

45V,350mA,2.5uA,High PSRR,Low-Dropout Voltage Regulator With Enable

Features

- Low Quiescent Current : 2.5uA
- Shutdown Current : 130nA
- Wide Input Voltage Range : 3V to 45V
- High Output Current : 350mA
- High PSRR : 73dB at 1kHz
- Low Dropout Voltage : 350mV@100mA
- Fixed Output Voltages : 1.8V, 3.0V, 3.3V and 5.0V
- Output Voltage Tolerance : $\pm 2\%$
- Fast Transient Response
- Current Limit Protection
- Short Circuit Protection
- Thermal Shutdown Protection
- Available Packages :SOT-23-5



Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
LP2985HM5-1.8/TR	SOT-23-5	85H18	REEL	3000pcs/reel
LP2985HM5-3.0/TR	SOT-23-5	85H30	REEL	3000pcs/reel
LP2985HM5-3.3/TR	SOT-23-5	85H33	REEL	3000pcs/reel
LP2985HM5-5.0/TR	SOT-23-5	85H50	REEL	3000pcs/reel

Description

The LP2985H series is an ultra-small, low dropout (LDO) linear regulator that can source 350mA of output current. The LP2985H series is designed to provide high PSRR, high input voltage, and excellent load and line transient performance.

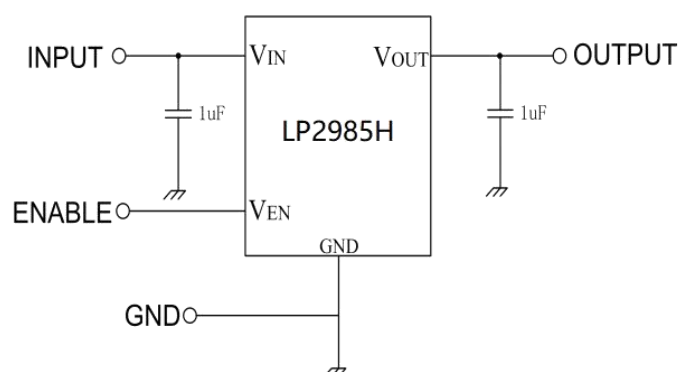
The LP2985H series has thermal shutdown, current limit, and short Circuit protections for added safety. Shutdown mode is enabled by pulling the EN pin low.

The LP2985H series contains four fixed output voltages of 1.8V, 3.0V, 3.3V and 5.0V.

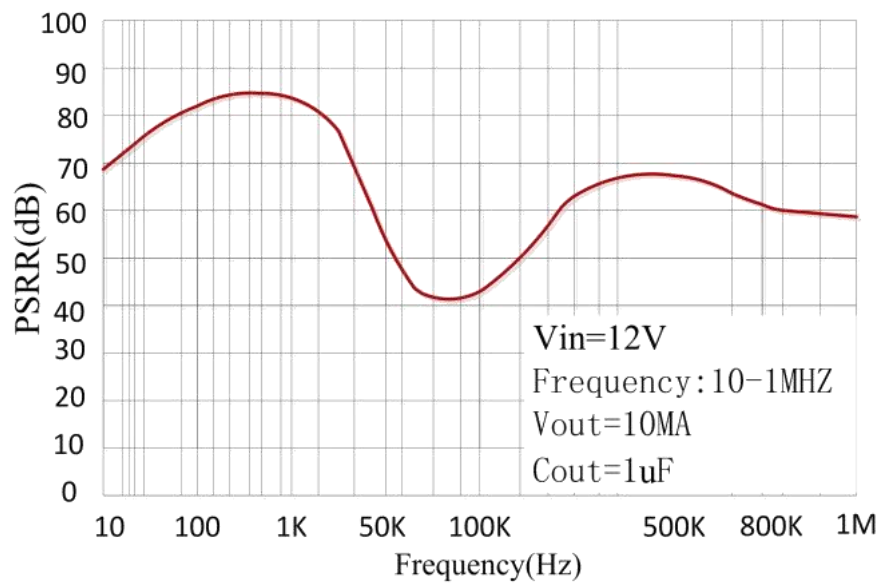
Application

- Battery-powered Equipment
- Smoke Detector and Sensor
- Micro Controller Applications
- Home Appliance

