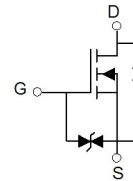
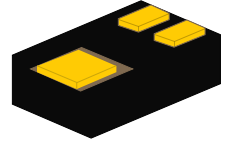
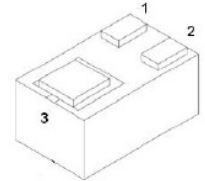


**N-Channel Plastic-Encapsulate MOSFET**

| PRIMARY CHARACTERISTICS |                 |       |
|-------------------------|-----------------|-------|
| $V_{(BR)DSS}$           | $R_{DS(on)MAX}$ | $I_D$ |
| 20V                     | 380mΩ@4.5V      | 0.75A |
|                         | 450mΩ@2.5V      |       |
|                         | 800mΩ@1.8V      |       |

**WBFBP-03E****PACKAGE****MARKING:**1.GATE  
2.SOURCE  
3.DRAIN**FEATURES**

- Lead Free Product is Acquired
- Surface Mount Package
- N-Channel Switch with Low RDS(on)
- Operated at Low Logic Level Gate Drive
- ESD Protected Gate

**APPLICATION**

- Load/ Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

**ABSOLUTE MAXIMUM RATINGS ( $T_a=25^{\circ}\text{C}$  unless otherwise noted)**

| Parameter                                                        | Symbol          | Value    | Unit                 |
|------------------------------------------------------------------|-----------------|----------|----------------------|
| Drain-Source Voltage                                             | $V_{DS}$        | 20       | V                    |
| Gate-Source Voltage                                              | $V_{GS}$        | $\pm 12$ | V                    |
| Continuous Drain Current (note 1)                                | $I_D$           | 0.75     | A                    |
| Pulsed Drain Current ( $t_p=10\mu\text{s}$ )                     | $I_{DM}$        | 1.8      | A                    |
| Power Dissipation (note 2)                                       | $P_D$           | 100      | mW                   |
| Thermal Resistance from Junction to Ambient (note 1)             | $R_{\theta JA}$ | 1250     | $^{\circ}\text{C/W}$ |
| Junction Temperature                                             | $T_J$           | 150      | $^{\circ}\text{C}$   |
| Storage Temperature                                              | $T_{STG}$       | -55~ 150 | $^{\circ}\text{C}$   |
| Lead Temperature for Soldering Purposes(1/8" from case for 10 s) | $T_L$           | 260      | $^{\circ}\text{C}$   |



