Description

The P1405T6 over-voltage protection device features an ultra-low 32mΩ (typical) on-resistance high current integrated N-MOSFET which actively protects low-voltage systems from voltage supply faults up to +32VDC. An input voltage exceeding the over-voltage threshold will cause the internal MOSFET to turn off, preventing excessive voltage from damaging downstream devices. P1405T6 has thermal protection at 150°C

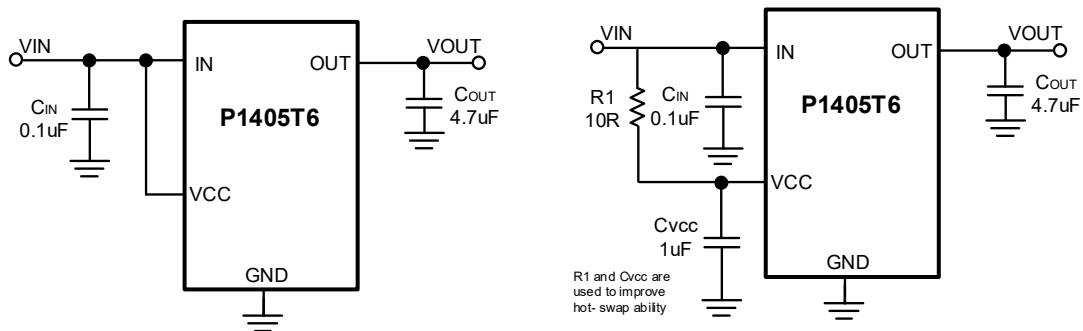The P1405T6 is available in a RoHS and Green compliant SOT23-6L package.
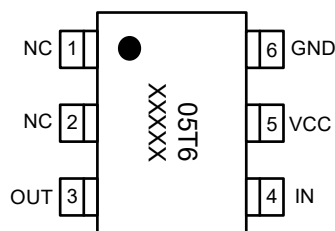
Figure 1. Typical Application

Figure 2. Pin order and Marking (Top view)

Feature

➢ Wide Input voltage range: 3.0-32V

➢ Ultra-low 32mohm On-resistance.

➢ Fixed OVP Threshold:6.0V

➢ Fast turn-off response time: 50ns

➢ Soft-start function to avoid in-rush current

➢ -40-85°C operation temperature

➢ SOT23-6L Package

Application

➢ Cellular Phones, Smart Phones, PDAs

➢ Tablet, Portable Media Players

➢ Gaming Device, Digital Cameras

Pin Definitions

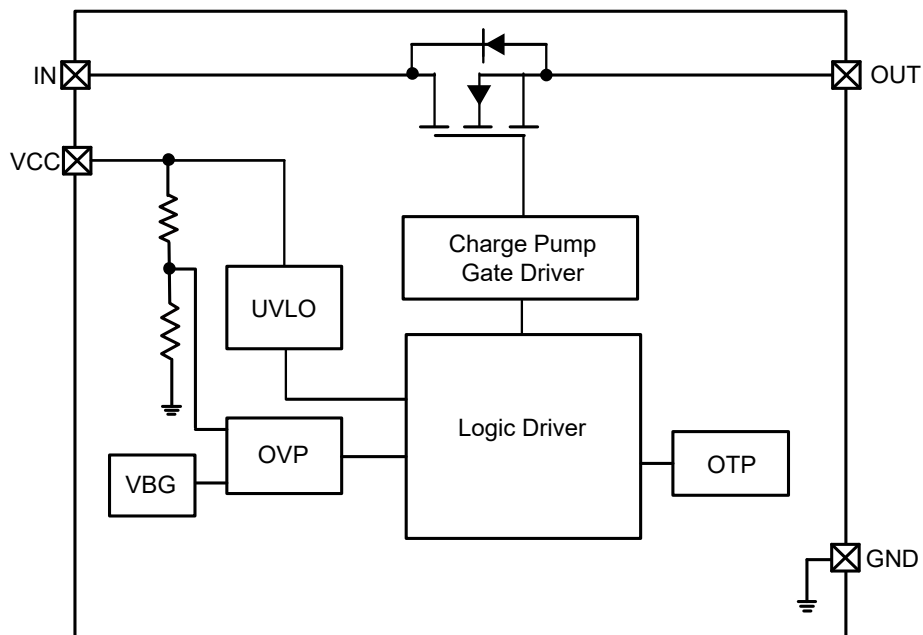| Pin#	PIN Name	Description
1,2	NC	Not connected.
3	OUT	Output Pin. Bypass with a 4.7uF capacitor from this pin to ground.
4	IN	Power Input. Bypass with a 0.1uF capacitor from this pin to ground.
5	VCC	The independent supply voltage for control logic and charge pump.
6	GND	Ground.

