

TM012NL03D

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

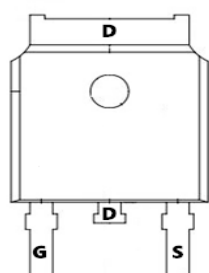
General Features

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

$R_{DS(ON)} = 12 m\Omega$ (Typ.) @ $V_{GS} = 10V$

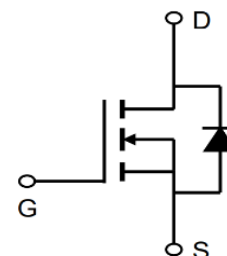
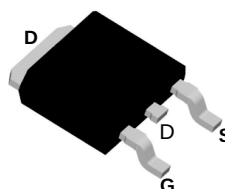
100% UIS Tested

100% R_g Tested



Marking: 30NL03

D:TO-252-3L



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	± 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 ¹	20	mJ
I_{DM}	Pulsed Drain Current ²	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
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =30V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 12V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	0.5	0.9	1	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V, I _D =10A	---	12	22	m Ω
	Drain-Source On Resistance	V _{GS} =4.5V, I _D =8A	---	21	25	m Ω
	Drain-Source On Resistance	V _{GS} =2.5V, I _D =6A	---	25	35	m Ω
Dynamic Characteristics						
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	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{GS} =4.5V ,V _{DD} =15V, I _D =2A R _{GEN} =3.3Ω	---	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℃	---	9.1	---	ns
Qrr	Reverse Recovery Charge	diF/dt=100A/μs	---	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
 - 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°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: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Figure1: Output Characteristics

