
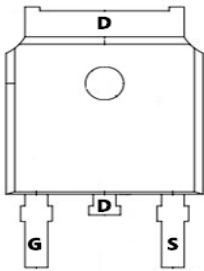




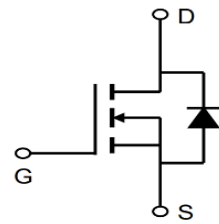
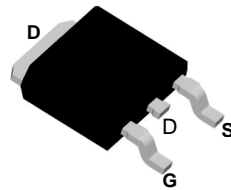
## TMN6030D

## 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} = 60V</math> <math>I_D = 30A</math></p> <p><math>R_{DS(ON)} = 26m\Omega</math> (Typ.) @ <math>V_{GS} = 10V</math></p> <p>100% UIS Tested 100% <math>R_g</math> Tested</p> 
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D:TO-252-3L



Marking: 30N06

**Absolute Maximum Ratings** ( $T_C = 25^\circ C$  unless otherwise specified)

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	30
		$T_C = 100^\circ C$	19
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	80	A
EAS	Single Pulsed Avalanche Energy <sup>note2</sup>	18	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	27.7
$R_{\theta JC}$	Thermal Resistance, Junction to Case	5.4	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ C$



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Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise specified)

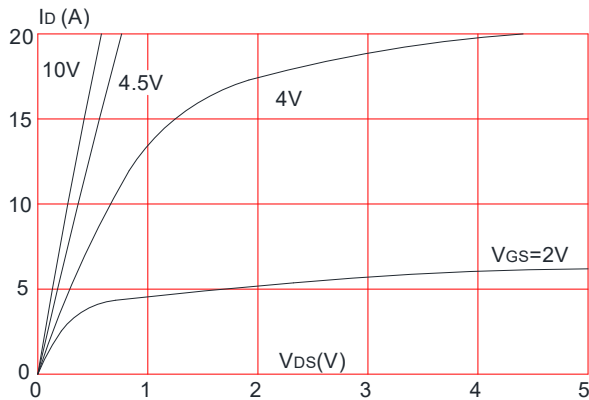
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V,$	-	-	1.0	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=10A$	-	26	32	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	-	30	45	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	1148	-	pF
$C_{oss}$	Output Capacitance		-	58.5	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	49.4	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=30V, I_D=10A,$ $V_{GS}=10V$	-	20.3	-	nC
$Q_{gs}$	Gate-Source Charge		-	3.7	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	5.3	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=30V, I_D=20A,$ $R_G=1.8\Omega, V_{GS}=10V$	-	7.6	-	ns
$t_r$	Turn-on Rise Time		-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	15	-	ns
$t_f$	Turn-off Fall Time		-	24	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	30	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	-	-	1.2	V
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=20A, dI/dt=100A/\mu s$	-	29	-	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge		-	43	-	nC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

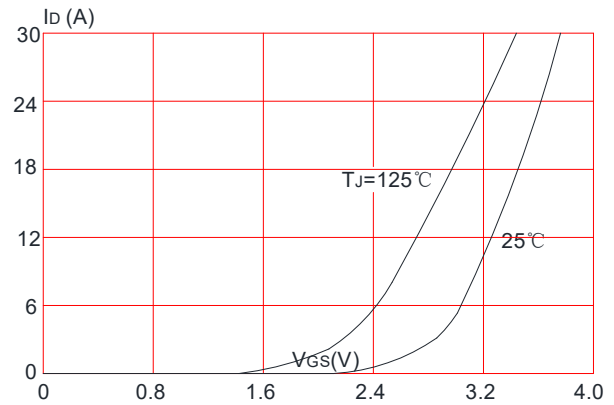
2. EAS condition :  $T_J=25^\circ\text{C}$ ,  $V_{DD}=30V$ ,  $V_G=10V$ ,  $L=0.5mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=8.5A$ 3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

