
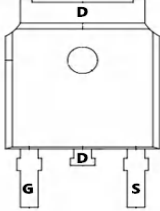




# TM10N15D

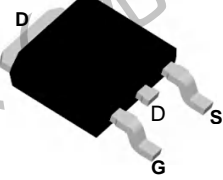
# N-Channel Enhancement Mosfet

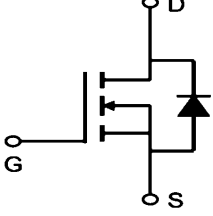
<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = 150V</math>   <math>I_D = 10A</math>  <math>R_{DS(ON)} = 240m\Omega</math> (typ.) @ <math>V_{GS} = 10V</math></p> <p>100% UIS Tested          100% <math>R_g</math> Tested</p> 
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Marking:10N15

D:TO-252-3 L





Absolute Maximum Ratings (T <sub>c</sub> = 25°C Unless Otherwise Noted)				
Symbol	Parameter	Rating	Units	
V <sub>DS</sub>	Drain-Source Voltage	150	V	
V <sub>GS</sub>	Gate-Source Voltage	±20	V	
I <sub>D</sub> @T <sub>c</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	10	A	
I <sub>D</sub> @T <sub>c</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	6.5	A	
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	37	A	
EAS	Single Pulse Avalanche Energy <sup>3</sup>	9.8	mJ	
P <sub>D</sub> @T <sub>c</sub> =25°C	Total Power Dissipation <sup>3</sup>	40.3	W	
T <sub>STG</sub>	Storage Temperature Range	-55 to 175	°C	
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 175	°C	
Thermal Data				
Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup>	---	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	6.6	°C/W



**TM10N15D**

**N-Channel Enhancement Mosfet**

**Electrical Characteristics (T<sub>J</sub> = 25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	<b>V<sub>(BR)DSS</sub></b>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	150	-	-	V
Gate-body Leakage current	<b>I<sub>GSS</sub></b>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	<b>I<sub>DSS</sub></b>	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V	T <sub>J</sub> =25°C	-	1	μA
			T <sub>J</sub> =100°C	-	100	
Gate-Threshold Voltage	<b>V<sub>GS(th)</sub></b>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0	2.5	3.0	V
Drain-Source on-Resistance <sup>4</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A	-	240	300	mΩ
Forward Transconductance <sup>4</sup>	<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4A	-	14.5	-	S
<b>Dynamic Characteristics<sup>5</sup></b>						
Input Capacitance	<b>C<sub>iSS</sub></b>	V <sub>DS</sub> = 75V, V <sub>GS</sub> = 0V, f = 1MHz	-	465	-	pF
Output Capacitance	<b>C<sub>oss</sub></b>		-	23	-	
Reverse Transfer Capacitance	<b>C<sub>rSS</sub></b>		-	14	-	
Gate Resistance	<b>R<sub>g</sub></b>	f = 1MHz	-	2	-	Ω
<b>Switching Characteristics<sup>5</sup></b>						
Total Gate Charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 75V, I <sub>D</sub> = 4A	-	14	-	nC
Gate-Source Charge	<b>Q<sub>gs</sub></b>		-	1.6	-	
Gate-Drain Charge	<b>Q<sub>gd</sub></b>		-	4	-	
Turn-on Delay Time	<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 75V, R <sub>G</sub> = 3Ω, I <sub>D</sub> = 4A	-	5.8	-	ns
Rise Time	<b>t<sub>r</sub></b>		-	2.2	-	
Turn-off Delay Time	<b>t<sub>d(off)</sub></b>		-	16.9	-	
Fall Time	<b>t<sub>f</sub></b>		-	2.6	-	
<b>Drain-Source Body Diode Characteristics</b>						
Diode Forward Voltage <sup>4</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V	-	-	1.2	V
Continuous Source Current	<b>I<sub>S</sub></b>	T <sub>C</sub> = 25°C	-	-	10	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub> = 150°C.
2. The EAS data shows Max. rating. The test condition is V<sub>DD</sub> = 25V, V<sub>GS</sub> = 10V, L = 0.4mH, I<sub>AS</sub> = 7A.
3. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.