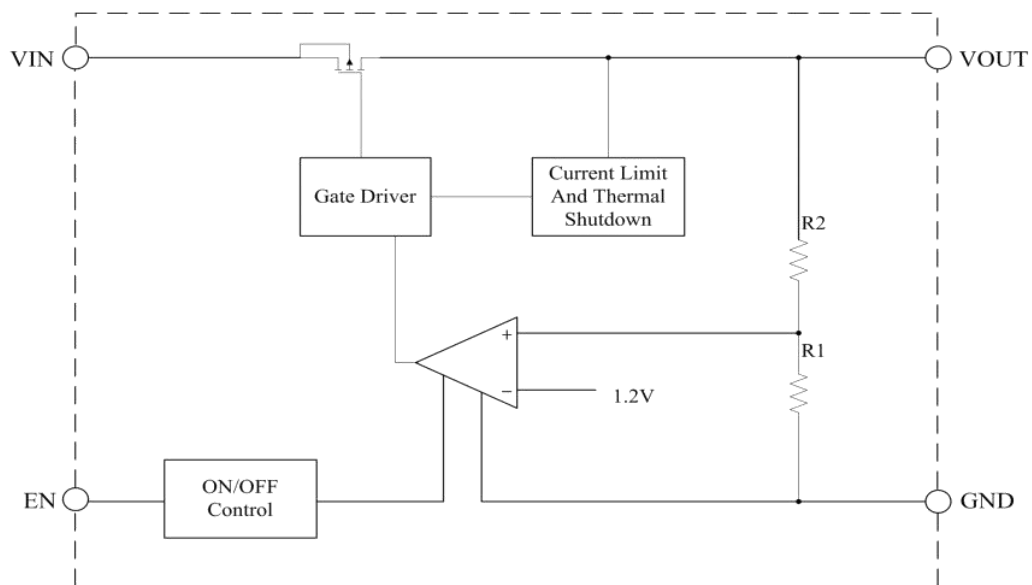
Typical Application Circuit



Power-Supply Rejection Ratio



Block Diagram



Pin Configuration



SOT23-5	Pin Name	Description
LP2985H		
1	VIN	Input Pin
2	GND	Ground Pin
3	EN	Enable pin
4	NC	No Connection
5	VOUT	Output Pin

Absolute Maximum Ratings

Item	Description	Min	Max	Unit
Voltage	VIN to GND	-0.3	55	V
	VOUT to GND	-0.3	7	V
	VIN to VOUT	-0.3	50	V
	EN to GND	-0.3	55	V
Current	Peak output current	Internally limited		
Temperature	Operating Temperature Range	-40	125	°C
	Storage Temperature	-40	150	°C
Thermal Resistance (Junction to Ambient)		200		°C/W
Power Dissipation		600		mW
Electrostatic discharge rating	Human Body Model (HBM)	4		kV
	Charged Device Model (CDM)	200		V

Note: exceeding the range specified by the rated parameters will cause damage to the chip, and the working state of the chip beyond the range of rated parameters cannot be guaranteed. Exposure outside the rated parameter range will affect the reliability of the chip.

