

Introduction of NCR18650PF

December 26, 2012

Energy Company of Panasonic Group
Lithium-Ion Battery Business Unit

NCR18650PF (TENTATIVE)

TENTATIVE

| Model | | NCR18650PD | NCR18650PF |
|---|----------|-------------|-------------|
| Nominal Voltage (V) | | 3.6 | 3.6 |
| Rated Capacity (mAh) at 20°C | | 2680 | 2680 |
| Typical Capacity (mAh) at 20°C | | 2830 | 2830 |
| Nominal Capacity (mAh)/Typ. at 25°C | | 2880 | 2880 |
| Standard Charge(CCCV) | | 0.5It 4.2V | 0.5It 4.2V |
| Dimensions with Tube(Max.) | Diameter | 18.5 | 18.5 |
| | Height | 65.3 | 65.3 |
| Weight (g) (max.) | | 46.5 | Almost 46.5 |
| Maximum Continuous Discharge Current (A) *Actual(Reference) | | 10(**Spec.) | 10(**Spec.) |
| AC-IR(mOhm) Actual | | 21 | 21 |
| DC-IR(mOhm) **Actual | | 43 | 43 |

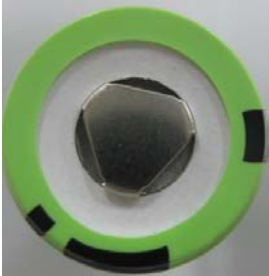



No change the specification

For Winpower

The data in this document is for descriptive purposes only and is not intended to make or imply any guarantee or warranty.

Changing points of NCR18650PF(TENTATIVE)

TENTATIVE

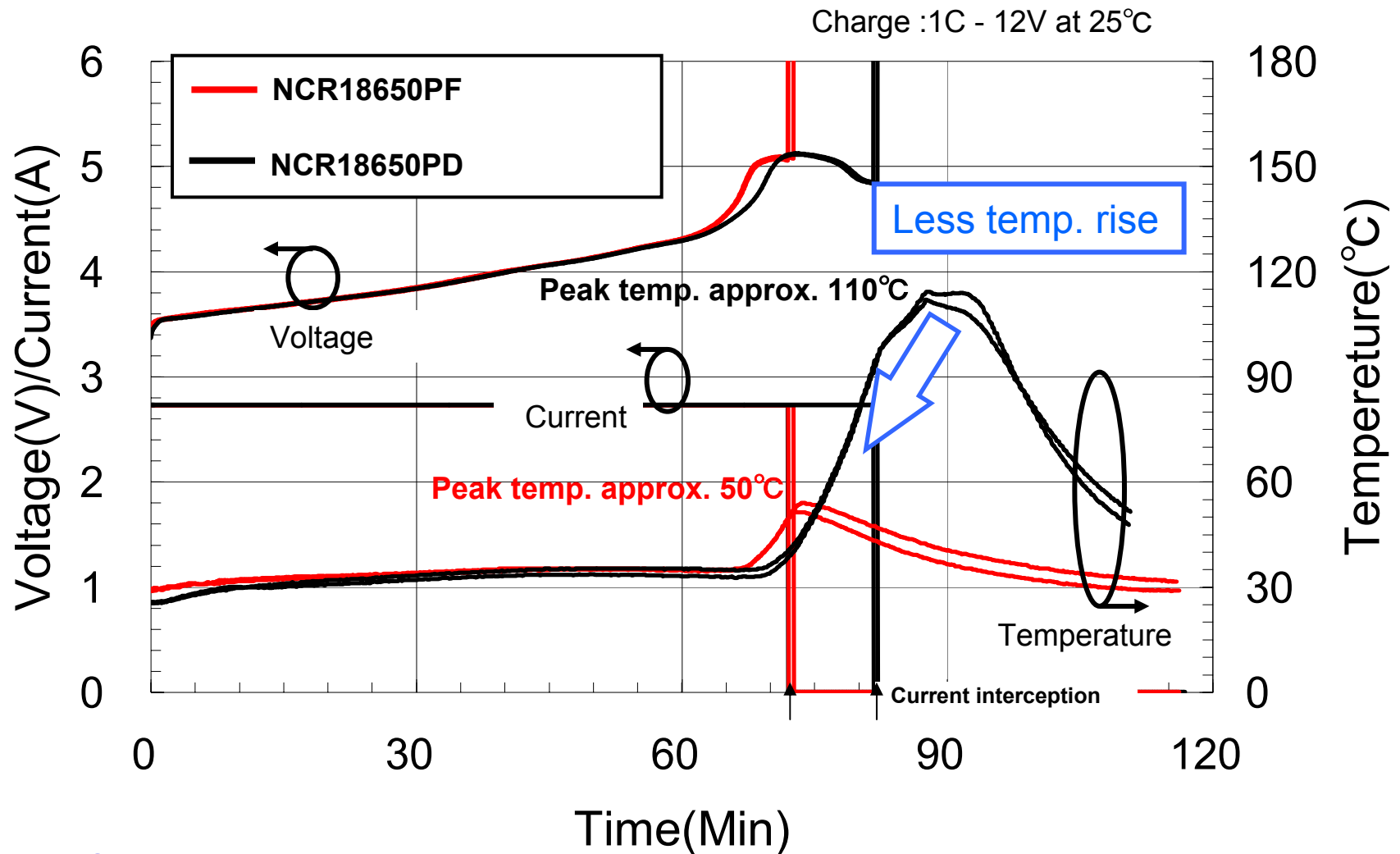
| | Current | Improved |
|----------------------------------|--|---|
| Top Cap Shape |  |  |
| Safety vent on the bottom of can |  |  |
| Over charge characteristics | — | CID will work earlier than current one |

