WS4620H

Adjusted Current Limit Over-Voltage Protection Load Switch

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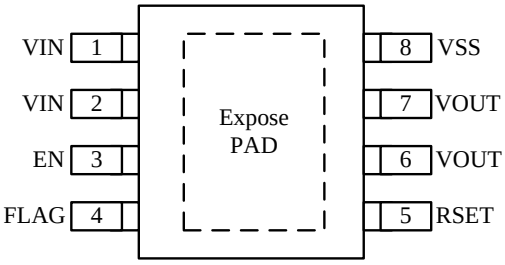
Descriptions

The WS4620H features a Low Ron internal 30V high voltage NMOS that can handle absolute maximum of $32V_{DC}$. An internal clamp is capable of shunting surge voltage 60V, protecting downstream components and enhancing system robustness. The WS4620H features over-voltage protection that powers down the internal NMOS if the input voltage exceeds the OVP threshold. The over current limit and over-temperature function can also protect the devices and the over current limit threshold is adjustable with the external RSET resistance. Exceptionally low off-state current facilitates compliance with standby power requirement.

The WS4620H is available in MSOP8-EP package. Standard product is Pb-free and Halogen-free.



MSOP8-EP
Pin Configuration (Top View)

Features

- Wide Input Voltage Range : 4.5V~30 V
- Integrated 150mΩ(@VIN=12V) NMOSFET
- Adjustable Current Limit : 0.6A~2A
- Over Voltage Protection Fixed: 15.8V
- Fast Over-Voltage Response Time : 1us(max)
- Thermal Shutdown and Short Circuit Protection
- Under Voltage Protection
- Integrated Surge Protection up to 60V
- ESD Protection
  -Human Body Model:±4kV(min)
- Pb-Free Package: MSOP8-EP