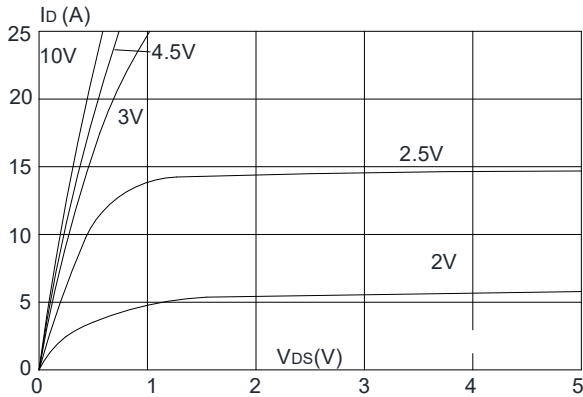


Figure 2: Typical Transfer Characteristics

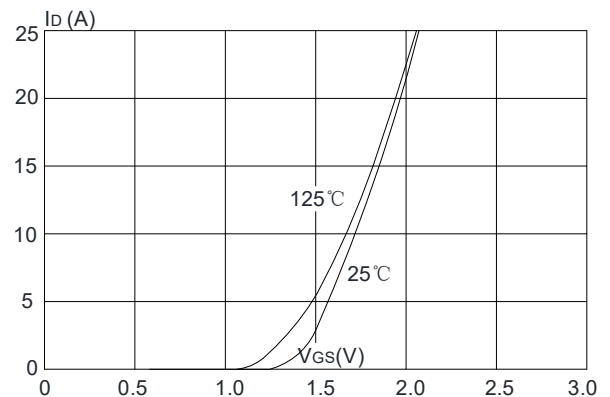


Figure 3: On-resistance vs. Drain Current

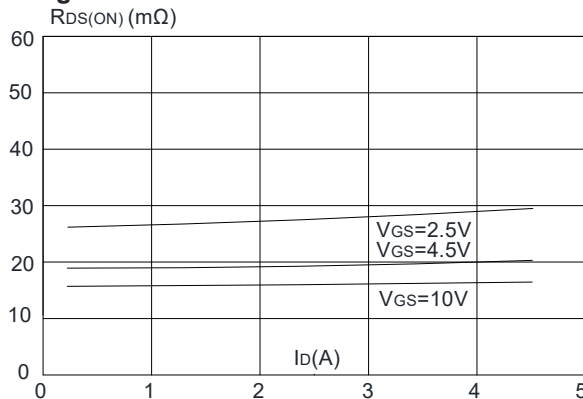


Figure 4: Body Diode Characteristics

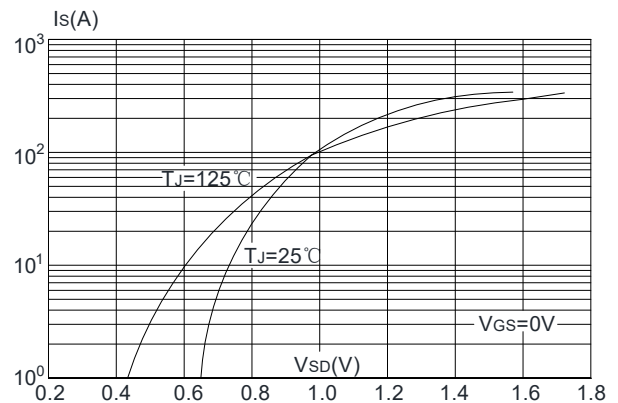


Figure 5: Gate Charge Characteristics

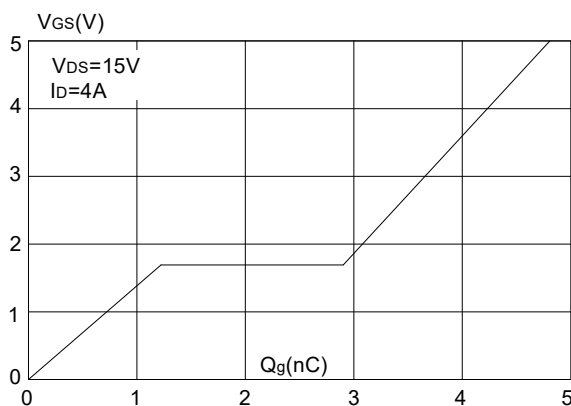
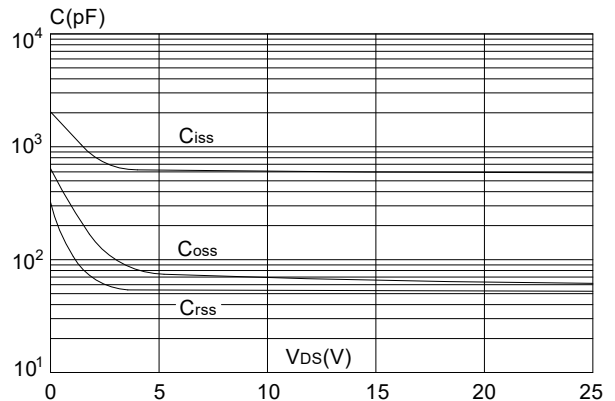


Figure 6: Capacitance Characteristics



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Figure 7: Normalized on Resistance vs. Junction Temperature

