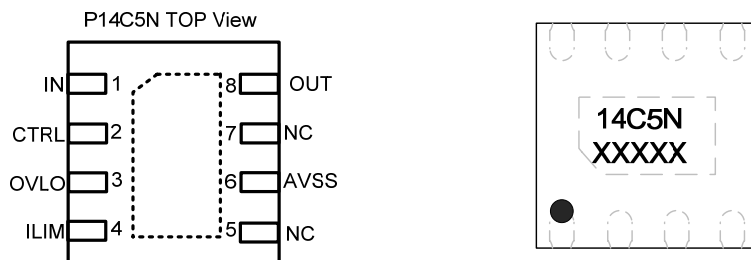


Figure 2: Pin order (Top view) and Marking (Top view)

**Feature**

- Maximum input voltage : 30V
  - Switch ON resistance : 55mΩ Typ.
  - Ultra fast OVP response time: 50ns Typ.
  - Programmed over-current protection
  - OVLO threshold voltage
- Reference voltage for adjustable version
- 1.2V : P14C5N with ±3% accuracy

**Application**

- Mobile Handsets and Tablets
- Portable Media Players
- Peripherals

Pin Definitions

Pin No.	Symbol	Descriptions
1	IN	Switch Input and Device Power Supply.
2	CTRL	OUTPUT power path is enabled when CTRL is logic low or floating;
3	OVLO	External OVLO adjustment. Connect a resistor-divider to set different OVLO threshold, $V_{OVLO}=1.2x(1+R1/R2)$ as shown typical application diagram. Connect OVLO to GND when using the internal fixed threshold voltage. R2=120kohm is recommended.
4	ILIM	Current limit adjustment. Connect a resistor to GND to set over current threshold. $I_{Lim} = 5600 \div R3$ . Short ILIM to GND will <b>disable</b> current limitation.
5,7	NC	No connect.
6	AVSS	Ground.
8	OUT	Switch Output to Load.

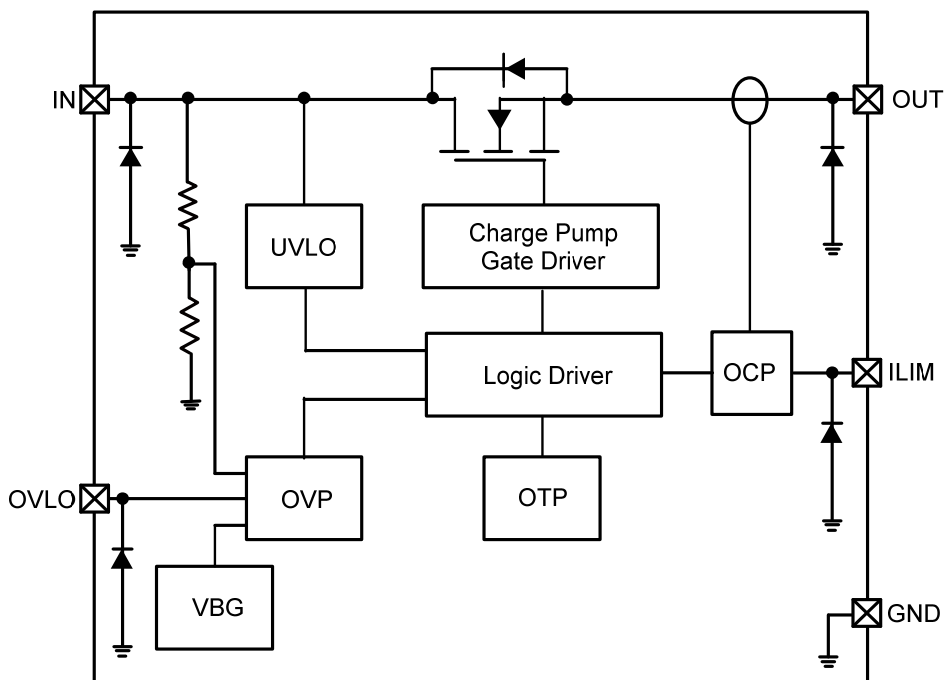


Figure 3: IC Block Diagram

**Absolute maximum rating**

Parameter(Note1)	Symbol	Value	Units
Input voltage (IN pin)	$V_{IN}$	-0.3 ~ 30	V
Output voltage (OUT pin)	$V_{OUT}$	-0.3 ~ 20	V
Input voltage (OVLO pin)	$V_{OVLO}$	-0.3 ~ 5	V
Thermal resistance	$R_{\theta JA}$	TBD	°C/W
Junction temperature	$T_J$	150	°C
Lead temperature(10s)	$T_L$	260	°C
Storage temperature	$T_{stg}$	-55~150	°C
ESD Ratings	HBM	±2000	V
	MM	±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	$V_{IN}$	3.5~30	V
MAX Continuous Output current	$I_{OUT}$	3	A
Ambient operating temperature	$T_{opr}$	-40~85	°C

