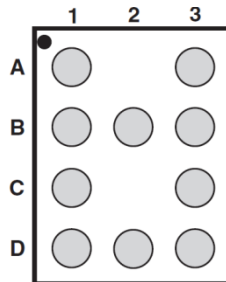


Battery gas gauge comparison STC3117 vs STC3115

STC3115 vs. STC3117

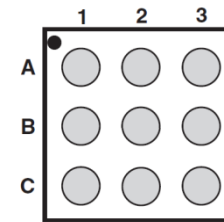
	STC3115	STC3117
Fuel Gauge Method	Voltage mode and Coulomb counter	
OptimGauge (OG) algorithm support	OG1 built-in	OG1 built-in, support OG2
Operation Current Consumption	45uA [in power saving mode]	40uA [in power saving mode]
Battery/charger control	Combined BATD/CD and RSTIO pins	Independent BATD and CD pins
Average current SOC change rate in voltage mode	Software No	Hardware Yes
Automatic measurements at battery insertion	Voltage	Voltage, current, temperature
OCV reference curve	Built-in curve for 4.2V or 4.35V batteries with adjustable values	Fully customizable curve (default 4.2V curve)
Package	CSP 1.4x2.0 and DFN10 2x3	CSP 1.5x1.6

STC3115



CSP 10 balls 2.0 X 1.4 mm

STC3117



CSP 9 balls 1.5 X 1.6 mm



STC3117 improvements:

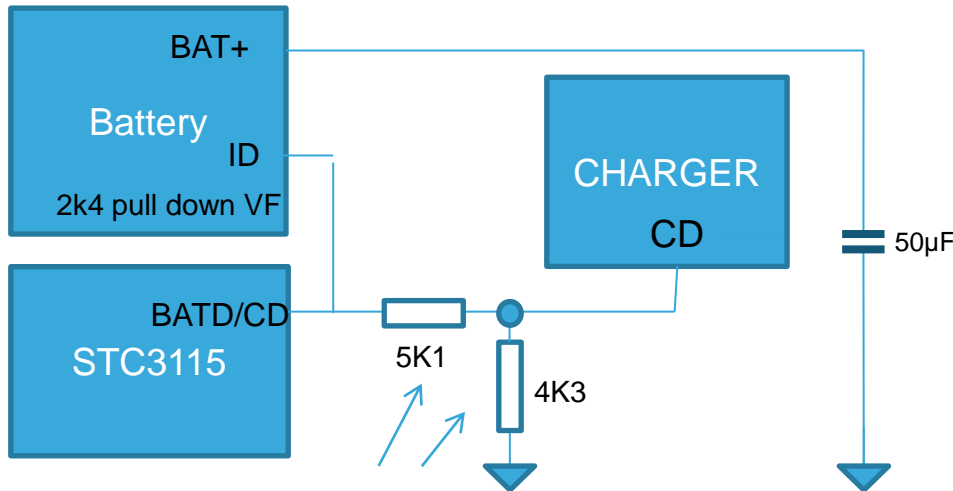
- Smaller package
- Lower power consumption

STC3117 functional improvements:

- Independent BATD battery detection and CD charger control pins for easier system integration
- Dead battery use case management: no charge inhibit at low battery voltage
- Software control of charge inhibit: no more OR'ed diodes needed
- Improved battery insertion bouncing detection: safer initial SOC
- Current and temperature measurements at battery insertion for better SOC compensation
- Fault signal on ALM pin in case of battery removal or missing
- Hardware average current calculation: improved accuracy, less workload for the software driver
- SOC change rate indication in voltage mode only
- RAM-based OCV table: a single part number for all batteries without special configuration
- Optimized for ST advanced OptimGauge algorithm