## N-Channel Plastic-Encapsulate MOSFET

### MOSFET ELECTRICAL CHARACTERISTICS

$T_a=25^{\circ}\text{C}$  unless otherwise specified

| Parameter                          | Symbol               | Test Condition                                                                               | Min  | Typ  | Max | Unit |
|------------------------------------|----------------------|----------------------------------------------------------------------------------------------|------|------|-----|------|
| STATIC PARAMETERS                  |                      |                                                                                              |      |      |     |      |
| Drain-source breakdown voltage     | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                                  | 20   |      |     | V    |
| Zero gate voltage drain current    | I <sub>DSS</sub>     | V <sub>DS</sub> =20V, V <sub>GS</sub> = 0V                                                   |      |      | 1   | μA   |
| Gate-body leakage current          | I <sub>GSS</sub>     | V <sub>GS</sub> =±10V, V <sub>DS</sub> = 0V                                                  |      |      | ±20 | uA   |
| Gate threshold voltage (note 2)    | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                     | 0.35 |      | 1.1 | V    |
| Drain-source on-resistance(note 2) | R <sub>DS(on)</sub>  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.65A                                                 |      |      | 380 | mΩ   |
|                                    |                      | V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.55A                                                 |      |      | 450 | mΩ   |
|                                    |                      | V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.45A                                                 |      |      | 800 | mΩ   |
| Forward tranconductance(note 2)    | g <sub>FS</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =0.8A                                                   |      | 1.6  |     | S    |
| Diode forward voltage              | V <sub>SD</sub>      | I <sub>S</sub> =0.15A, V <sub>GS</sub> = 0V                                                  |      |      | 1.2 | V    |
| DYNAMIC PARAMETERS(note 4)         |                      |                                                                                              |      |      |     |      |
| Input Capacitance                  | C <sub>iss</sub>     | V <sub>DS</sub> =16V, V <sub>GS</sub> =0V, f =1MHz                                           |      | 79   | 120 | pF   |
| Output Capacitance                 | C <sub>oss</sub>     |                                                                                              |      | 13   | 20  | pF   |
| Reverse Transfer Capacitance       | C <sub>rss</sub>     |                                                                                              |      | 9    | 15  | pF   |
| SWITCHING PARAMETERS (note 4)      |                      |                                                                                              |      |      |     |      |
| Turn-on delay time (note 3)        | t <sub>d(on)</sub>   | V <sub>DD</sub> =4.5V, V <sub>GS</sub> =10V,<br>I <sub>D</sub> =500mA, R <sub>GEN</sub> =10Ω |      | 6.7  |     | ns   |
| Turn-on rise time (note 3)         | t <sub>r</sub>       |                                                                                              |      | 4.8  |     | ns   |
| Turn-off delay time (note 3)       | t <sub>d(off)</sub>  |                                                                                              |      | 17.3 |     | ns   |
| Turn-off fall time (note 3)        | t <sub>f</sub>       |                                                                                              |      | 7.4  |     | ns   |

