5V, 3.5A Low Side Load Switch

DESCRIPTION

HM9713 is a low side load switch that is capable of providing a low resistance path between negative load terminal and the ground terminal and limits the load current up to 3.5A. The internal load switch is a low RDSON MOSFET minimizing power dissipation during normal operation. During a short-circuit event, it enters into a hiccup mode where the power switch turns on and off periodically to prevent heating up of the IC due to high power and detect when the dead short condition is removed in order to automatically restart again. It also has other protection such as input UVLO, and over temperature protection.

HM9713 is housed in a tiny SOT23-6 package.

FEATURES

- **Adjustable Current limit up to 3.5A**
- **Low RDSON: 55 mΩ**
- **Hiccup during Dead Short**
- **SOT23-6 Package**

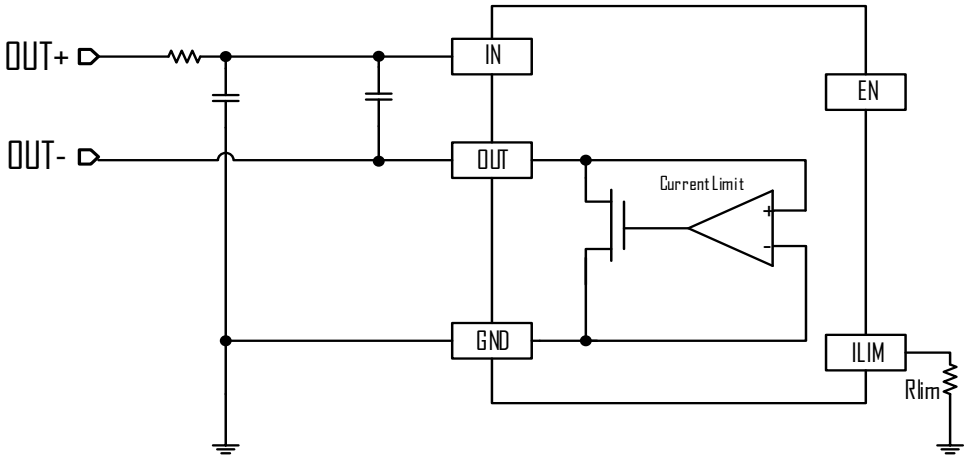
APPLICATIONS

- USB ports
- Power bank
- Notebook computer

ORDERING INFORMATION

PART	PACKAGE PIN	TOP MARK
HM9713MR	SOT23-6	ADYW AD: Product ID YW: Date Code

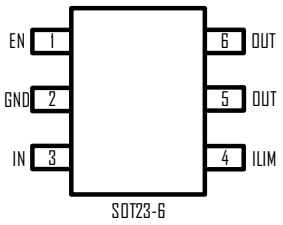
TYPICAL APPLICATION



$$Ilim = \frac{3300}{\text{Rlim}}\ (A)$$

Typical Application Circuit

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

All Pin Voltage .....–0.3V to 6.5V
SW to ground current.....Internally limited
Operating Temperature Range .....–40°C to 85°C
Storage Temperature Range .....–55°C to 150°C
Thermal Resistance θ_{JA}
SOT23-6 .....190 ..... °C/W

ELECTRICAL CHACRACTERISTICS

(V_{IN} =5V, unless otherwise specified. Typical values are at TA = 25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Voltage Range		2.5		5.5	V
Input Clamped Voltage			5.5		V
Input UVLO	Rising, Hysteresis=250mV		2.35		V
Input Supply Current	R_{ILIM}=20K		100		uA
Input Shutdown Current			0.5	1.5	uA
Power Switch On Resistance	I_{SW} =500mA		50		mΩ
	I_{SW} =500mA, -40°C≤T_J≤120°C			80	mΩ
Current limit Threshold	R_{ILIM}=1K		3.5		A
	R_{ILIM}=2K		1.75		A
	R_{ILIM}=3.5K		1.00		A
Current limit Foldback	R_{ILIM}=1K		1		A
Current limit Foldback Voltage			VIN-1V		V
Short-circuit hiccup on time			10		ms
Short-circuit hiccup off time			160		ms
EN input pull-up resistance			2000		kΩ
EN Input Logic High threshold				1	V
EN Input Logic Low threshold		0.66			V
Thermal Shutdown			160		°C
Thermal Shutdown Hysteresis			15		°C