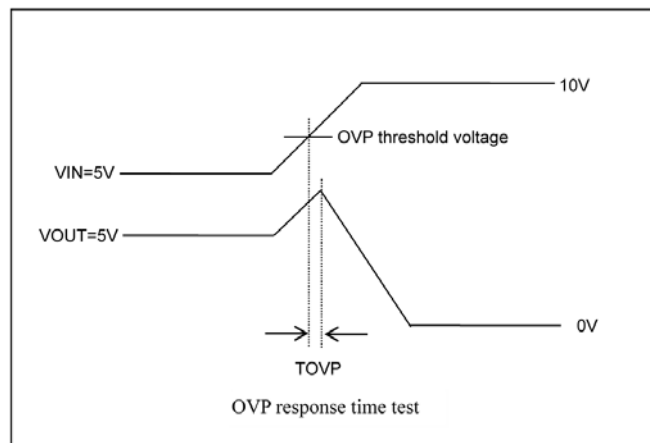
Over voltage protector

Electrical Characteristics

( $T_A=25^{\circ}C$ ,  $V_{IN}=5V$ ,  $C_{IN}=1\mu F$ ,  $C_{OUT}=1\mu F$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input voltage range	$V_{IN}$		3.5		30	V
Quiescent current	$I_Q$	NO Load, $OVLO=GND$ $V_{IN}=25V$		130		$\mu A$
ON resistance	$R_{ON}$	$V_{IN}=5V$ , $I_{OUT}=1A$		50	70	$m\Omega$
OVP response time	$t_{OVP}$	$V_{IN}$ rising, $C_{IN}=C_L=0pF$ (Note2)		50		ns
OVP threshold voltage	$V_{OVLO\_TH}$			1.2		V
Adjust OVP voltage range	$VOVP\_EXTSEL$	$V_{IN}$ rising	4.5		20	V
	$VOVP\_INTSEL$			6.8		V
External OVLO select voltage	$VOVLO\_EXTSEL$		0.4			V
Internal OVLO select voltage	$VOVLO\_INTSEL$				0.6	V
OVP hysteresis voltage	$VOVLO\_HYS$	$V_{IN}$ falling		0.1		V
UVLO threshold voltage	$V_{UVLO}$	$V_{IN}$ rising			3.5	V
UVLO hysteresis voltage	$V_{UVLO\_HYS}$	$V_{IN}$ falling		0.25		V
OCP current	$I_{OCP}$	Current rising. ( $R_3=2.7Kohm$ in Fig.1)		2.1		A
OCP recovery time	$T_{rec-ocp}$	Recover output after OCP occurs		18		ms
Debounce Time	$T_{DEB}$	$V_{IN}>UVLO$ to $V_{OUT}=V_{IN}*10\%$		18		ms
Turn On Time	$T_{ON}$	$V_{OUT}=V_{IN}*10\%$ to $V_{OUT}=V_{IN}*90\%$		300		us
Output discharge resistance	$R_{DCHG}$	$V_{IN}=5V$		700		$\Omega$
OTP threshold temperature	$T_{OTP}$	$V_{IN}=5V$		140		$^{\circ}C$
OTP hysteresis temperature	$T_{HYS}$	$V_{IN}=5V$		20		$^{\circ}C$

Note 2:Guaranteed by design



## 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 Current Protection (OCP)

If the load current rises to the OCP threshold, the device will cut off the output voltage immediately[1].