For Winpower

Panasonic ideas for life

The data in this document is for descriptive purposes only and is not intended to make or imply any guarantee or warranty.

Over Charge Test for NCR18650PD and PF



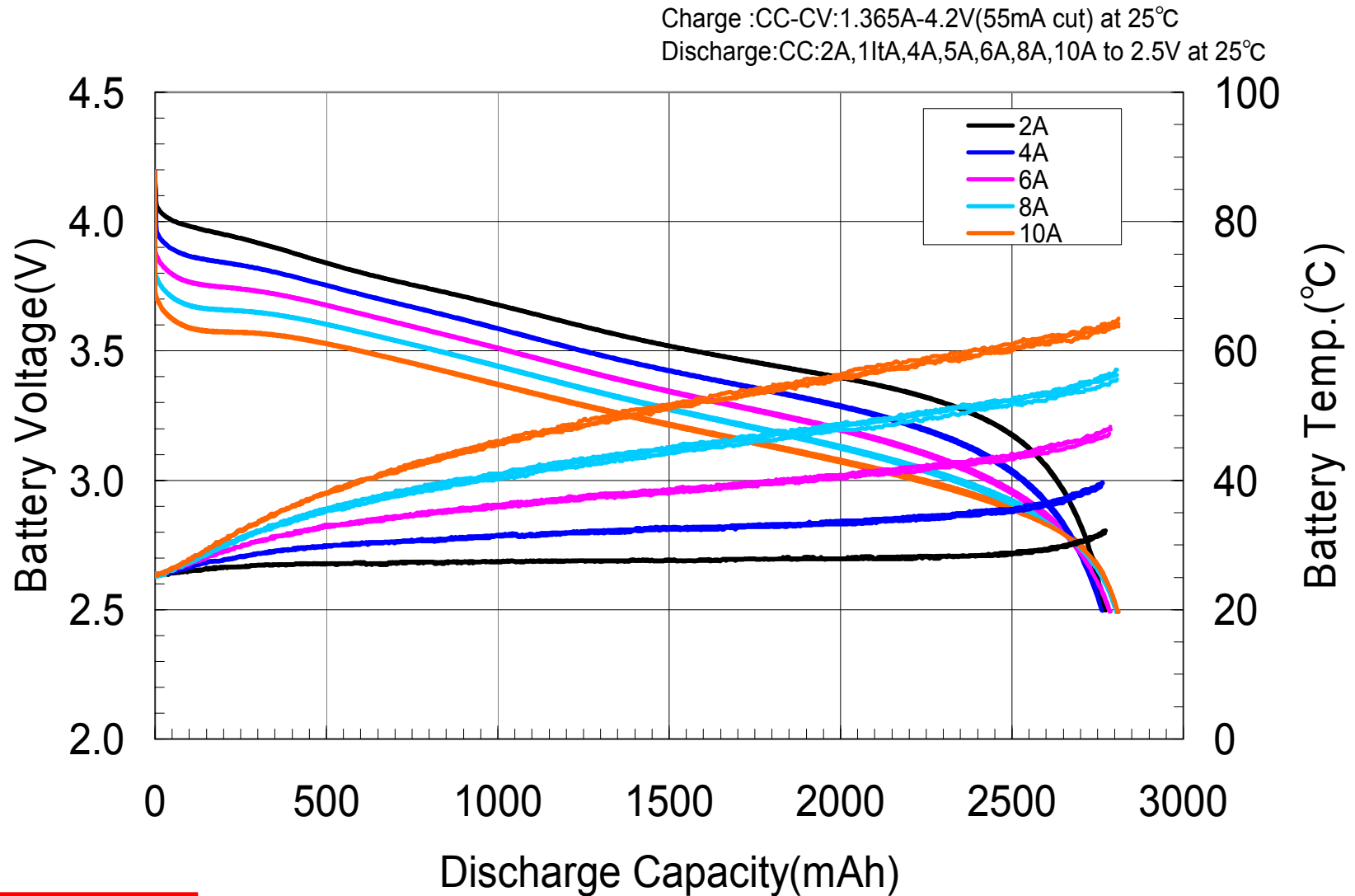
- NCR18650PF passed overcharge test with enough temperature margin. (No fire, No explosion)

For Willpower

MAX temperature of overcharge decreased, compared with current design.

