
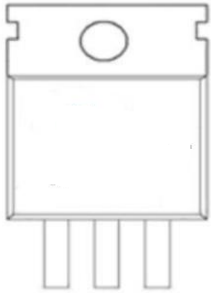


TMGN10060P

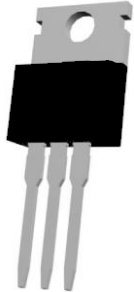
N-Channel Enhancement Mosfet

<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>$V_{DS} = 100V$ $I_D = 60A$ $R_{DS(ON)} = 13.8m\Omega$(typ.) @ $V_{GS} = 10V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
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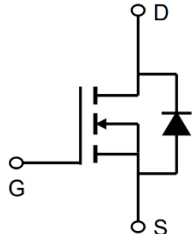


Marking: 60N10

P:TO-220AB



G D S



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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ¹⁾ , $T_C = 25^\circ C$	60	A
$I_{D, pulse}$	Pulsed drain current ²⁾ , $T_C = 25^\circ C$	98	A
P_D	Power dissipation ³⁾ , $T_C = 25^\circ C$	96	W
E_{AS}	Single pulsed avalanche energy ⁵⁾	65	mJ
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	1.3	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁴⁾	62	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	100	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=100V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.4	---	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	13.8	20	m Ω
		$V_{GS}=4.5V, I_D=7A$	---	17.4	26	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=50V, V_{GS}=0V,$ $f=100\text{KHz}$	---	1000	---	pF
C_{oss}	Output Capacitance		---	180	---	
C_{rss}	Reverse Transfer Capacitance		---	9.5	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=50V, I_D=5A,$ $V_{GS}=10V, R_G=10\Omega$	---	16.6	---	ns
t_r	Rise Time		---	3.8	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	75.5	---	ns
t_f	Fall Time		---	46	---	ns
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=50V,$ $I_D=5A$	---	16.2	---	nC
Q_{gs}	Gate-Source Charge		---	2.8	---	nC
Q_{gd}	Gate-Drain Charge		---	4.1	---	nC
$V_{plateau}$	Gate plateau voltage		---	3	---	V
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=12A$	---	---	1.3	V
t_{rr}	Reverse Recovery Time	$V_R=50\text{V}, I_S=5\text{A},$ $di/dt=100\text{A}/\mu\text{s}$	---	49	---	Ns
q_{rr}	Reverse Recovery Charge		---	61.8	---	nc
I_{rmm}	Peak reverse recovery current		---	2.4	---	A

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) $V_{DD}=50\text{V}, V_{GS}=10\text{V}, L=0.3\text{mH}$, starting $T_j=25^\circ\text{C}$.

