



TM30N03LD

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

$V_{DS} = 30V$ $I_D = 28A$

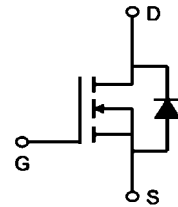
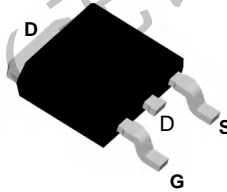
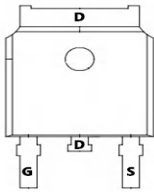
$R_{DS(ON)} = 15 m\Omega$ (Typ.) @ $V_{GS} = 10V$

100% UIS Tested

100% R_g Tested



D:TO-252-3L



Marking: 30NL03

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	28	A
$I_D @ T_c = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	16	A
I_{DM}	Pulsed Drain Current ²	114	A
EAS	Single Pulse Avalanche Energy ³	20	mJ
I_{AS}	Avalanche Current	10	A
$P_D @ T_c = 25^\circ C$	Total Power Dissipation ³	30	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 ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	6.6	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=30V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	0.7	0.9	1.2	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	15	18	$\text{m}\Omega$
	Drain-Source On Resistance	$V_{GS}=4.5V, I_D=8A$	---	19	23	$\text{m}\Omega$
	Drain-Source On Resistance	$V_{GS}=2.5V, I_D=6A$	---	26	36	$\text{m}\Omega$
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	450	---	pF
C_{oss}	Output Capacitance		---	65	---	
C_{rss}	Reverse Transfer Capacitance		---	55	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{GS}=4.5V, V_{DD}=15V, I_D=2A$ $R_{GEN}=3.3\Omega$	---	17	---	ns
t_r	Rise Time		---	48	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	20	---	ns
t_f	Fall Time		---	13	---	ns
Q_g	Total Gate Charge	$V_{GS}=4.5V, V_{DS}=15V,$ $I_D=4A$	---	5.5	---	nC
Q_{gs}	Gate-Source Charge		---	1.2	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	1.8	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage	$I_D=30A$	---	---	1.2	V
trr	Reverse Recovery Time	$I_F=10A, T_J=25^{\circ}\text{C}$	---	9.1	---	ns
Qrr	Reverse Recovery Charge	$diF/dt=100A/\mu\text{s}$	---	2	---	nC

- Notes:**
- 1.The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
 - 2.The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
 - 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=12.7A$
 - 4.The power dissipation is limited by 150°C junction temperature
 - 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics

