

R5403x/R5405x Series are high input voltage CMOS-based protection ICs for over-charge/discharge of rechargeable one-cell Lithium-ion (Li-ion) / Lithium polymer excess load current, further include a short circuit protector for preventing large external short circuit current and excess charge/discharge-current. Each of these ICs is composed of four voltage detectors, a reference unit, a delay circuit, a short circuit protector, an oscillator, a counter, and a logic circuit.

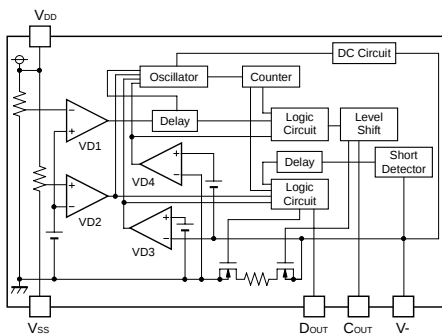
In addition to SOT-23-5 and SOT-23-6 packages, DFN(PLP)1616-6, DFN(PLP)1820-6 are also available.

FEATURES

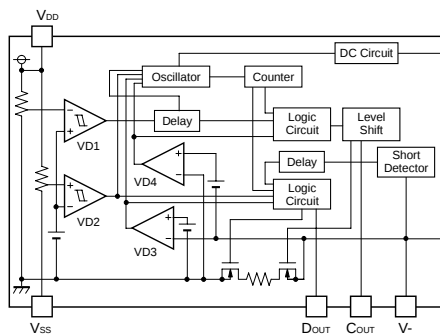
- Supply Voltage (V_{DD}) 12V (Absolute Maximum Rating)
- Charger Negative Input Voltage (V_-) ... -30V (Absolute Maximum Rating)
- Operating Input Voltage Range (V_{DD}) 1.5V to 5.0V
- Supply Current (I_{DD}) Typ. 4.0 μ A
- Standby Current (I_S) Max. 0.1 μ A (C, E, G Version)
Max. 2.0 μ A (D, F Version)
- Over-charge (V_{DET1}) Detector Threshold Range 4.0V to 4.5V (0.005V steps)
Detector Threshold Accuracy ... ± 25 mV (25°C)
 ± 30 mV (-5 to 55°C)
Output Delay Time ($t_{V_{DET1}}$) Typ. 1.0s
- Over-discharge (V_{DET2}) Detector Threshold Range 2.0V to 3.0V (0.1V steps)
Detector Threshold Accuracy ... $\pm 2.5\%$
Output Delay Time ($t_{V_{DET2}}$) Typ. 20ms
- Excess discharge-current (V_{DET3})
- Excess charge-current (V_{DET4})
- Short Protection
- 0V-battery charge
- Packages
- Detector Threshold Range 0.05V to 0.20V (0.005V steps)
Detector Threshold Accuracy ± 15 mV
Output Delay Time ($t_{V_{DET3}}$) Typ. 6ms or 12ms or 18ms
Detector Threshold Range -0.05V to -0.20V (0.005V steps)
Detector Threshold Accuracy ± 30 mV
Output Delay Time ($t_{V_{DET4}}$) Typ. 8ms or 16ms
Voltage (V_{SHORT}) Typ. 0.8V
Output Delay Time (t_{SHORT}) Typ. 200 μ s or 300 μ s or 400 μ s
- Selectable
- DFN(PLP)1616-6,
DFN(PLP)1820-6,
SOT-23-5, SOT-23-6

BLOCK DIAGRAMS

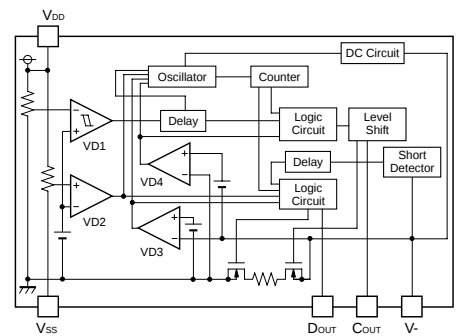
R5403/05xxxxCC/EC/KG/PG



R5403/05xxxxKD/KF



R5403/05xxxxKE



SELECTION GUIDES

Package	Quantity per Reel	Part No.
DFN(PLP)1820-6	5,000 pcs	R5403Kxxx\$*-TR
SOT-23-5	3,000 pcs	R5403Nxxx\$*-TR-FE

