

**TMN3030LD**

**N-Channel Enhancement Mosfet**

**General Description**

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

**Applications**

- Load switch
- PWM

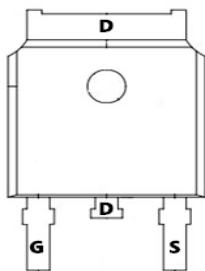
**General Features**

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

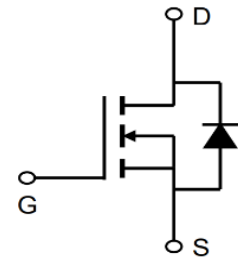
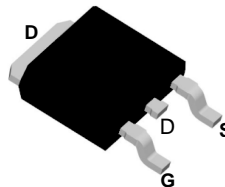
$R_{DS(ON)} = 15 m\Omega$  (Typ.) @  $V_{GS} = 10V$

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	Ratings	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current- $T_C = 25^\circ C$	30	A
	Continuous Drain Current- $T_C = 100^\circ C$	16	
$E_{AS}$	Single Pulse Avalanche Energy <sup>1</sup>	20	mJ
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	90	A
$P_D$	Power Dissipation, $T_C = 25^\circ C$	30	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

**Thermal Characteristics:**

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to ambient	-	



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu A$	30	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=30V$	---	---	1	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu A$	0.5	0.9	1	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	15	22	$m\ \Omega$
	Drain-Source On Resistance	$V_{GS}=4.5V, I_D=8A$	---	21	25	$m\ \Omega$
	Drain-Source On Resistance	$V_{GS}=2.5V, I_D=6A$	---	25	35	$m\ \Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	550	---	pF
$C_{oss}$	Output Capacitance		---	65	---	
$C_{rss}$	Reverse Transfer Capacitance		---	55	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	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
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage	$I_D=30A$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=10A, T_J=25^{\circ}\text{C}$	---	9.1	---	ns
$Q_{rr}$	Reverse Recovery Charge	$diF/dt=100A/\mu s$	---	2	---	nC

- Notes:**
- 1.The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z copper.
  - 2.The data tested by pulsed , pulse width  $\cong 300\mu s$  , duty cycle  $\cong 2\%$
  - 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=12.7A$
  - 4.The power dissipation is limited by  $150^{\circ}\text{C}$  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.

