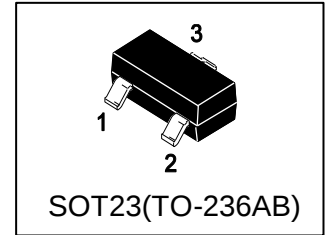


# S-LN4501SLT1G

20V N-Channel (D-S) MOSFET

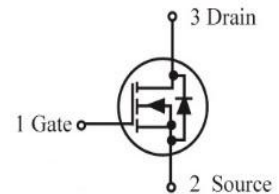
## 1. FEATURES

- $V_{DS}=20V$
- 2.5 V rated for low voltage gate drive
- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.



## 2. APPLICATIONS

- Load/Power switch for portables
- Load/Power switch for computing
- DC-DC conversion



## 3. DEVICE MARKING AND ORDERING INFORMATION

| Device        | Marking | Shipping        |
|---------------|---------|-----------------|
| S-LN4501SLT1G | S45     | 3000/Tape&Reel  |
| S-LN4501SLT3G | S45     | 10000/Tape&Reel |

## 4. MAXIMUM RATINGS( $T_a = 25^{\circ}C$ )

| Parameter                                         |                     | Symbol        | Limits          | Unit        |
|---------------------------------------------------|---------------------|---------------|-----------------|-------------|
| Drain-Source Voltage                              |                     | $V_{DS}$      | 20              | V           |
| Gate-to-Source Voltage                            |                     | $V_{GS}$      | $\pm 12$        | V           |
| Continuous Drain Current (Note 1)<br>Steady State | $T_A = 25^{\circ}C$ | $I_D$         | 3.2             | A           |
|                                                   | $T_A = 75^{\circ}C$ |               | 2.4             | A           |
|                                                   | $T_A = 85^{\circ}C$ |               | 2.3             | A           |
| Steady State Power Dissipation (Note 1)           |                     | PD            | 1.25            | W           |
| Pulsed Drain Current ( $t_p = 10 \mu s$ )         |                     | IDM           | 12              | A           |
| Operating and Storage Temperature Range           |                     | $T_J/T_{stg}$ | $-55 \sim +150$ | $^{\circ}C$ |

## 5. THERMAL CHARACTERISTICS

| Parameter                               |          | Symbol        | Limits | Unit          |
|-----------------------------------------|----------|---------------|--------|---------------|
| Thermal Resistance, Junction-to-Ambient | (Note 1) | R $\theta$ JA | 102    | $^{\circ}C/W$ |
|                                         | (Note 2) |               | 300    | $^{\circ}C/W$ |

Note: 1. Surface mounted on "1.5 x 1.5" FR4 board using 1 sq in pad, 2 oz Cu.

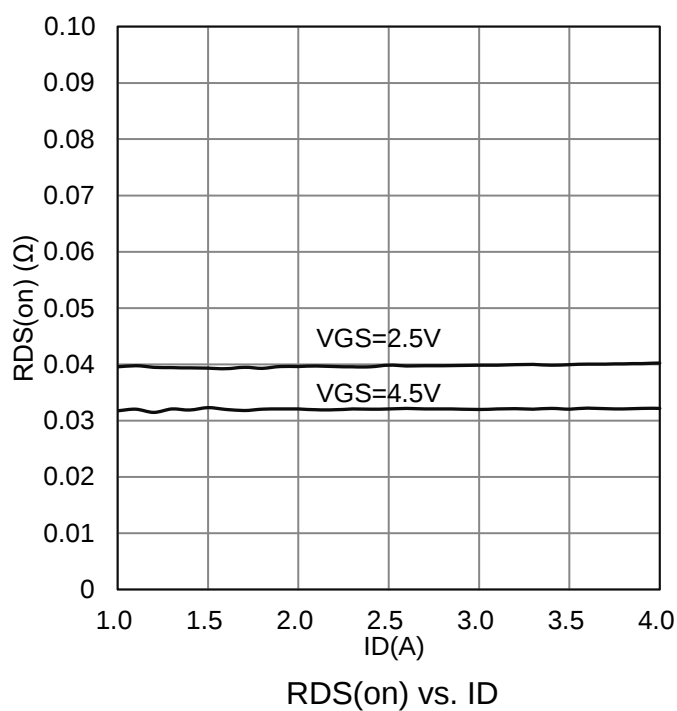
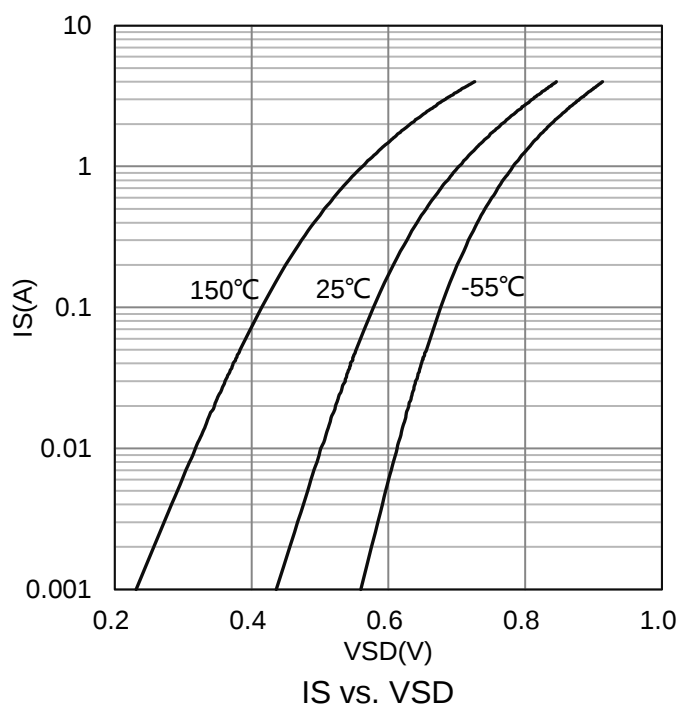
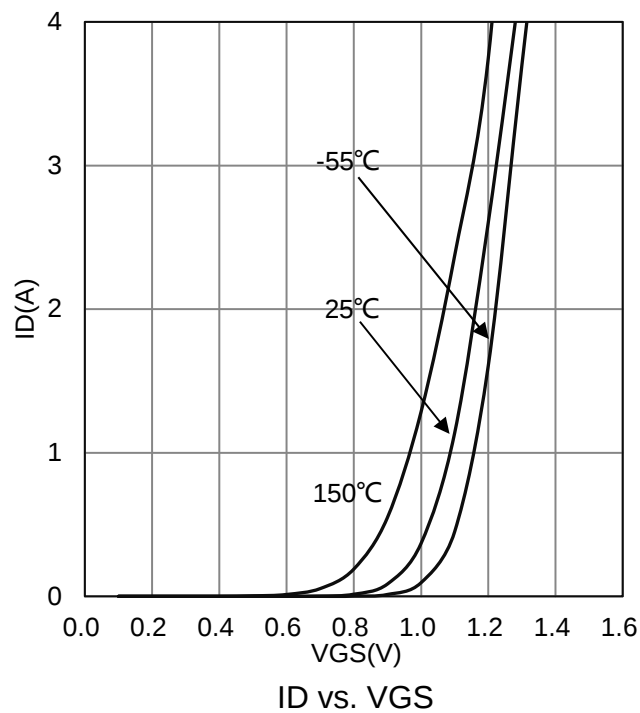
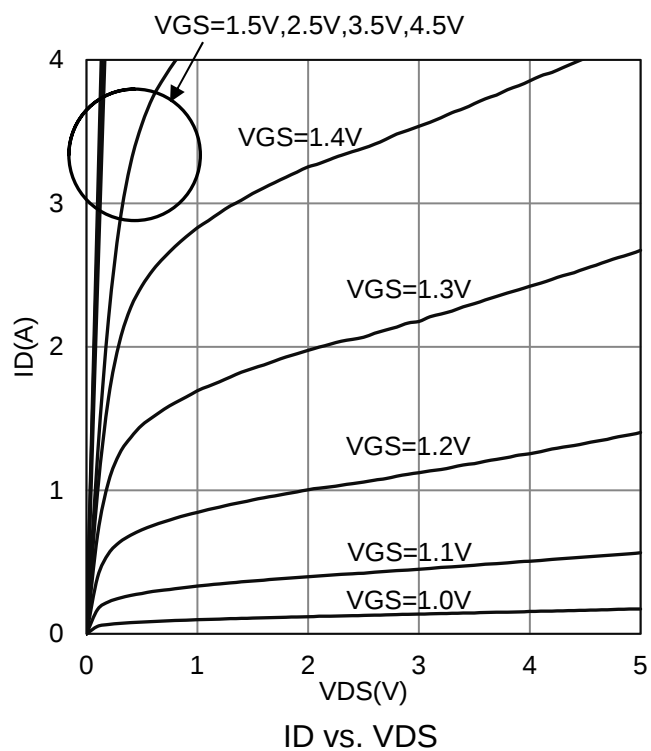
2. Surface-mounted on FR4 board using the minimum recommended pad size.

