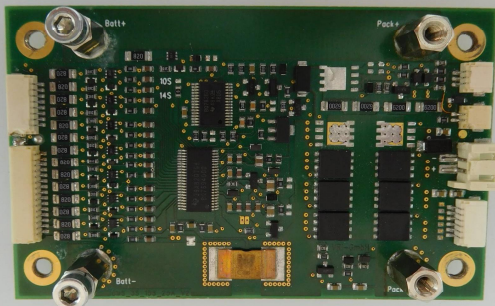


# Data Sheet

# VR-I6-15S-P-25A

## Adjustable 6-15S Li-ion/LiFePO4 Battery Protection Circuit Module (PCM)



### FEATURES

- For 6-15 cell Li-ion, LiFePO4 battery pack
- Up to 25A charge/discharge current
- High-accuracy voltage detection circuit
- Low current consumption
- Over charge/discharge protection
- Over current/short-circuit protection
- Temperature Monitoring of cell
- Passive Balancing Technology
- Smart Battery System 1.1 Compliant via SMBus.
- Fully Programmable Voltage, Current, Balance, and Temperature-Protection features.
- Lead Free (RoHS)
- ESD protection

### APPLICATION

- Lithium-ion/LiFePO4 rechargeable battery pack protection for Mobility Devices (E-Bike, E-scooter)

The VR-I6-15P-25A is a microprocessor based lithium-ion/LiFePO4 rechargeable battery pack protection module incorporating high accuracy cell state detection, passive balance and Gas Gauge control circuits.

Is suitable for 6 up to 15-cell configuration and is ideal for soft/hard battery pack assembling.

### Absolute maximum ratings

Item	Min	Typ	Max	Unit
Voltage between terminals of B+ and B- (depends on the number of cells)	-0.2		+75.0	V
Voltage between terminals of P+ and P- (depends on the number of cells)	-0.2		+100.0	V
Operating temperature	0		+50	°C
Storage temperature	-45		+85	°C
Operating humidity			85%	%RH
Storage humidity			85%	%RH

### Electrical specs (part 1)

@Ta=25°C

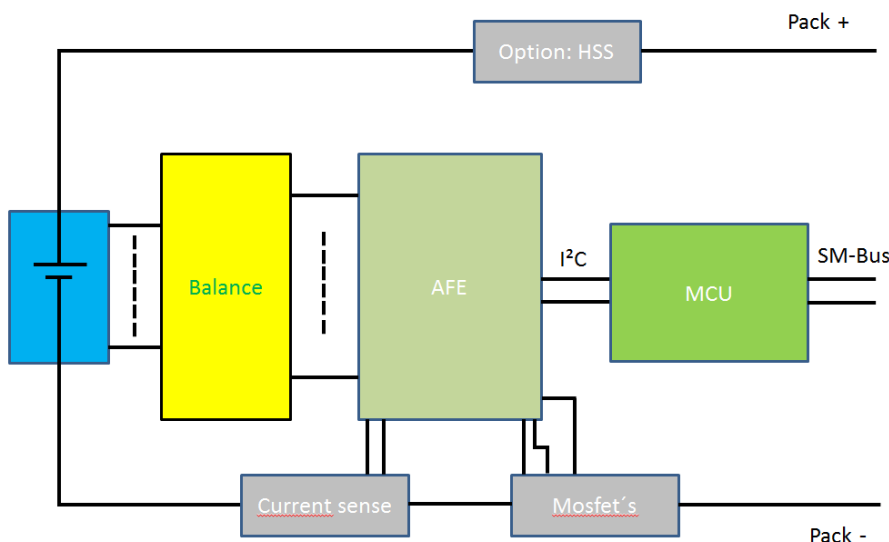
Item	Min	Typ	Max	Unit
Cell Voltage Measurement range	2.0		5.0	V
Cell Voltage Measurement resolution		<1		mV
Cell Voltage Accuracy (typ) ( 0° C~ 60° C )		±25		mV
Over Current Charge/Discharge Threshold ( <i>user definable</i> )	5		200	A
Over Current Charge/Discharge Accuracy		±1		A
Over Current Charge/Discharge Step Size		500		mA
Over Current Charge/Discharge Time ( <i>user definable</i> )	0.9		106	ms
Short-Circuit Discharge Threshold ( <i>user definable</i> )	5		200	A
Short-Circuit Discharge Accuracy		±6.0		A
Short-Circuit Discharge Step Size		3.0		A
Short Circuit Time ( <i>user definable</i> )	0.1		3.2	ms
Current Sense Measurement range		±270		A
Current Measurement resolution		1		mA
Current Measurement Error		6%		
Continuos Charge/discharge current			25	A
Precharging Current		70		mA
Balancing Current		40		mA

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Electrical specs (part 2)				@Ta=25°C
Item	Min	Typ	Max	Unit
Ext. Temp. Measurement Range	-40		+85	°C
Ext. Temp. Measurement Resolution		0.1		°C
Ext. Temp. Measurement Accuracy ( 0°C ~ +85°C )		±3		°C
Internal Temp. Measurement Range	-30		+85	°C
Internal Temp. Measurement Resolution		0.1		°C
Internal Temp. Measurement Accuracy (typ) ( 0°C ~ +85°C )		±3		°C
Current consumption in Operating mode		780	845	µA
Current consumption in Standby mode		340	360	µA
Current consumption in Ship mode		0.7	2.8	µA
Current consumption in Protection mode				µA
Current Sense Resistor (package: SMD5931 5W)		1		mΩ
Total circuit-Impedance (Mos Rdss + track impedance)			TBD	mΩ

### Functional Block digram & Basic Function

The module VR-I6-15S-P-25A provides complete programmability of the parameters of protection and management of the battery pack, so the detailed specifications are outlined in a document provided on request.