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

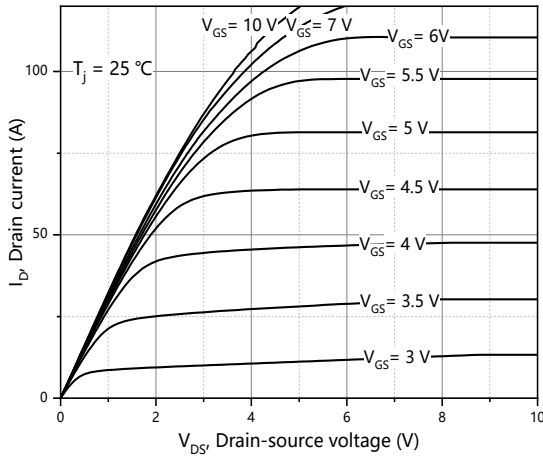


Figure 1. Typ. output characteristics

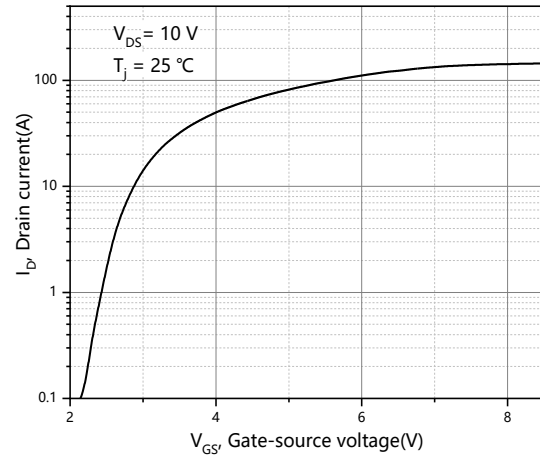


Figure 2. Typ. transfer characteristics

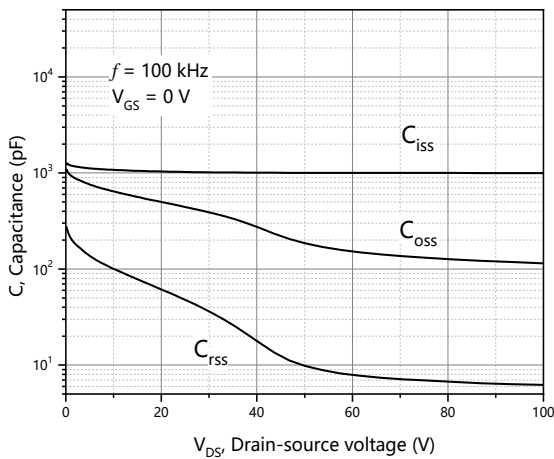


Figure 3. Typ. capacitances

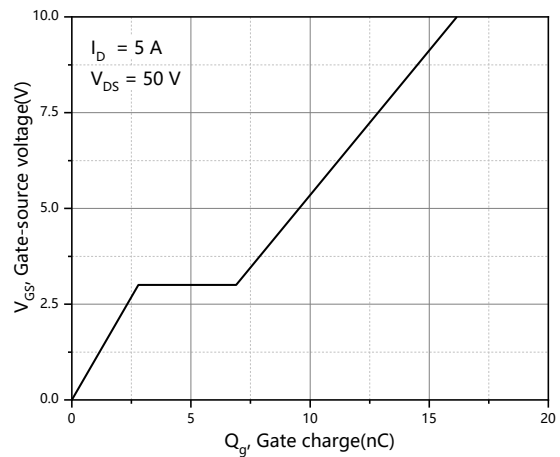


Figure 4. Typ. gate charge

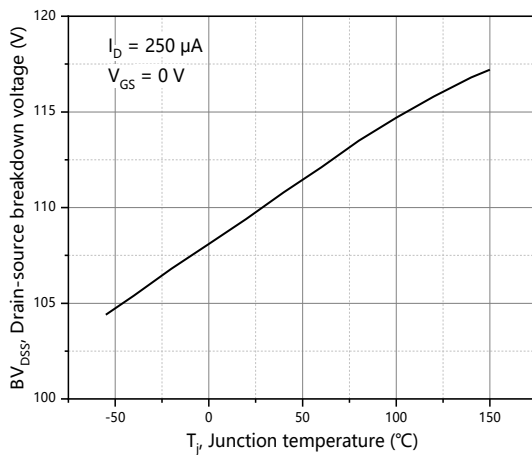


Figure 5. Drain-source breakdown voltage

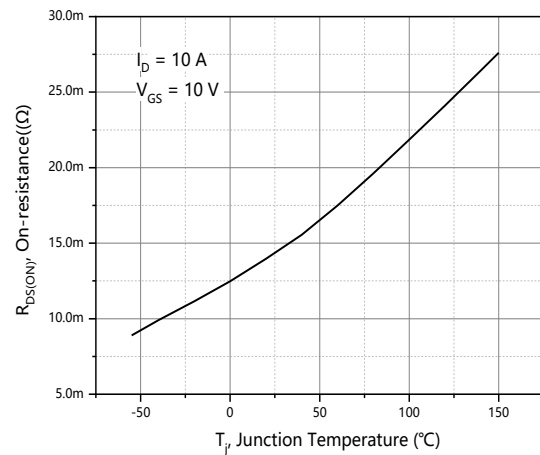


Figure 6. Drain-source on-state resistance



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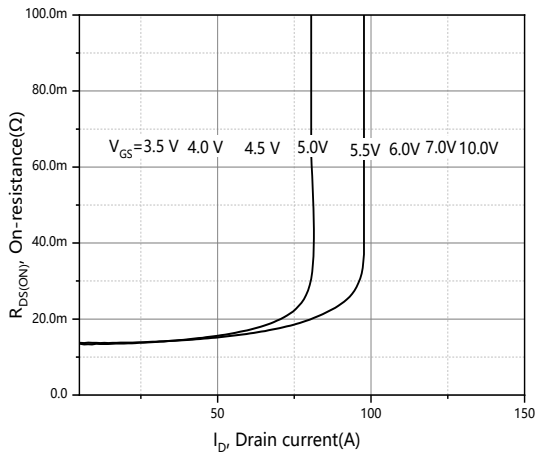


