

N-MOSFET 100V 3.8mΩ 120A

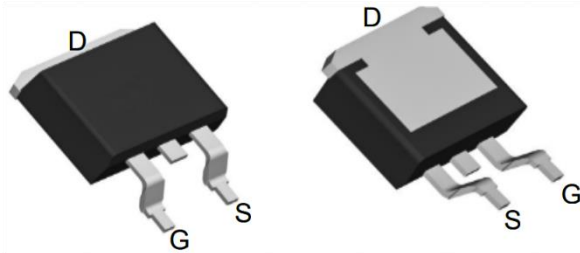
■ Product Summary

- V_{DS} 100V
- I_D 120A
- R_{DS(ON)} (at V_{GS}=10V) <4.5 mΩ (Typ: 3.8 mΩ)

■ Naming convention

M	G	H	0	3	8	N	1	0	A	N
Megain		B: PDFN3X3 C: PDFN5X6 P: TO220 H: TO263 S: SOP8 L: SOT223	R _{DS(on)} Typ. @V _{GS} =10V	N: N P: P C: N+P D: N+N		10: 100V 08: 80V 06: 60V 04: 40V 03: 30V	A:V _{GS} 20/-12 w/o A: V _{GS} ±20		L:V _{th} (1~2.5V) N:V _{th} (2~4V)	

■ Pin configuration



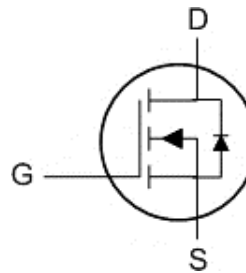
■ Features

- Advanced Trench MOS Technology
- 100% EAS Guaranteed
- Super Low R_{DS(ON)}
- Green Device Available

■ Application

- Motor Driver
- BMS
- High frequency switching and synchronous rectification

■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGH038N10N	TO263	Tape & Reel	800 / Tape & Reel	MGH038N10N

■ Absolute Maximum Ratings

T_C=25°C Unless Otherwise Noted.

Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	100	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current – Continuous ^{1,6} (T _C =25°C)	120	A
	Drain Current – Continuous ^{1,6} (T _C =100°C)	100	
	Drain Current – Continuous ^{1,6} (T _A =25°C)	15.6	
	Drain Current – Continuous ^{1,6} (T _A =70°C)	12.4	
I _{DM}	Pulsed Drain Current ²	480	A
EAS	Single Pulse Avalanche Energy ³	702	mJ
I _{AS}	Avalanche Current	53	A
P _D	Total Power Dissipation ⁴ (T _C =25°C)	250	W
	Total Power Dissipation ⁴ (T _C =100°C)	100	
	Total Power Dissipation ⁴ (T _A =25°C)	2.0	
	Total Power Dissipation ⁴ (T _A =70°C)	1.3	
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

■ Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ¹	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case ¹	0.5	°C/W

■ Electrical Characteristics

$T_J=25^{\circ}\text{C}$ Unless Otherwise Noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$B_{V_{DS}}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
$R_{DS(ON)}$	Drain-Source On-state Resistance ²	$V_{GS}=10V, I_D=30A$	-	3.8	4.5	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=100V, V_{GS}=0V$	-	-	10	
		$T_J=55^{\circ}\text{C}$	-	-	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=30A$	-	50	-	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	-	1	-	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=50V, V_{GS}=10V, I_D=20A$	-	72	-	nC
Q_{gs}	Gate-Source Charge		-	28	-	
Q_{gd}	Gate-Drain Charge		-	15	-	
$T_{d(ON)}$	Turn-on Delay Time	$V_{DS}=50V, V_{GS}=10V, R_G=3\Omega, I_D=20A$	-	35	-	nS
T_r	Turn-on Rise Time		-	18	-	
$T_{d(OFF)}$	Turn-off Delay Time		-	45	-	
T_f	Turn-off Fall Time		-	55	-	
C_{iss}	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	-	4725	-	pF
C_{oss}	Output Capacitance		-	609	-	
C_{rss}	Reverse Transfer Capacitance		-	14	-	

Diode Characteristics

I_S	Continuous Source Current ^{1,5,6}	$V_G=V_D=0V, \text{Force Current}$	-	-	120	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=50A$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$I_F=30A, dI_F/dt=100A/\mu s$	-	70	-	nS
Q_{rr}	Reverse Recovery Charge		-	170	-	nC

Note :

1.The data tested by surface mounted on a 1 inch² 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 $V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=53A$.

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.

