

# TM75N07HD

## N-Channel Enhancement Mosfet

### General Description

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

### Applications

- Load switch
- PWM

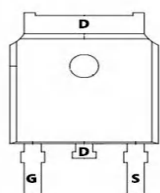
### General Features

$V_{DS} = 70V$   $I_D = 75A$   
 $R_{DS(ON)} = 6.6m\Omega (typ.) @ V_{GS} = 10V$

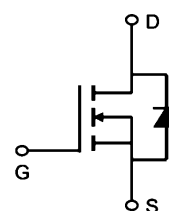
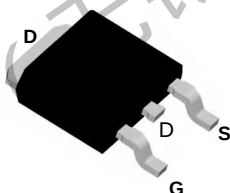
100% UIS Tested  
100%  $R_g$  Tested



D:TO-252-3L



Marking: 75N07



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

| Symbol                    | Parameter                                  | Rating     | Units      |
|---------------------------|--------------------------------------------|------------|------------|
| $V_{DS}$                  | Drain-Source Voltage                       | 70         | V          |
| $V_{GS}$                  | Gate-Source Voltage                        | $\pm 20$   | V          |
| $I_D @ T_C = 25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$ | 75         | A          |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 52         | A          |
| $I_{DM}$                  | Pulsed Drain Current <sup>2</sup>          | 320        | A          |
| EAS                       | Single Pulse Avalanche Energy <sup>3</sup> | 121        | mJ         |
| $P_D$                     | Total Power Dissipation <sup>3</sup>       | 116        | W          |
| $T_{STG}$                 | Storage Temperature Range                  | -55 to 175 | $^\circ C$ |
| $T_J$                     | Operating Junction Temperature Range       | -55 to 175 | $^\circ C$ |

### Thermal Data

| Symbol          | Parameter                                        | Typ. | Max. | Unit         |
|-----------------|--------------------------------------------------|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient <sup>1</sup> | ---  | 62   | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 6.6  | $^\circ C/W$ |

**TM75N07HD**
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**Electrical Characteristics:** ( $T_C=25^{\circ}\text{C}$  unless otherwise noted)

| Symbol                             | Parameter                                            | Conditions                                                         | Min | Typ  | Max   | Units |
|------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|-----|------|-------|-------|
| Off Characteristics                |                                                      |                                                                    |     |      |       |       |
| BV <sub>DSS</sub>                  | Drain-Sourtce Breakdown Voltage                      | V <sub>GS</sub> =0V,I <sub>D</sub> =250 μ A                        | 70  | ---  | ---   | V     |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current                      | V <sub>DS</sub> =68V, V <sub>GS</sub> =0V                          | --- | ---  | 1     | μ A   |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current                          | V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0A                        | --- | ---  | ± 100 | nA    |
| On Characteristics                 |                                                      |                                                                    |     |      |       |       |
| V <sub>GS(th)</sub>                | GATE-Source Threshold Voltage                        | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250 μ A         | 2   | 3    | 4     | V     |
| R <sub>DS(ON)</sub>                | Drain-Source On Resistanc <sup>2</sup>               | V <sub>GS</sub> =10V,I <sub>D</sub> =30A                           | --- | 6.6  | 8.6   | m Ω   |
| Dynamic Characteristics            |                                                      |                                                                    |     |      |       |       |
| C <sub>iss</sub>                   | Input Capacitance                                    | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz                  | --- | 4000 | ---   | pF    |
| C <sub>oss</sub>                   | Output Capacitance                                   |                                                                    | --- | 258  | ---   |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance                         |                                                                    | --- | 225  | ---   |       |
| Switching Characteristics          |                                                      |                                                                    |     |      |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time                                   | VDD=30V , VGS=10V ,<br>RG=6Ω , I <sub>D</sub> =20A                 | --- | 13   | ---   | ns    |
| t <sub>r</sub>                     | Rise Time                                            |                                                                    | --- | 90   | ---   | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                                  |                                                                    | --- | 43   | ---   | ns    |
| t <sub>f</sub>                     | Fall Time                                            |                                                                    | --- | 30   | ---   | ns    |
| Q <sub>g</sub>                     | Total Gate Charge                                    | V <sub>GS</sub> =10V, V <sub>DS</sub> =30V,<br>I <sub>D</sub> =20A | --- | 33   | ---   | nC    |
| Q <sub>gs</sub>                    | Gate-Source Charge                                   |                                                                    | --- | 8    | ---   | nC    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge                           |                                                                    | --- | 7    | ---   | nC    |
| Drain-Source Diode Characteristics |                                                      |                                                                    |     |      |       |       |
| I <sub>S</sub>                     | Continuous Source Current                            | -                                                                  | --- | ---  | 75    | A     |
| I <sub>SM</sub>                    | Maximum Pulsed Drain to Source Diode Forward Current | -                                                                  | --- | ---  | 320   | A     |
| V <sub>SD</sub>                    | Diode Forward Voltage <sup>2</sup>                   | V <sub>GS</sub> =0V , I <sub>S</sub> =80A                          | --- | ---  | 1.2   | V     |
| T <sub>rr</sub>                    | Reverse Recovery Time                                | IF=20A , dI/dt=100A/μs ,<br>T <sub>J</sub> =25℃                    | --- | 78   | ---   | ns    |
| Q <sub>rr</sub>                    | Reverse Recovery Charge                              |                                                                    | --- | 51   | ---   | nC    |