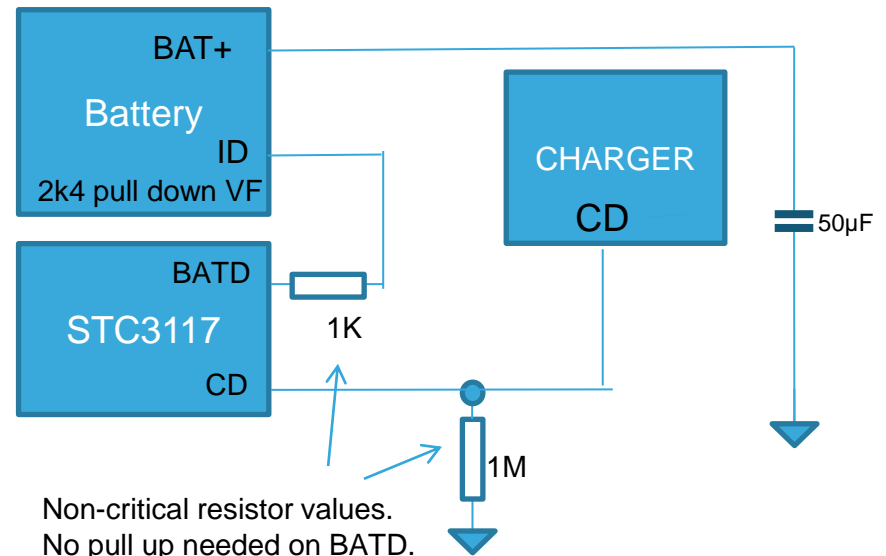
Independent BATD and CD pins

STC3115 configuration



Resistor values to defined according to battery and charger spec.

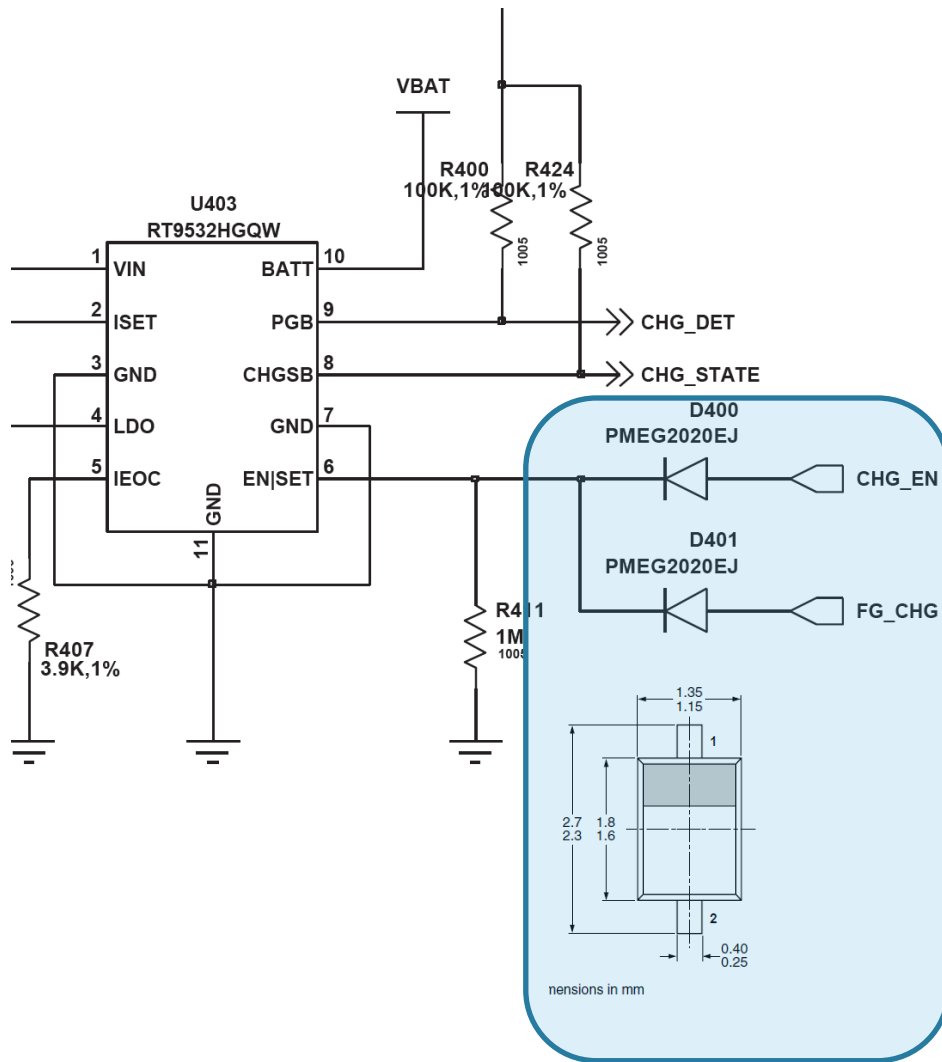
STC3117 configuration



Non-critical resistor values.
No pull up needed on BATD.