Figure 1: Output Characteristics

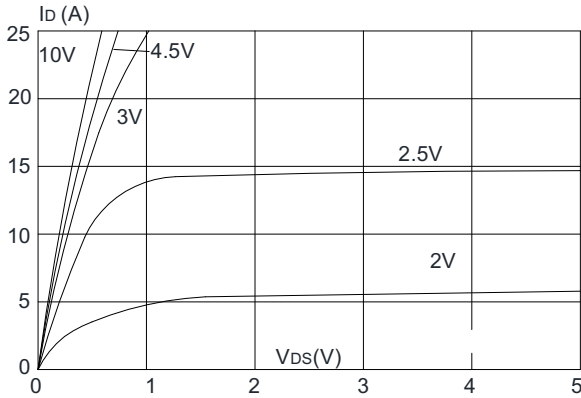


Figure 2: Typical Transfer Characteristics

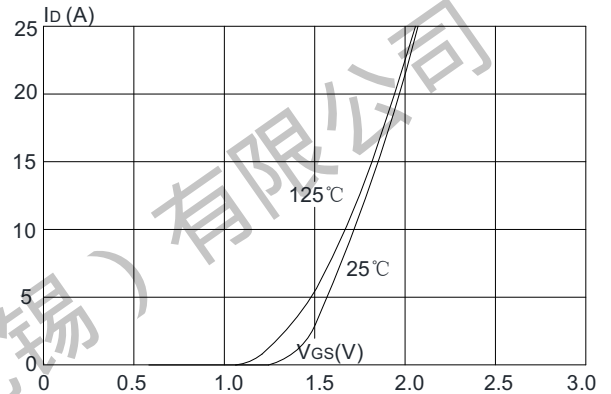


Figure 3: On-resistance vs. Drain Current

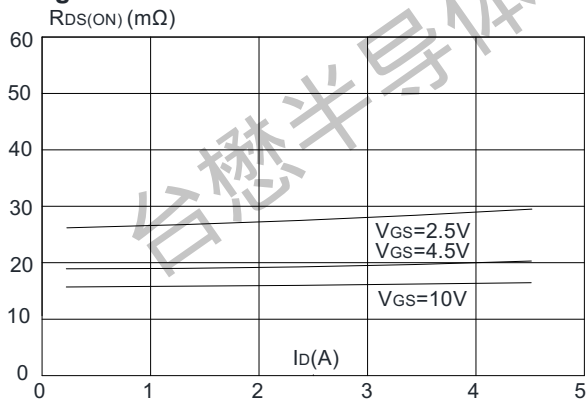


Figure 4: Body Diode Characteristics

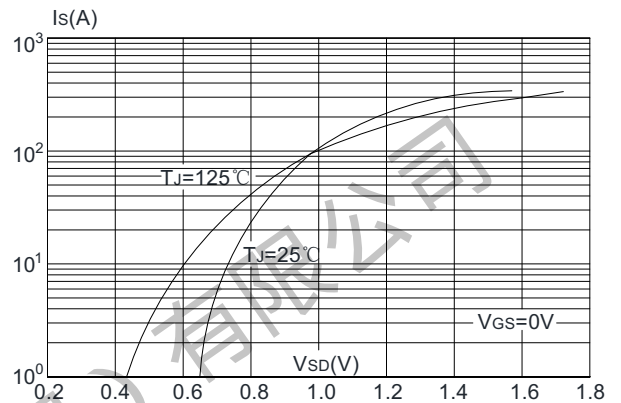


Figure 5: Gate Charge Characteristics

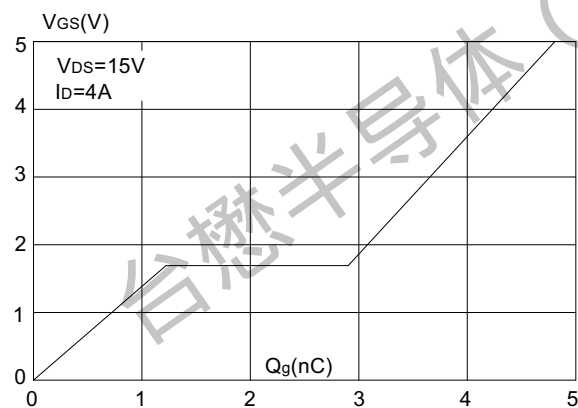
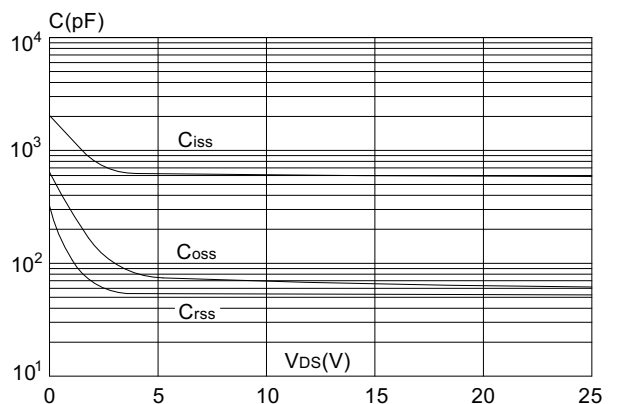


Figure 6: Capacitance Characteristics





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Figure 7: Normalized on Resistance vs. Junction Temperature

