

NGK Corporation "EnerCera" ET Series Evaluation Board User Manual

**NGK Corporation "EnerCera" ET Series
Battery charging & monitoring reference circuit**

CAUTION

ENGINEERING EVALUATION PURPOSES ONLY

This evaluation board is made for the purpose of the product evaluation.
It is strictly prohibited to use this evaluation board for any other purpose.

Torex Semiconductor does not guarantee that all samples will perform in exactly the same way and we recommend that you always consult our product data sheets for the minimum and maximum specifications.

It is also important that you evaluate all our products carefully before mass production and in case of any doubt, please contact your Torex representative.

NGK Corporation "EnerCera" ET Series Evaluation Board

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Battery Feature : "EnerCera" ET Series

- **Constant voltage charging by LDO** is possible.
No need for dedicated expensive CC/CV charger ICs.
- **Reliable and safe** with long life and resistance to repeated charge/discharge.
- **Resistant to over-discharge**. Simple voltage detector is sufficient.
- **Stable voltage of 2.1~2.4V**.
Easy energy extraction compared to Supercap (EDLC).
- **105°C high-temperature operation, reflow-compatible, thin and hot-laminate-compatible** products are also available.



Battery Lineup

	Coin		Pouch
Model Number	ET2016C-R	ET1210C-H	ET382704P-H
Dimensions (Without terminals)	φ20mm	φ12.5mm	38mm×27mm
Typical Thickness (With terminals)	2.05mm	1.3mm	0.45mm
Nominal Capacity (Charging Voltage: 2.7V)	25mAh	4mAh	20mAh
Nominal Voltage	2.3V		
Charging Condition	Constant Voltage(CV) Charging (No current control required)		
(Ref.) Peak Discharge Current *1	60mA	20mA	300mA
Operation Temp.	-40℃~60℃	-20℃~105℃	-40℃~70℃
Features	Reflow soldering unapplicable	Reflow soldering applicable *2	Fast Charging *3

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- * 1 Voltage drop is less than 0.5V with continuous discharge for 0.1 sec. (at 25°C)
- * 2 Recommended conditions Max.240°C x 1 time. Please contact NGK (enercera-sales@ngk.co.jp) for details.
- * 3 Can be charged from 0% to 80% capacity in 14 min.

The terminals (both +/-) of the pouch (ET382704P-H) are aluminium and cannot be attached to the evaluation board with common solder.

Contact NGK Corporation

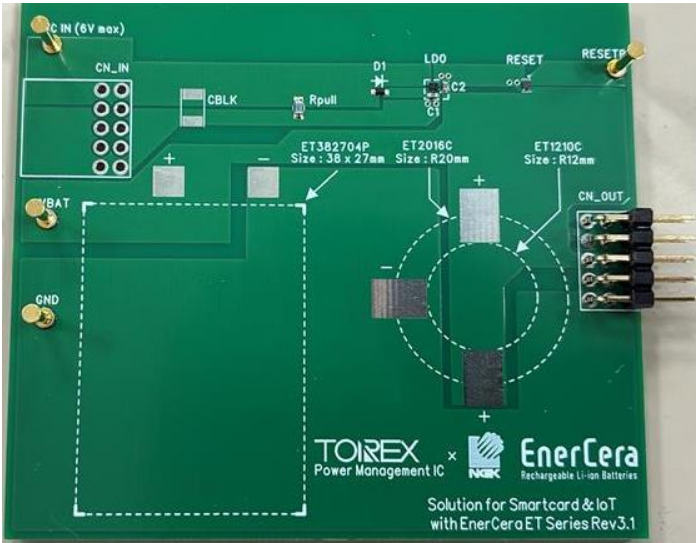
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Evaluation Board Picture



Evaluation Board SPEC

Ta=25°C

		CONDITION / SIGNAL	MIN.	TYP.	MAX.	UNIT
Vin	Input Voltage Range	-	2.0	5.0	6.0	V
Battery Voltage	CV Voltage (Max Charge Voltage)	Ta=25°C	-	2.63	-	V
		Ta=-40°C ~ 85°C	-	2.63	2.70	
Detect Voltage	Battery Low Voltage Monitor	RESETB="L"	1.984	2.000	2.016	V
Release Volatge	Battery High Voltage Monitor	RESETB="H"	2.443	2.475	2.507	V

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XC6240 / XC6140 Feature

Charger IC for LTO Battery : XC6240 Series

- | | | |
|------------------------|-------|-------------------------|
| ▪ Input Voltage Range | | 1.5V ~ 6.0V |
| ▪ Output Voltage Range | | 2.63V @ Ta=25°C |
| | | Max 2.70V @ Ta=-40~85°C |
| ▪ Output Current | | 150mA |
- Designed to reduce the discharge current from the battery.
 - Low profile package with h=0.33 mm for low profile solutions.

