

## TM100N02D

## N-Channel Enhancement Mosfet

### General Description

- Low  $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

### Applications

- Load switch
- PWM

### General Features

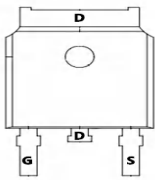
$V_{DS} = 20V$   $I_D = 100A$

$R_{DS(ON)} = 2.6m\Omega (typ.) @ V_{GS} = 4.5V$

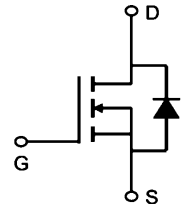
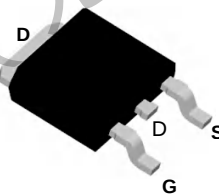
100% UIS Tested  
100%  $R_g$  Tested



D:TO-252-3L



Marking: 100N02



### Absolute Maximum Ratings ( $T_C = 25^\circ C$ Unless Otherwise Noted)

| Symbol                    | Parameter                                 | Rating     | Units      |
|---------------------------|-------------------------------------------|------------|------------|
| $V_{DS}$                  | Drain-Source Voltage                      | 20         | V          |
| $V_{GS}$                  | Gate-Source Voltage                       | $\pm 12$   | V          |
| $I_D @ T_C = 25^\circ C$  | Continuous Drain Current, $V_{GS} @ 4.5V$ | 100        | A          |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V$ | 69         | A          |
| $I_{DM}$                  | Pulsed Drain Current                      | 360        | A          |
| EAS                       | Single Pulse Avalanche Energy             | 118        | mJ         |
| $I_{AS}$                  | Avalanche Current                         | 41         | A          |
| $P_D @ T_C = 25^\circ C$  | Total Power Dissipation                   | 88         | W          |
| $T_{STG}$                 | Storage Temperature Range                 | -55 to 150 | $^\circ C$ |
| $T_J$                     | Operating Junction Temperature Range      | -55 to 150 | $^\circ C$ |

### Thermal Data

| Symbol          | Parameter                           | Typ. | Max. | Unit         |
|-----------------|-------------------------------------|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient | ---  | 62   | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case    | ---  | 6.6  | $^\circ C/W$ |