## Typical Performance Characteristics

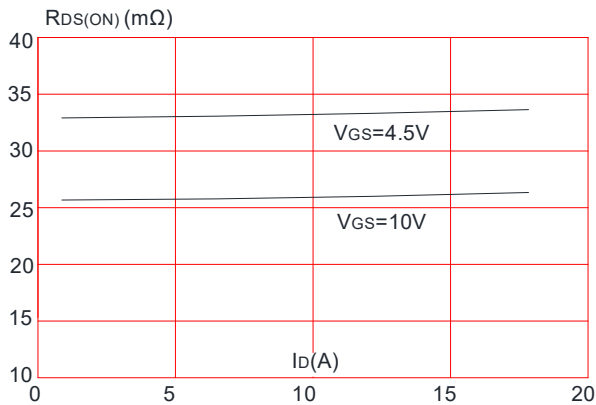
**Figure 1: Output Characteristics**



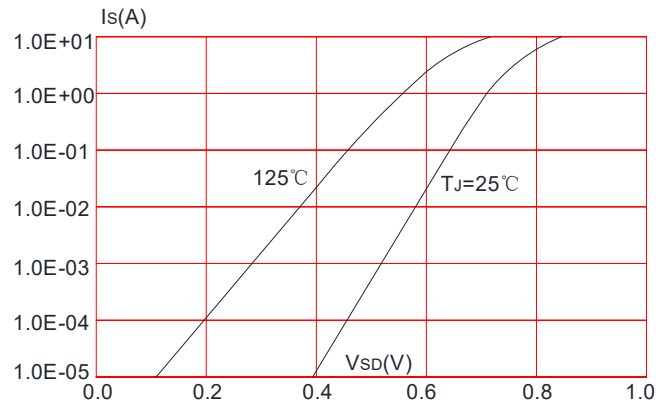
**Figure 2: Typical Transfer Characteristics**



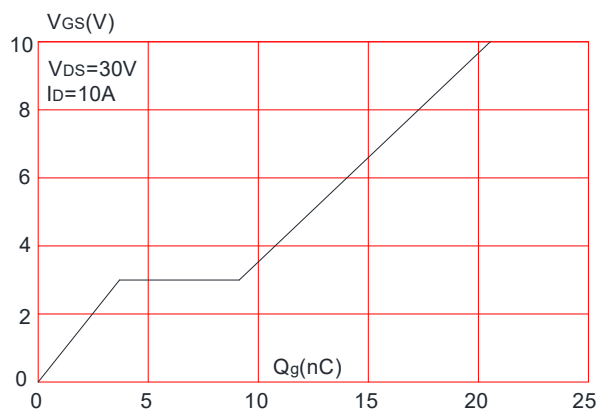
**Figure 3: On-resistance vs. Drain Current**



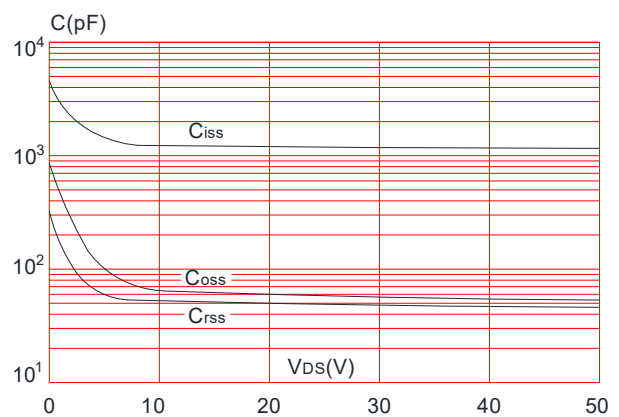
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**



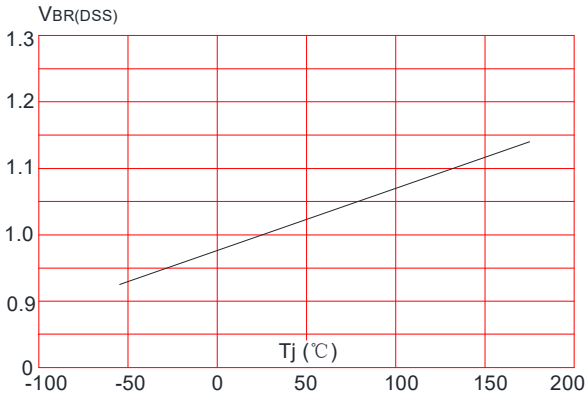
**Figure 6: Capacitance Characteristics**



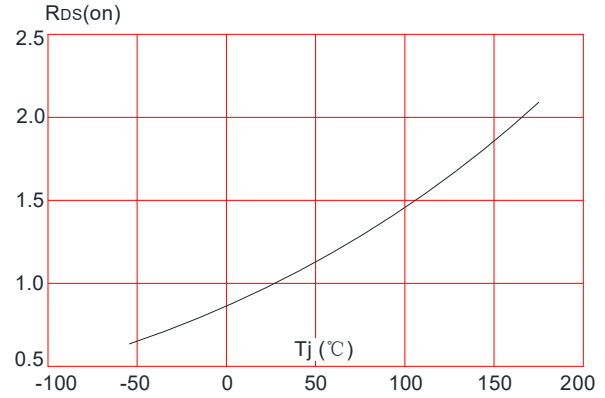
TMN6030D

N-Channel Enhancement Mosfet

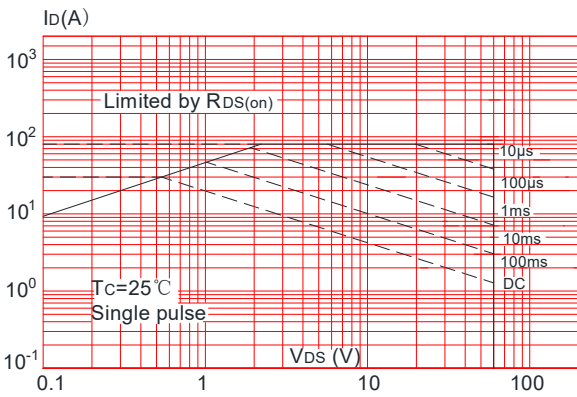
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