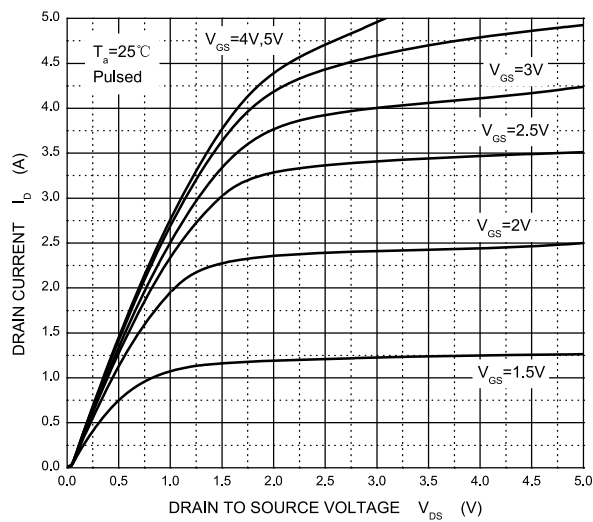
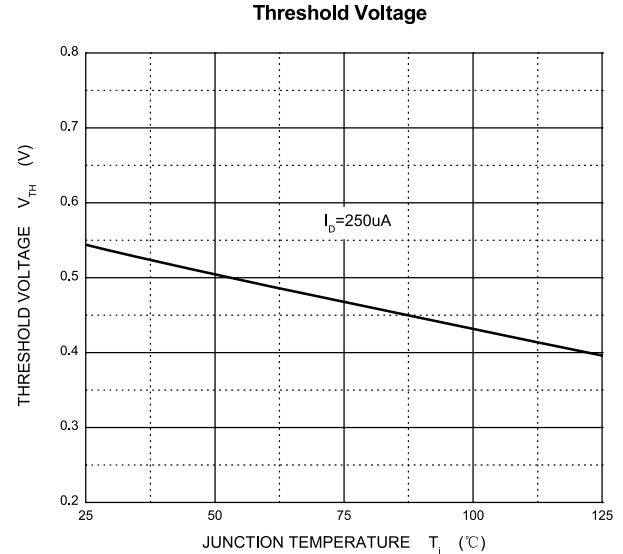
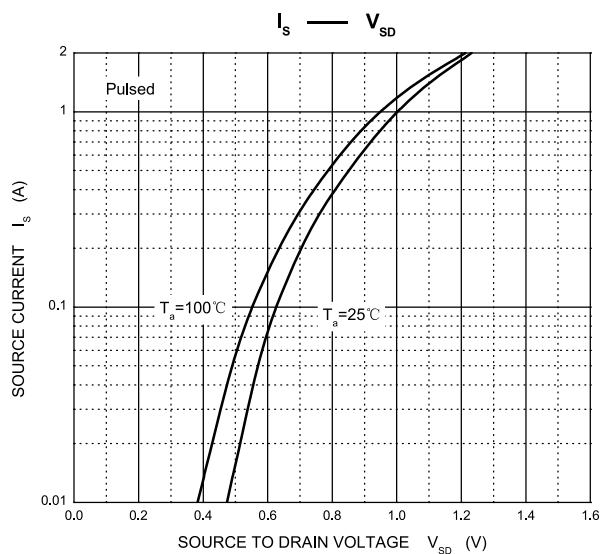
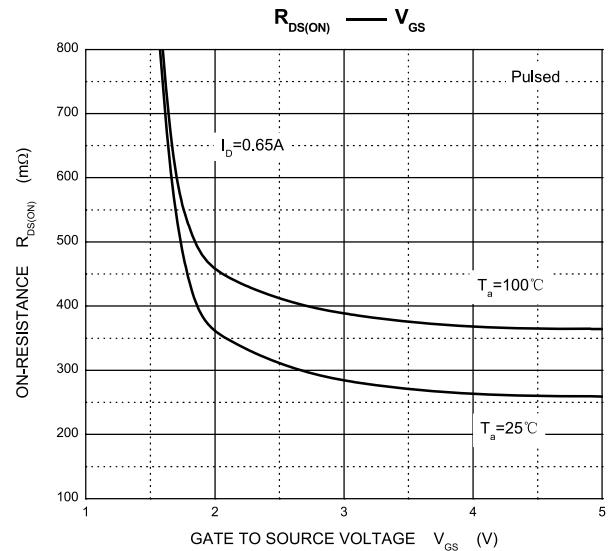
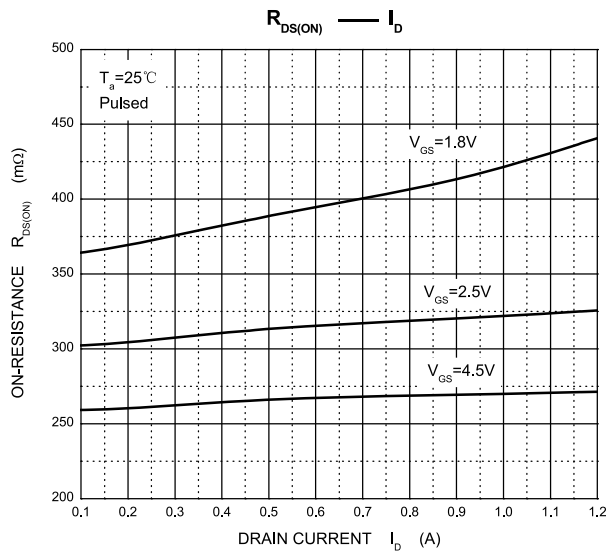
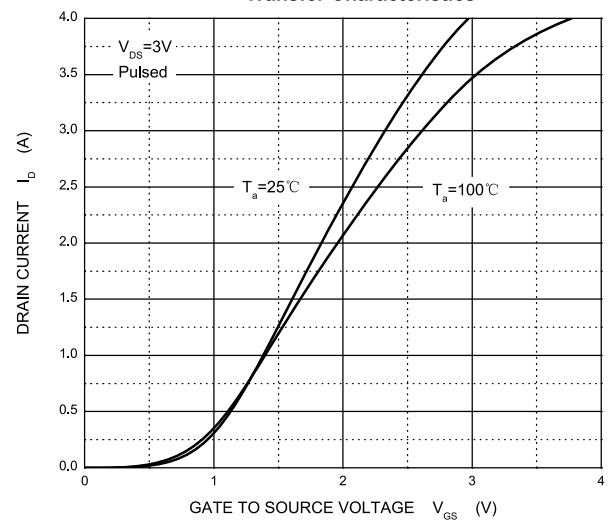
#### Notes :

- 1.Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse width=300 $\mu$ s, duty cycle $\leq$ 2%.
3. Switching characteristics are independent of operating junction temperatures.
4. Graranted by design, not subject to producing.