Package	Quantity per Reel	Part No.
DFN(PLP)1616-6	5,000 pcs	R5405Kxxx\$*-TR
SOT-23-6	3,000 pcs	R5405Nxxx\$*-TR-FE

xxx: Serial Number for the R5403x/R5405x Series designating input four threshold for over-charge, over-discharge, excess discharge-current, and excess charge-current detectors

\$: Designation of Output delay time option of excess charge-current, excess discharge-current, and Short Circuit

- (C) $t_{V_{DET3}}=12$ ms, $t_{V_{DET4}}=16$ ms, $t_{SHORT}=300\mu$ s
- (E) $t_{V_{DET3}}=6$ ms, $t_{V_{DET4}}=8$ ms, $t_{SHORT}=200\mu$ s
- (K) $t_{V_{DET3}}=12$ ms, $t_{V_{DET4}}=8$ ms, $t_{SHORT}=300\mu$ s
- (P) $t_{V_{DET3}}=18$ ms, $t_{V_{DET4}}=16$ ms, $t_{SHORT}=400\mu$ s

*: Designation of protection type and 0V-battery charge is available or unavailable

(C) With Latch function after Over-charge and Over-discharge. 0V-battery charge is available

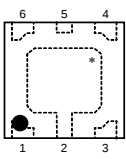
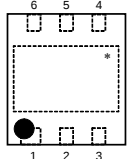
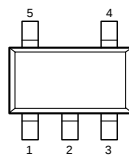
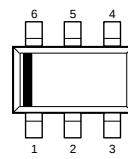
(D) Auto Release after Over-charge and Over-discharge. 0V-battery charge is available.

(E) Auto Release after Over-charge and with latch function after Over-discharge. 0V-battery charge is available.

(F) Auto Release after Over-charge and Over-discharge. 0V-battery charge is unavailable.

(G) With Latch function after Over-charge and Over-discharge. 0V-battery charge is unavailable.

PACKAGES (Top View)

DFN(PLP)1616-6		DFN(PLP)1820-6		SOT-23-5		SOT-23-6																																															
	<table><tr><td>1</td><td>VSS</td></tr><tr><td>2</td><td>VDD</td></tr><tr><td>3</td><td>V-</td></tr><tr><td>4</td><td>COUT</td></tr><tr><td>5</td><td>NC</td></tr><tr><td>6</td><td>DOUT</td></tr></table>	1	VSS	2	VDD	3	V-	4	COUT	5	NC	6	DOUT		<table><tr><td>1</td><td>V-</td></tr><tr><td>2</td><td>COUT</td></tr><tr><td>3</td><td>DOUT</td></tr><tr><td>4</td><td>VSS</td></tr><tr><td>5</td><td>VDD</td></tr><tr><td>6</td><td>NC</td></tr></table>	1	V-	2	COUT	3	DOUT	4	VSS	5	VDD	6	NC		<table><tr><td>1</td><td>V-</td></tr><tr><td>2</td><td>VDD</td></tr><tr><td>3</td><td>VSS</td></tr><tr><td>4</td><td>DOUT</td></tr><tr><td>5</td><td>COUT</td></tr></table>	1	V-	2	VDD	3	VSS	4	DOUT	5	COUT		<table><tr><td>1</td><td>DOUT</td></tr><tr><td>2</td><td>V-</td></tr><tr><td>3</td><td>COUT</td></tr><tr><td>4</td><td>NC</td></tr><tr><td>5</td><td>VDD</td></tr><tr><td>6</td><td>VSS</td></tr></table>	1	DOUT	2	V-	3	COUT	4	NC	5	VDD	6	VSS
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*) The tab is substrate level (V_{DD})

APPLICATIONS

- Li-ion / Li polymer protector of over-charge, over-discharge, excess discharge-current, excess charge-current for battery pack
- High precision protectors for cell-phones and any other gadgets using on board Li-ion / Li polymer battery