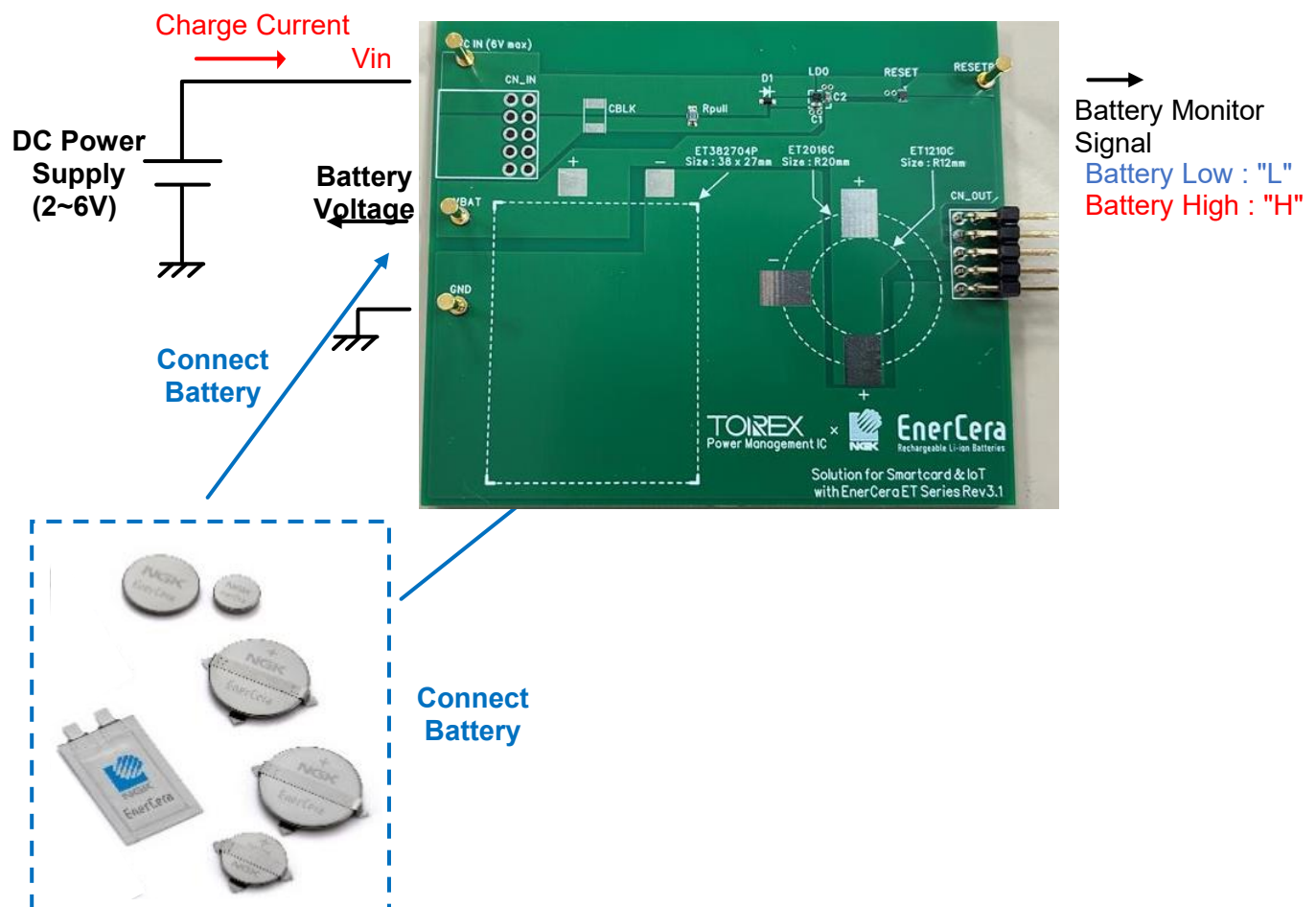
Battery Monitor IC for LTO Battery : XC6140 Series

- | | | |
|-----------------------|-------|-------------|
| ▪ Input Voltage Range | | 1.1V ~ 6.0V |
| ▪ Detect Voltage | | 1.6V ~ 2.2V |
| ▪ Release Voltage | | 2.475V |
- Optimum detection voltage for over-discharge protection of LTO batteries.
 - Large hysteresis width for stable signal output even with LTO batteries with high internal impedance.
 - Designed to reduce the discharge current from the battery.
 - Low profile package with h=0.33 mm for low profile solutions.

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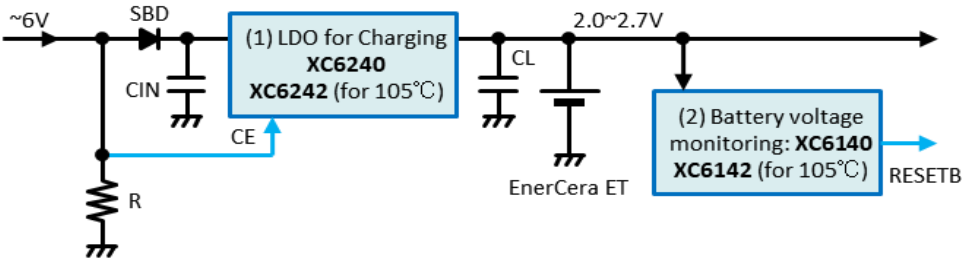
Quick Start Procedure