Panasonic ideas for life

NCR18650PF Discharge characteristics

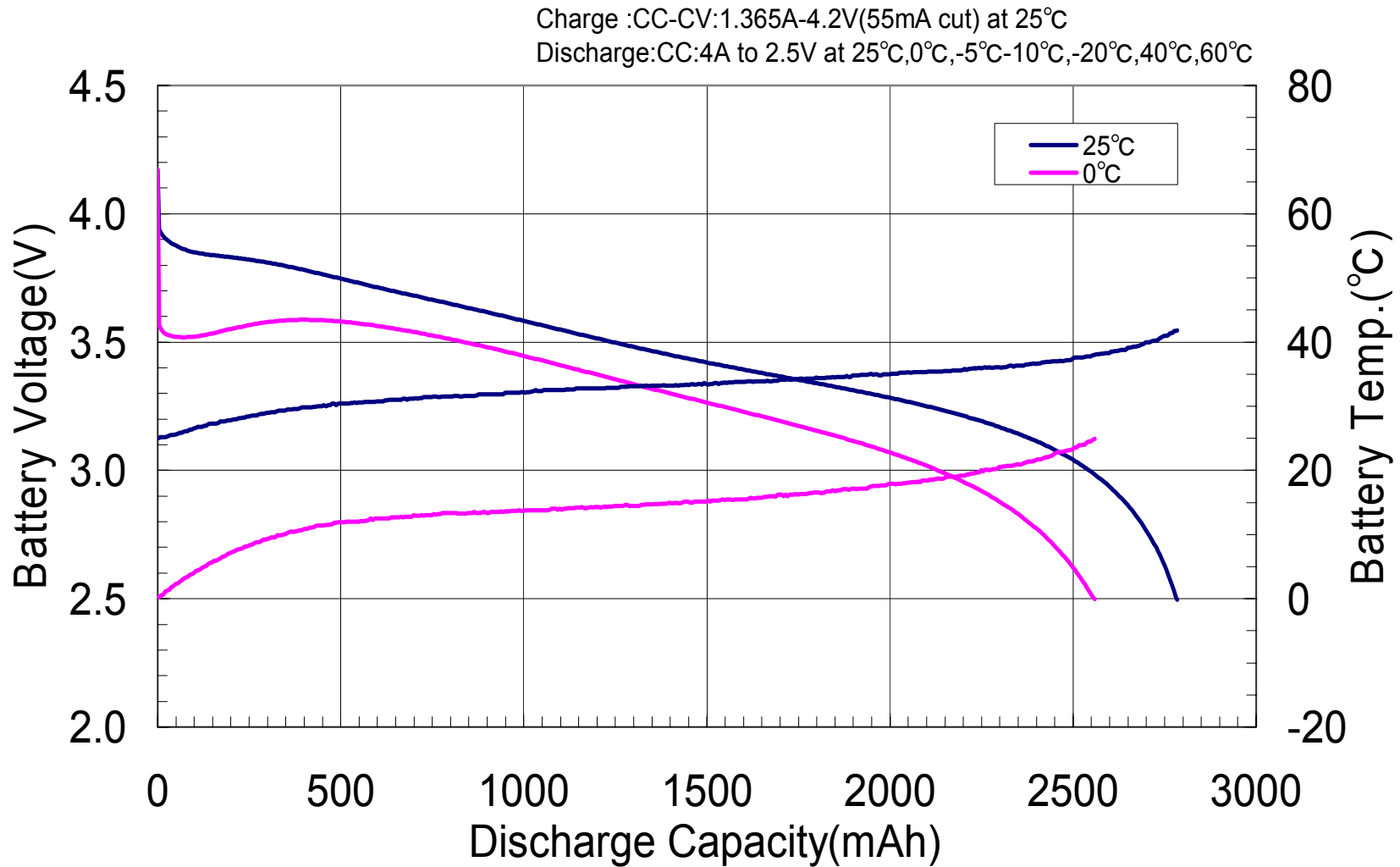


For Winpower

Panasonic ideas for life

The data in this document is for descriptive purposes only and is not intended to make or imply any guarantee or warranty.

