
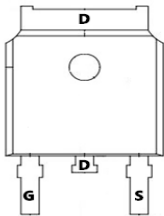




**TMG40N10D**

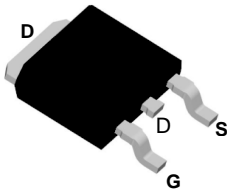
**N-Channel Enhancement Mosfet**

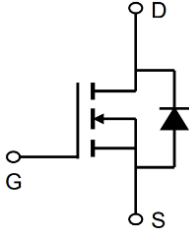
<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = 100V</math> <math>I_D = 40A</math></p> <p><math>R_{DS(ON)} = 25m\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 :G40N10

**D:TO-252-3L**





**Absolute Maximum Ratings:** ( $T_J=25^\circ C$  unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current <sup>1</sup> - $T_C=25^\circ C$	40	A
$E_{AS}$	Single Pulse Avalanche Energy <sup>5</sup>	8	mJ
$I_{DM}$	Pulsed Drain Current <sup>2</sup> - $T_C=25^\circ C$	134	A
$I_S$	Continuous diode forward current <sup>1</sup> - $T_C=25^\circ C$	40	A
$I_{SM}$	Diode pulsed current <sup>2</sup> - $T_C=25^\circ C$	84	A
$P_D$	Power Dissipation <sup>3</sup> - $T_C=25^\circ C$	27	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	4.63	$^\circ C/W$
$R_{\theta JA}$	Thermal resistance, junction-ambient <sup>4</sup>	62	$^\circ C/W$



# TMG40N10D

# N-Channel Enhancement Mosfet

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	100	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=100V$	---	---	1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1	---	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	25	30	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	31	38	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHz}$	---	680	---	pF
$C_{oss}$	Output Capacitance		---	371	---	
$C_{rss}$	Reverse Transfer Capacitance		---	25	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{GS}=10V, V_{DS}=50V,$ $R_G=2\Omega, I_D=20A$	---	16.8	---	ns
$t_r$	Rise Time		---	3.2	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	25.4	---	ns
$t_f$	Fall Time		---	2	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=50V,$ $I_D=20A$	---	11	---	nC
$Q_{gs}$	Gate-Source Charge		---	1.8	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	2.4	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	---	---	1.3	V
$t_{rr}$	Body Diode Reverse Recovery Time	$I_S=20A, V_R=50V$ $di/dt=100A/\mu\text{s}$	---	41.6	---	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge		---	54.6	---	nc

**Notes:**

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. Pd is based on max. junction temperature, using junction-case thermal resistance.
4. The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_a=25^\circ\text{C}$ .
5.  $V_{DD}=30V, V_{GS}=10V, L=0.3\text{mH}$ , starting  $T_J=25^\circ\text{C}$ .