Funktional block diagram

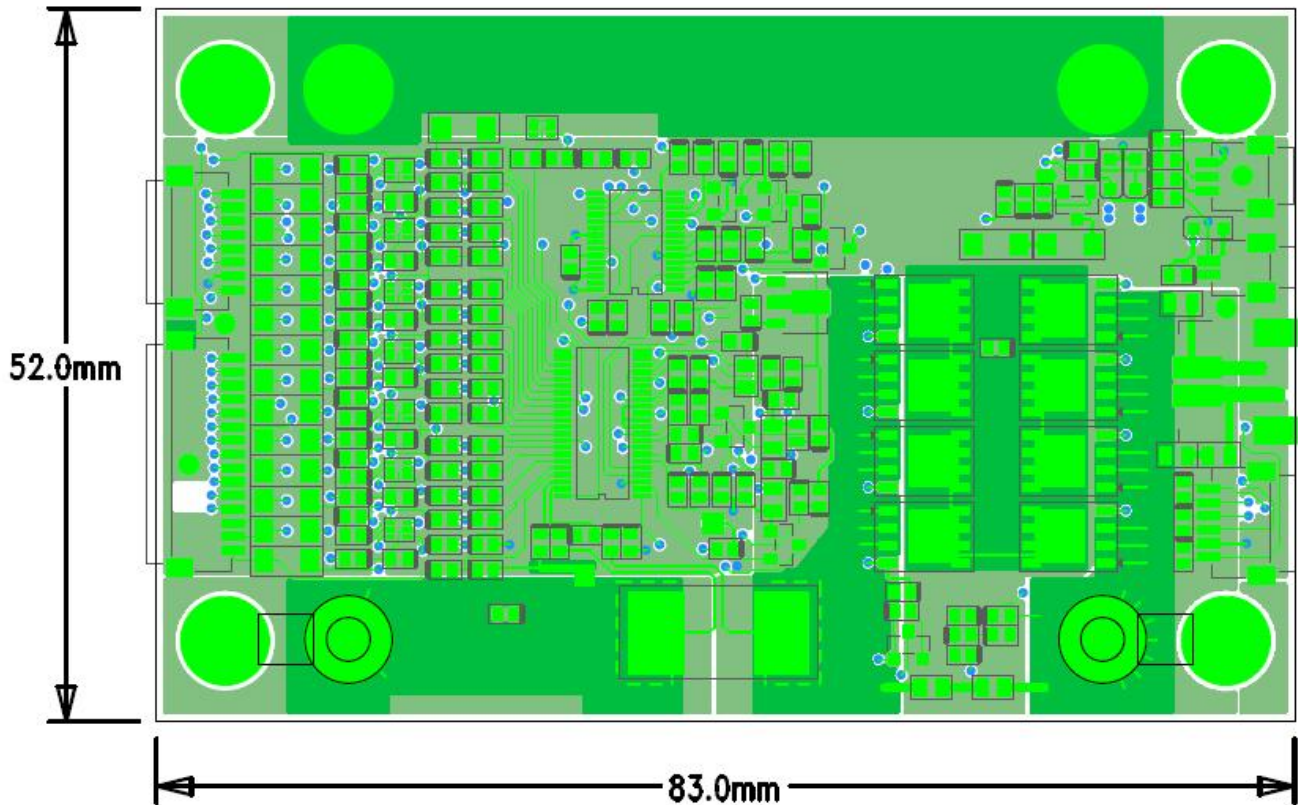
### Basic Function:

- Rate of Change detection of all important cell characteristics (Voltage, Current, Temperature)
- Passive Balancing Technology
- High-Resolution Delta-Sigma Coulomb counter for precise measurements and gas gauging.
- Multiple Independent Delta-Sigma ADCs: One-per-Cell Voltage, Plus Separate Temperature, Current, and Safety.
- Simultaneous, Synchronous Measurement of Pack Current and Individual Cell Voltages.
- Accurate Temperature Monitoring of Cells with up to 3 Sensors.
- Fail-Safe operation of Pack Protection Circuits by three MOSFET controlled line.
- Fully Programmable Voltage, Current, Balance, and Temperature-Protection features.
- Smart Battery System 1.1 Compliant via SMBus.

## Protection Circuit Module

### Mechanical specs

PCB material	FR4			
Dimensions, components inclusive	(W) 52±0.3	(L) 84±0.3	(H) 7.3 max	mm



### Legal requirements

Observed directive	UL 94V-0
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### Revision History

A	09/20/2016	Issued (Karl Thorwart)