

# SPECIFICATION

**Model No. : CT-GTA02(Lead Free)**

**Document No. : DM-GTA02(Rev. A)**

**Customer :**

## Record of Revisions

<b>Revision</b>	<b>Model. No.</b>	<b>From</b>	<b>Description</b>	<b>Date</b>
A	CT-GTA02	R&D Dept.	New issue from R&D	Feb., 14, 2008

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## Table of Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>3</b>
<b>2.0</b>	<b>Description .....</b>	<b>3</b>
<b>3.0</b>	<b>Circuit diagram .....</b>	<b>3</b>
<b>4.0</b>	<b>Major components.....</b>	<b>4</b>
<b>5.0</b>	<b>Bill of materials .....</b>	<b>4</b>
<b>6.0</b>	<b>Absolute maximum rating .....</b>	<b>5</b>
<b>7.0</b>	<b>Basic functions .....</b>	<b>5、 6</b>
<b>8.0</b>	<b>Pin Layout Diagram .....</b>	<b>6</b>
<b>9.0</b>	<b>Artwork drawing.....</b>	<b>7</b>
<b>10.0</b>	<b>Electrical characteristics .....</b>	<b>8</b>
	10.1 Parameters of protection circuit .....	8
	10.2 Requirement of protection functions.....	8
<b>11.0</b>	<b>Specification of PCB .....</b>	<b>9</b>

## 1. Introduction :

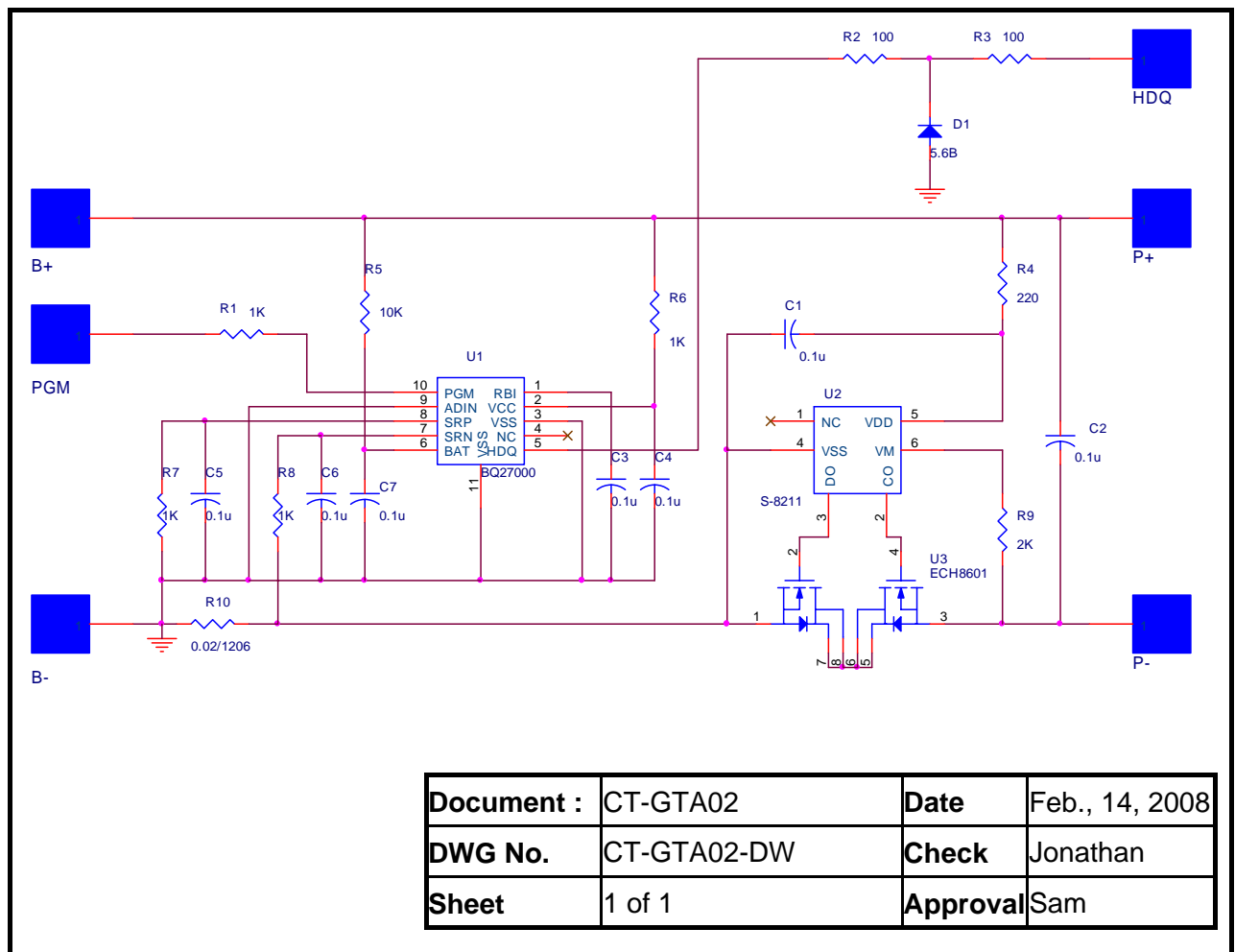
This specification provides engineering information and electrical specifications for the protection circuit module of Li-ion cells.