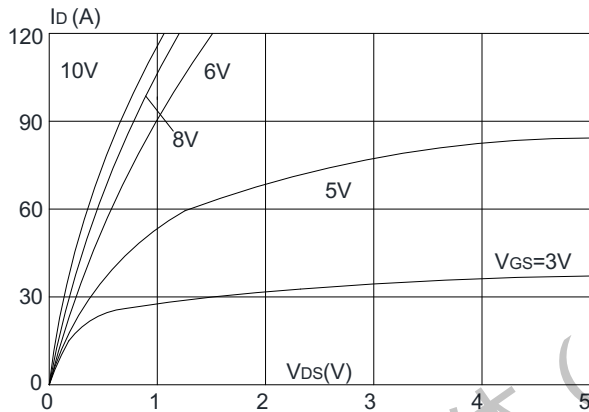
**Notes:**

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- 2.EAS condition :  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=35V$ ,  $V_G=10V$ ,  $L=0.5mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=22A$
- 3.Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

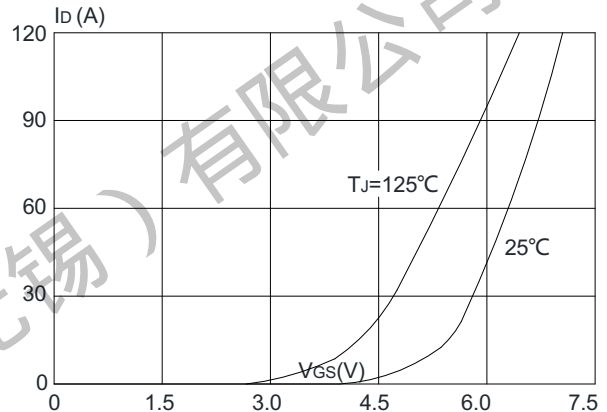
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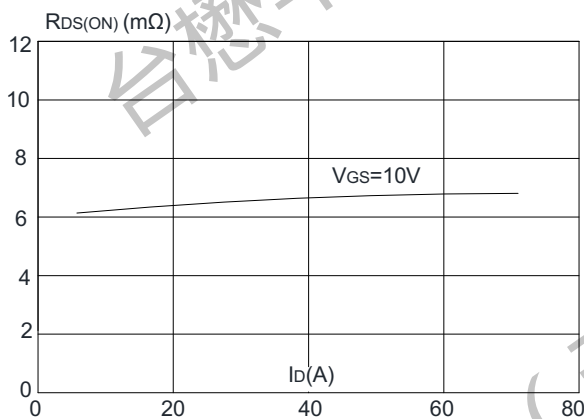
### Typical Characteristics:



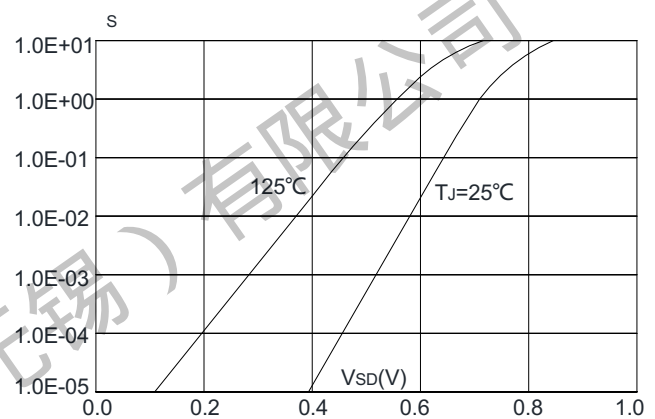
**Figure1:** Output Characteristics



**Figure 2:** Typical Transfer Characteristics



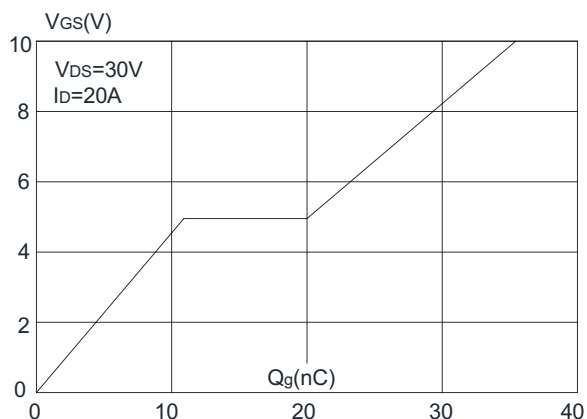
**Figure 3:** On-resistance vs. Drain Current