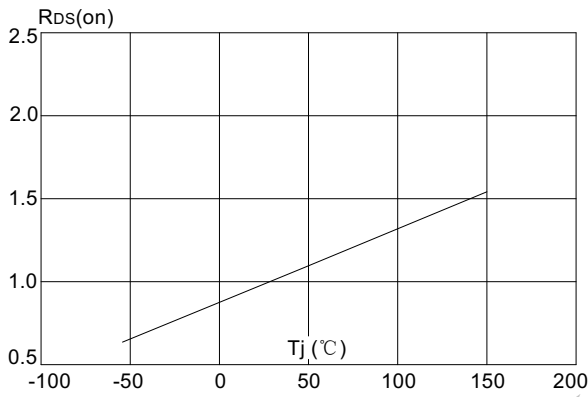


Figure 8: Safe Operating Area

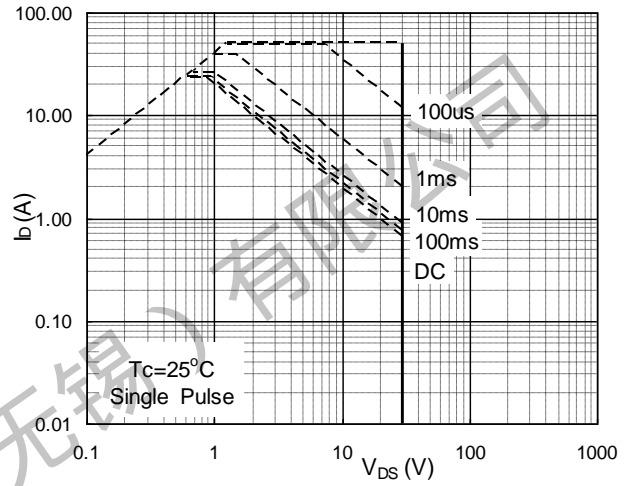
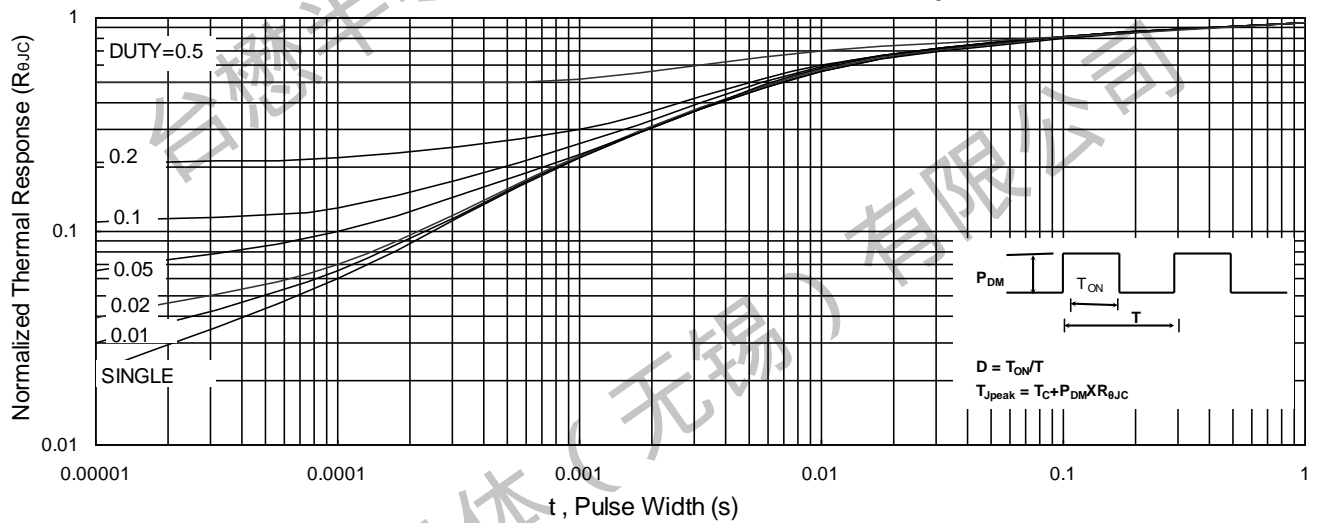