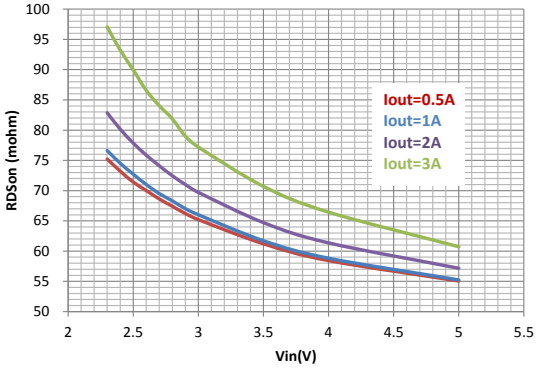
PIN DESCRIPTION

PIN #	NAME	DESCRIPTION
1	EN	Enable pin. Tie high to enable the power switch, tie low to disable.
2	GND	Ground
3	IN	Input power for internal circuitry. Bypass with a 10uF cap to OUT and a 1uF cap to GND.
4	ILIM	Curernt limit external setting pin. Connect a resistor (Rlim) between this pin and ground to set the current limit. And it follows the equation: I_{lim}=3300/R_{lim} (A)
5,6	OUT	Output power pin. Connect to the negative terminal of the external load

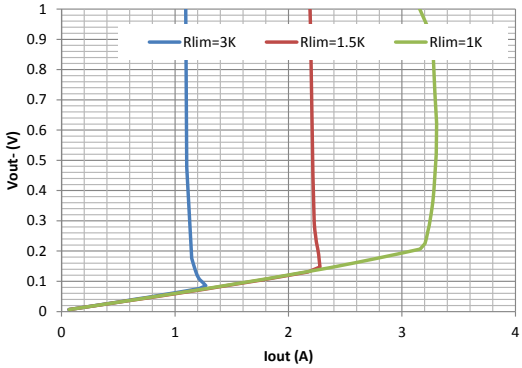
TYPICAL CHARACTERISTICS

(Typical values are at TA = 25°C unless otherwise specified.)

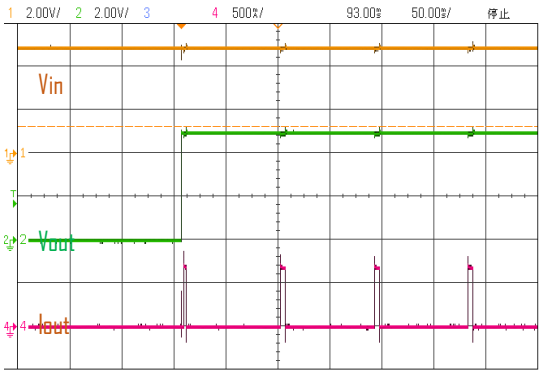
Power Switch Rdson Vs. Vin



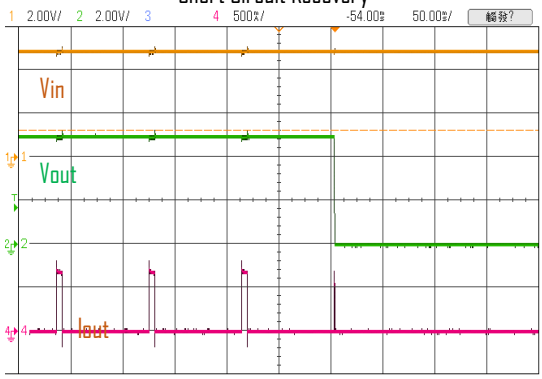
V_{OUT-} Vs. I_{out} at diffreent R_{lim} setting



Short Circuit Proection

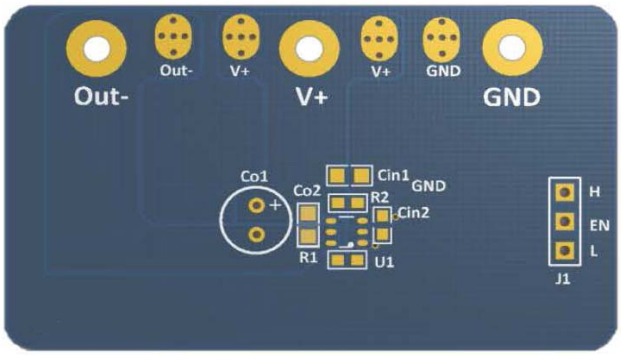


Short Circuit Recovery



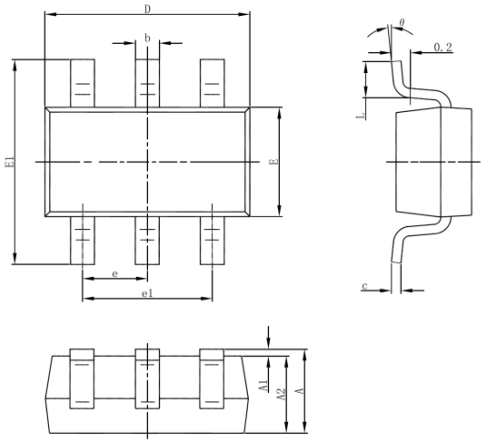
PCB GUIDELINE

To guarantee a good output current control characteristic, the output capacitance is always recommended to be as large as possible, such as a 10uF MLCC capacitor in parallel with a 100uF electrolytic capacitor as shown in the demo board below. Please also refer to the demo board that to place the input capacitor and output capacitor just next to the chip.



PACKAGE OUTLINE

Package:SOT23-6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°