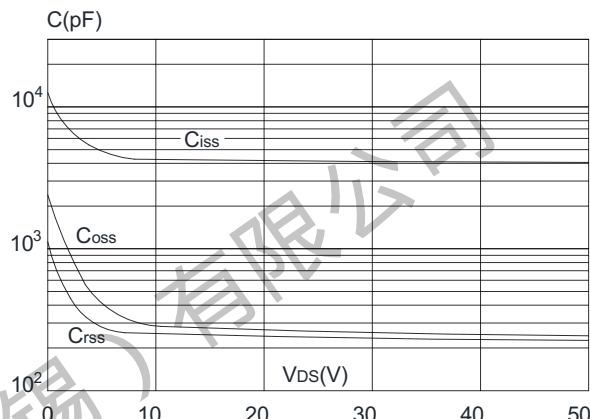
**Figure 4:** Body Diode Characteristics

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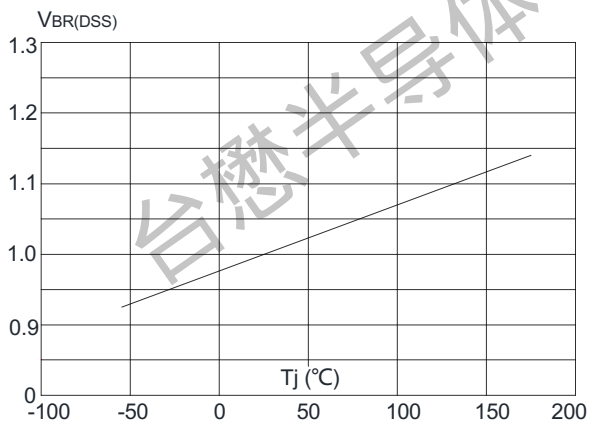
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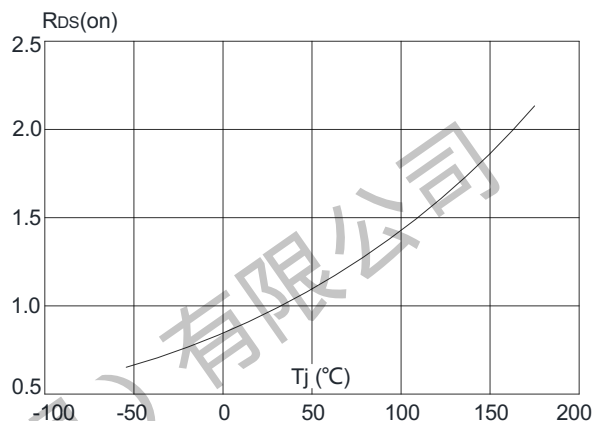
**Figure 5:** Gate Charge Characteristics



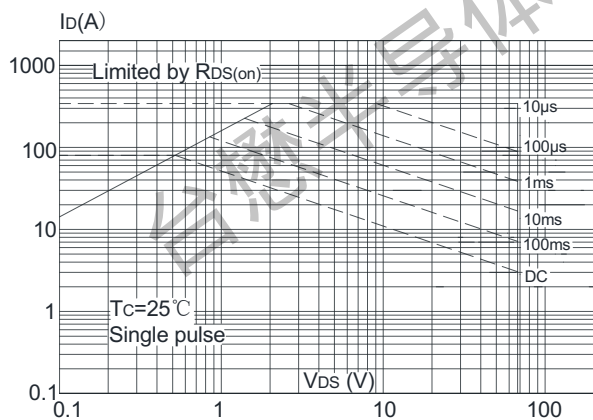
**Figure 6:** Capacitance Characteristics