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

Figure 1: Output Characteristics

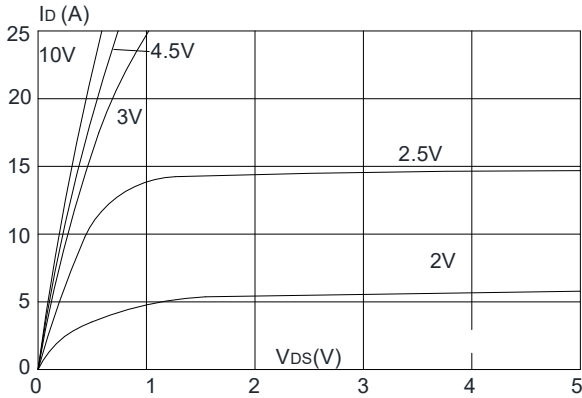


Figure 2: Typical Transfer Characteristics

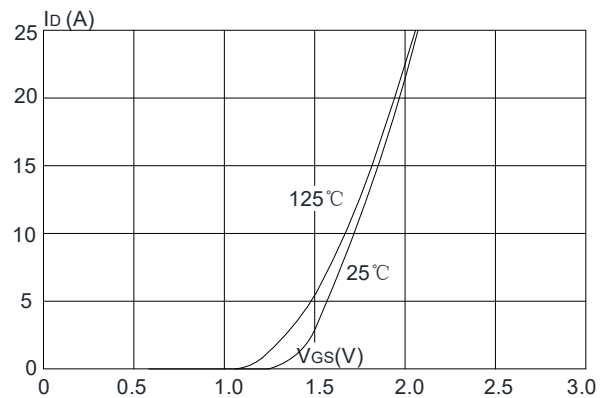


Figure 3: On-resistance vs. Drain Current

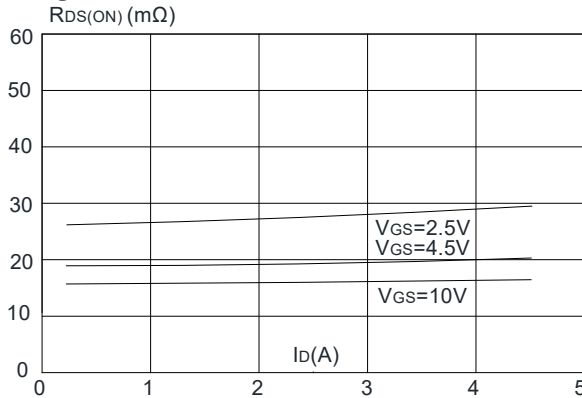


Figure 4: Body Diode Characteristics

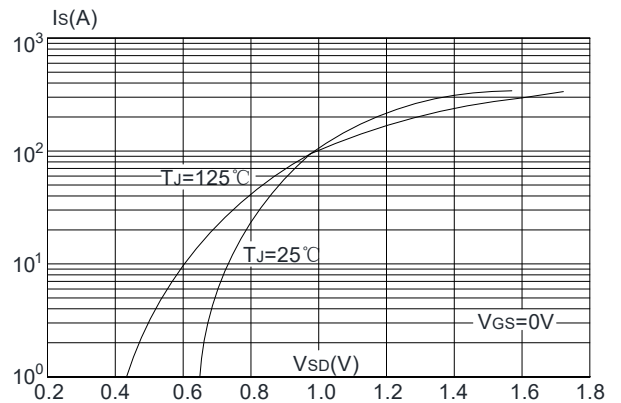


Figure 5: Gate Charge Characteristics

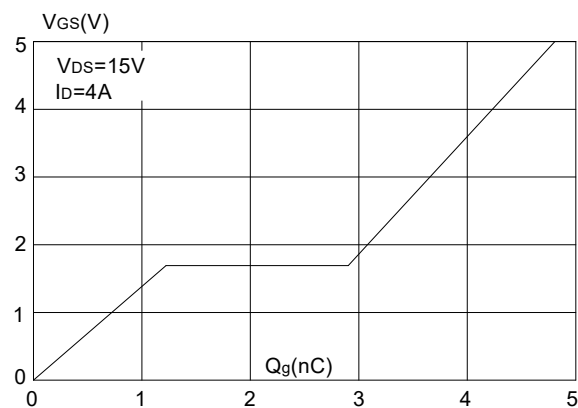
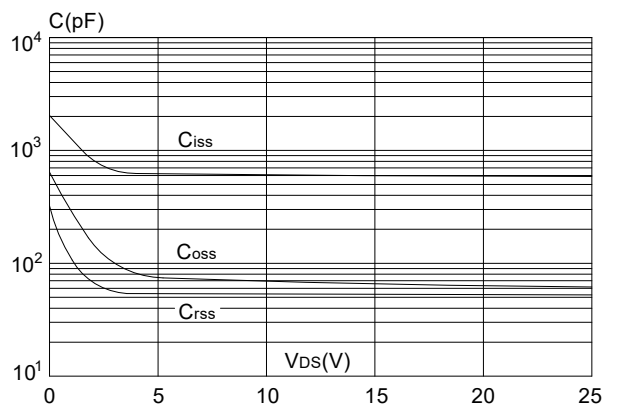