4620 **= Device code**
YW **= Month code**

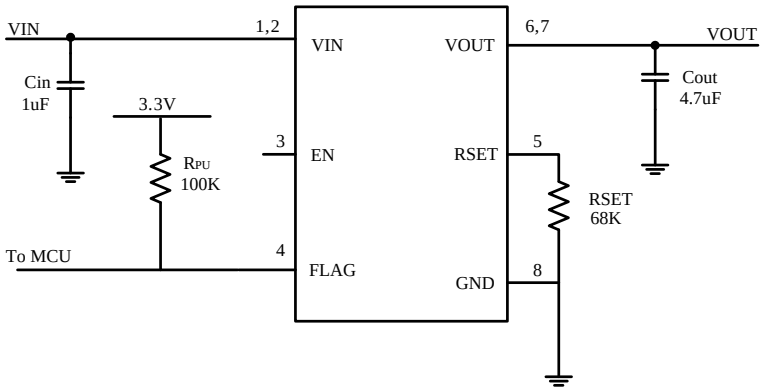
Applications

- Automotive Devices
- Tablet Computers
- Peripherals

Order information

Device	Package	Shipping
WS4620H-8/TR	MSOP8-EP	3000/Reel&Tape

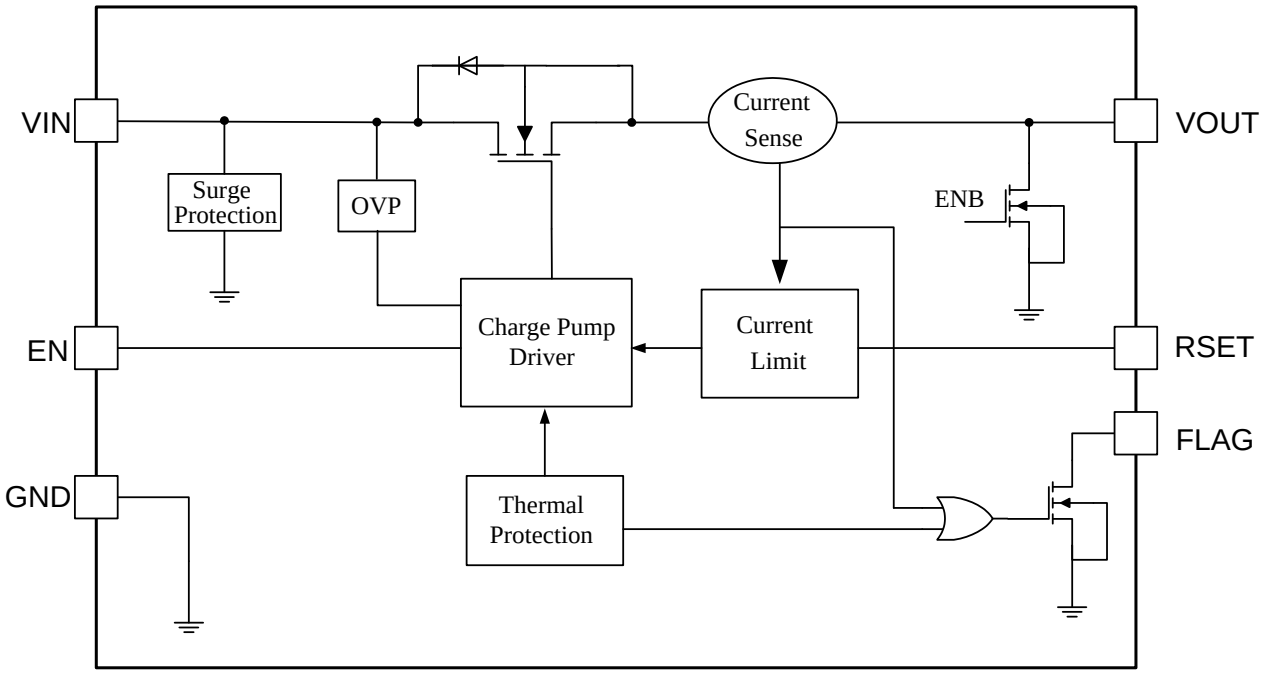
Typical Applications



Pin Descriptions

Pin Number	Symbol	Descriptions
1,2	VIN	Input Supply Voltage
3	EN	Enable Pin, Active Low
4	FLAG	Fault Flag Output Pin, Open Drain Structure, Active Low
5	RSET	Current Limit Threshold Set Pin
6,7	VOUT	Output Voltage
8	VSS	Ground

Block Diagram



Absolute maximum ratings

Parameter	Symbol	Value	Unit
VIN pin voltage range	V_{IN}	-0.3～32.0	V
VOUT to GND	V_{OUT}	-0.3~ V_{IN}+0.3	V
EN pin voltage range	V_{EN}	-0.3~6.5	V
Junction temperature	T_J	-40~150	°C
Lead temperature(Soldering, 10s)	T_L	260	°C
Storage temperature	Tstg	-55 ~ 150	°C
ESD Ratings	HBM	4000	V
	MM	300	V

These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Recommend Operating Conditions

Parameter	Symbol	Value	Unit
VIN supply input voltage range	V_{cc}	4.5～13.5	V
Operating ambient temperature	T_A	-40～85	°C
Thermal Resistance	$R_{\theta JA}$	80	°C/W

Application Information

- **Over Voltage Protection**

  The OVP and UVP threshold Voltage of the WS4620H is fixed at 15.8V and 6.5V.

- **Current Limit Protection and Output Short Protection**

  The current limit range is 0.6A to 2A that is set by the external RSET resistance. When the output voltage is shorted, the inrush current can be suppressed by the internal short protection acceleration circuit. The Equation (1) can produce the desired current limit threshold and resistor values.

  $$Ioc = 68K / Rset \quad (1)$$

- **Output Discharge**

  When the power NMOS is shut down, the NMOS in the output can pull down the output capacitor voltage which may destroy the load if existed.

- **Fault Flag Output**

  When fault states such as OVP, UVP, OCP and OTP are existed, the FLAG pin is low.