**6. ELECTRICAL CHARACTERISTICS (Ta= 25°C)**

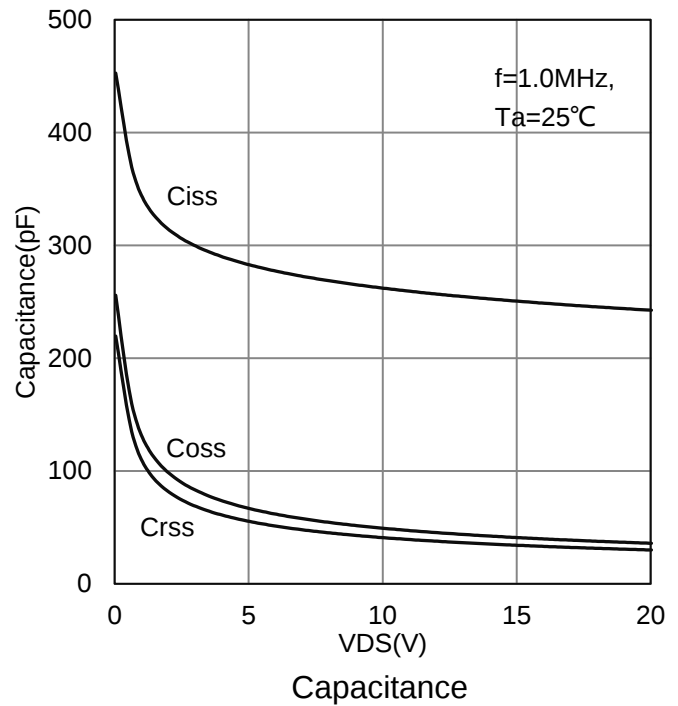
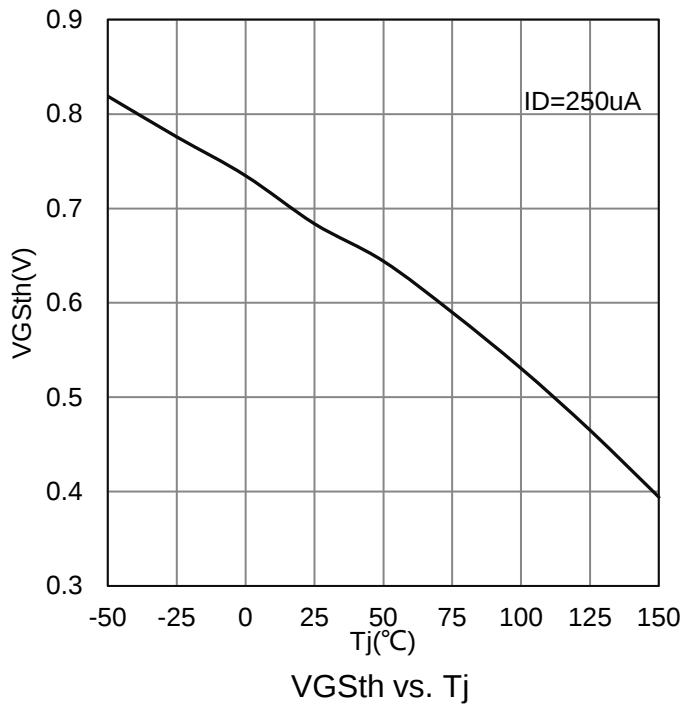
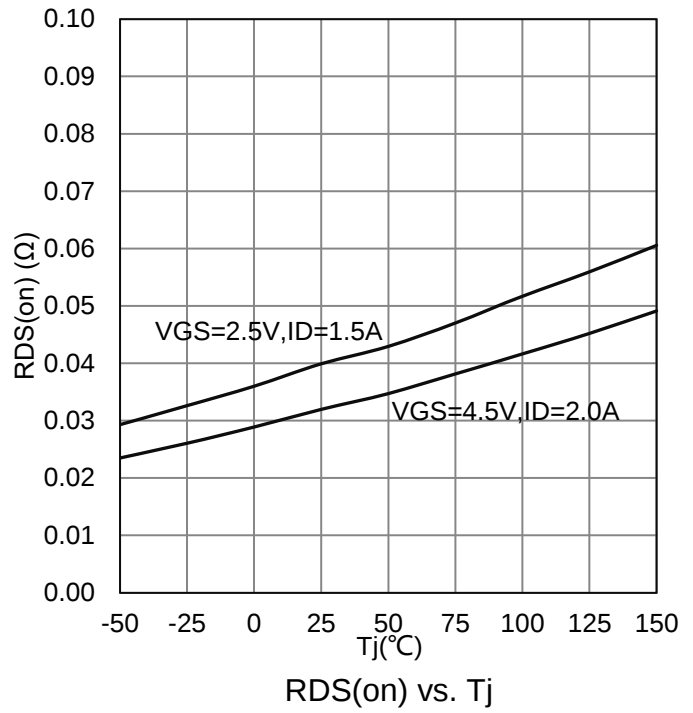
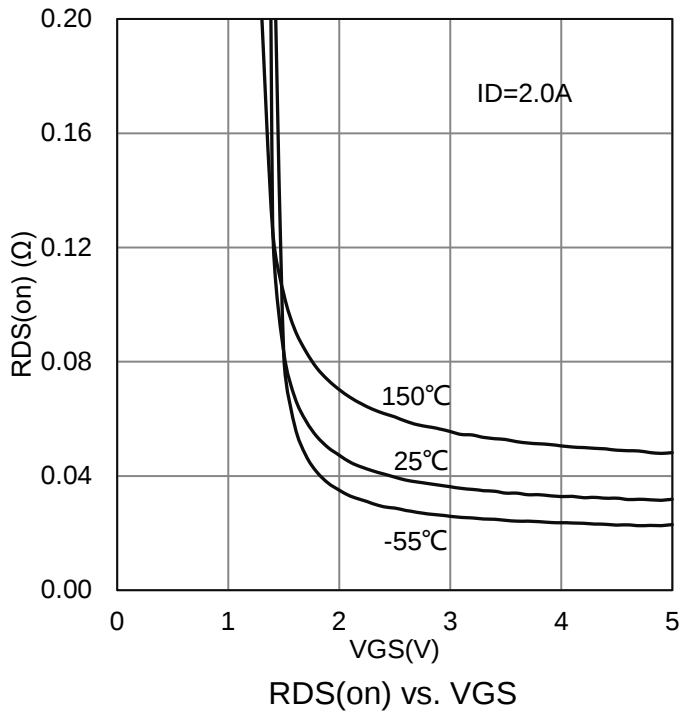
| Characteristic                                                                                  |                                                            | Symbol   | Min.   | Typ.     | Max.     | Unit |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------|--------|----------|----------|------|
| Static                                                                                          |                                                            |          |        |          |          |      |
| Drain–Source Breakdown Voltage(Note 3)<br>(VGS = 0 V, ID = 250 μA)                              |                                                            | V(BR)DSS | 20     | -        | -        | V    |
| Zero Gate Voltage Drain Current<br>(VDS= 20 V, VGS= 0 V)                                        |                                                            | IDSS     | -      | -        | 1        | μA   |
| Gate–Body Leakage Current<br>(VDS = 0 V, VGS = ±12 V)                                           |                                                            | IGSS     | -      | -        | ± 100    | nA   |
| Gate Threshold Voltage(Note 3)<br>(VDS = VGS, ID = 250 μA)                                      |                                                            | VGS(th)  | 0.3    | 0.8      | 1.2      | V    |
| Static Drain–Source On–State Resistance<br>(VGS = 4.5 V, ID = 2 A)<br>(VGS = 2.5 V, ID = 1.5 A) |                                                            | RDS(on)  | -<br>- | 28<br>35 | 75<br>90 | mΩ   |
| Dynamic                                                                                         |                                                            |          |        |          |          |      |
| Total Gate Charge                                                                               | (VDS = 10 V, VGS = 10 V, ID = 2 A)                         | Qg       | -      | 7        | -        | nC   |
| Gate–Source Charge                                                                              |                                                            | Qgs      | -      | 0.32     | -        |      |
| Gate–Drain Charge                                                                               |                                                            | Qgd      | -      | 1.24     | -        |      |
| Input Capacitance<br>(VGS = 0 V, f = 1.0MHz, VDS= 10 V)                                         |                                                            | Ciss     | -      | 262      | -        | pF   |