Figure 7. Drain-source on-state resistance

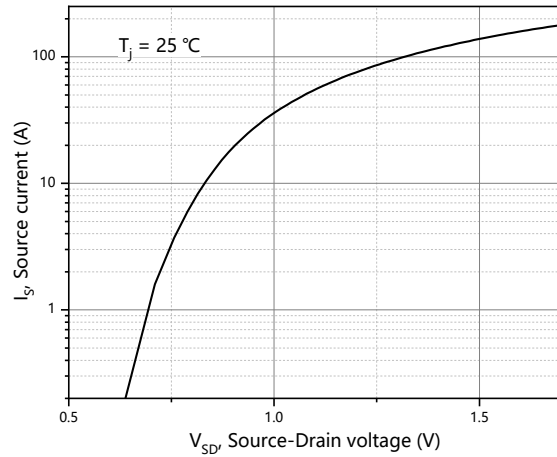


Figure 8. Forward characteristic of body diode

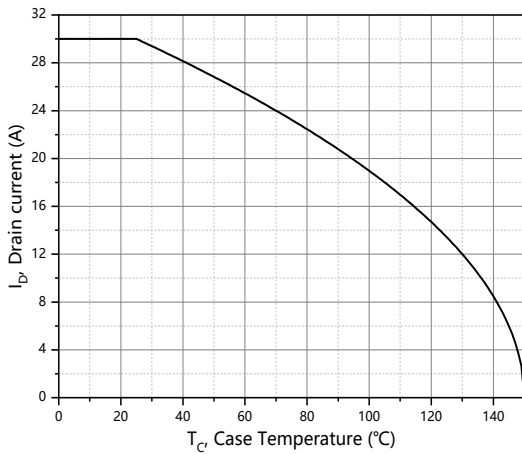


Figure 9. Drain current

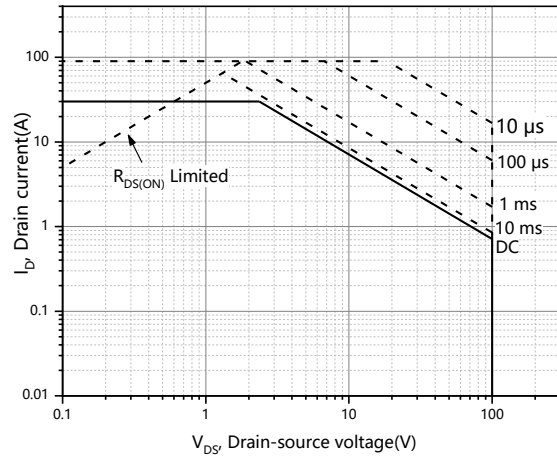
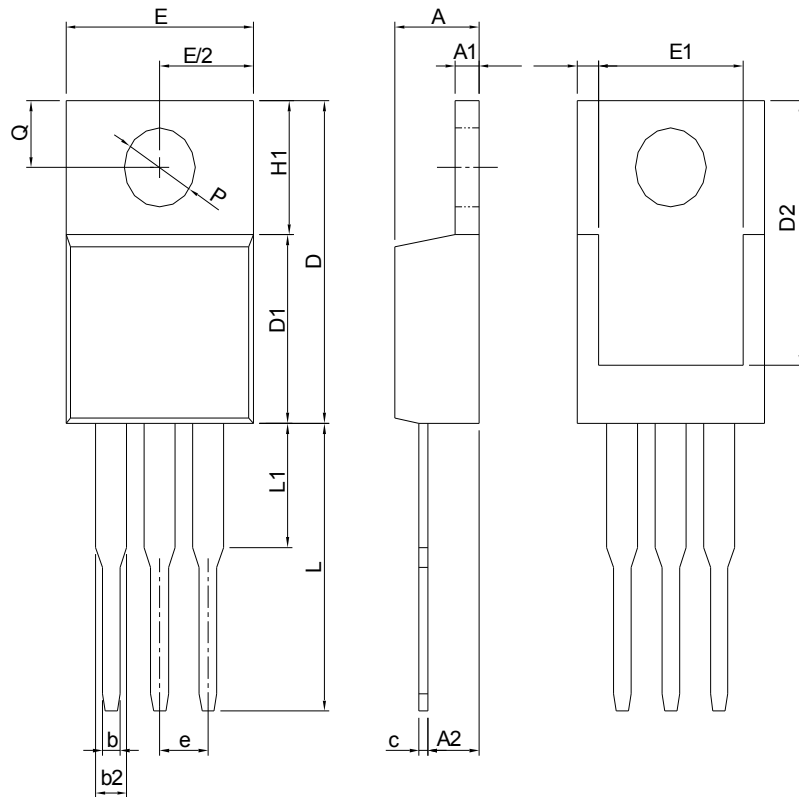


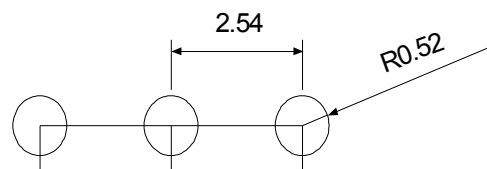
Figure 10. Safe operation area T_C=25 °C

Package Information: TO-220AB



SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

RECOMMENDED LAND PATTERN



UNIT: mm

Note: Follow JEDEC TO-220 AB.

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