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

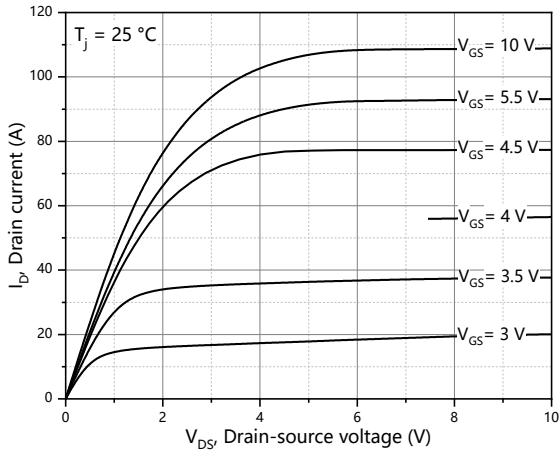


Figure 1. Typ. output characteristics

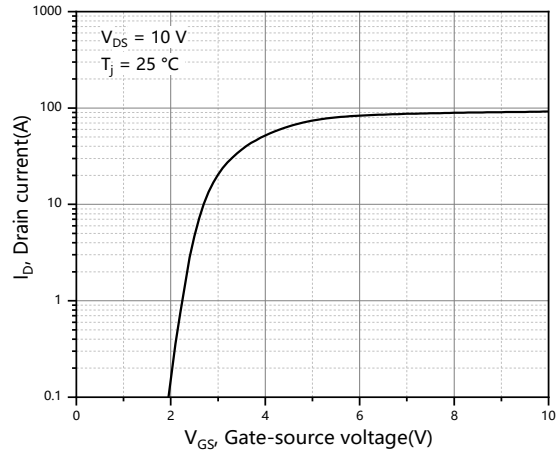


Figure 2. Typ. transfer characteristics

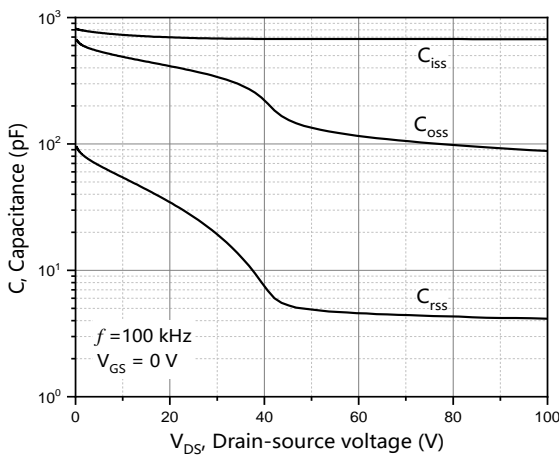


Figure 3. Typ. capacitances

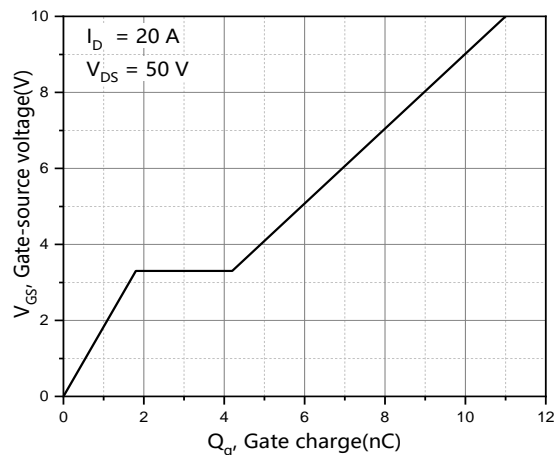


Figure 4. Typ. gate charge

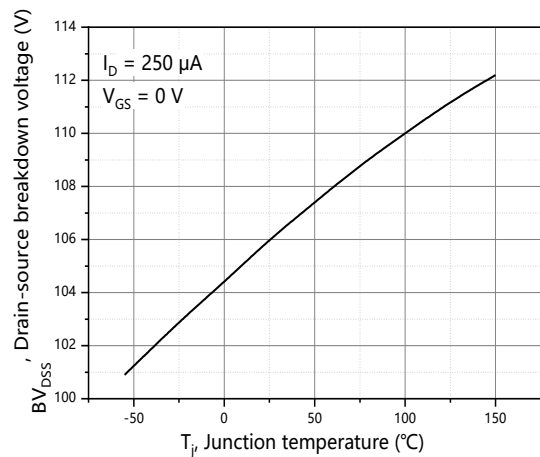


Figure 5. Drain-source breakdown voltage

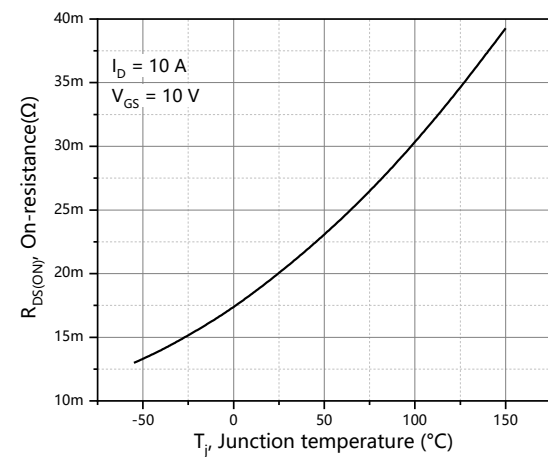
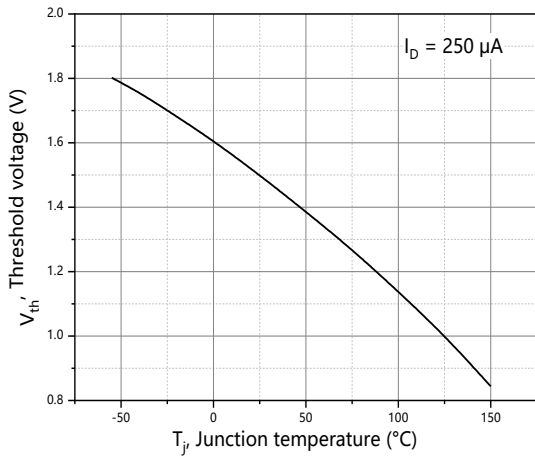