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Typical Characteristics

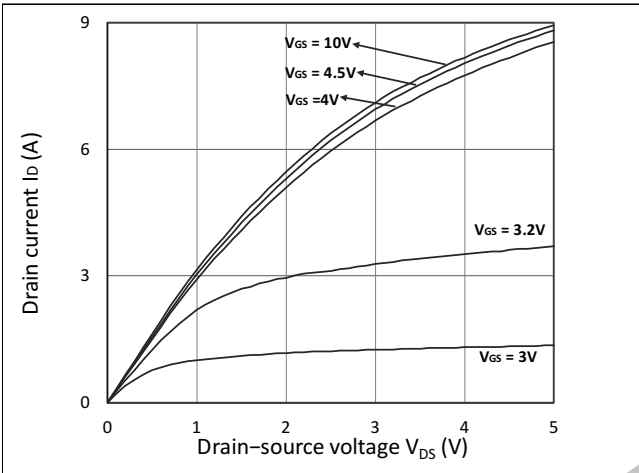


Figure 1. Output Characteristics

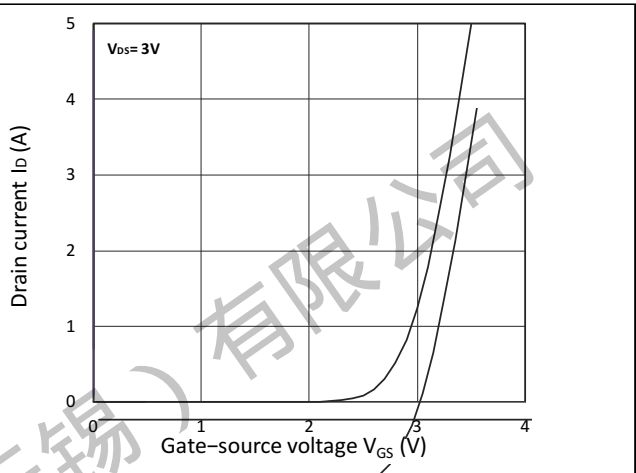


Figure 2. Transfer Characteristics

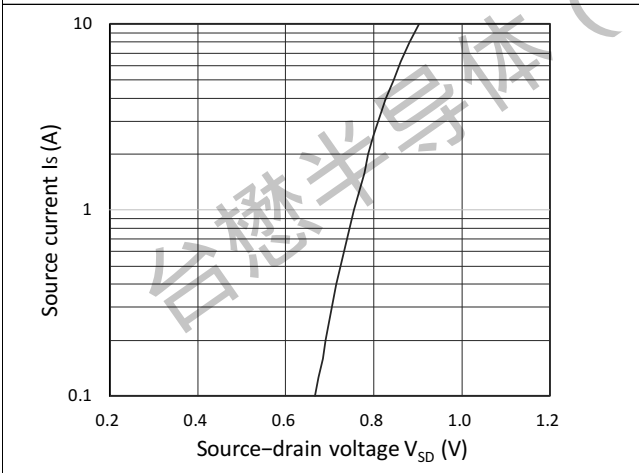


Figure 3. Forward Characteristics of Reverse

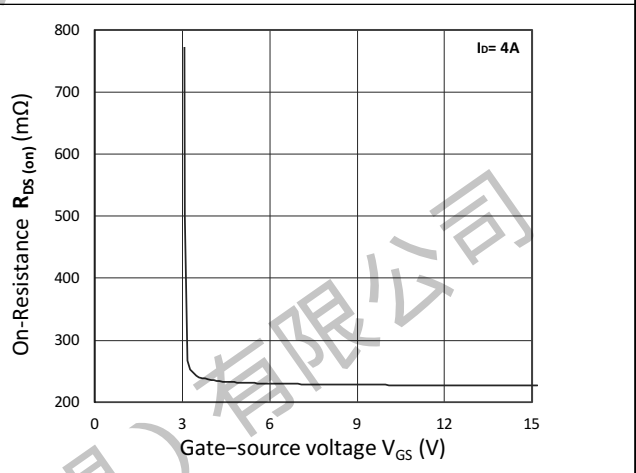