Figure 9: Normalized Maximum Transient Thermal Impedance

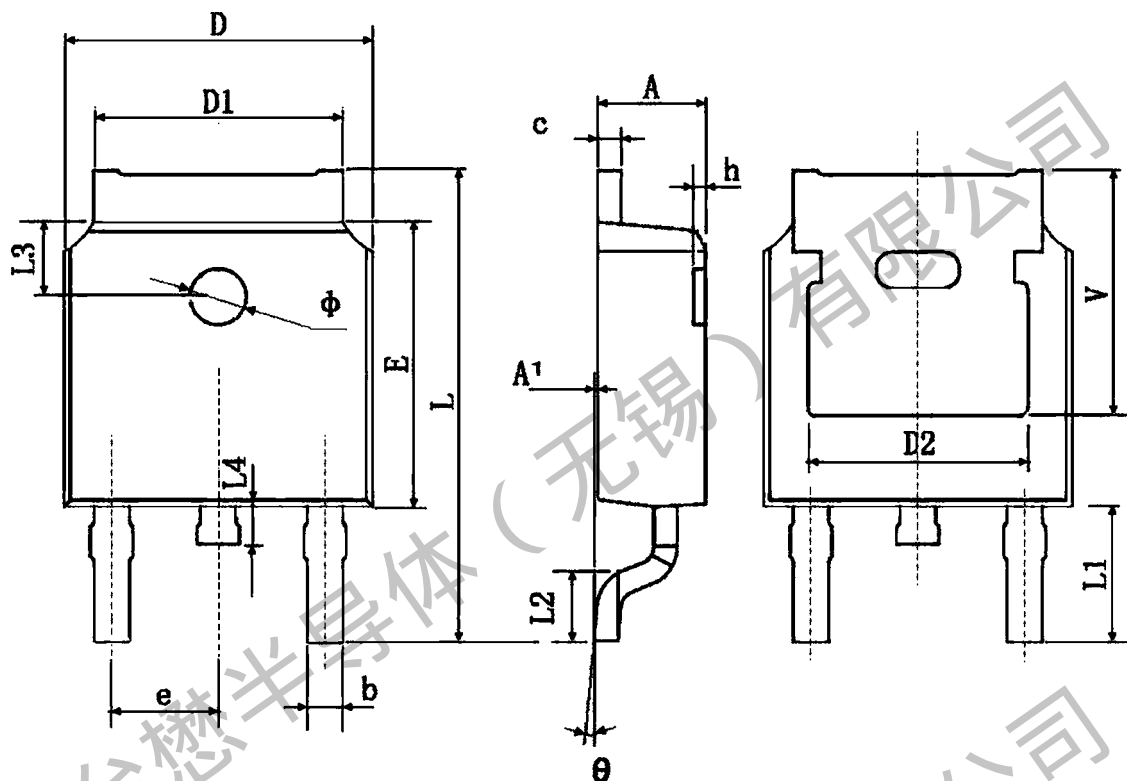




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Package Mechanical Data: TO-252-3L



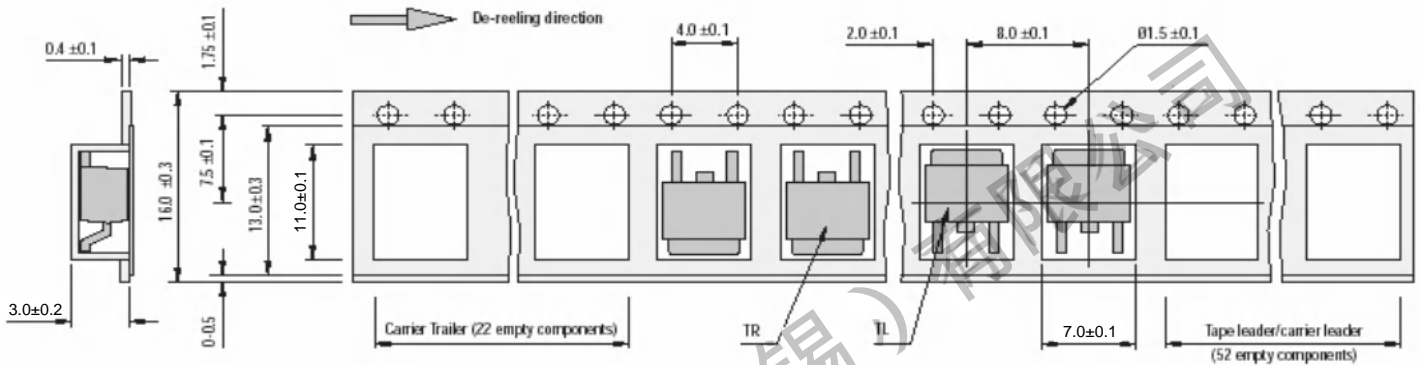
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386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



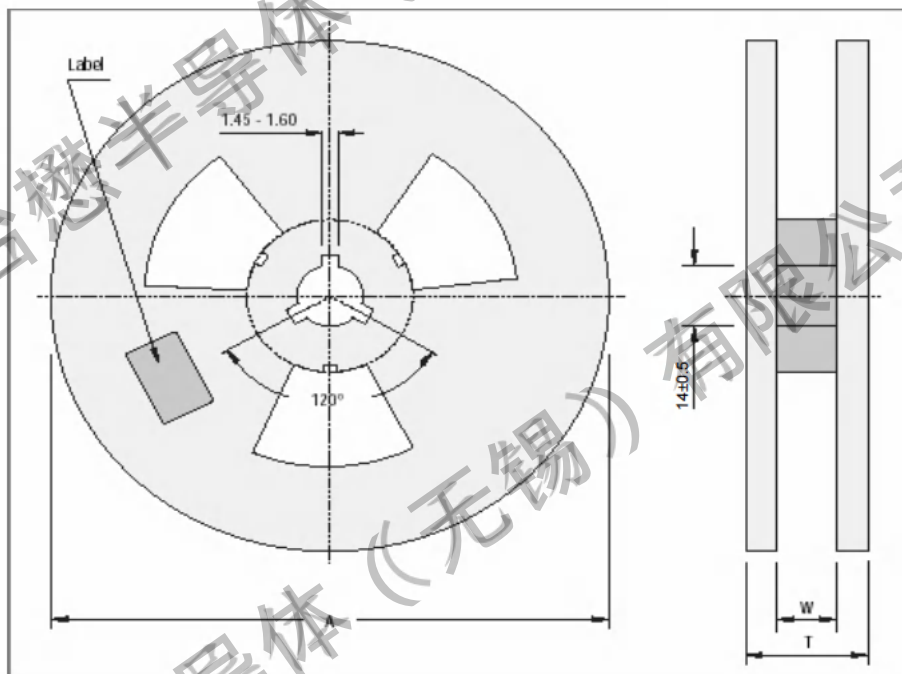
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TO-252-3L Embossed Carrier Tape



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
2023.06.03	23.06	Original	