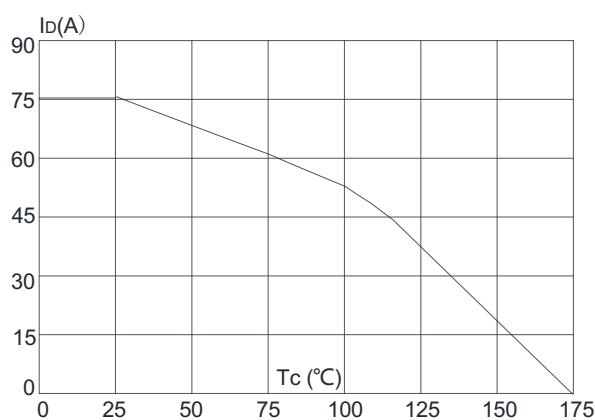
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



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



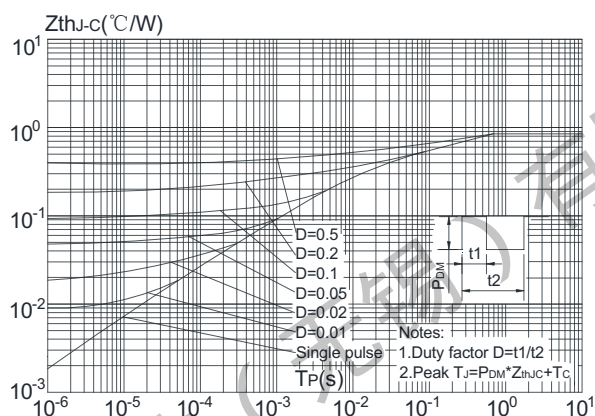
**Figure 9:** Maximum Safe Operating Area



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

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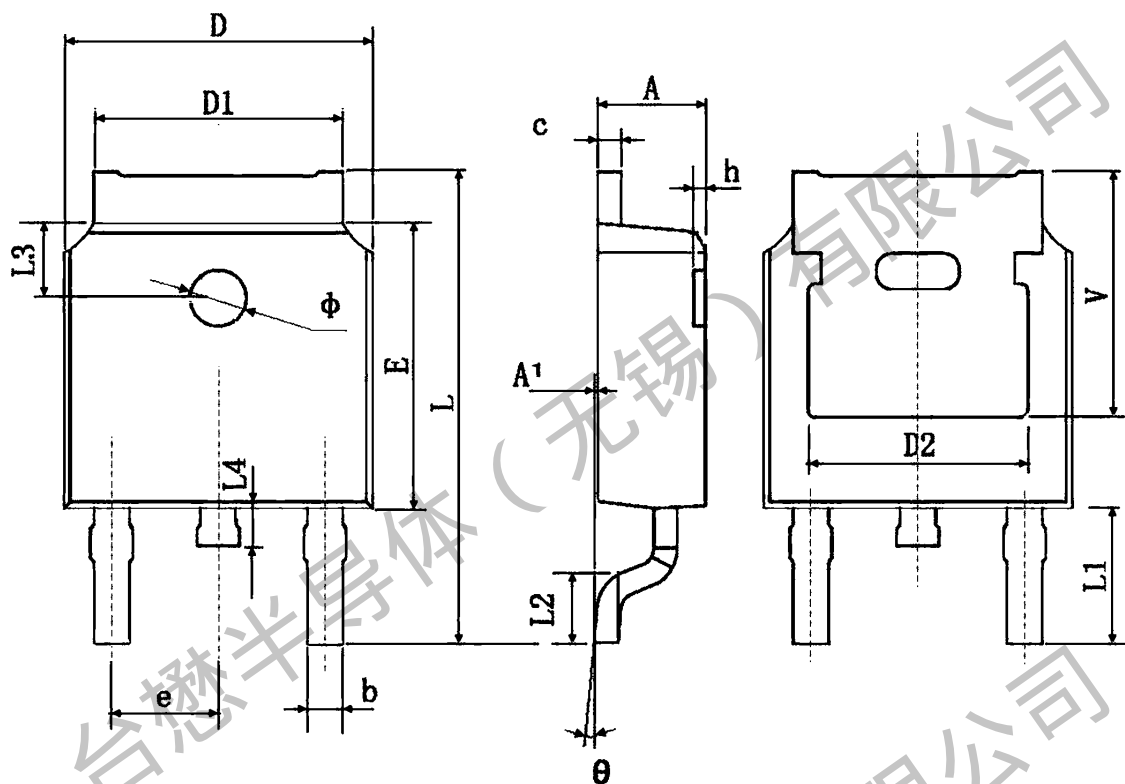