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

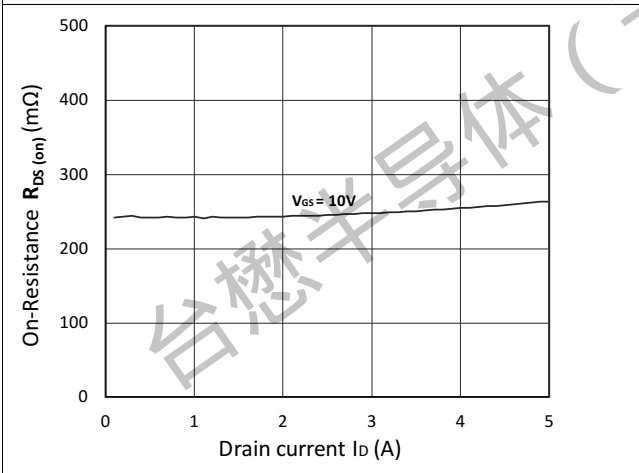


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

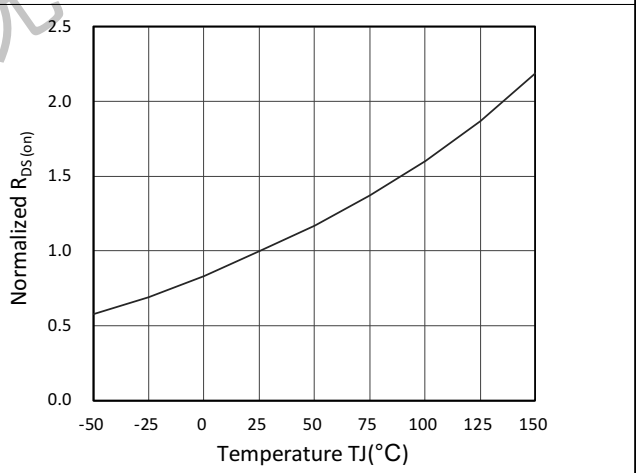


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature



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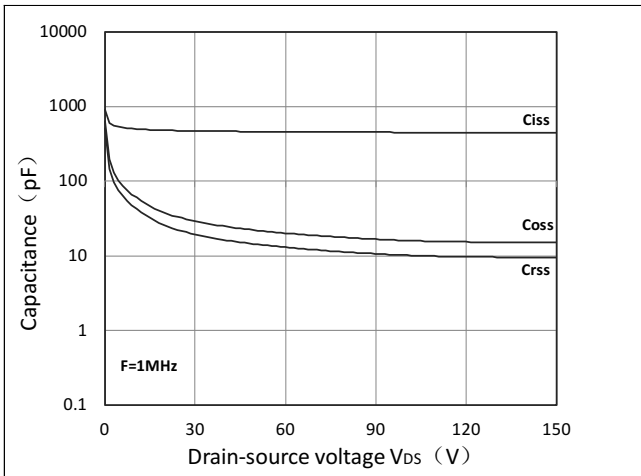