| Output Capacitance<br>(VGS = 0 V, f = 1.0MHz, VDS= 10 V)                                        |                                                            | Coss     | -      | 50       | -        | pF   |
| Reverse Transfer Capacitance<br>(VGS = 0 V, f = 1.0MHz, VDS= 10 V)                              |                                                            | Crss     | -      | 41       | -        | pF   |
| Turn-On Delay Time                                                                              | (VGS = 10 V, VDS = 10 V, ID = 1 A, RG = 6.2 Ω, RL = 10 Ω ) | td(on)   | -      | 2        | -        | ns   |
| Rise Time                                                                                       |                                                            | tr       | -      | 1.6      | -        |      |
| Turn-Off Delay Time                                                                             |                                                            | td(off)  | -      | 46       | -        |      |
| Fall Time                                                                                       |                                                            | tf       | -      | 24       | -        |      |
| Diode characteristics                                                                           |                                                            |          |        |          |          |      |
| Continuous Current TA =25° C                                                                    |                                                            | IS       | -      | -        | 3.2      | A    |
| Plused Current TA =25° C                                                                        |                                                            | ISM      | -      | -        | 12       | A    |
| Diode Forward Voltage<br>(IS = 1 A, VGS = 0 V)                                                  |                                                            | VSD      | -      | 0.7      | 1.2      | V    |
| Reverse Recovery Time<br>(VDD=10V, IF=3.2A, dIF/dt=60A/us)                                      |                                                            | trr      | -      | 26       | -        | ns   |
| Reverse Recovery Charge<br>(VDD=10V, IF=3.2A, dIF/dt=60A/us)                                    |                                                            | Qrr      | -      | 2.1      | -        | nC   |
| Reverse Recovery Current<br>(VDD=10V, IF=3.2A, dIF/dt=60A/us)                                   |                                                            | IRRM     | -      | 0.14     | -        | A    |