Electrical Characteristics

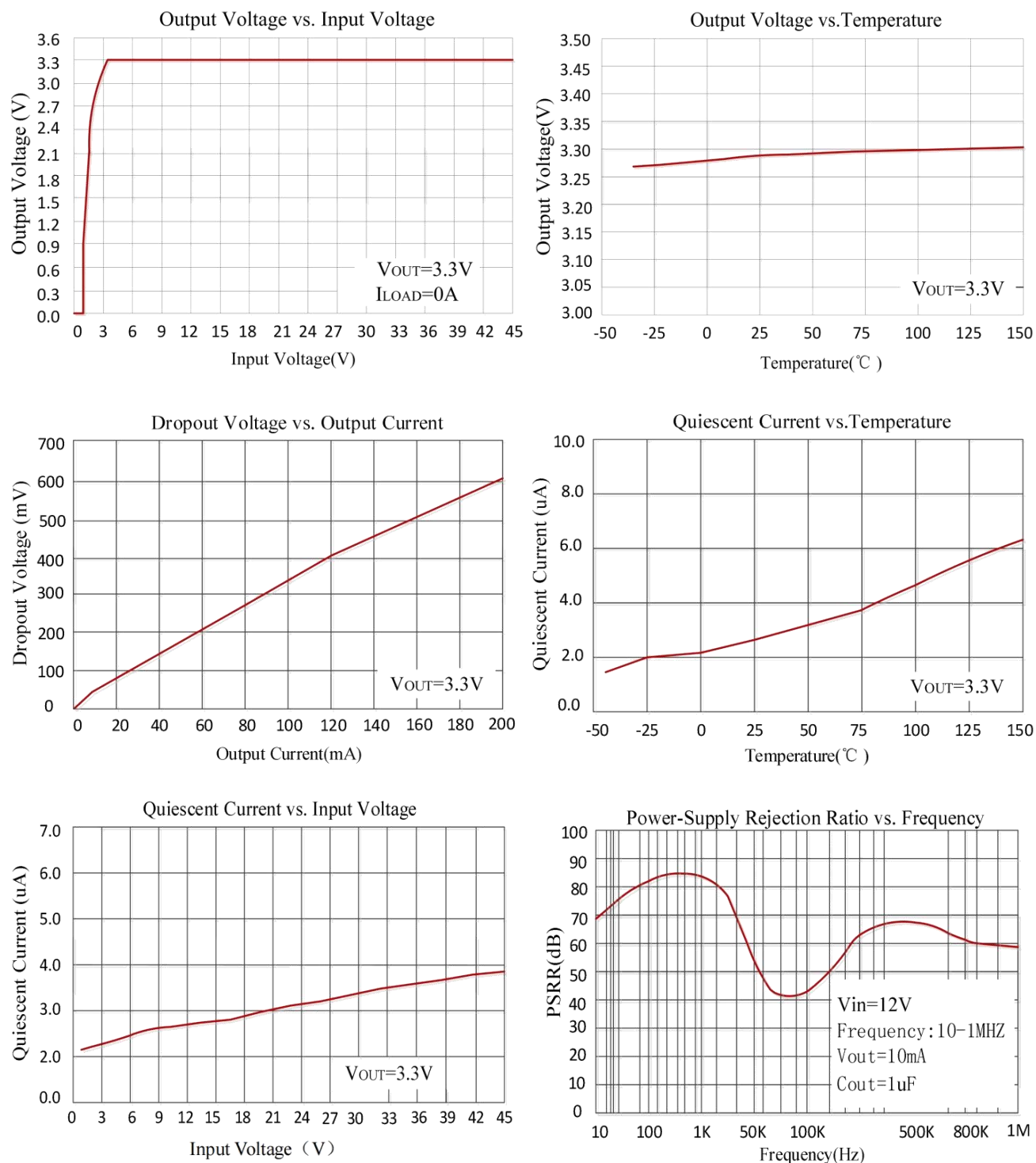
(At $T_A=25^{\circ}\text{C}$, $C_{IN}=1\mu\text{F}$, $V_{IN}=V_{OUTNOM}+1.0\text{V}$, $C_{OUT}=10\mu\text{F}$, unless otherwise noted)