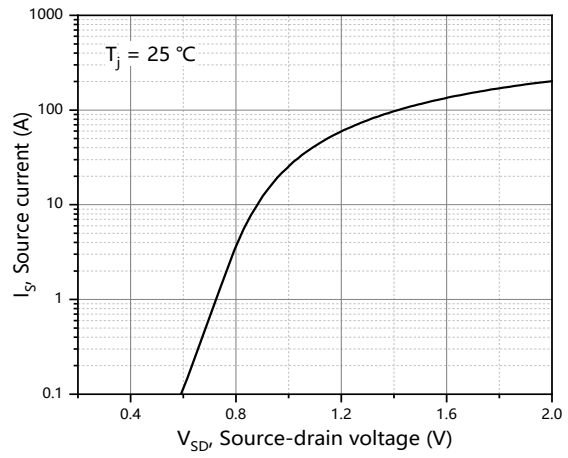
Figure 6. Drain-source on-state resistance

**TMG40N10D**

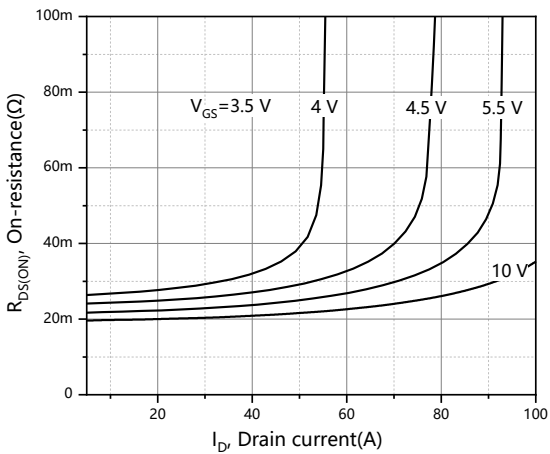
**N-Channel Enhancement Mosfet**



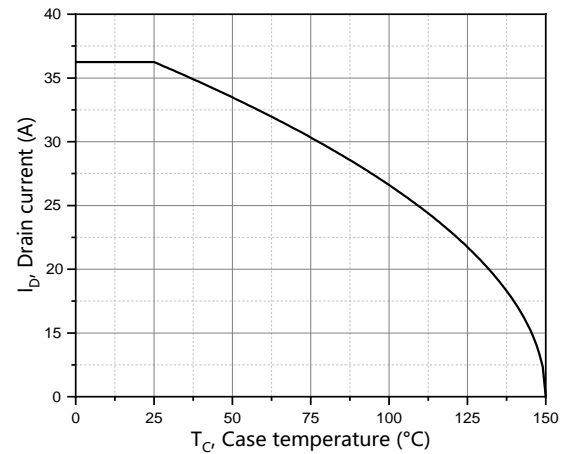
**Figure 7. Threshold voltage**



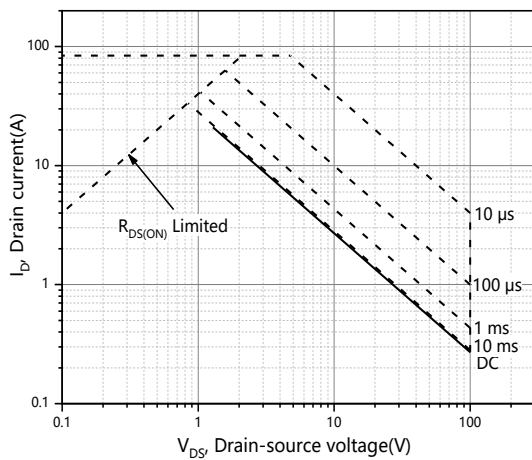
**Figure 8. Forward characteristic of body diode**