3. Pulse test: PW  $\leq$  300us duty cycle  $\leq$  2%.

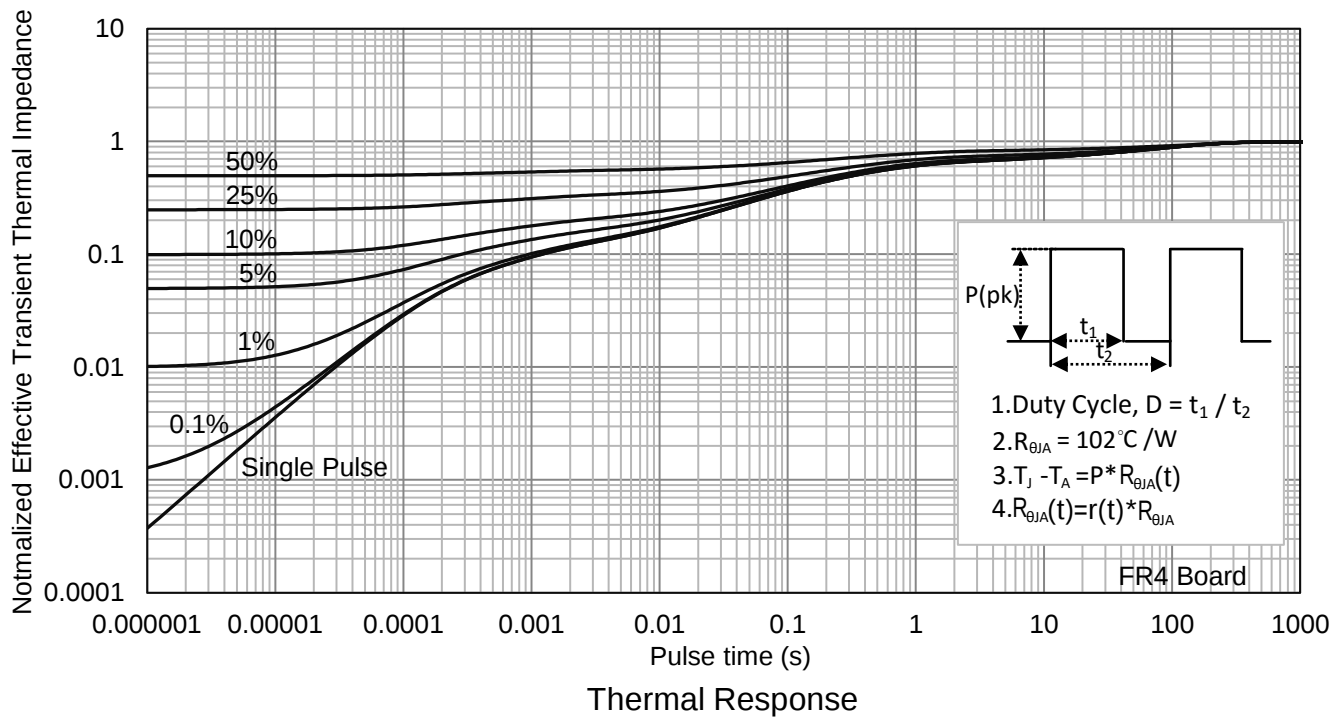
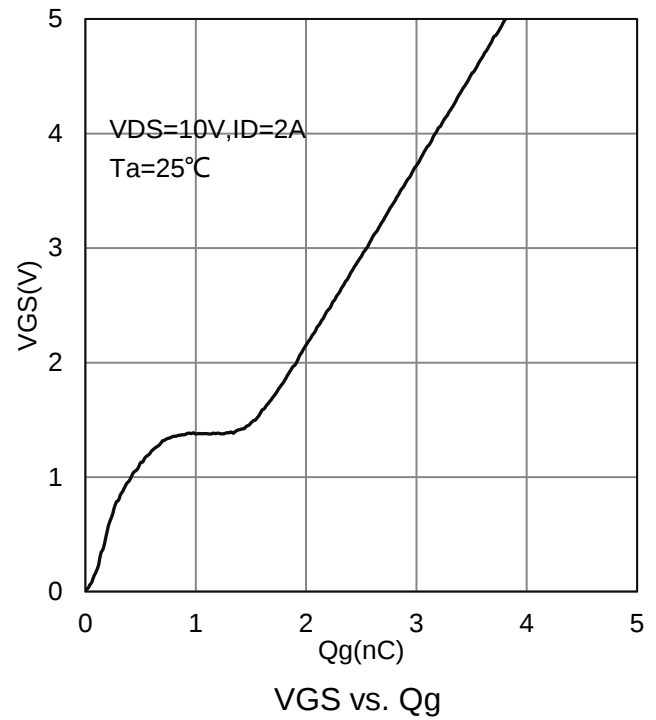
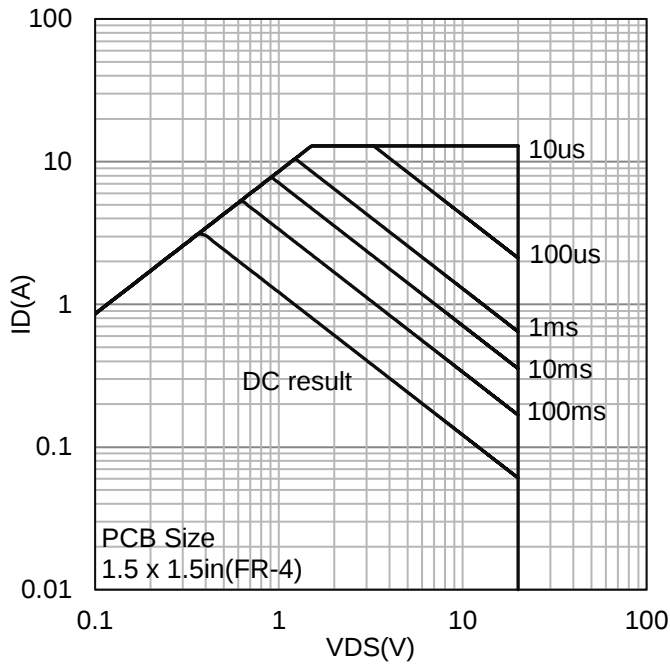
## 7. ELECTRICAL CHARACTERISTICS CURVES



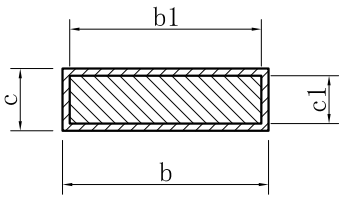
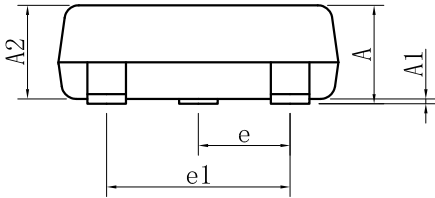
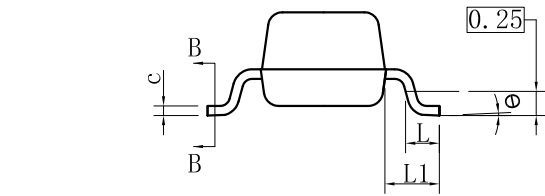
## 7. ELECTRICAL CHARACTERISTICS CURVES(Con.)



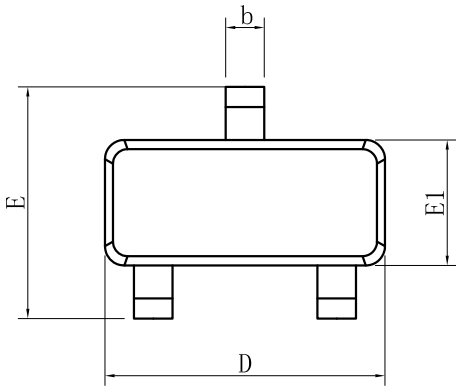
## 7. ELECTRICAL CHARACTERISTICS CURVES(Con.)