Figure 7. Capacitance Characteristics

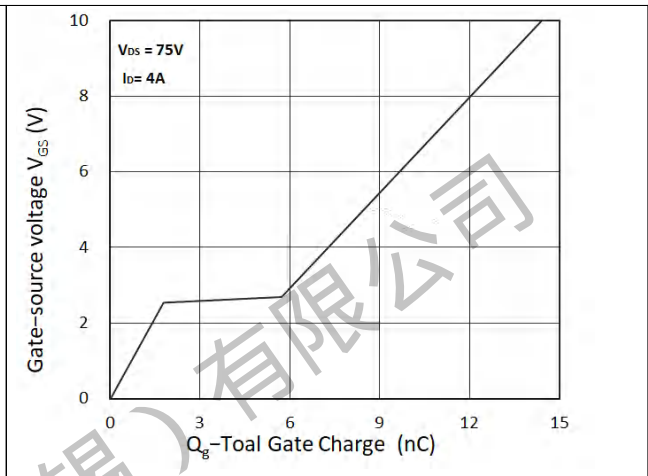


Figure 8. Gate Charge Characteristics

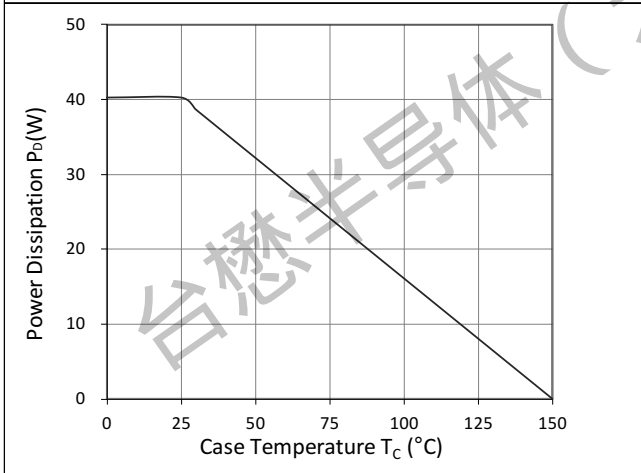


Figure 9. Power Dissipation

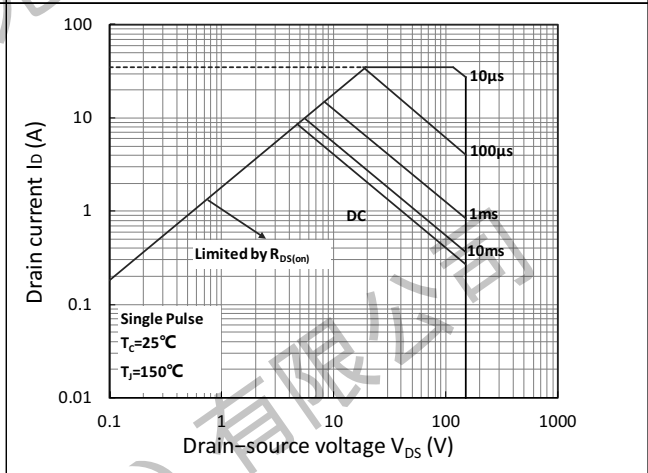