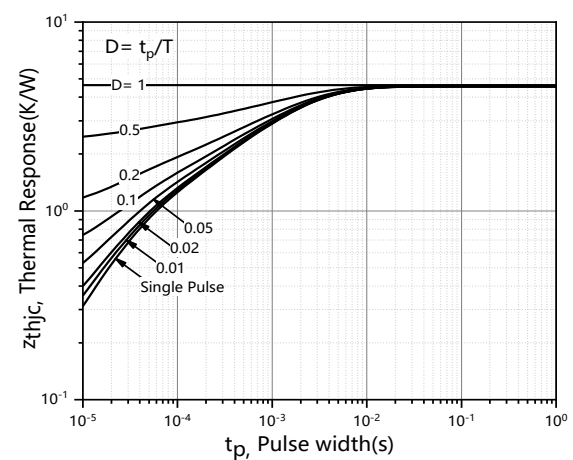
**Figure 9. Drain-source on-state resistance**



**Figure 10. Drain current**

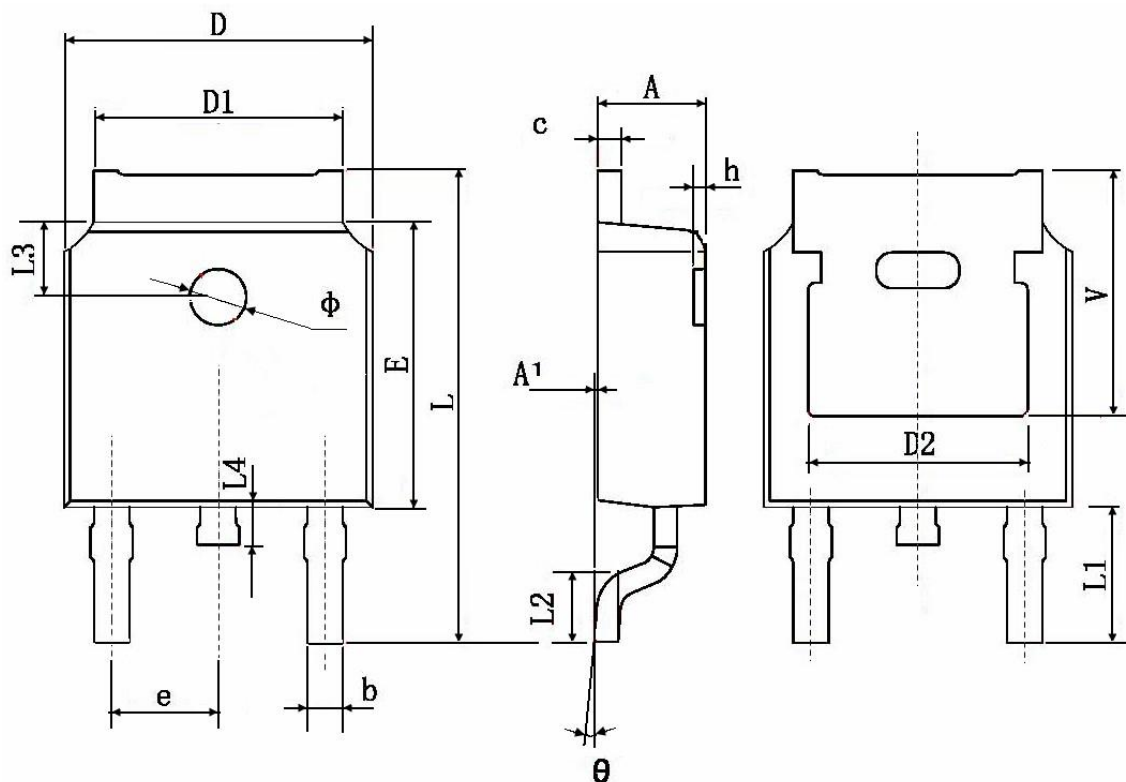


**Figure 11. Safe operation area Tc=25°C**



**Figure 12. Max. 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.	