**8.OUTLINE AND DIMENSIONS**



SECTION B-B

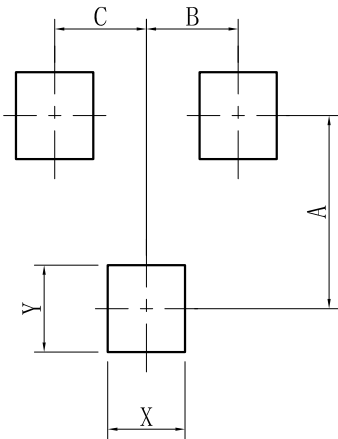


| SOT23                |         |      |      |
|----------------------|---------|------|------|
| DIM                  | MIN     | NOR  | MAX  |
| A                    | 0.89    | -    | 1.12 |
| A1                   | 0.01    | -    | 0.10 |
| A2                   | 0.88    | 0.95 | 1.02 |
| b                    | 0.30    | -    | 0.50 |
| b1                   | 0.30    | 0.40 | 0.45 |
| c                    | 0.08    | -    | 0.20 |
| c1                   | 0.08    | 0.10 | 0.16 |
| D                    | 2.80    | 2.90 | 3.04 |
| E                    | 2.10    | -    | 2.64 |
| E1                   | 1.20    | 1.30 | 1.40 |
| e                    | 0.95BSC |      |      |
| e1                   | 1.90BSC |      |      |
| L                    | 0.40    | 0.46 | 0.60 |
| L1                   | 0.54REF |      |      |
| θ                    | 0°      | -    | 8°   |
| All Dimensions in mm |         |      |      |

**GENERAL NOTES**

- 1.Top package surface finish Ra0.4±0.2um
- 2.Bottom package surface finish Ra0.7±0.2um
- 3.Side package surface finish Ra0.4±0.2um

**9.SOLDERING FOOTPRINT**



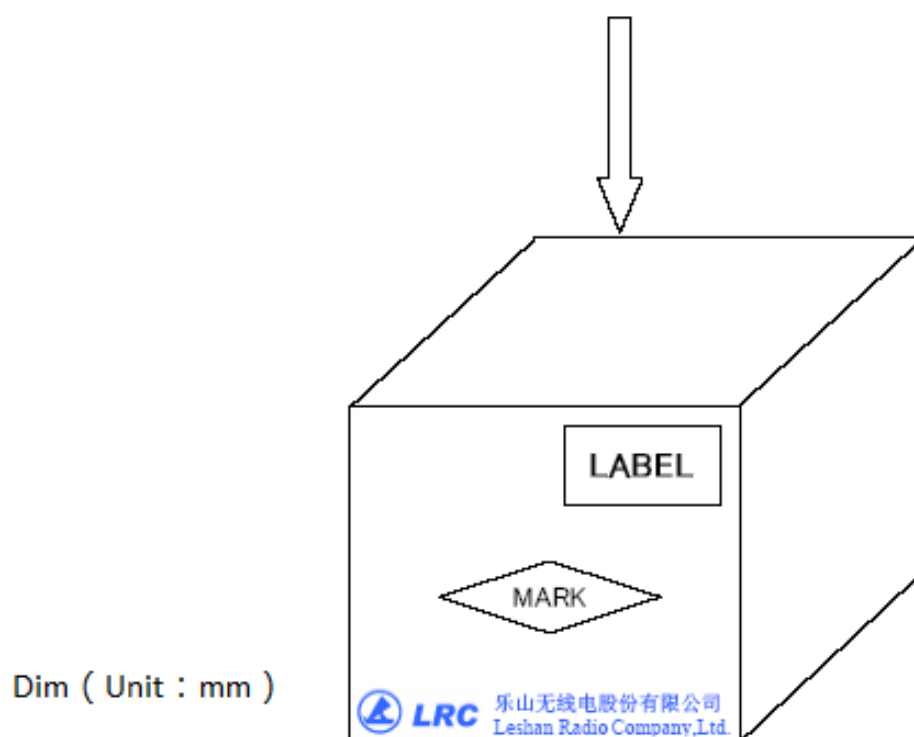
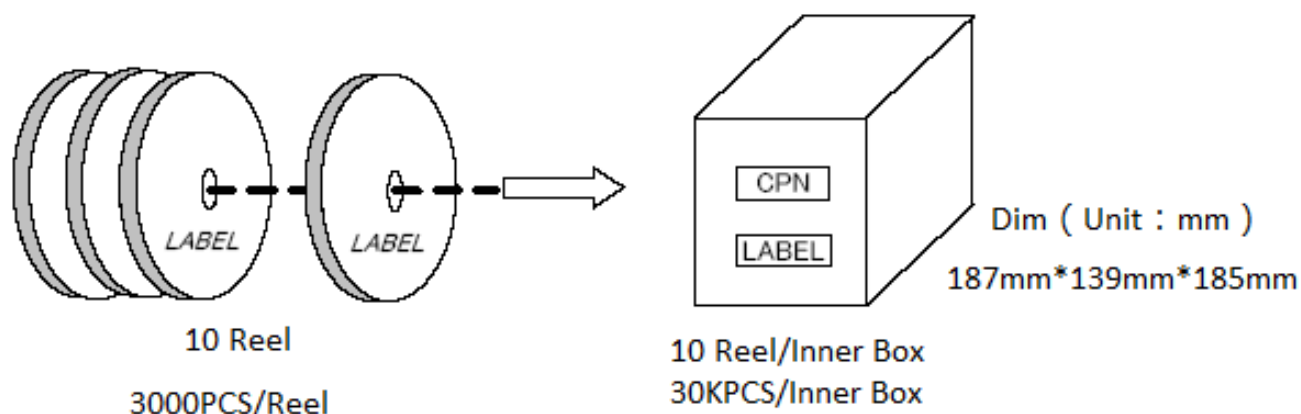
| SOT23 |      |
|-------|------|
| DIM   | (mm) |
| X     | 0.80 |
| Y     | 0.90 |
| A     | 2.00 |
| B     | 0.95 |
| C     | 0.95 |

## 10.General Packing Specification

|                                     |             |
|-------------------------------------|-------------|
| SOT23 General Packing Specification | CS-024      |
|                                     | Page 1 of 7 |