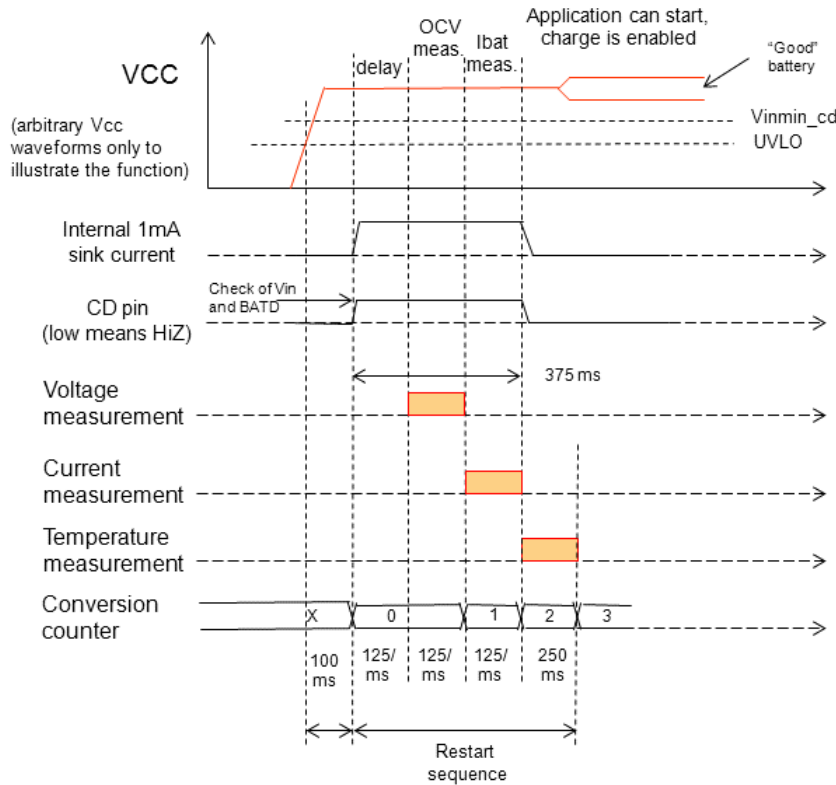
Note: the STC3115 can be configured with independent BATD and CD pins, but this requires a special configuration at first powerup. The STC3117 doesn't need any special configuration

Charger Control thru Gas Gage

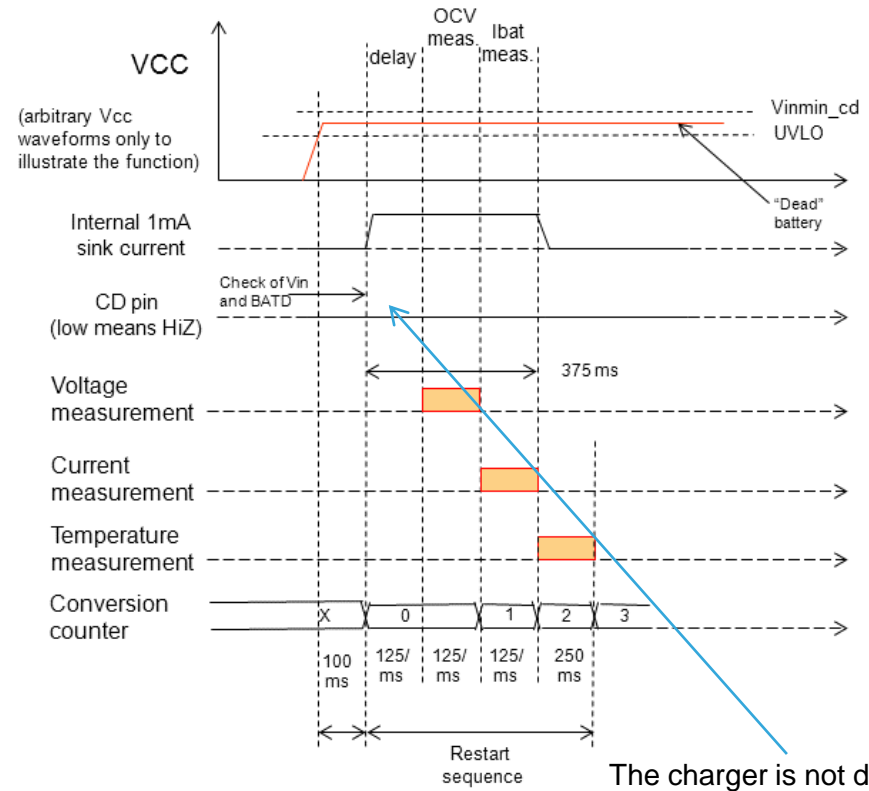


- Charger like Richtek are connected like the SUMMIT charger. There no more need for wired OR with diode.
- Smaller PCB footprint, no more need for 1PS79SB10 or PMEG2020EJ
- 3 mm² less area
- More robust control: no more dependency on reverse current sensitivity.