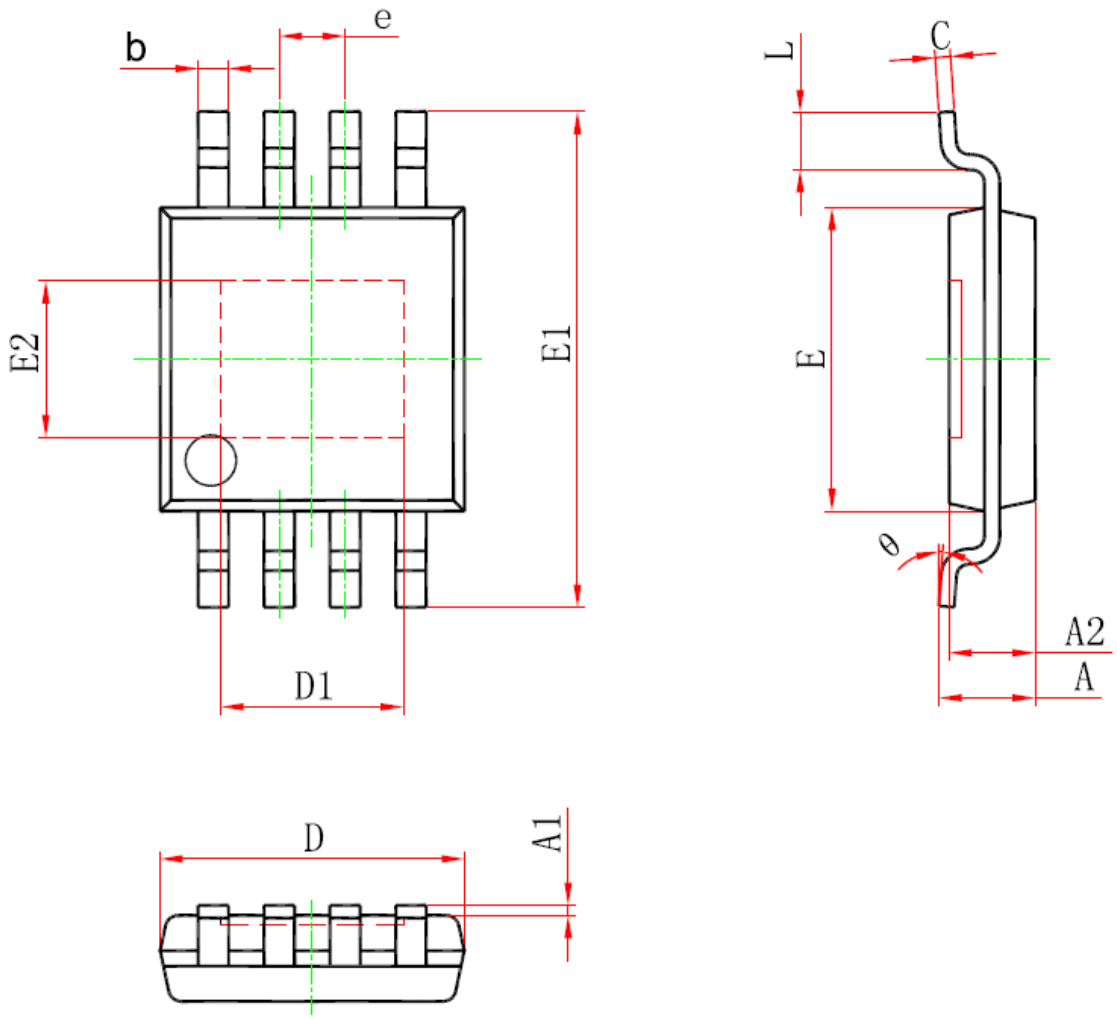
Electrical Characteristics

(Ta=25°C, V_{IN}=12V, C_{IN} = 1uF, C_{OUT} = 1uF, R_{SET} = 68K，unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Quiescent supply current	I_Q	V_{CC}=12V, V_{EN}=0V,	190	420	510	uA
Shutdown current	I_{SD}	V_{IN} =12V ,V_{EN}=3.3V	4	10	16	uA
ON resistance	R_{ON}	V_{IN}=12V, I_{OUT}=0.2A	90	150	210	mΩ
Current Limit	I_{LIMIT}	V_{IN}=12V, V_{EN}=0V, R_{SET}=68K	1			A
VIN OVP voltage	V_{OVP}		15	15.8	18	V
OVP response time	t_{OVP}				1	us
OVP hysteresis voltage	V_{HYS_OVP}			1.8		V
Start delay time	T_{START_DLY}	From EN falling edge to 10% Vout		6		ms
Output short response time	t_{SHORT}	V_{IN}=12V		2		us
Output short current overshoot	I_{SHORT_OVS}	V_{IN}=12V		5		A
Surge voltage suppression	V_{SURGE}			60		V
Flag deglitch time	t_{FLAG}	V_{IN}=12V	9	20	31	ms
Flag pull-down resistance	R_{FLAG}	V_{IN}=12V		86		Ω
Output discharge resistance	R_{DCHG}	V_{IN}=12V		100		Ω
EN high level	V_{IH}	V_{IN}=12V	1.6			V
EN low level	V_{IL}	V_{IN}=12V			0.4	V
UVLO threshold voltage	V_{UVLO}		5.5	6.6	9	V
UVLO hysteresis voltage	V_{HYS_UVLO}			0.8		V
Over-temperature protection threshold	T_{SD}	V_{IN}=12V		160		°C
Over-temperature protection hysteresis	T_{HYS}	V_{IN}=12V		18		°C

Package outline dimensions

MSOP8-EP



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
D1	1.700	1.900	0.067	0.075
e	0.65 (BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
E2	1.450	1.650	0.057	0.065
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°