NCR18650PF Discharge characteristics



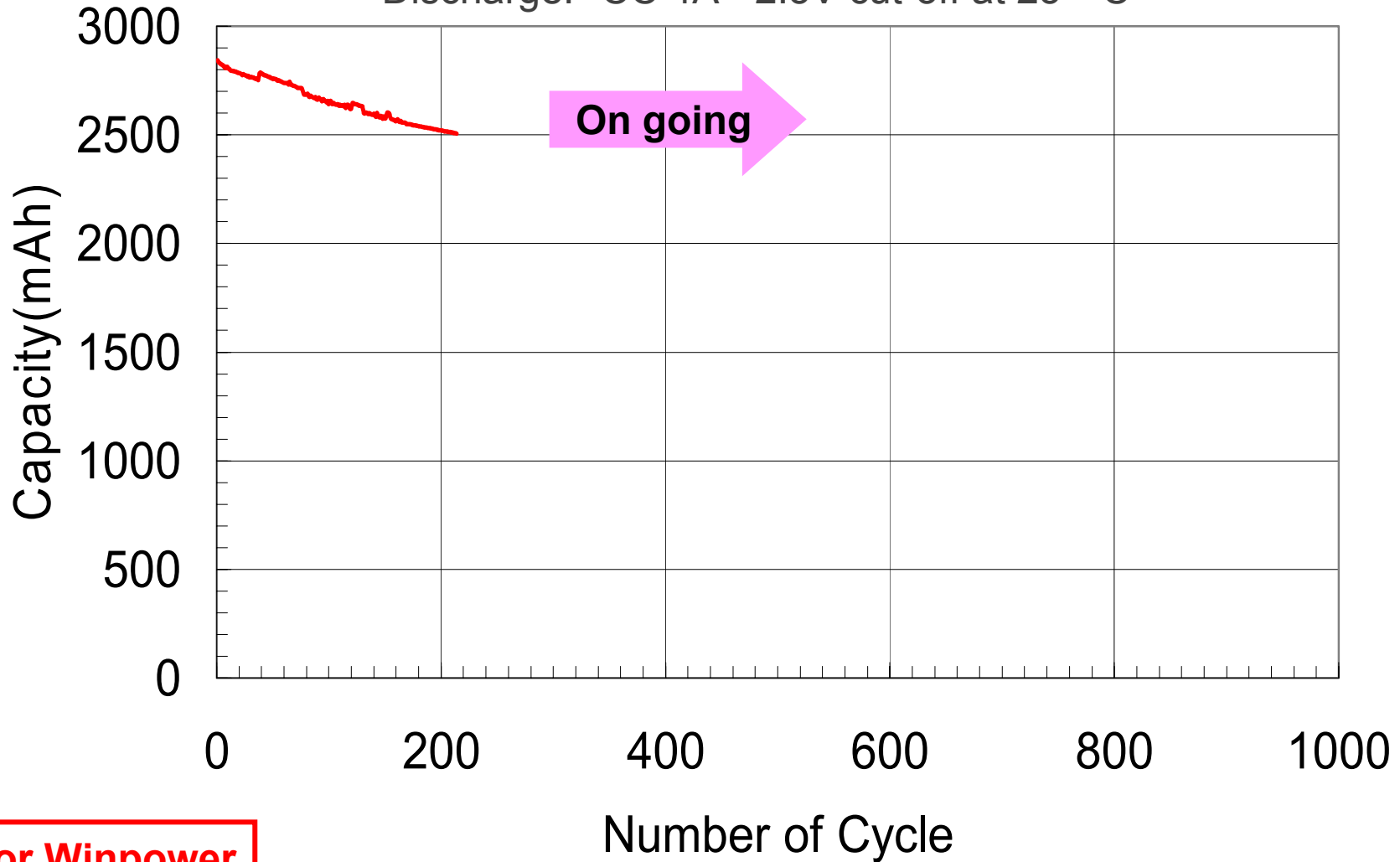
For Winpower

Panasonic ideas for life

The data in this document is for descriptive purposes only and is not intended to make or imply any guarantee or warranty.

NCR18650PF Cycle life characteristics

Charge: CC-CV 1.365A- 4.2V, 55mA cut-off at 25° C
Discharge: CC 4A - 2.5V cut-off at 25° C



For Winpower

Panasonic ideas for life

The data in this document is for descriptive purposes only and is not intended to make or imply any guarantee or warranty.

- **Sample available : End of January 2013
(Small qty)**
- **Cell mass production (TBD) : 3Q 2013**

For Winpower

Panasonic

ideas for life

For Winpower

Panasonic ideas for life

The data in this document is for descriptive purposes only and is not intended to make or imply any guarantee or warranty.