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Block Diagram



BOM

Required Circuit Component

Item	Value	Description	Size [mm]	Part Number	Manufacturer
LDO	-	Battery Charger for LTO Battery	USPN-4	XC6240A2637R-G	TOREX
C1	1μF	Ceramic cap., 25V/1μF	1005	CGB2A1X5R1E105K	TDK
C2	1μF	Ceramic cap., 25V/1μF	1005	CGB2A1X5R1E105K	TDK
RESET	-	Battery Monitor IC for LTO Battery	USPQ-4B05	XC6140C20A9R-G	TOREX
D1	-	Schottky Barrier Diode, 40V/200mA	SOD-523	XBS024S15R-G	TOREX
Rpull	100kΩ	-	1608	-	-

Battery

Item	Value	Description	Size [mm]	Part Number	Manufacturer
Battery	-	-	-	"EnerCera" ET Series (Implement the system yourself)	NGK Corporation

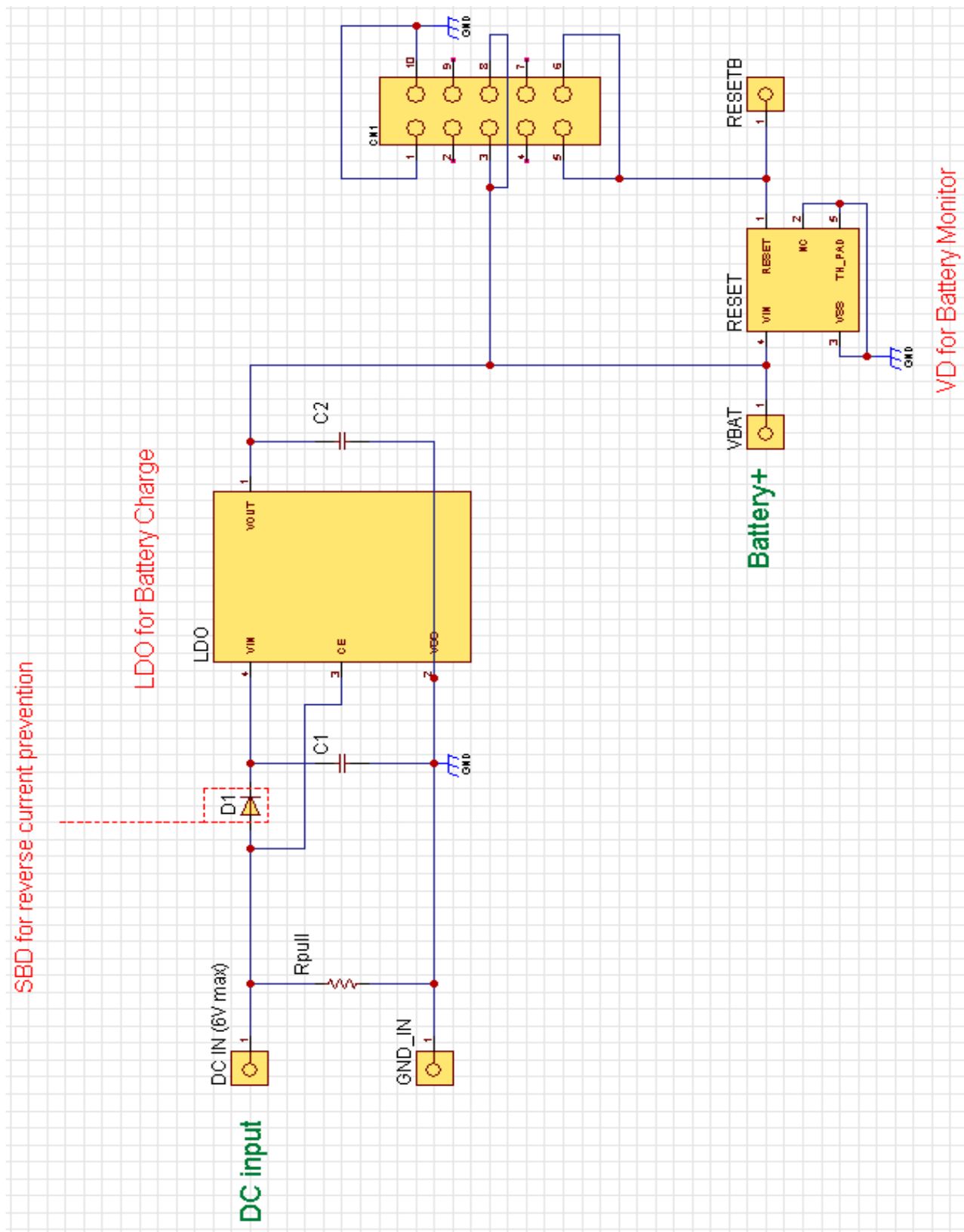
Connector

Item	Value	Description	Size [mm]	Part Number	Manufacturer
CN1	-	Pin Header, Dual 2x5	-	61301021021	Würth Elektronik

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Schematic



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PCB Layout