### 1.0 Packing method

3000PCS/Reel

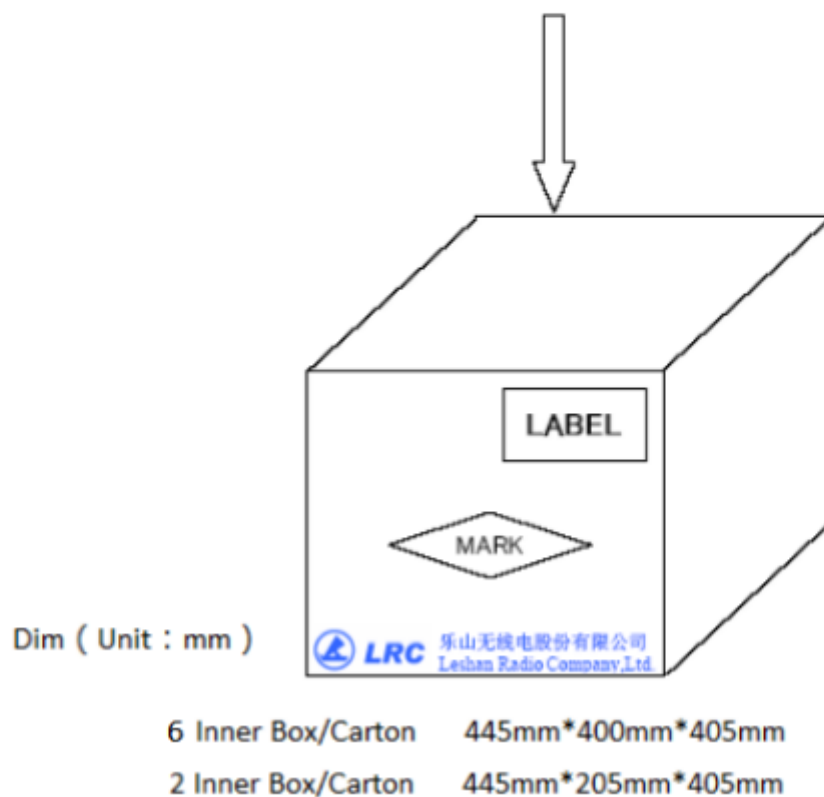
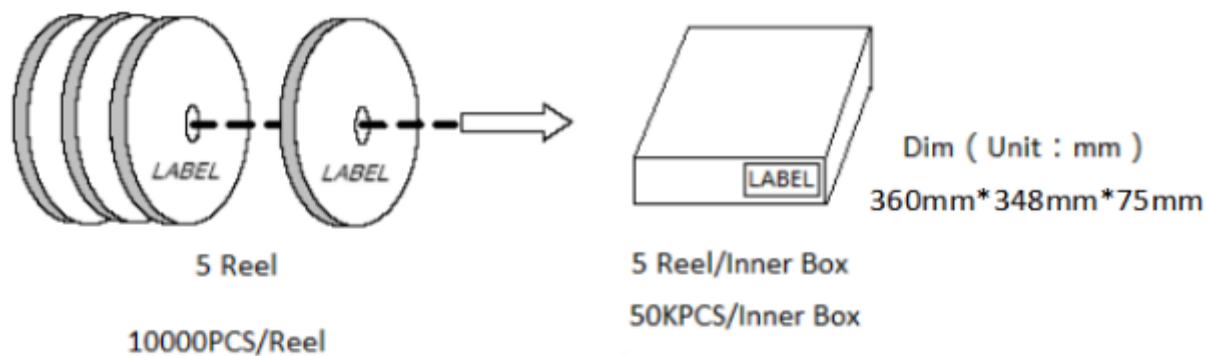


|                     |                   |
|---------------------|-------------------|
| 12 Inner Box/Carton | 445mm*400mm*405mm |
| 6 Inner Box/Carton  | 445mm*205mm*405mm |
| 3 Inner Box/Carton  | 445mm*215mm*220mm |

## 10.General Packing Specification(Con.)

|                                     |             |
|-------------------------------------|-------------|
| SOT23 General Packing Specification | CS-024      |
|                                     | Page 2 of 7 |

10000PCS/Reel

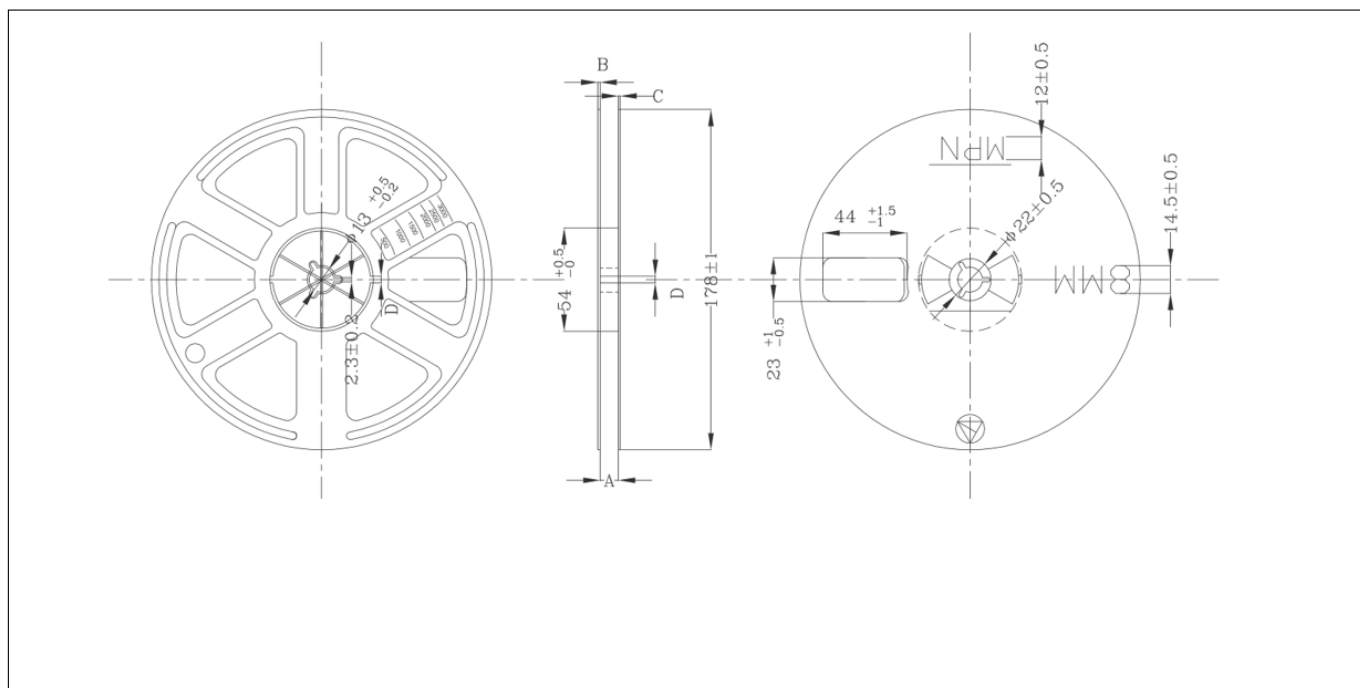


## 10.General Packing Specification(Con.)

|                                     |             |
|-------------------------------------|-------------|
| SOT23 General Packing Specification | CS-024      |
|                                     | Page 3 of 7 |

### 2.0 Reel dimensions

7inch\*8mm Reel (3000PCS/Reel)

