

## One Cell Lithium-ion/Polymer Battery Protection IC

### ■ GENERAL DESCRIPTION

The FH7003 product is a high integration solution for lithium- ion/polymer battery protection. FH7003 contains advanced power MOSFET, high-accuracy voltage detection circuits and delay circuits. FH7003 is put into an ultra-small SOT-23-5L package and only one external component makes it an ideal solution in limited space of battery pack. FH7003 has all the protection functions required in the battery application including overcharging, over-discharging, over-current and load short circuiting protection etc. The accurate overcharging detection voltage ensures safe and full utilization charging.

The low standby current drains little current from the cell while in storage.

The device is not only targeted for digital cellular phones, but also for any other Li-Ion and Li-Poly battery-powered information appliances requiring long- term battery life.

### ■ APPLICATIONS

- One-Cell Lithium-ion Battery Pack
- Lithium-Polymer Battery Pack

### ■ Typical Application Circuits

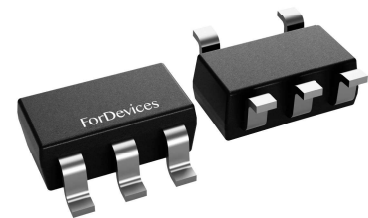
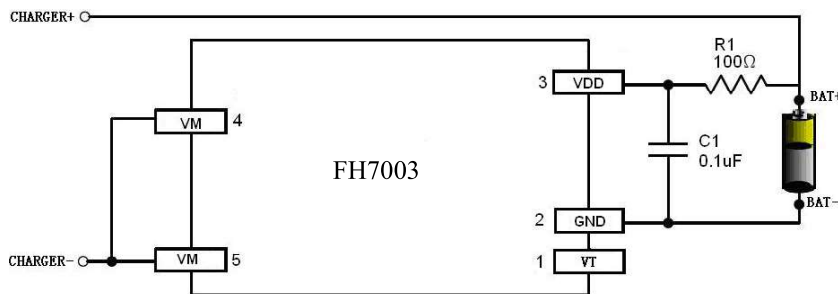


Figure 1. Typical Application Circuit

### ■ FEATURES

- Protection of Charger Reverse Connection
- Protection of Battery Cell Reverse Connection
- Integrate Advanced Power MOSFET with Equivalent of 54mΩ  $R_{SS(ON)}$
- Ultra-small SOT-23-5L Package
- Only One External Capacitor Required
- Over-temperature Protection
- Overcharge Current Protection
- Two-step Over-current Detection:
  - Over-discharge Current
  - Load Short Circuiting
- Charger Detection Function
- 0.0V Battery Charging Function
- Delay Times are generated inside
- High-accuracy Voltage Detection
- Low Current Consumption
- Operation Mode: 2.8μA typ.
- Power-down Mode: 1.5μA typ.
- RoHS Compliant and Lead (Pb) Free

## ■ PIN CONFIGURATION

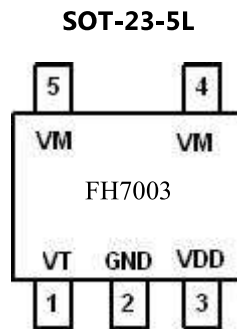


Figure 2. PIN Configuration

## ■ PIN DESCRIPTION

PIN NUMBER	PIN NAME	PIN DESCRIPTION
1	VT	Test pin; only for vendor not used by application
2	GND	Ground, connect the negative terminal of the battery to this pin
3	VDD	Power Supply
4,5	VM	The negative terminal of the battery pack. The internal FET switch connects this terminal to GND

## ■ ABSOLUTE MAXIMUM RATINGS

(Note: Do not exceed these limits to prevent damage to the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

PARAMETER	VALUE	UNIT
VDD input pin voltage	-0.3 to 6.0	V
VM input pin voltage	-6 to 10.0	V
Operating Ambient Temperature	-40 to 85	°C
Maximum Junction Temperature	125	°C
Storage Temperature	-55 to 150	°C
Lead Temperature ( Soldering, 10 sec)	300	°C
Power Dissipation at T=25°C	0.4	W
Package Thermal Resistance (Junction to Ambient) $\theta_{JA}$	250	°C/W
Package Thermal Resistance (Junction to Case) $\theta_{JC}$	130	°C/W
ESD	2000	V

## ■ ORDERING INFORMATION

PART NUMBER	[VCU](V)	[VCL](V)	[VDL](V)	[VDR](V)	[IOV1](A)	Package	Top Mark	SPQ
FH7003AM5	4.30	4.10	2.40	3.0	3	SOT-23-5L	**YW <sub>(note)</sub>	3000PCS/Reel

Note:

- “YW” is manufacture date code, “Y” means the year, “W” means the week
- FH7003 devices are Pb-free and RoHs compliant.
- The surface prints of our semiconductor devices are subject to change during the production process and do not involve changes in electrical parameters, and we will not separately state the notice.

### Note:

- The information described herein is subject to change without notice.
- ForDevices Inc. is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.
- Use of the information described herein for other purposes and/or reproduction or copying without the express permission of ForDevices Inc. is strictly prohibited.
- The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of ForDevices Inc.
- Although ForDevices Inc. exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.

➤ Update by Oct.2018