Figure 10. Safe Operating Area

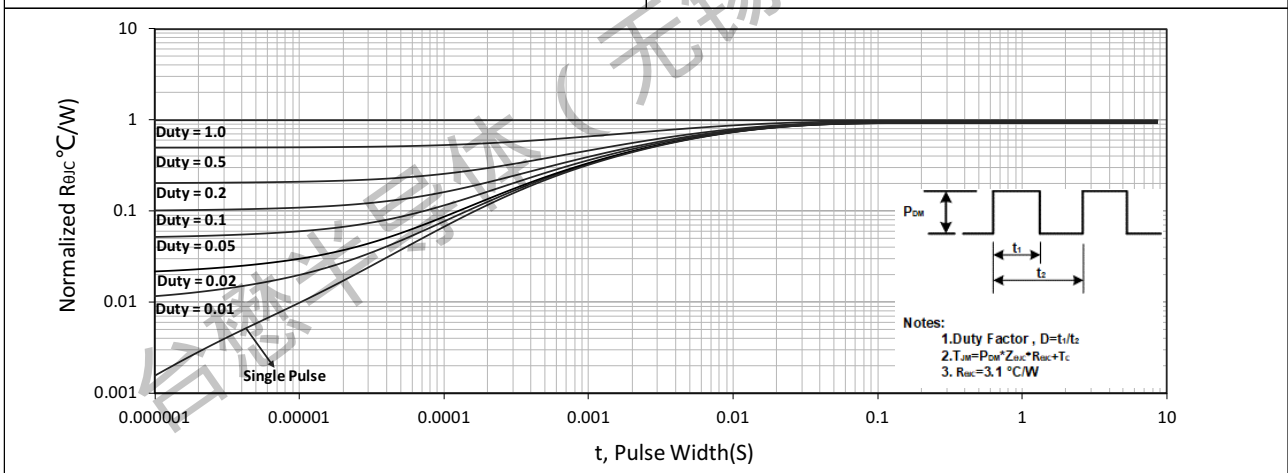


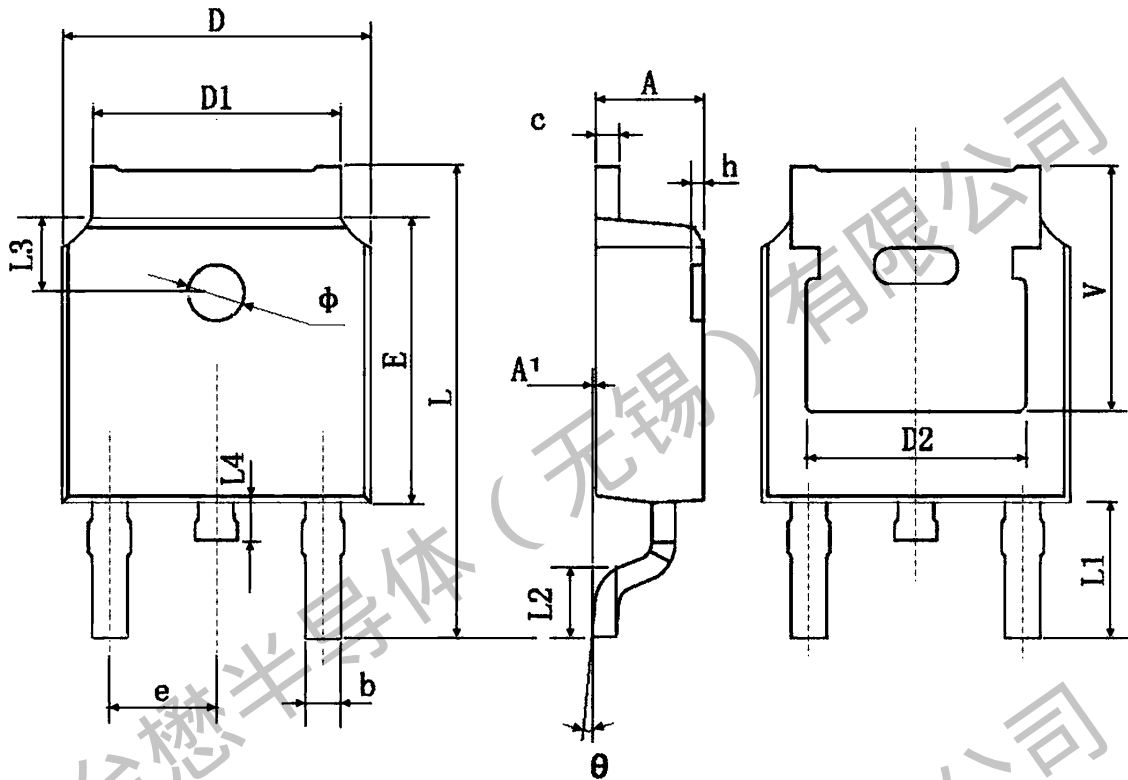
Figure 11. Normalized Maximum Transient Thermal Impedance



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Package Mechanical Data: TO-252-3L