## TM100N02D

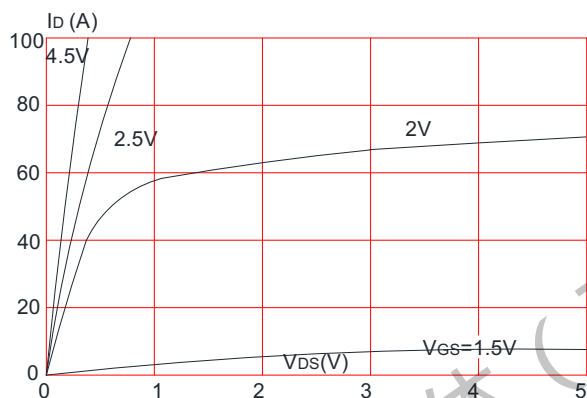
## N-Channel Enhancement Mosfet

### Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

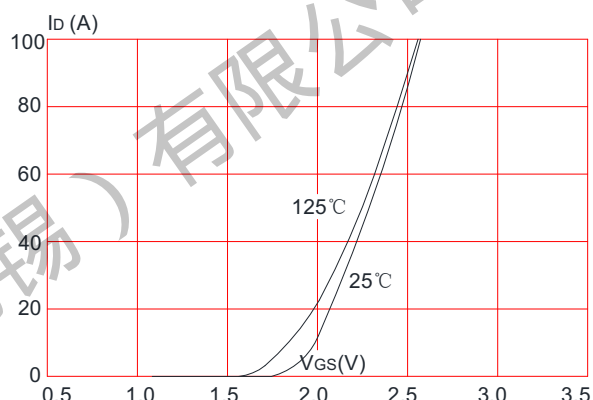
| Symbol                                                 | Parameter                                                 | Test Condition                                                                            | Min. | Typ. | Max. | Units |
|--------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|------|------|------|-------|
| Off Characteristic                                     |                                                           |                                                                                           |      |      |      |       |
| V <sub>(BR)DSS</sub>                                   | Drain-Source Breakdown Voltage                            | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                                | 20   | -    | -    | V     |
| I <sub>DSS</sub>                                       | Zero Gate Voltage Drain Current                           | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                                                 | -    | -    | 1    | μA    |
| I <sub>GSS</sub>                                       | Gate to Body Leakage Current                              | V <sub>GS</sub> = ±12V, V <sub>DS</sub> =0V                                               | -    | -    | ±100 | nA    |
| On Characteristics                                     |                                                           |                                                                                           |      |      |      |       |
| V <sub>GS(th)</sub>                                    | Gate Threshold Voltage                                    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                  | 0.5  | 0.7  | 0.9  | V     |
| R <sub>DS(on)</sub>                                    | Static Drain-Source On-Resistance<br><small>note3</small> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A                                                | -    | 2.6  | 3.8  | mΩ    |
|                                                        |                                                           | V <sub>GS</sub> =2.5V, I <sub>D</sub> =20A                                                |      | 3.8  | 4.8  |       |
| Dynamic Characteristics                                |                                                           |                                                                                           |      |      |      |       |
| C <sub>iss</sub>                                       | Input Capacitance                                         | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V,<br>f=1.0MHz                                    | -    | 2200 | -    | pF    |
| C <sub>oss</sub>                                       | Output Capacitance                                        |                                                                                           | -    | 460  | -    | pF    |
| C <sub>rss</sub>                                       | Reverse Transfer Capacitance                              |                                                                                           | -    | 445  | -    | pF    |
| Q <sub>g</sub>                                         | Total Gate Charge                                         | V <sub>DS</sub> =10V, I <sub>D</sub> =30A,<br>V <sub>GS</sub> =4.5V                       | -    | 48   | -    | nC    |
| Q <sub>gs</sub>                                        | Gate-Source Charge                                        |                                                                                           | -    | 3.6  | -    | nC    |
| Q <sub>gd</sub>                                        | Gate-Drain(“Miller”) Charge                               |                                                                                           | -    | 19   | -    | nC    |
| Switching Characteristics                              |                                                           |                                                                                           |      |      |      |       |
| t <sub>d(on)</sub>                                     | Turn-On Delay Time                                        | V <sub>DS</sub> =10V, I <sub>D</sub> =30A,<br>R <sub>G</sub> =1.8Ω, V <sub>GS</sub> =4.5V | -    | 9.7  | -    | ns    |
| t <sub>r</sub>                                         | Turn-On Rise Time                                         |                                                                                           | -    | 37   | -    | ns    |
| t <sub>d(off)</sub>                                    | Turn-Off Delay Time                                       |                                                                                           | -    | 63   | -    | ns    |
| t <sub>f</sub>                                         | Turn-Off Fall Time                                        |                                                                                           | -    | 52   | -    | ns    |
| Drain-Source Diode Characteristics and Maximum Ratings |                                                           |                                                                                           |      |      |      |       |
| I <sub>S</sub>                                         | Maximum Continuous Drain to Source Diode Forward Current  |                                                                                           | -    | -    | 100  | A     |
| I <sub>SM</sub>                                        | Maximum Pulsed Drain to Source Diode Forward Current      |                                                                                           | -    | -    | 360  | A     |
| V <sub>SD</sub>                                        | Drain to Source Diode Forward Voltage                     | V <sub>GS</sub> =0V, I <sub>SD</sub> =30A,<br>T <sub>J</sub> =25℃                         | -    | -    | 1.2  | V     |
| t <sub>rr</sub>                                        | Reverse Recovery Time                                     | T <sub>J</sub> =25℃, I <sub>F</sub> =30A,                                                 | -    | 23   | -    | ns    |
| Q <sub>rr</sub>                                        | Reverse Recovery Charge                                   | di/dt =100A/μs                                                                            | -    | 10   | -    | nC    |