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case

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



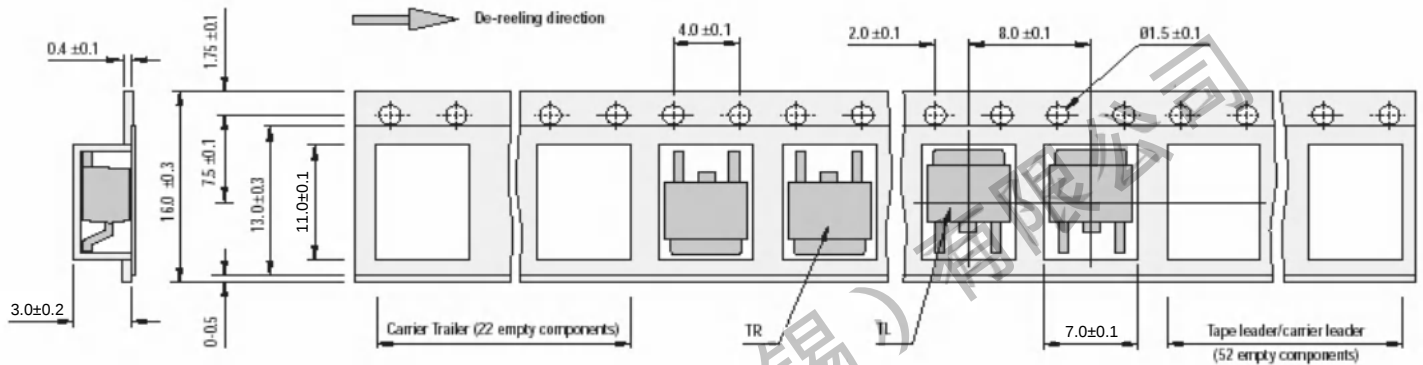
| Symbol   | Dimensions In Millimeters |        | Dimensions In Inches |       |
|----------|---------------------------|--------|----------------------|-------|
|          | Min.                      | Max.   | Min.                 | Max.  |
| A        | 2.200                     | 2.400  | 0.087                | 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 |
| $\phi$   | 1.100                     | 1.300  | 0.043                | 0.051 |
| $\theta$ | 0°                        | 8°     | 0°                   | 8°    |
| h        | 0.000                     | 0.300  | 0.000                | 0.012 |
| V        | 5.350 TYP.                |        | 0.211 TYP.           |       |



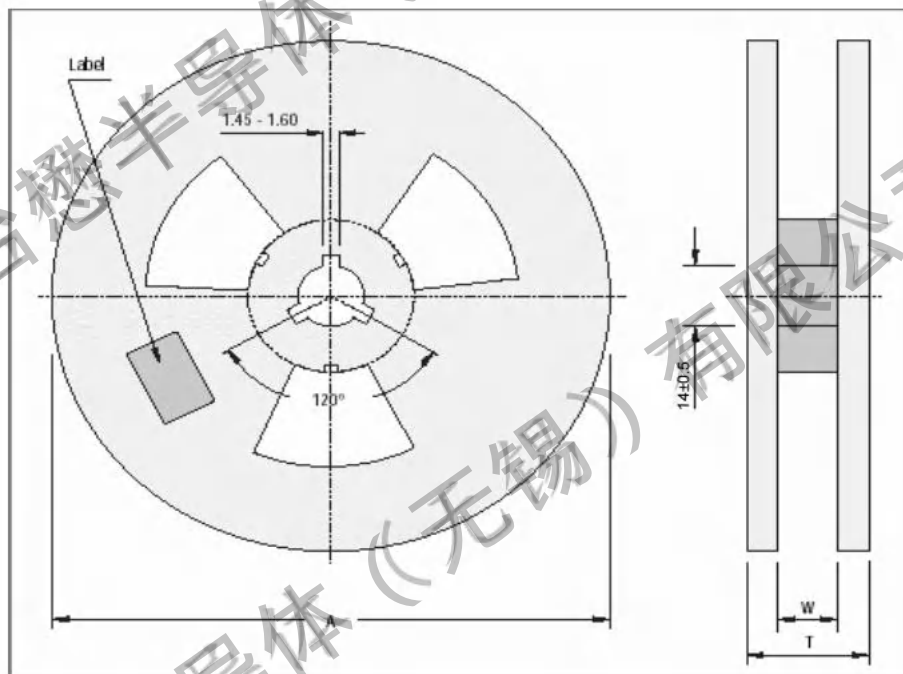
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### TO-252-3L Embossed Carrier Tape



### TO-252-3L Reel



All Dimensions are in mm

| Reel Specifications |            |                   |                    |                        |
|---------------------|------------|-------------------|--------------------|------------------------|
| Package             | Tape Width | Reel Dia. A - Max | Inside Thickness W | Reel Thickness T - max |
| TO-252-3L           | 16         | 330               | 18.0 ± 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     |          |

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Revision history:

| Date       | Rev   | Description | Page |
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