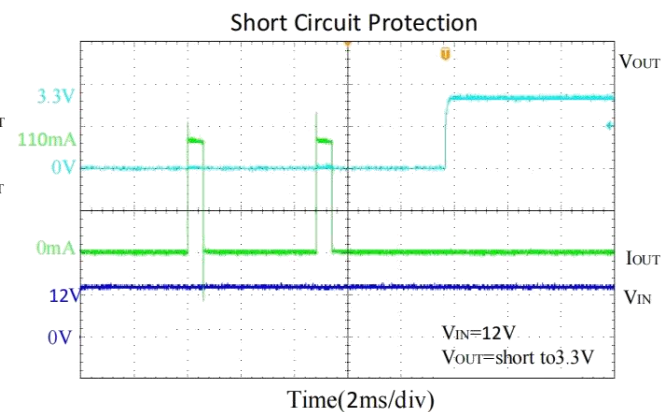
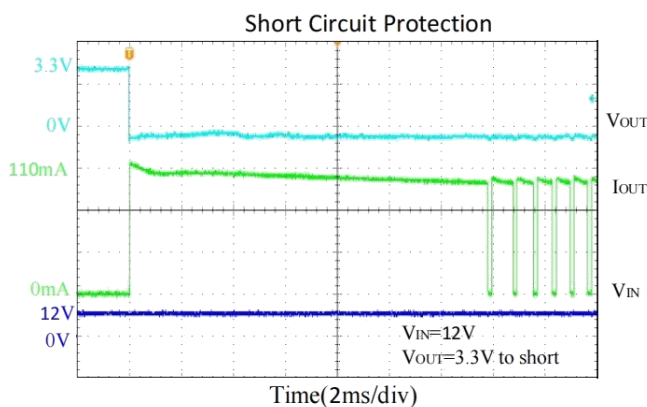
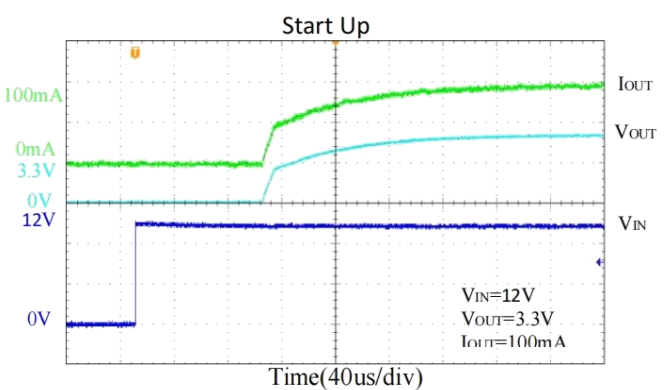
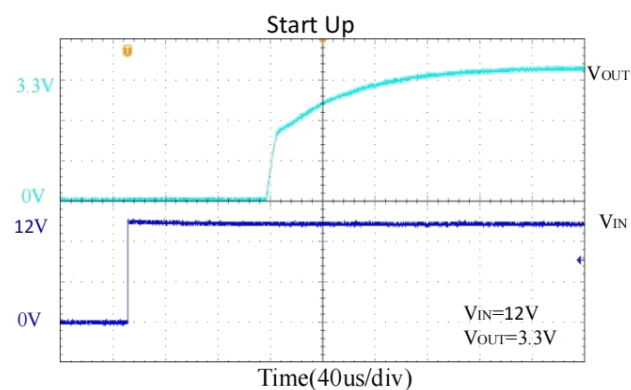
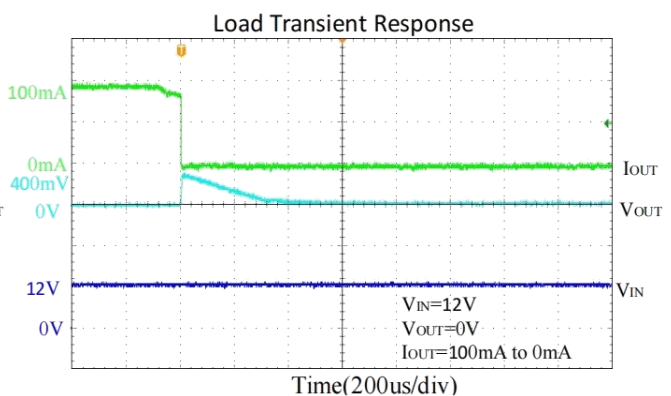
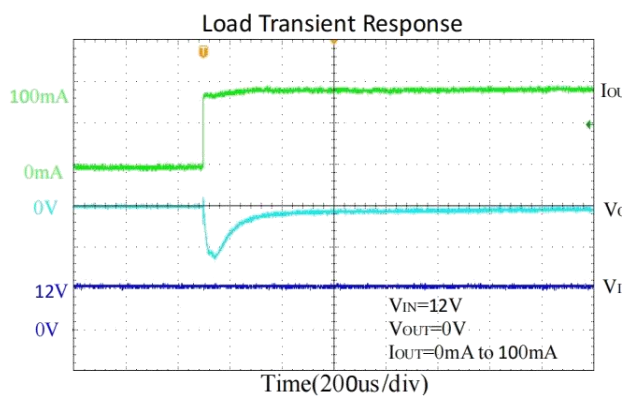
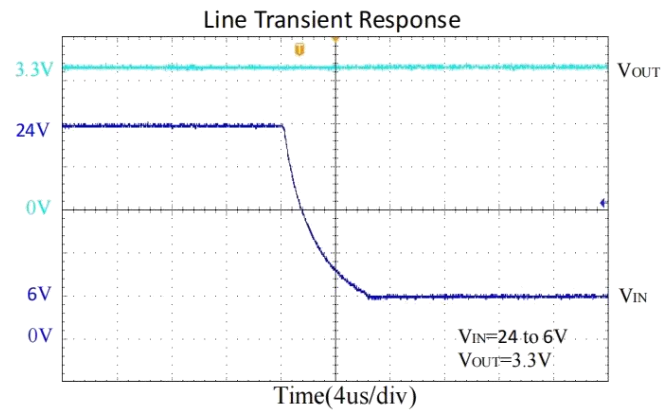
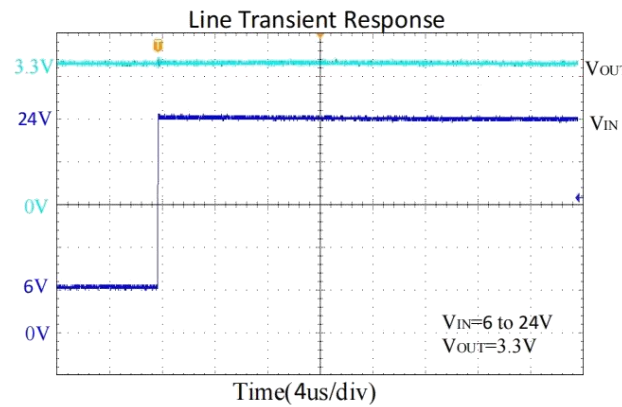
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage		3	—	45	V
I_{GND}	Quiescent Current	$V_{IN}=12\text{V}$, No load	—	2.5	—	μA
I_{SHUT}	Shutdown Current	$V_{IN}=12\text{V}$, $EN=0\text{V}$	—	130	—	nA
V_{OUT}	Output Voltage	$V_{IN}=12\text{V}$, $I_{OUT}=10\text{mA}$	$V_{OUTNOM} * 0.98$	V_{OUTNOM}	$V_{OUTNOM} * 1.02$	V
I_{OUT_MAX}	Output Current		300	350	—	mA