## N-Channel Plastic-Encapsulate MOSFET

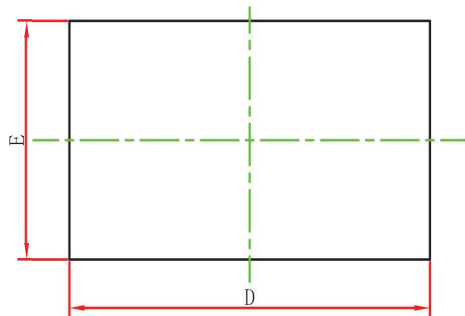
### Typical Characteristics

**Output Characteristics****Transfer Characteristics**

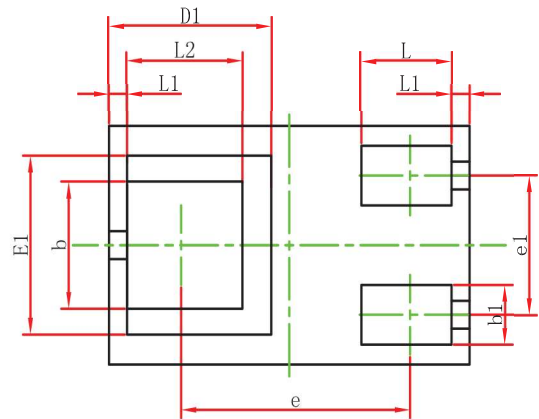


## Outline Drawing

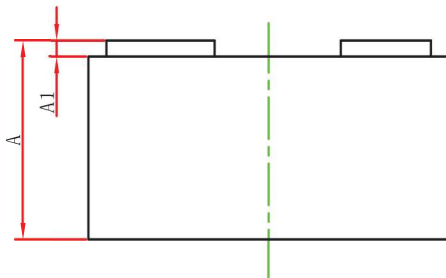
## WBFBP-03E(J)



