

# MD1421ExxCPAL Series

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## Outline

The MD1421ExxCPAL series are protection IC with integrated MOSFET for protection of the rechargeable lithium-ion or lithium-polymer battery. The overcharge, overdischarge and discharging and charging overcurrent protection of the rechargeable one-cell lithium-ion or lithium-polymer battery can be detected.

## Product Series

For one-cell

## Features

### 1. Range and accuracy of detection/release voltage

- Overcharge detection voltage 4.10V to 4.45V, 5mV steps Accuracy±20mV
- Overcharge release voltage 3.90V to 4.30V (Note1) Accuracy±50mV
- Overdischarge detection voltage 2.00V to 3.00V (Note2) Accuracy±100mV
- Overdischarge release voltage 2.00V to 3.20V (Note2) Accuracy±100mV
- Discharge overcurrent detection voltage 40mV to 180mV, 5mV steps Accuracy±5mV
- Charging overcurrent detect voltage -180mV to -50mV, 5mV step Accuracy±15mV
- Short detection voltage Selection from 0.56, 0.90V Accuracy±100mV
- Over voltage charger detection voltage VDD-8.0V fixed Accuracy±2.0V
- Over voltage charger release voltage VDD-7.3V fixed Accuracy±1.5V

### 2. Range of detection delay time

- Overcharge detection delay time Selection from 1.0s, 4.5s, 6.25s
- Overdischarge detection delay time Selection from 100ms, 256ms
- Discharging overcurrent detection delay time Selection from 8ms, 12ms, 16ms, 20ms, 34ms
- Charging overcurrent detection delay time Selection from 8.5ms, 25ms, 32.5ms
- Short detection delay time Selection from 0.50ms, 0.75ms, 1.00ms

### 3. 0V battery Charge function Selection from "Permission" or "Prohibition"

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4. The overcharge detection delay timer reset time function(function for the pulse charge) is provided.fixed
5. Low current consumption
  - Normal mode Typ. 3.0μA, Max. 5.2μA
  - Stand-by mode Max. 0.1μA (For "Charger connection release" the overdischarge release condition.)  
Max. 0.5μA (For "Voltage release" the overdischarge release condition.)
6. MOS-FET Source to Source on state resistance Typ. 38.0mΩ (@VCC=3.7V)

Note1 : Hysteresis voltage between Overcharge detection and release voltage is selectable from 0.10V/0.15V/0.20V/0.25V

Note2 : Please inquire to us about details of the setting of Overdischarge detection and release voltage.

## Specifications

Product name	Package	OV battery charge function	Overcharge detection voltage [V]	Overcharge release voltage [V]	Overdischarge detection voltage [V]	Overdischarge release voltage [V]
MD1421E28CPAL-R	PLP-4-1228	Permission	4.375	4.175	3.000	3.000
MD1421E34CPAL-R	PLP-4-1228	Permission	4.375	4.175	3.200	3.000
MD1421E35CPAL-R	PLP-4-1228	Prohibition	4.425	4.225	2.700	2.700
MD1421E36CPAL-R	PLP-4-1228	Permission	4.425	4.225	2.800	2.800
MD1421E39CPAL-R	PLP-4-1228	Prohibition	4.280		2.700	2.700
MD1421E41CPAL-R	PLP-4-1228	Prohibition	4.280	4.180	2.700	2.700
MD1421E43CPAL-R	PLP-4-1228	Prohibition	4.270	4.070	3.000	3.000
MD1421E44CPAL-R	PLP-4-1228	Permission	4.425	4.225	3.200	3.000
MD1421E48CPAL-R	PLP-4-1228	Permission	4.425	4.225	3.000	3.000
MD1421E50CPAL-R	PLP-4-1228	Prohibition	4.280	4.180	2.700	2.700
MD1421E51CPAL-R	PLP-4-1228	Prohibition	4.425		2.800	2.800