V_{DROP}	Dropout Voltage(1)	$I_{OUT}=10\text{mA}$, $V_{IN}=V_{OUTNOM}-0.1\text{V}$	—	35	—	mV
		$I_{OUT}=100\text{mA}$, $V_{IN}=V_{OUTNOM}-0.1\text{V}$	—	350	—	mV
$\Delta V_{OUT}/\Delta I_{OUT}$	Load Regulation	$V_{IN}=7\text{V}$, $1\text{mA} \leq I_{OUT} \leq 100\text{mA}$	—	0.1	—	mV/mA
$\Delta V_{OUT}/\Delta V_{IN}$	Line Regulation	$I_{OUT}=1\text{mA}$, $V_{OUTNOM}+0.5\text{V} \leq V_{IN} \leq 42\text{V}$	—	0.1	—	mV/V
I_{LIMIT}	Current Limit		—	500	—	mA
T_{SHDN}	Thermal Shutdown Temperature	Shutdown, temperature increasing	—	144	—	$^{\circ}\text{C}$
		Reset, temperature decreasing	—	126	—	
PSRR		$V_{IN}=10\text{V}$, $I_{OUT}=10\text{mA}$ $F=1\text{KHz}$, $V_{OUT}=3.3\text{V}$	—	73	—	dB
V_{ENH}	EN High level	Enabled	1	—	—	V
V_{ENL}	EN Low level	Shutdown	—	—	0.4	V