## 2. Description :

The CT-GTA02 is a PCM which provides high-precision battery monitoring, data-acquisition, information-storage, and safety protection for single-cell Li-ion battery.

The semiconductor devices with ESD protections are utilized on CT-GTA02 PCM.

## 3. Circuit diagram :



**4. Major components :**

ITEM	P/N	Package
Li-ion Protection IC	<b>S8211CAB-I6T1G</b>	<b>SNT-6A</b>
Gas Gauge IC	<b>BQ27000</b>	<b>DRK</b>
MOSFET	<b>ECH8601</b>	<b>ECH8</b>

**5. Bill of materials :**

Document: CT- GTA02 -BOM					Subject: BOM for CT-GTA02		Revision: 1.0 Date: Feb., 14, 2008	
No.	Bill of materials for CT- GTA02				Q'ty	Maker	REMARK	
	Ref.	Part Name	DESCRIPTION	Package				
1	C1,C2,C3,C4,C7	Capacitor	0.1uF Y5V/16V	SMD0402	5	Yageo, or TDK		
2	C5,C6	Capacitor	0.1uF X7R/16V	SMD0402	2	Yageo, or TDK		
3	D1	Zener Diode	UDZS5.6BG	SOD-323	1	Rohm,or ON-Semi		
4	R1,R6,R7,R8	Resistor	1K ohm ±5%	SMD0402	4	Yageo, or TDK		
5	R2,R3	Resistor	100 ohm ±5%	SMD0402	2	Yageo, or TDK		
6	R4	Resistor	220 ohm ±5%	SMD0402	1	Yageo, or TDK		
7	R5	Resistor	10K ohm ±5%	SMD0402	1	Yageo, or TDK		
8	R9	Resistor	2K ohm ±5%	SMD0402	1	Yageo, or TDK		
9	R10	Resistor	20m ohm ±1%	SMD0402	1	CYNTEC		
10	U1	Gauge IC	BQ27000	DRK	1	TI		
11	U2	Protection IC	S8211CAB-I6T1G	SNT-6A	1	SEIKO		
12	U3	MOSFET	ECH8601	ECH-8	1	SANYO		
13	-	PCB	PGTA02	-	1	SJ, or equivalent		

**6. Absolute maximum rating :**

Parameter	Rating	Unit
Operating temperature range	-20 ~ 75	°C
Operating humidity range	Less than 85% RH	%RH
Storage temperature range	-45 ~ 85	°C
Storage humidity range	Less than 85% RH	%RH
Voltage between terminals of P+ and P-	12.0	V
Voltage Between terminals of B+ and B-	7.0	V
Maximum continue current	2.0	A

Remarks:

The negative voltage is not allowed to be applied between the charge / discharge terminals (P+ and P-) or between the cell connection terminals (B+ and B-).

**7. Basic functions :**

(1) Over-charge protection

Over-charge occurs whenever the voltage applied to each battery is over 4.325V ± 0.025V.