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MD1421E54CPAL-R	PLP-4-1228	Permission	4.425	4.225	3.200	2.700
MD1421E59CPAL-R	PLP-4-1228	Permission	4.410	4.210	3.000	3.000
MD1421E60CPAL-R	PLP-4-1228	Permission	4.480	4.280	3.000	3.000
MD1421E62CPAL-R	PLP-4-1228	Permission	4.475	4.275	3.000	2.800
MD1421E63CPAL-R	PLP-4-1228	Permission	4.270	4.070	3.000	3.000
MD1421E65CPAL-R	PLP-4-1228	Permission	4.455	4.255	2.900	2.500
MD1421E66CPAL-R	PLP-4-1228	Permission	4.495	4.295	2.900	2.300

Product name	Discharging overcurrent detection voltage [V]	Charging overcurrent detection voltage [V]	Short detection voltage [V]	Overcharge detection delay time [s]	Overdischarge detection delay time [ms]	Discharging overcurrent detection delay time [ms]	Charging overcurrent detection delay time [ms]
MD1421E28CPAL-R	0.040	-0.0500	0.900	1.000	100.0	12.0	8.5
MD1421E34CPAL-R	0.040	-0.0500	0.900	1.000	100.0	12.0	8.5
MD1421E35CPAL-R	0.070	-0.0700	0.560	1.000	100.0	20.0	8.5
MD1421E36CPAL-R	0.085	-0.0950	0.900	1.000	100.0	20.0	8.5
MD1421E39CPAL-R	0.080	-0.0800	0.900	1.000	100.0	20.0	8.5
MD1421E41CPAL-R	0.120	-0.1200	0.900	1.000	100.0	20.0	8.5
MD1421E43CPAL-R	0.040	-0.0500	0.560	1.000	100.0	12.0	8.5
MD1421E44CPAL-R	0.040	-0.0500	0.900	1.000	100.0	12.0	8.5
MD1421E48CPAL-R	0.040	-0.0500	0.900	1.000	100.0	12.0	8.5
MD1421E50CPAL-R	0.140	-0.0900	0.900	1.000	100.0	12.0	8.5
MD1421E51CPAL-R	0.085	-0.0950	0.900	1.000	100.0	20.0	8.5
MD1421E54CPAL-R	0.110	-0.0500	0.900	1.000	100.0	48.0	8.5
MD1421E59CPAL-	0.040	-0.0800	0.560	1.000	100.0	12.0	8.5

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R	0.080	-0.1300	0.900	1.000	100.0	20.0	25.0
MD1421E60CPAL-R	0.080	-0.1300	0.900	1.000	100.0	20.0	25.0
MD1421E62CPAL-R	0.080	-0.0900	0.560	1.000	100.0	12.0	8.5
MD1421E63CPAL-R	0.040	-0.0500	0.560	1.000	100.0	12.0	8.5
MD1421E65CPAL-R	0.160	-0.1750	0.560	1.000	100.0	12.0	8.5
MD1421E66CPAL-R	0.180	-0.1800	0.560	1.000	100.0	20.0	32.5

Product name	Short detection delay time [ms]	Discharge current limit [A]	Charge current limit [A]
MD1421E28CPAL-R	0.500	1.050	1.300
MD1421E34CPAL-R	0.500	1.050	1.300
MD1421E35CPAL-R	0.750	1.800	1.800
MD1421E36CPAL-R	0.750	2.200	2.450
MD1421E39CPAL-R	0.750	2.050	2.050
MD1421E41CPAL-R	0.750	3.100	3.100
MD1421E43CPAL-R	0.500	1.050	1.300
MD1421E44CPAL-R	0.500	1.050	1.300
MD1421E48CPAL-R	0.500	1.050	1.300
MD1421E50CPAL-R	0.500	3.600	2.300
MD1421E51CPAL-R	0.750	2.200	2.450
MD1421E54CPAL-R	0.500	2.800	1.300
MD1421E59CPAL-R	0.500	1.050	2.050
MD1421E60CPAL-R	0.750	2.050	3.350
MD1421E62CPAL-R	0.500	2.050	2.300
MD1421E63CPAL-R	0.500	1.050	1.300
MD1421E65CPAL-R	0.500	4.100	4.500
MD1421E66CPAL-R	0.750	4.600	4.600

## Package

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PLP-4-1228