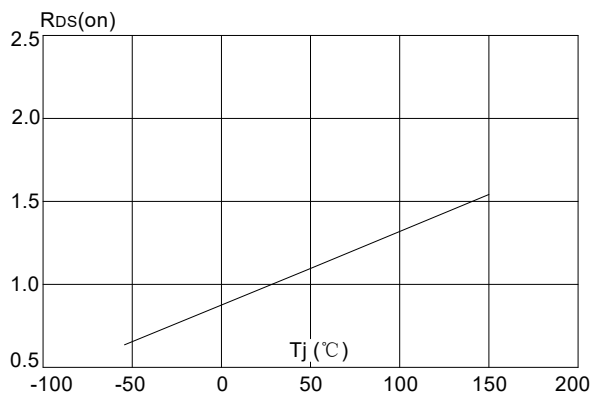


Figure 8: Safe Operating Area

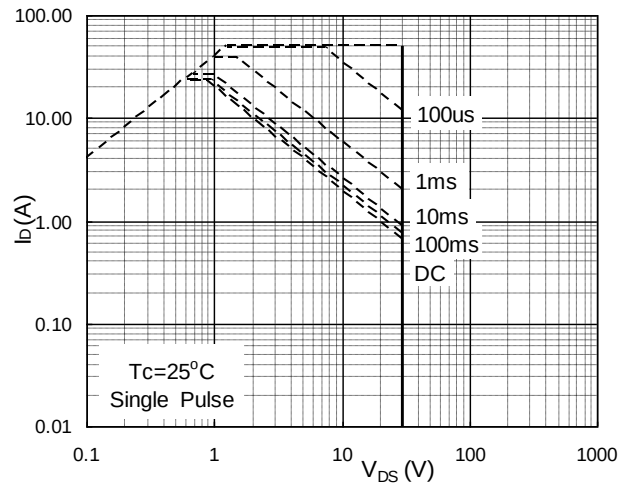
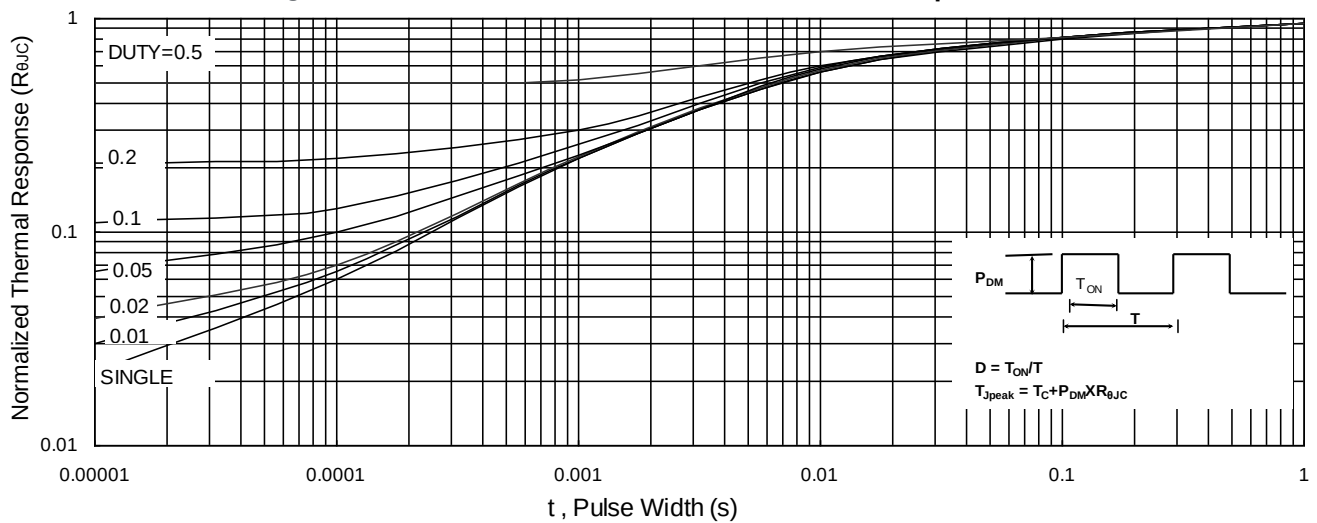
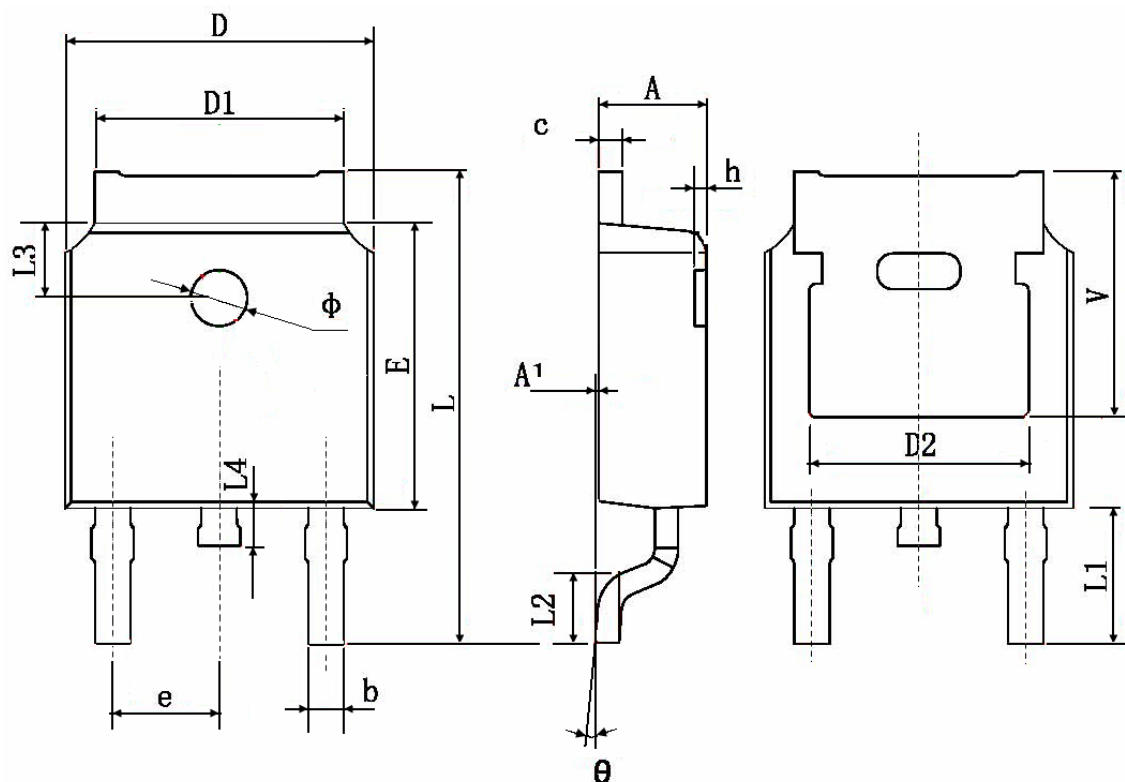


Figure 9: Normalized Maximum Transient Thermal Impedance



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
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.	