Protection circuit on CT-GTA02 should stop charging the battery when over-charge condition occurs and any deformation in the outer appearance of the Lithium cell connected to CT-GTA02 should not occur.

(2) Over-discharge protection

Over-discharge occurs whenever the battery is discharged with voltage below 2.500V ± 0.05V

Protection Circuit on CT-GTA02 should stop discharging the cells when over-discharge condition occurs.

(3) Over-current protection

Over-current condition occurs when excessive discharge current occurs or excessive charge current occurs. The excessive discharge current threshold is higher than 0.150V and the excessive charge current threshold is higher than 0.100V when S8211CAB is used.

(4) Short-circuit protection

Short-circuit condition occurs when the terminals between P+ and P- is shortened.

Protection circuit on CT-GTA02 should stop discharging the cell when short-circuit condition occurs and temperature of MOSFET should not be overheated.

(5) BQ27000 GAS Gauge IC Function.

a. Measurement:

Reports Accurate Time-to-Empty With Measured Load and Historical Maximum and Standby Loads .

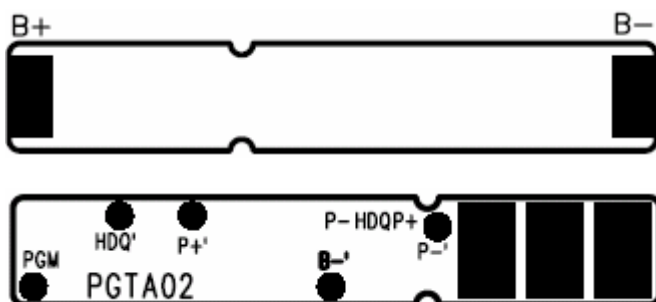
Reports Temperature, Voltage, and Current.

b. Charge and discharge counting:

From sense resistor 20m provide High-Accuracy coulometer charge and discharge current Integration .

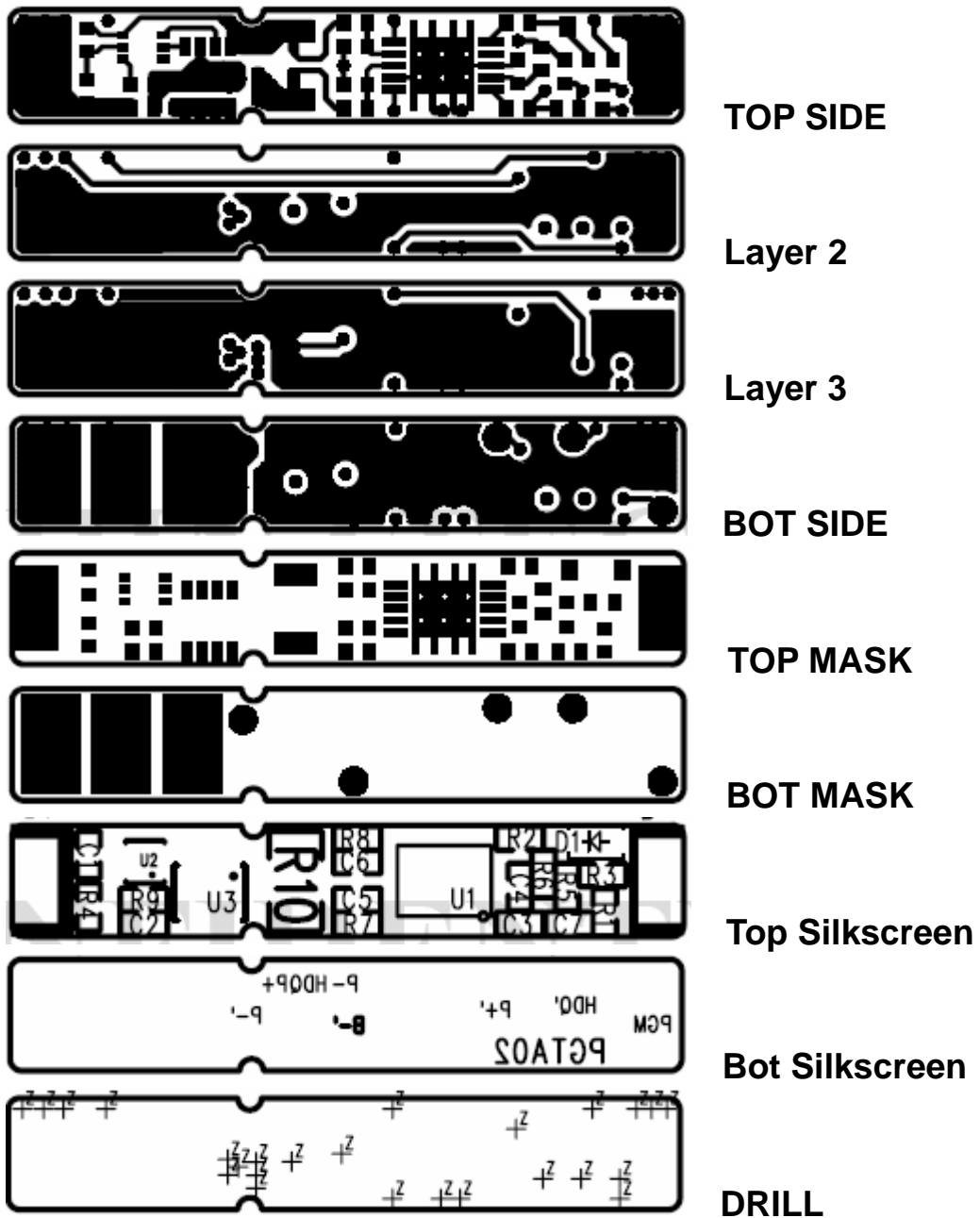
c. BQ27000 provide an auto-compensation feature to cancel the internal Voltage offset error.