## Typical Performance Characteristics

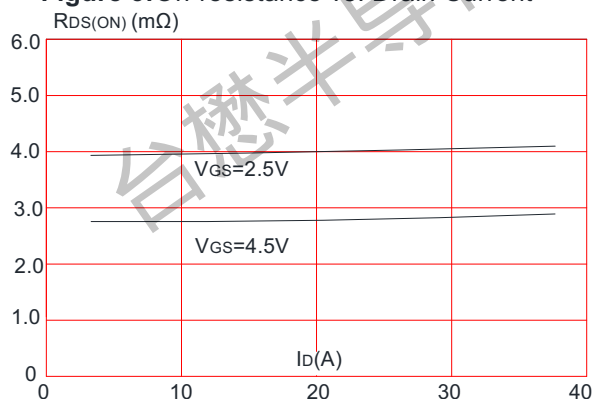
**Figure 1: Output Characteristics**



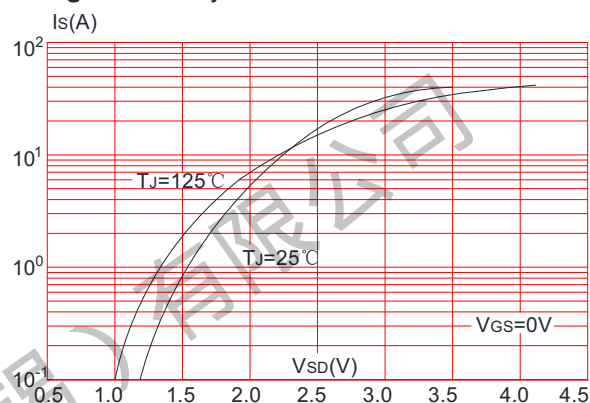
**Figure 2: Typical Transfer Characteristics**



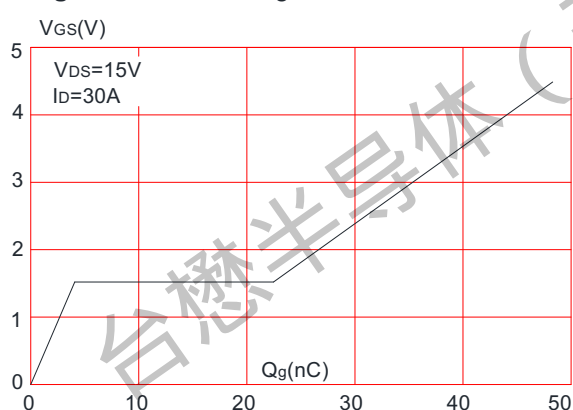
**Figure 3: On-resistance vs. Drain Current**



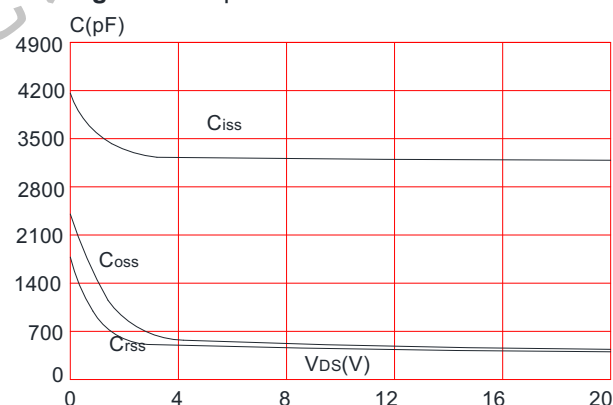
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**



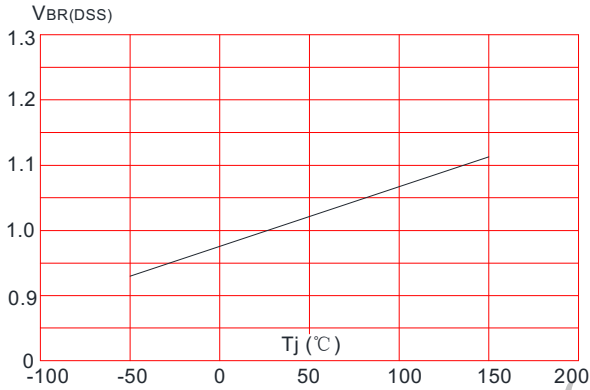
**Figure 6: Capacitance Characteristics**