STC3117 new startup sequence and dead battery management



"Good battery"



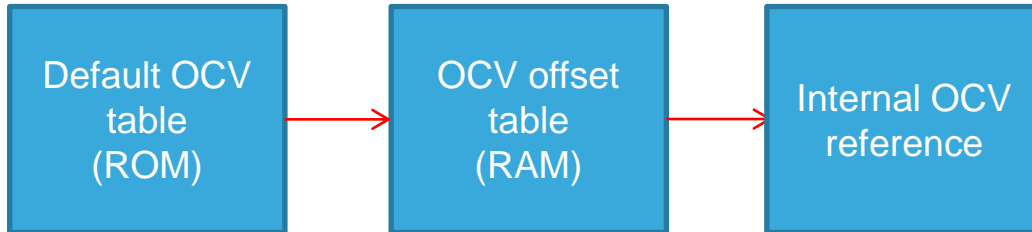
"Dead battery"

The charger is not disabled in case of dead battery.

In both cases, the current and temperature are measured at new battery insertion. The current is used to compensate the OCV in case the application is already started and/or the charger is still enabled. The temperature is used to compensate the SOC for the first SOC estimation for faster algorithm response. The internal 1mA sink current manages the contact bouncing issue and protects against false battery insertion.

RAM-based OCV table

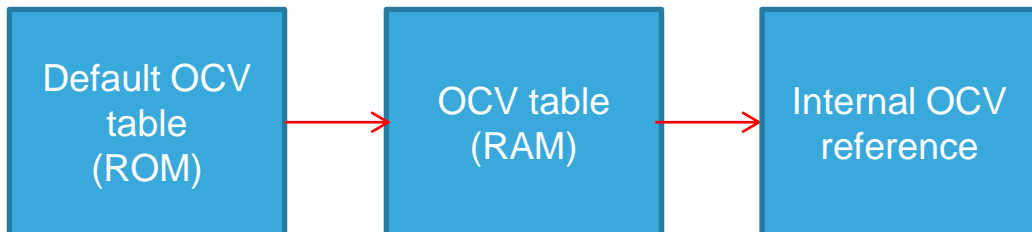
STC3115



- Default OCV table in ROM
- +/-64mV offset table
- Two STC3115 part numbers:
 - 4.20V battery
 - 4.35V battery

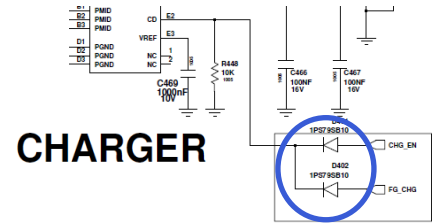
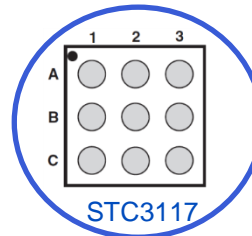
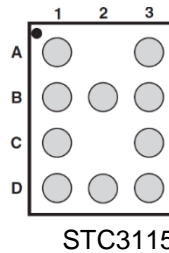
Note: the STC3115 “ROM” table (actually flash) can be configured with a different table but this requires a special configuration at first powerup. The STC3117 doesn’t need any special configuration.

STC3117



- Default OCV table in ROM to initialize the RAM table.
- Can be overwritten by a new table by the driver
- No restriction on OCV values
- Single STC3117 part number for all existing and future batteries

BOM comparison



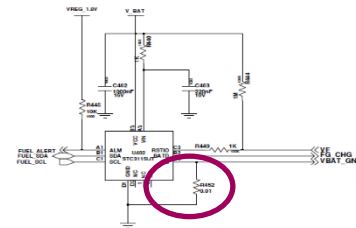
Current improvements

	STC3115	STC3117	Gain
Device size	2 x 1.4 = 2.8mm ²	1.5 x 1.6 = 2.4mm ²	0.4mm ²
OR diode for charger control	Around 2 x 1.26 = 2.52mm ²	NO NEED	# 2.5mm ²
Quantifiable PCB size reduction			Around 2.9mm²

Evolution improvement

	STC3115	STC3117	Gain
R _{sense} t	Around 1.4*1 = 1.4mm ²	Cu wire (on the PCB)	# 1.4mm ²
Quantifiable PCB size reduction			Around 1.4mm²

FUEL GAUGE



Saved PCB area # 4.3mm²

Saved components = 2 diodes + 1 R_{sense}