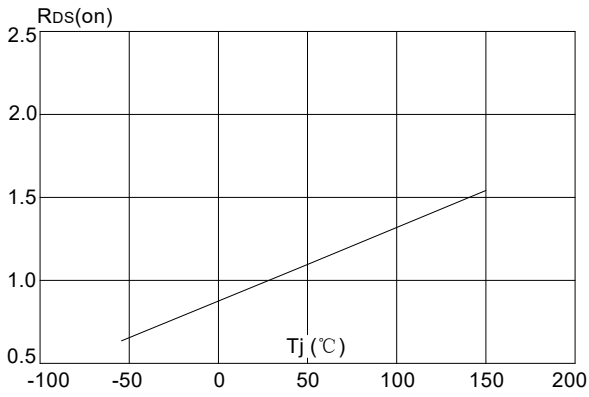
Figure 6: Capacitance Characteristics



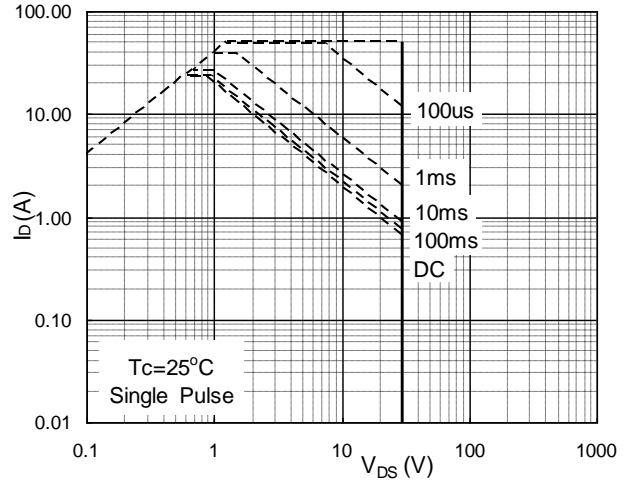
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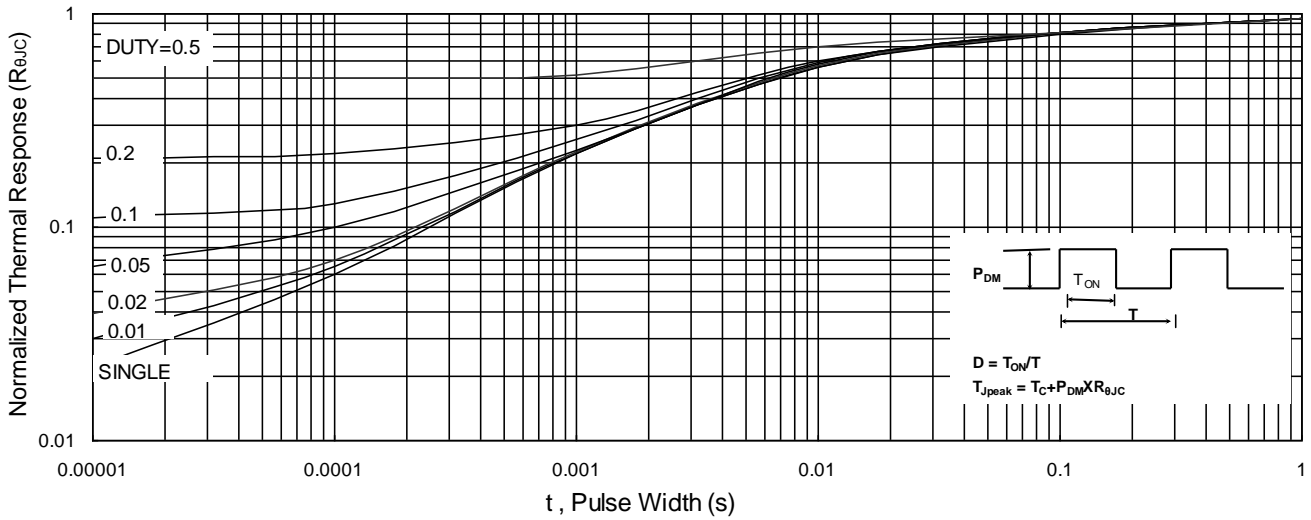
**Figure 7: Normalized on Resistance vs. Junction Temperature**



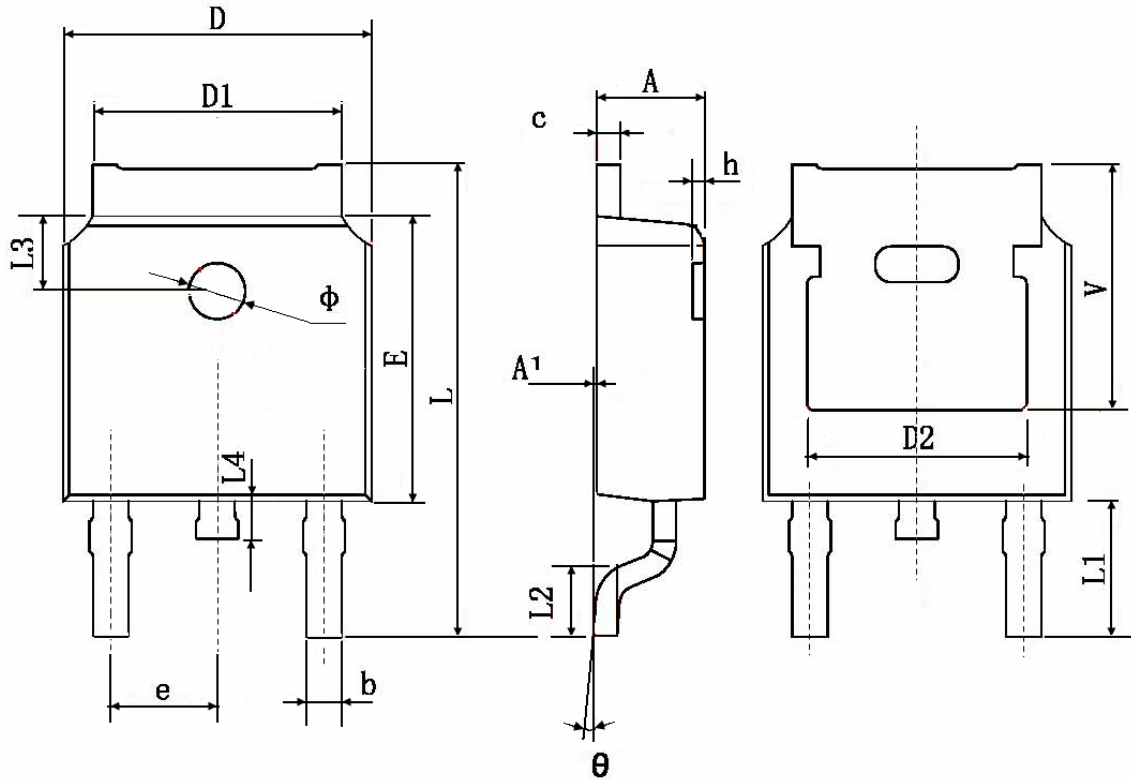
**Figure 8: Safe Operating Area**



**Figure 9: Normalized Maximum Transient Thermal Impedance**



## Package Information: 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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