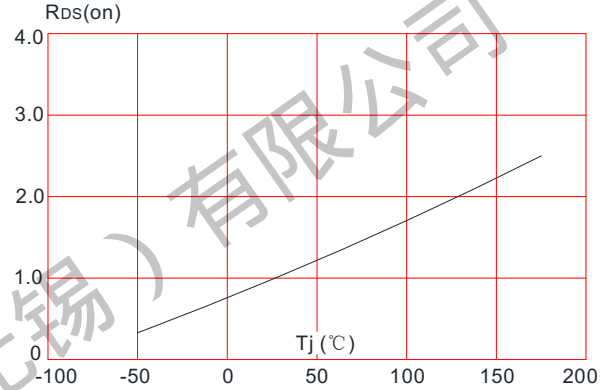
# TM100N02D

## N-Channel Enhancement Mosfet

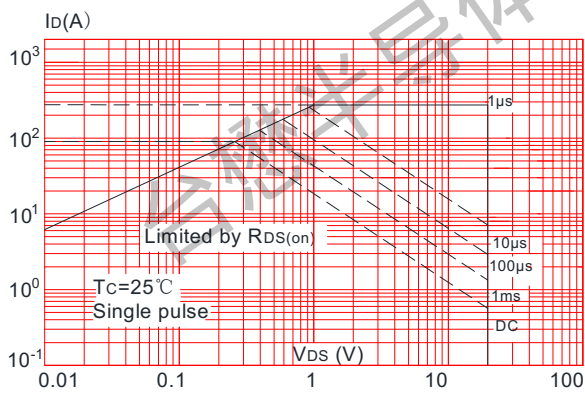
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



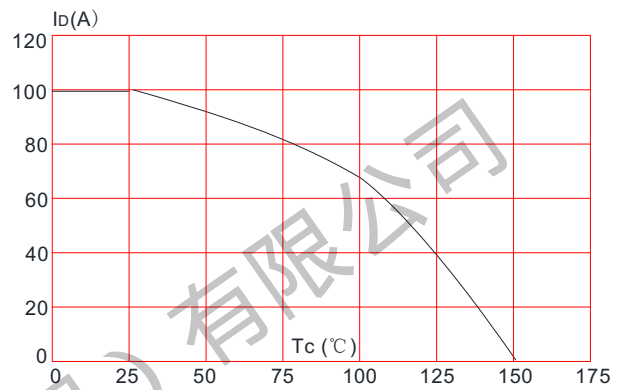
**Figure 8:** Normalized on Resistance vs. Junction Temperature



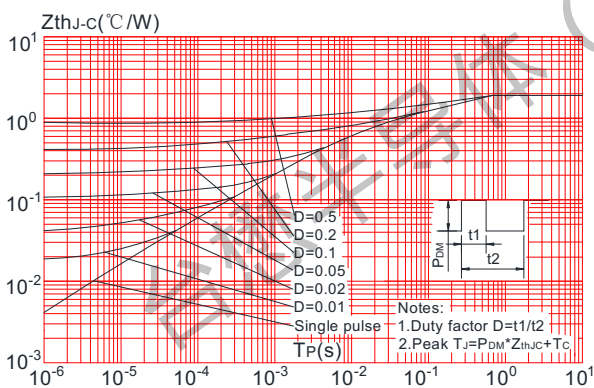
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