TOP VIEW



BOTTOM VIEW



SIDE VIEW

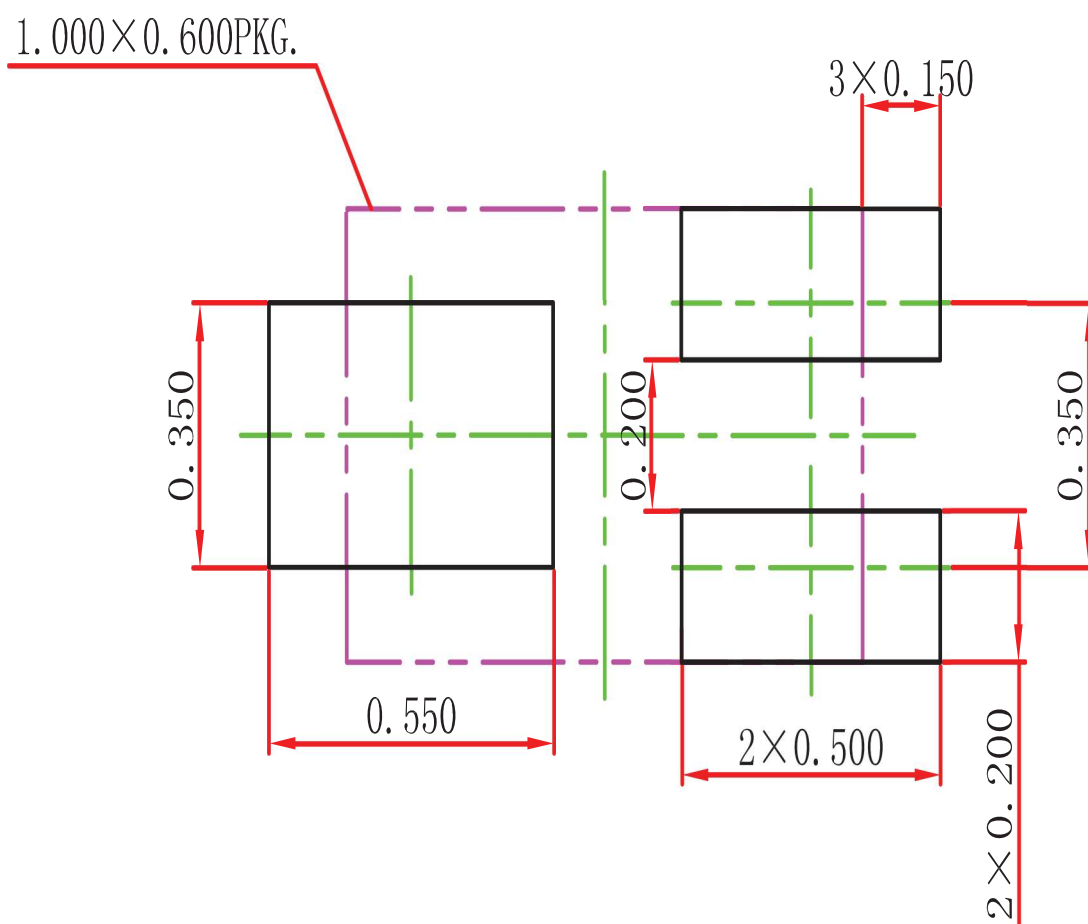
| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.450                     | 0.550 | 0.018                | 0.022 |
| A1     | 0.010                     | 0.100 | 0.000                | 0.004 |
| D      | 0.950                     | 1.050 | 0.037                | 0.041 |
| E      | 0.550                     | 0.650 | 0.022                | 0.026 |
| D1     | 0.450REF.                 |       | 0.018REF.            |       |
| E1     | 0.450REF.                 |       | 0.018REF.            |       |
| b      | 0.270                     | 0.370 | 0.011                | 0.015 |
| b1     | 0.100                     | 0.200 | 0.004                | 0.008 |
| e      | 0.635REF.                 |       | 0.025REF.            |       |
| e1     | 0.300                     | 0.400 | 0.012                | 0.016 |
| L      | 0.200                     | 0.300 | 0.008                | 0.012 |
| L1     | 0.050REF.                 |       | 0.002REF.            |       |
| L2     | 0.270                     | 0.370 | 0.011                | 0.015 |

Rev.A



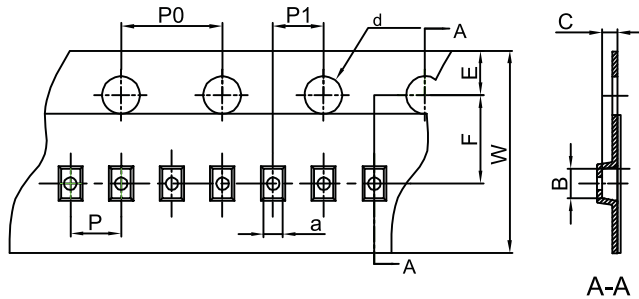
## Suggested Soldering Pad Layout

WBFBP-03E(J)