Note : (1) Dropout Voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

Typical Performance Characteristics

(Test Condition: $T_A=25^{\circ}\text{C}$, $V_{in}=12\text{V}$, $I_{out}=1\text{mA}$, $C_{OUT}=10\mu\text{F}$, unless otherwise note)

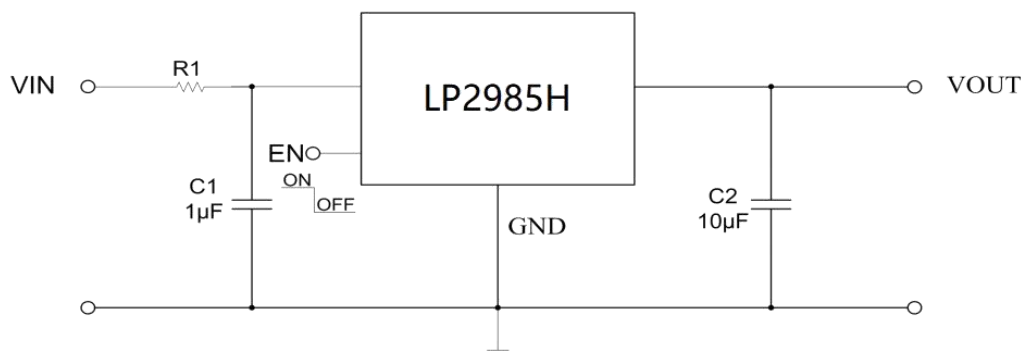




Detailed Description

Input Capacitor

A 1 μ F ceramic capacitor is recommended to connect between VIN and GND pins to decouple input power supply glitch and noise. The amount of the capacitance may be increased without limit. This input capacitor must be located as close as possible to the device to assure input stability and less noise. For PCB layout, a wide copper trace is required for both VIN and GND. When $V_{IN} \geq 18V$, it is recommended to add R1 ($R1 > 1\Omega$, The resistance shall be adjusted according to the actual application) at the input end.



Output Capacitor

An output capacitor is required for the stability of the LDO. The recommended minimum output capacitance is 1 μ F, ceramic capacitor is recommended, and temperature characteristics are X7R or X5R. Higher capacitance values help to improve load/line transient response. The output capacitance may be increased to keep low undershoot/overshoot. Place output capacitor as close as possible to VOUT and GND pins.

EN Pin Operation

The LP2985H is turned on by setting the EN pin to “H”. Since the EN pin is neither pulled down nor pulled up internally, do not set it in floating status. When the EN pin is not used, connect the EN pin with VIN to keep the LDO in operating mode.

Current Limit and Short Circuit Protection

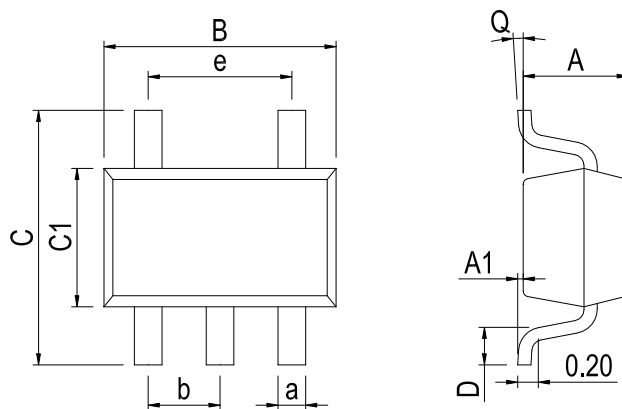
When output current at VOUT pin is higher than current limit threshold or the VOUT pin is direct short to GND, the current limit protection will be triggered and clamp the output current at a pre-designed level to prevent over-current and thermal damage.

Thermal Protection

The LP2985H has internal thermal sense and protection circuits. When excessive power dissipation happens on the device, such as short circuit at the output pin or very heavy load current with a large voltage drop across the device, the internal thermal protection circuit will be triggered, and it will shut down the power MOSFET to prevent the LDO from damage. As soon as excessive thermal condition is removed and the temperature of the device drops down, the thermal protection circuit will lease the control of the power MOSFET, and the LDO device goes to normal operation.

Physical Dimensions

SOT-23-5



Dimensions In Millimeters(SOT-23-5)										
Symbol:	A	A1	B	C	C1	D	Q	a	b	e
Min:	1.00	0.00	2.82	2.65	1.50	0.30	0°	0.30	0.95 BSC	1.90 BSC
Max:	1.15	0.15	3.02	2.95	1.70	0.60	8°	0.50		

Revision History

REVISION NUMBER	DATE	REVISION	PAGE
V1.0	2014-11	New	1-11
V1.1	2025-2	Document Reformatting	1-12

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