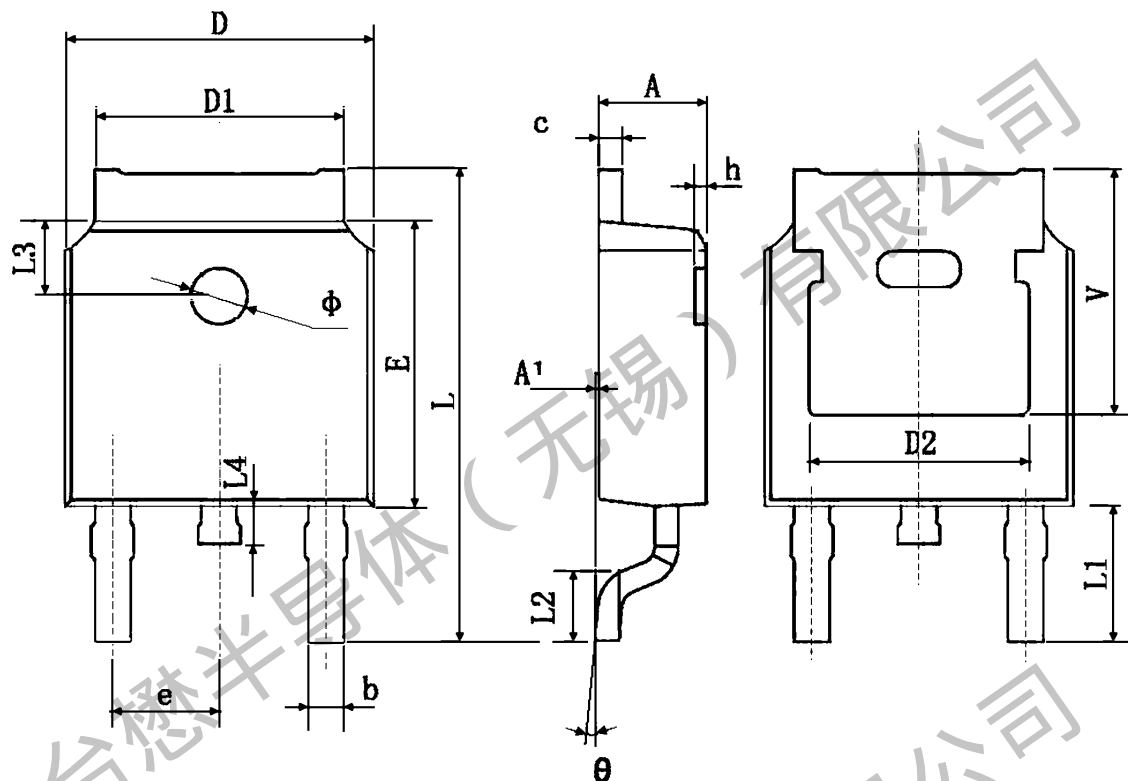


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



## N-Channel Enhancement Mosfet

## Package Mechanical Data: TO-252-3L

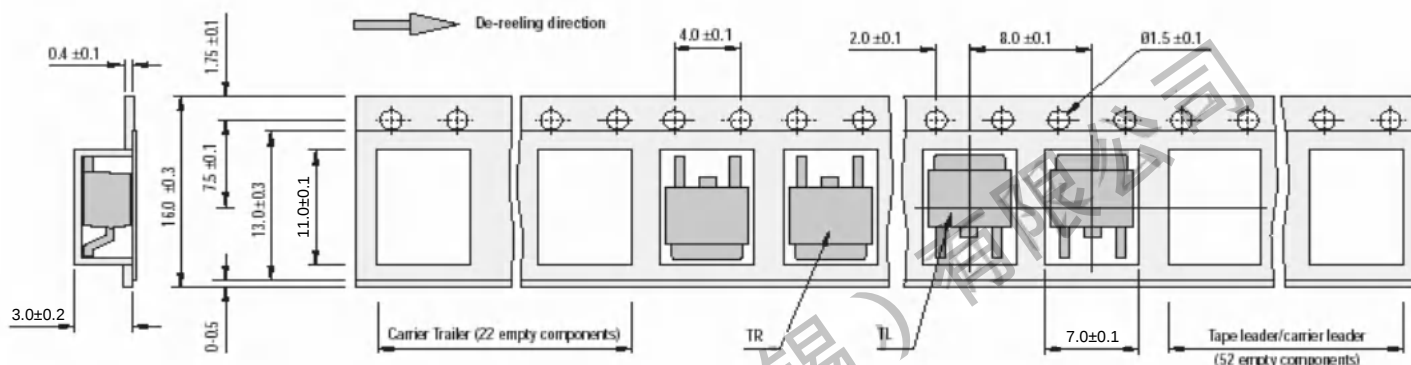


| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127  | 0.000                | 0.005 |
| b      | 0.660                     | 0.860  | 0.026                | 0.034 |
| c      | 0.460                     | 0.580  | 0.018                | 0.023 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2     | 4.830 TYP.                |        | 0.190 TYP.           |       |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.186                     | 2.386  | 0.086                | 0.094 |
| L      | 9.800                     | 10.400 | 0.386                | 0.409 |
| L1     | 2.900 TYP.                |        | 0.114 TYP.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3     | 1.600 TYP.                |        | 0.063 TYP.           |       |
| L4     | 0.600                     | 1.000  | 0.024                | 0.039 |
| Φ      | 1.100                     | 1.300  | 0.043                | 0.051 |
| θ      | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.350 TYP.                |        | 0.211 TYP.           |       |