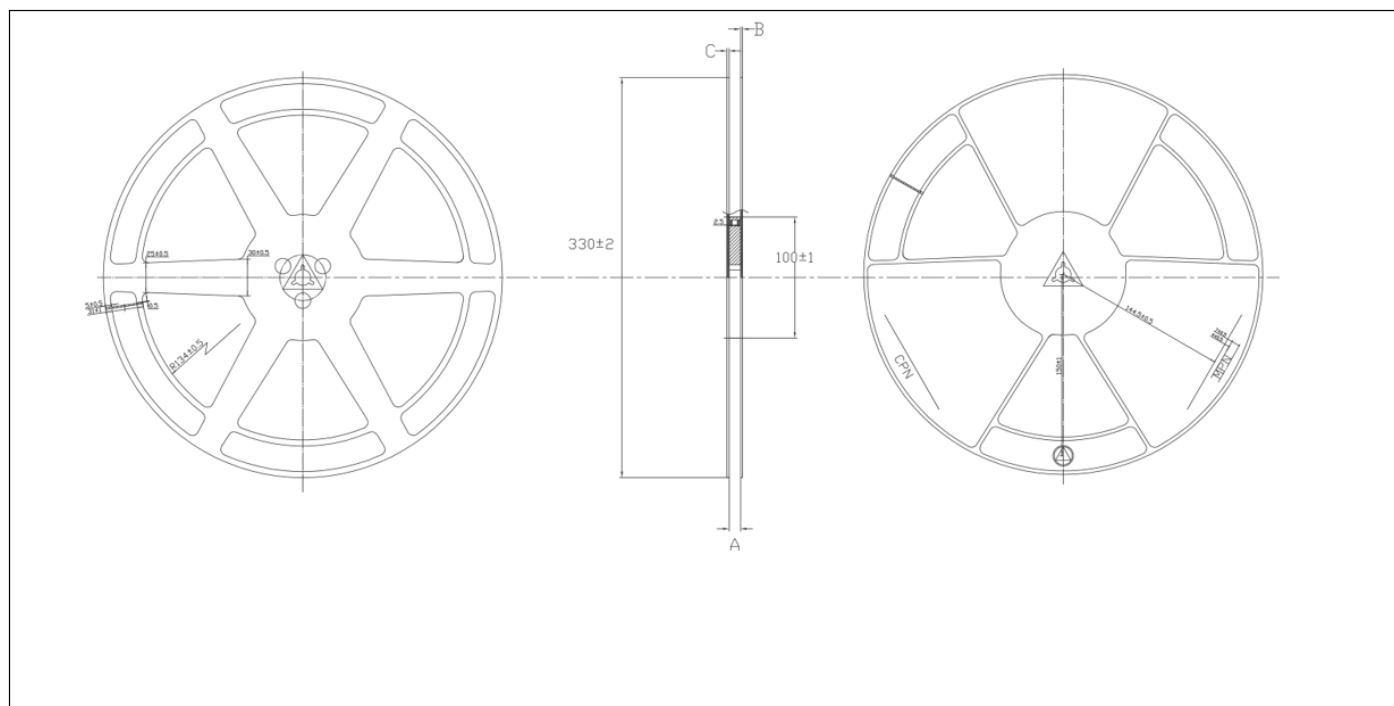


| Size     | A       | B                                    | C                                     | D       |
|----------|---------|--------------------------------------|---------------------------------------|---------|
| Spec(mm) | 9.6±1.2 | 1.2 <sup>+0.3</sup> <sub>-0.05</sub> | 0.85 <sup>+0.1</sup> <sub>-0.05</sub> | 3.5±0.5 |

## 10.General Packing Specification(Con.)

|                                     |             |
|-------------------------------------|-------------|
| SOT23 General Packing Specification | CS-024      |
|                                     | Page 4 of 7 |

13inch\*8mm Reel (10000PCS/Reel)

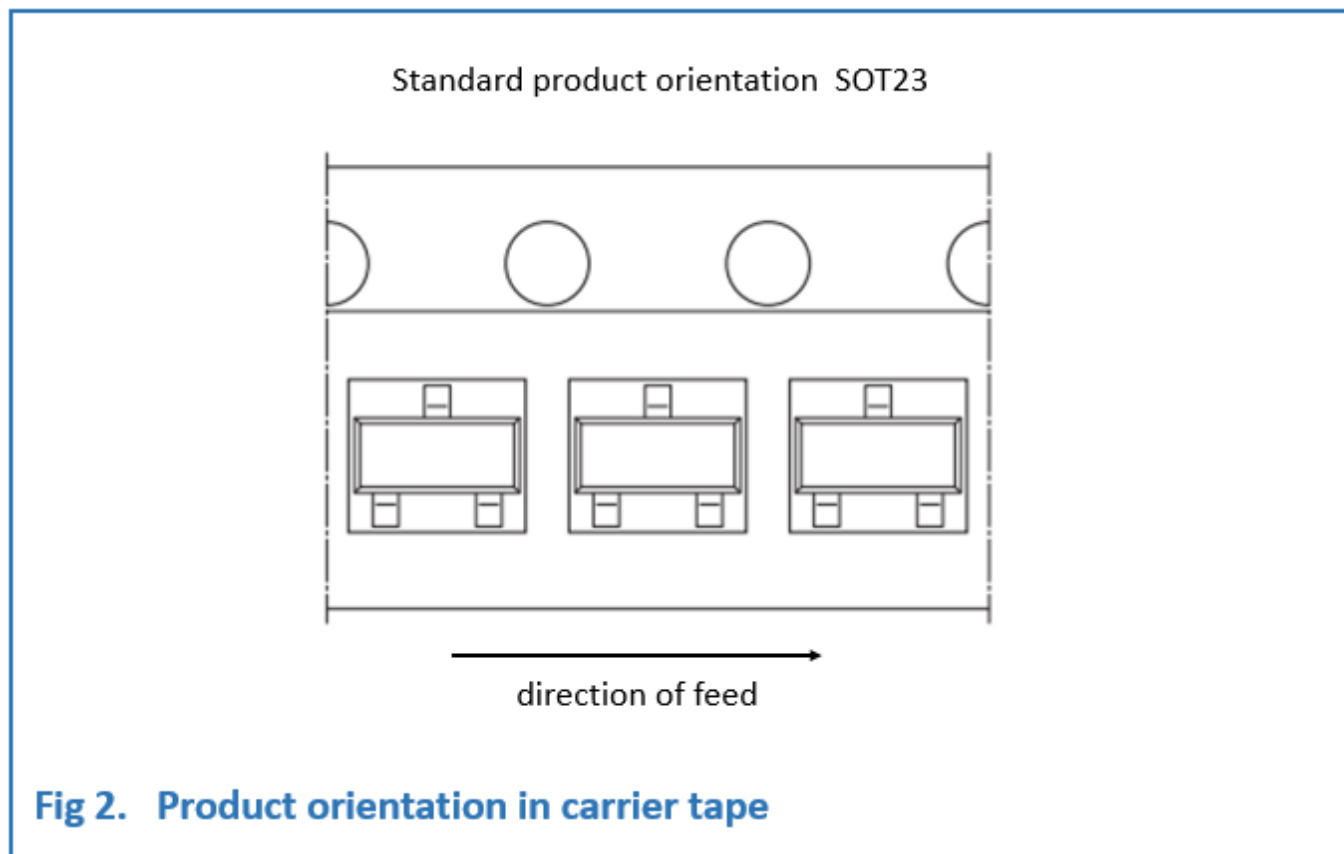


| Size     | A             | B                 | C                 |
|----------|---------------|-------------------|-------------------|
| Spec(mm) | $9.6 \pm 1.2$ | $2^{+0.3}_{-0.2}$ | $2^{+0.3}_{-0.2}$ |