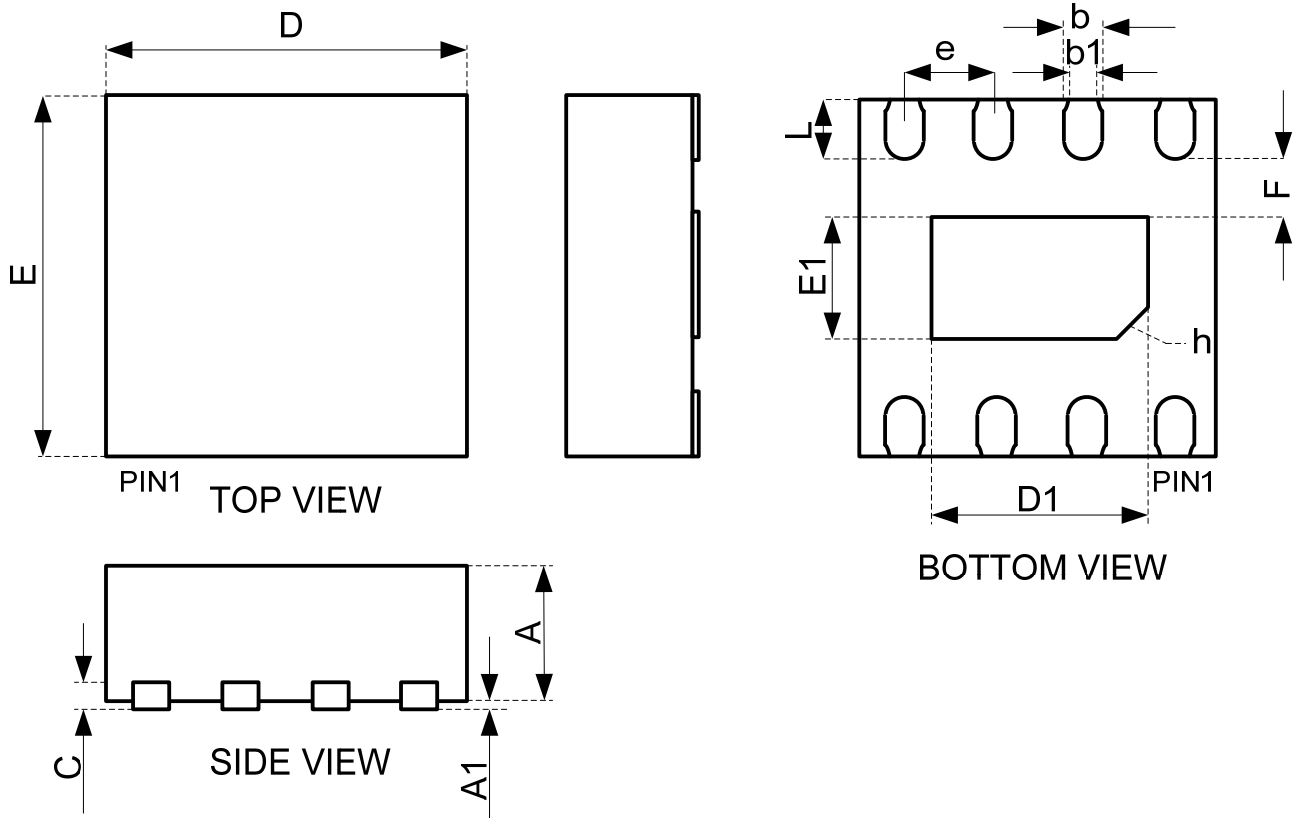
The OCP threshold is calculated by the equation:  $I_{Lim} = 5600/R3$  (current in A, resistance in ohm).

Note[1]: It takes 18ms after power on for OCP begins to detect.

### 3. Over-voltage Lockout (OVLO)


When  $V_{IN}$  exceeds 6.8V (or the set value by external resistors), the over-voltage lockout (OVLO) circuit turns off the protected power switch.

The OVP threshold is calculated by the equation:  $V_{OVLO} = 1.2 \times (1 + R1/R2)$ .

**Product dimension (DFN2X2-8L)**


Dim	Millimeters		
	MIN	Typ.	MAX
A	0.70	0.75	0.80
A1	0.000	0.020	0.050
b	0.200	0.250	0.300
b1	0.18REF		
C	0.180	0.200	0.220
D	1.900	2.000	2.100
E	1.900	2.000	2.100
D1	1.100	1.200	1.300
E1	0.600	0.700	0.800
e	0.475	0.500	0.525
L	0.300	0.350	0.400
F	0.280	0.300	0.320
h	0.230	0.280	0.330


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