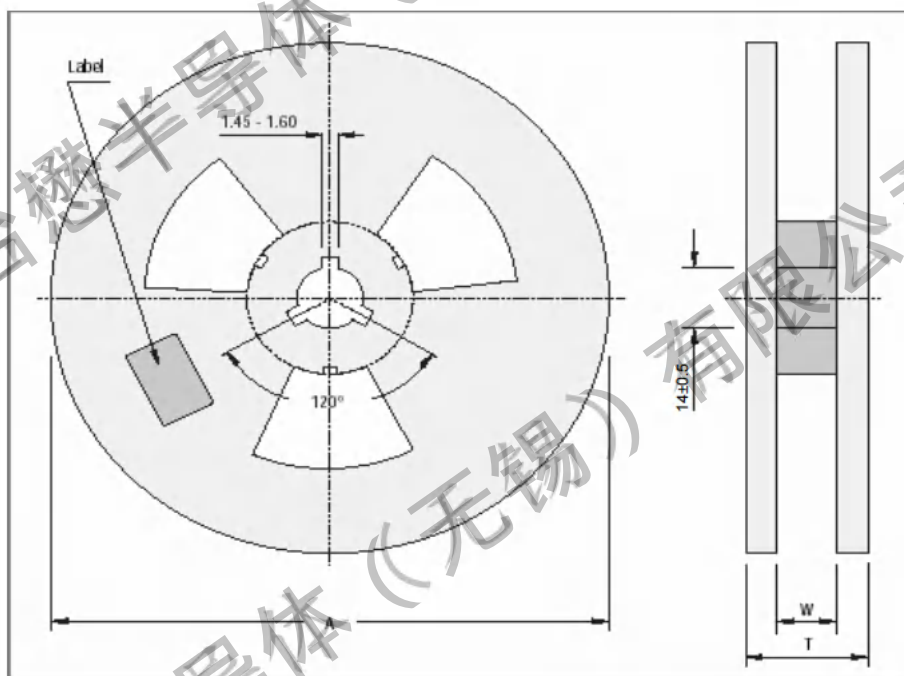
# TM100N02D

## N-Channel Enhancement Mosfet

### TO-252-3L Embossed Carrier Tape



### TO-252-3L Reel



All Dimensions are in mm

| Reel Specifications |            |                      |                       |                           |
|---------------------|------------|----------------------|-----------------------|---------------------------|
| Package             | Tape Width | Reel Dia.<br>A - Max | Inside Thickness<br>W | Reel Thickness<br>T - max |
| TO-252-3L           | 16         | 330                  | $18.0 \pm 1.5$        | 20                        |

### Packaging Information

| REEL      | Reel Size | Box       | Box Size(mm) | Carton     | Carton Size(mm) | G.W.(kg) |
|-----------|-----------|-----------|--------------|------------|-----------------|----------|
| 2,500 pcs | 13 inch   | 5,000 pcs | 355×370×50   | 25,000 pcs | 380×275×380     |          |

### Important Notices and Disclaimers

- Tritech-MOS Technology Corp. reserves the right to change this document, its products, and specifications at any time without prior notice.
- Before final design, purchase, or use, customers should obtain and confirm the latest product information and specifications.
- Tritech-MOS Technology Corp. makes no warranties, representations or warranties regarding the suitability of its products for any specific purpose, and Tritech-MOS Technology Corp. does not assume any responsibility for application assistance or customer product design.
- Tritech-MOS Technology Corp. does not guarantee or assume any responsibility for the purchase or use of any unexpected or unauthorized products.
- Any intellectual property rights of Tritech-MOS Technology Corp. are not licensed through implicate or other means.
- Products of Tritech-MOS Technology Corp. are not included as critical components in life support equipment or systems without explicit written approval from Tritech-MOS Technology Corp.

Revision history:

| Date       | Rev   | Description | Page |
|------------|-------|-------------|------|
| 2024.06.11 | 24.06 | Original    |      |