**8. Pin Layout Diagram :**



<b>Document :</b>	CT-GTA02	<b>Date</b>	Feb., 14, 2008
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<b>Revision</b>	A	<b>Approval by</b>	Sam

9. Artwork drawing :



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**10. Electrical characteristics :**

**10.1 Parameters of protection circuit (@25°C) :**

No	ITEM	Specification	UNIT
1	Over-charge detection voltage	4.325±0.025	V
2	Over-charge release voltage	4.075±0.050	V
3	Over-discharge detection voltage	2.500±0.050	V
4	Over-discharge release detection voltage	2.900±0.1	V
5	Over-charge current detection voltage	0.100±0.030	V
6	Over-discharge current detection voltage	0.150±0.015	V
7	Over-charge detection delay time	960 ~ 1400	msec
8	Over-discharge detection delay time	120 ~ 180	msec
9	Discharge over current detection delay time	7.2 ~ 11	msec
10	Charge over current detection delay time	7.2 ~ 11	msec
11	Short circuit detection delay time	450~670	usec
12	Supply current (Active mode)	100(max)	uA
13	Supply current (Sleep mode)	8(max)	uA
14	Supply current (Protection mode)0<Vcc<1.5V	2(max)	uA

**10.2 Requirement of protection functions (@25°C) :**

No.	Item	Criteria
1	Over-charge inhibition	4.325±0.025 (from cell terminal)
2	Over-charge protection recovery method	When the battery is connected to the cellular phone, the protective condition is released.
3	Over-discharge inhibition	2.500±0.050 (from cell terminal)
4	Over-discharge protection recovery method	When the battery is charged, the protective condition is released.
5	Discharge over current protection	2.5 ~ 5.0A
6	Charge over current protection	1.4 ~ 4.00A
7	Internal impedance (B--P-)	90ohm(max,Vgs=4V)



**11. Specification of PCB :**

Material	FR-4
Dimension	L: 38.5+0.1/-0.1mm W: 4.7+0.1/-0.1mm
Thickness	0.60+0.1/-0.1 mm (overall)
UL	94V-0

- (1) Material 1 oz copper double sided bonded to FR-4 base material.
- (2) 4 layers with through hole.
- (3) All through hole connections to have solder resist applied
- (4) Gold finger plating to 3u inch.