Block Diagram

Figure 3. IC Block Diagram

Absolute maximum rating

Parameter(Note1)	Symbol	Value	Units
IN voltage range	V_{IN}, V_{CC}	-0.3 to 32	V
OUT voltage range	V_{OUT}	-0.3 to 7	V
Junction temperature	T_J	150	℃
Lead temperature(Soldering,10s)	T_L	260	℃
Storage temperature	T_{STG}	-55 to 150	℃
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 range	V_{IN}	3.0 to 32	V
Switch Maximum Continuous Current	I_{IN}	4	A
Operating ambient temperature	T_A	-40 to 85	℃

Over voltage protector

Electrical Characteristics

（T_A=25℃，V_{IN}=5V，C_{IN}=0.1uF，C_{OUT}=4.7uF，for 5V application，unless otherwise specified.）

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Basic Operation						
Quiescent Supply Current	I_{DDQ1}	V_{IN}=5V,No load		120		uA
	I_{DDQ2}	V_{IN}=30V,No load		190		uA
UVLO Threshold Voltage	V_{UVLO}	V_{IN} Rising		2.4	3.2	V
Start-up Delay Time	T_{START_DLY}	V_{IN}=0->5V to Output ON		18		ms
Main Switch ON-Resistance	R_{ON}	V_{IN}=5V,I_{OUT}=1A		32	42	mΩ
Over-Voltage Protection						
VBUS OVP Threshold	V_{OVP}	V_{IN} Rising	5.85	6.0	6.15	V
OVP Response Time	t_{OVP}			50		ns
OVP Recovery Time	t_{R_OVP}	VIN < V_{OVP} to VOUT start rising		18		ms
Output discharge resistance	R_{DCHG}	V_{IN} > V_{OVP}		400		Ω
Thermal Protection						
Over-Temperature Protection Threshold	T_{SD}			150		℃
Over-Temperature Protection Hysteresis	T_{HYS}			20		℃