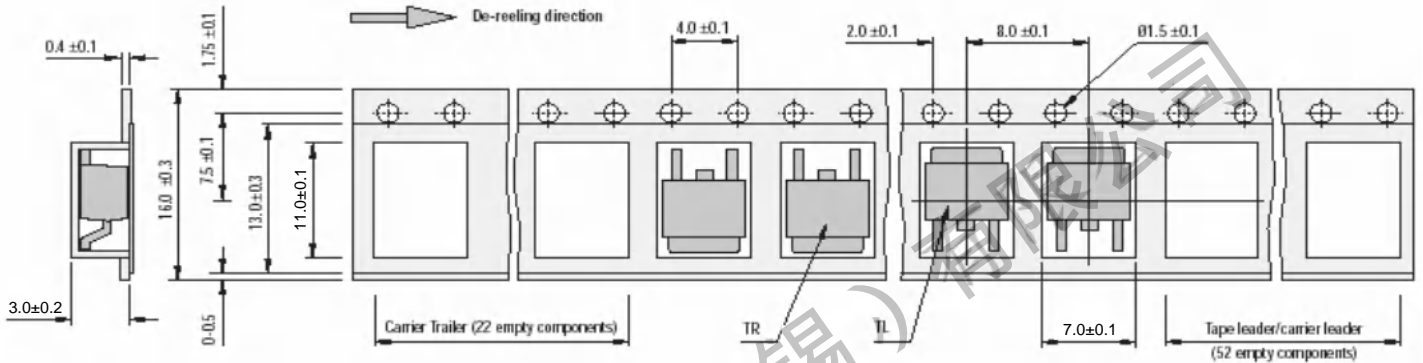
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	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
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.	



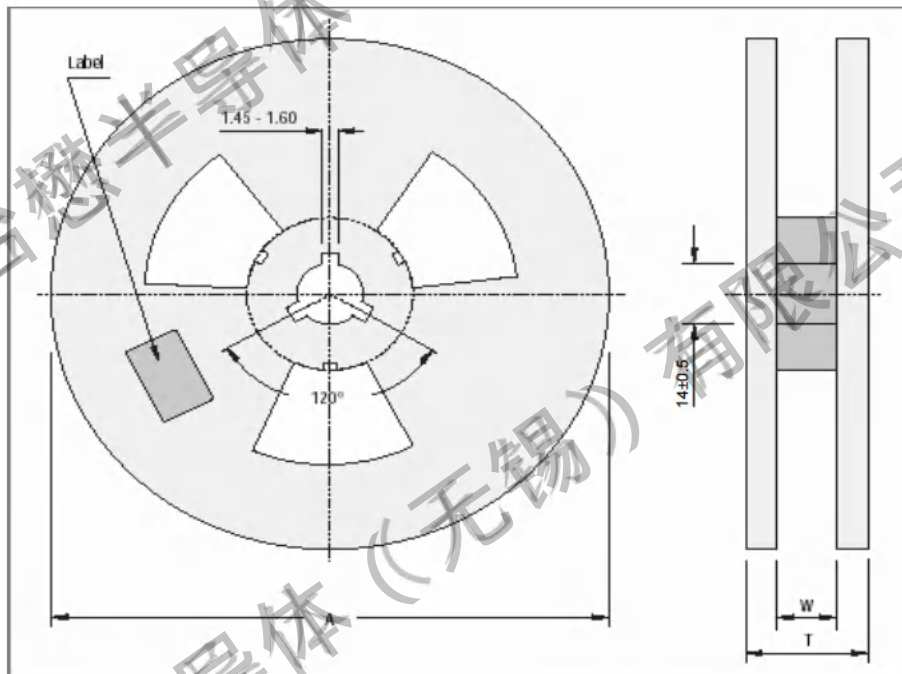
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N-Channel Enhancement Mosfet

TO-252-3L Embossed Carrier Tape



TO-252-3L Reel



All Dimensions are in mm.

Reel Specifications				
Package	Tape Width	Reel Dia. 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
2023.09.09	23.09	Original	