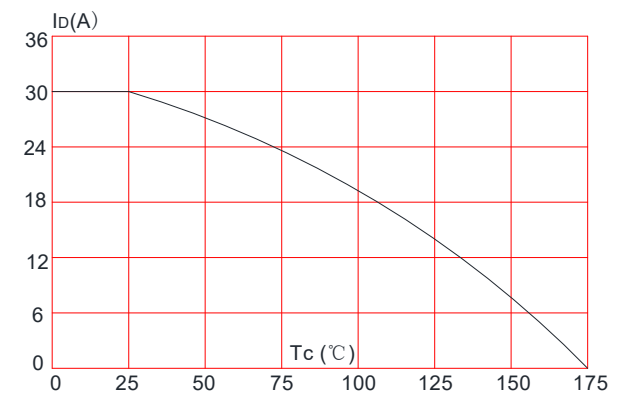
**Figure 8:** Normalized on Resistance vs. Junction Temperature



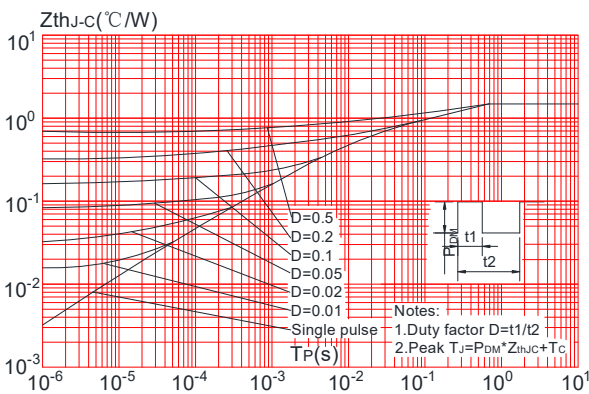
**Figure 9:** Maximum Safe Operating Area



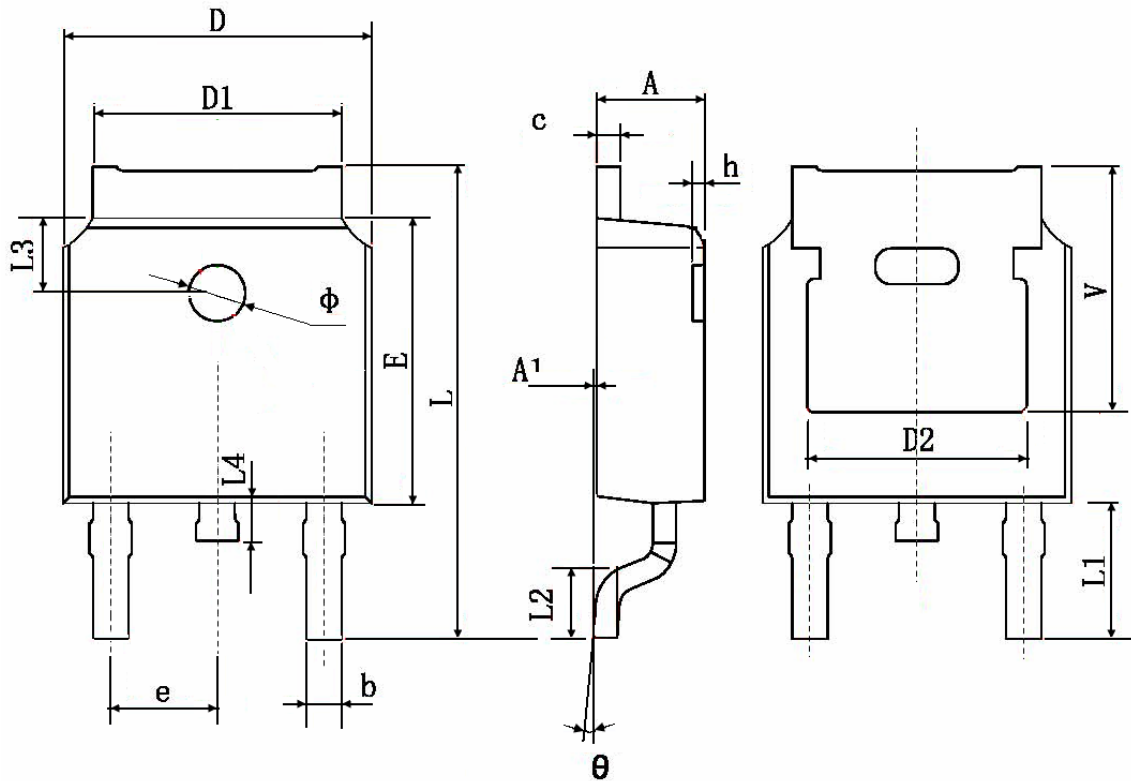
**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



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



**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.	