Typical Characteristics
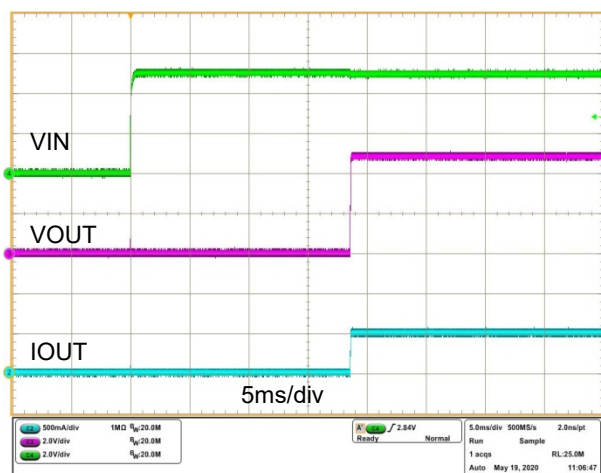

Figure 4. Start-up waveform(Rload=10Ω)
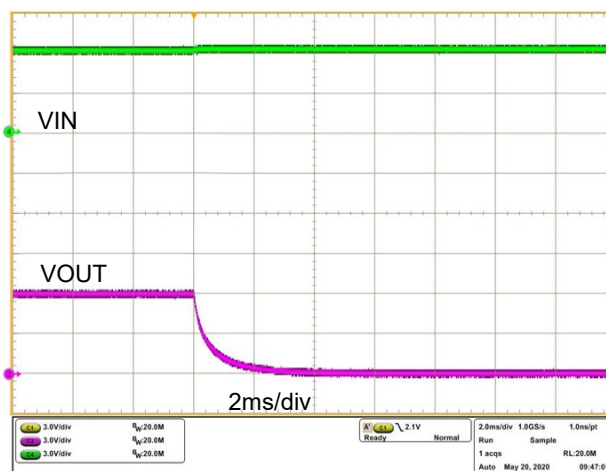
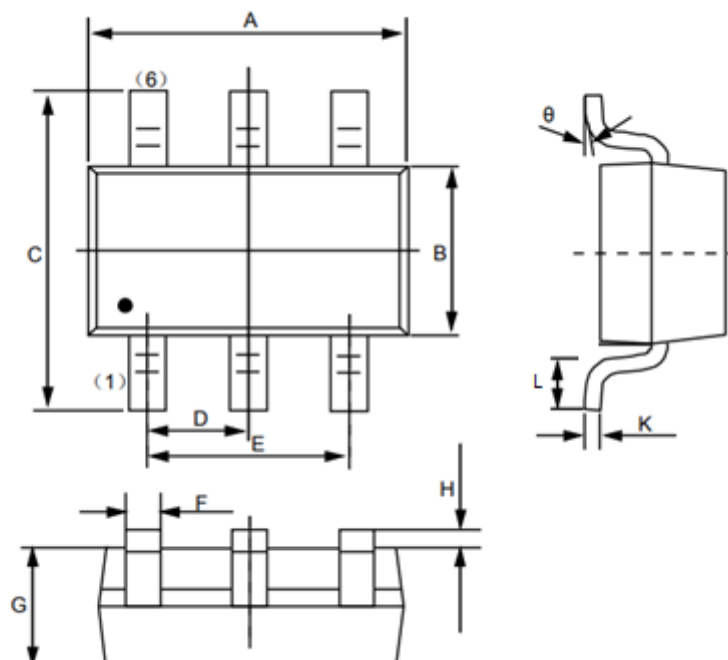Figure 5. OVP response
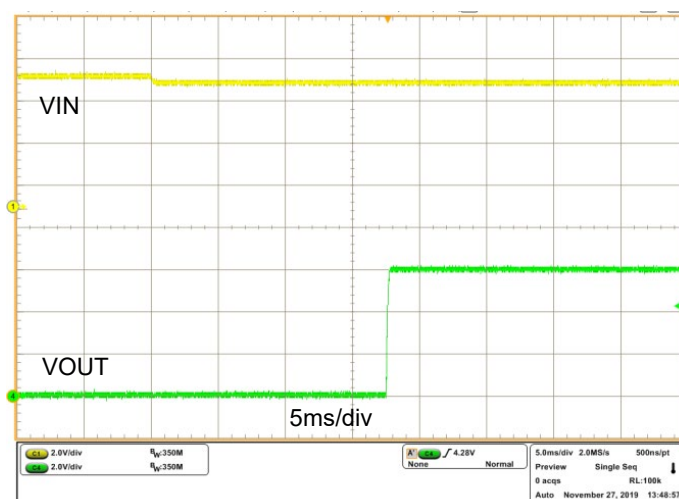
Figure 6. OVP recovery waveform

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Over voltage protector

Product dimension (SOT23-6L)

Dim	Millimeters		
	MIN	**NOM**	**MAX**
A	2.72	2.92	3.12
B	1.40	1.60	1.80
C	2.60	2.80	3.00
D	0.95BSC		
E	1.80	1.90	2.00
F	0.30	0.40	0.50
G	0.90	1.10	1.30
H	0.01	--	0.15
L	0.30	--	0.60
K	0.08	--	0.21
θ	0º	---	8º

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