**Note:**

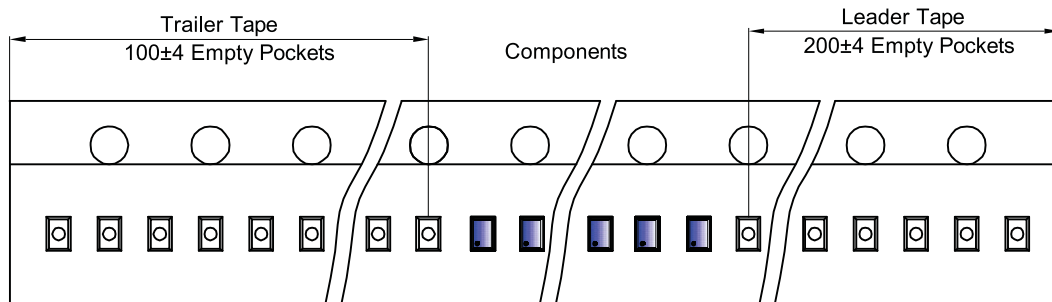
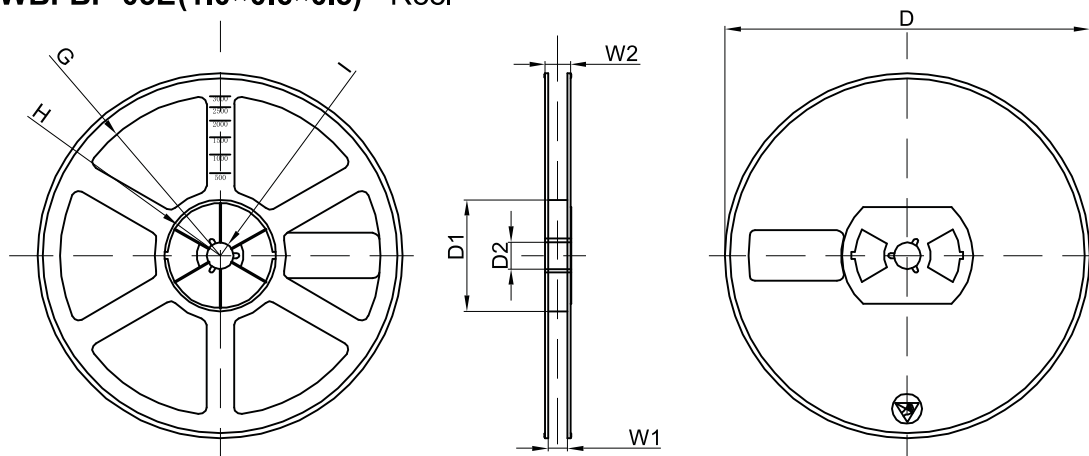
1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050\text{mm}$ .
3. The pad layout is for reference purposes only.

Rev.A

**N-Channel Plastic-Encapsulate MOSFET**
**WBFBP-03E(1.0×0.6×0.5) Tape and Reel**
**WBFBP-03E(1.0×0.6×0.5) Embossed Carrier Tape**

**Packaging Description:**

**WBFBP-03E(1.0×0.6×0.5)** parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 10,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter  |      |      |      |       |      |      |      |      |      |      |
|-------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type                      | a    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| <b>WBFBP-03E(1.0×0.6×0.5)</b> | 0.66 | 1.15 | 0.66 | Ø1.50 | 1.75 | 3.50 | 4.00 | 2.00 | 2.00 | 8.00 |

**WBFBP-03E(1.0×0.6×0.5) Tape Leader and Trailer**

**WBFBP-03E(1.0×0.6×0.5) Reel**


| Dimensions are in millimeter |         |       |       |        |        |       |      |       |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option                  | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
| 7"Dia                        | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

| REEL      | Reel Size | Box         | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|-----------|-----------|-------------|--------------|-------------|-----------------|----------|
| 10000 pcs | 7 inch    | 100,000 pcs | 203×203×195  | 400,000 pcs | 438×438×220     |          |

**Ordering Information:**

| Device PN                                                       | Marking <sup>(4)</sup> | Packing               |
|-----------------------------------------------------------------|------------------------|-----------------------|
| SEAA3134K- T <sup>(1)</sup> H <sup>(2)</sup> -WS <sup>(3)</sup> | 34                     | Tape&Reel:10Kpcs/Reel |

Note: (1) Packing code, Tape & Reel Packing

(2) Packing code suffix "G"for RoHS product : Packing code Suffix"H" for halogen free product  
All materials and products supplied comply with the U.S. Toxic Substances Control Act statement, PBT Chemicals

(3) Willas brand abbreviation, Label Type does not display

(4) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device

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