## 10.General Packing Specification(Con.)

|                                     |             |
|-------------------------------------|-------------|
| SOT23 General Packing Specification | CS-024      |
|                                     | Page 5 of 7 |

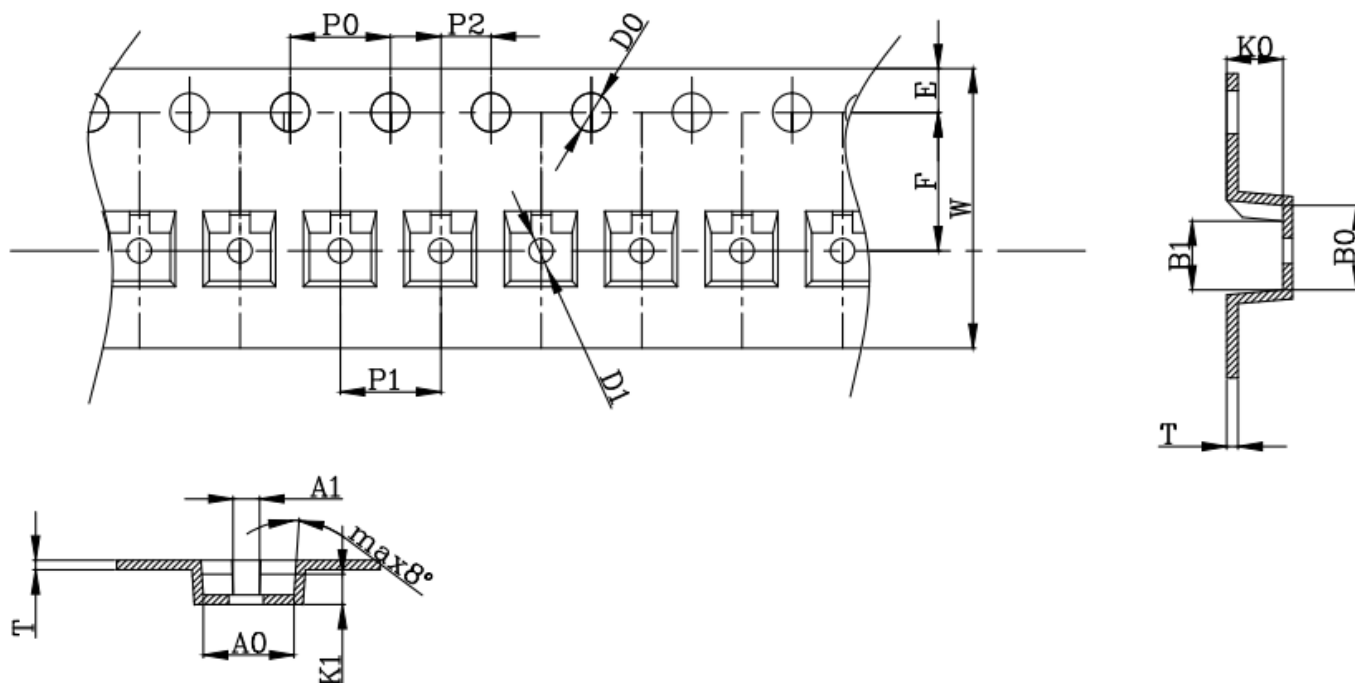
### 3.0 Product orientation



## 10.General Packing Specification(Con.)

|                                     |             |
|-------------------------------------|-------------|
| SOT23 General Packing Specification | CS-024      |
|                                     | Page 6 of 7 |

### 4.0 Carrier tape dimensions

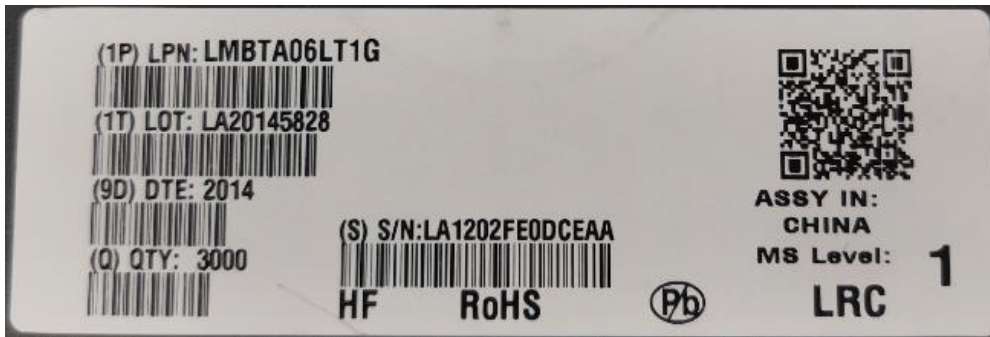


| Symbol   | A0             | A1             | B0             | B1             | K0              | K1             | P0                   | P1            |
|----------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------------|---------------|
| Spec(mm) | 3.15 $\pm$ 0.1 | 1.09 $\pm$ 0.1 | 2.77 $\pm$ 0.1 | 2.1 $\pm$ 0.1  | 1.22 $\pm$ 0.1  | 0.65 $\pm$ 0.1 | 4.0 $\pm$ 0.1        | 4.0 $\pm$ 0.1 |
| Symbol   | P2             | T              | E              | F              | D0              | D1             | W                    |               |
| Spec(mm) | 2.0 $\pm$ 0.05 | 0.2 $\pm$ 0.02 | 1.75 $\pm$ 0.1 | 3.5 $\pm$ 0.05 | 1.55 $\pm$ 0.05 | 1.0 $\pm$ 0.1  | 8.0 $^{+0.2}_{-0.1}$ |               |

## 10.General Packing Specification(Con.)

|                                     |             |
|-------------------------------------|-------------|
| SOT23 General Packing Specification | CS-024      |
|                                     | Page 7 of 7 |

### 5.0 Barcode label



**Note:**

1. Example of typical reel barcode lable.
2. The HF/RoHS/Pb-free,MSL level may vary depending upon different P/N.

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| Version | Date       | Description of revision                                                      | DRI   |
|---------|------------|------------------------------------------------------------------------------|-------|
| O       | 2021/11/11 | LRC ORIGINAL RELEASE                                                         | XU ZY |
| A       | 2023/3/20  | Add Curve of VGS vs. Qg.                                                     | XU ZY |
| B       | 2023/9/25  | Add typ of RDS(on);Add IS,ISM,trr,Qrr,IRRM;Add ID@TA=85°C                    | XU ZY |
| C       | 2023/12/27 | Add General Packing Specification;<br>Revise dimension diagram of SOT23 POD. | XU ZY |