6. Package limitation current.

■ Typical Characteristics

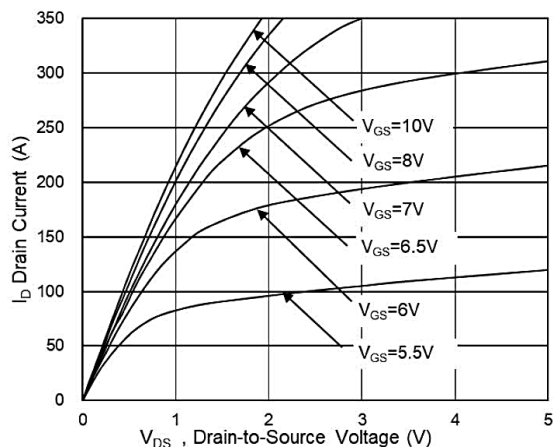


Fig.1 Typical Output Characteristics

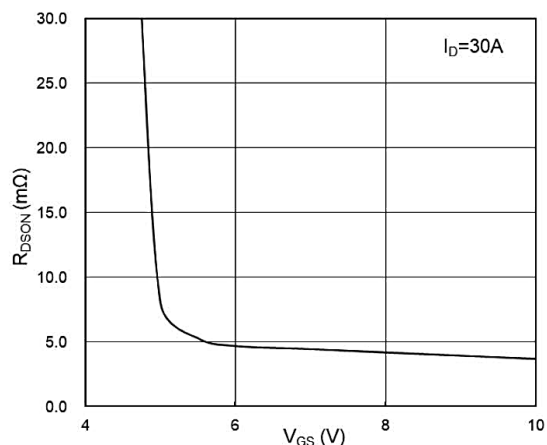


Fig.2 On-Resistance vs G-S Voltage

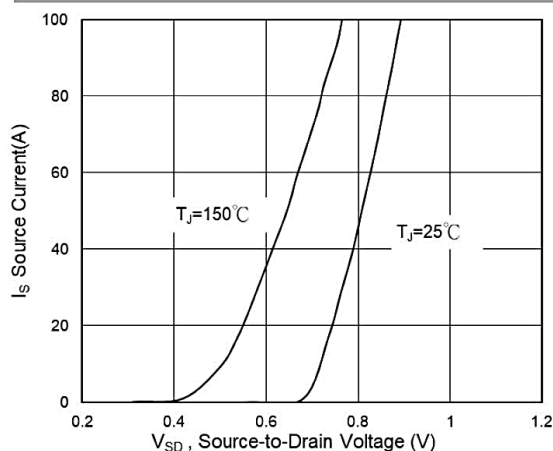


Fig.3 Source Drain Forward Characteristics

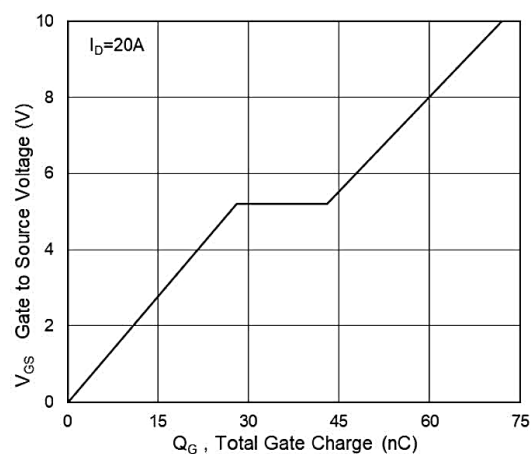


Fig.4 Gate-Charge Characteristics

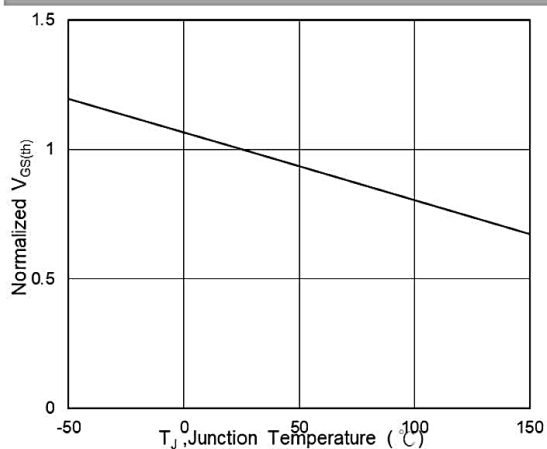


Fig.5 Normalized V_{TH} vs T_J

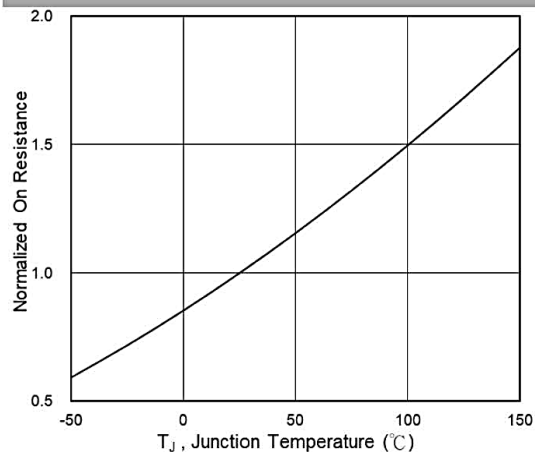


Fig.6 Normalized $R_{DS(on)}$ vs T_J

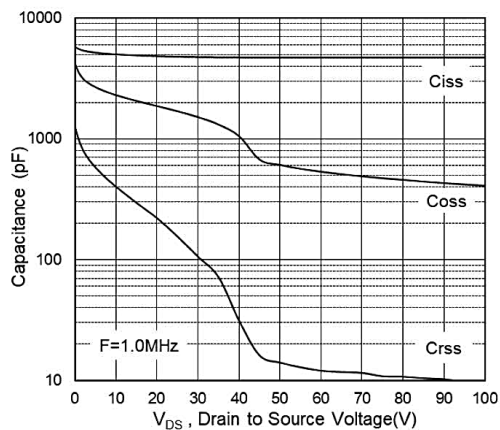


Fig.7 Capacitance

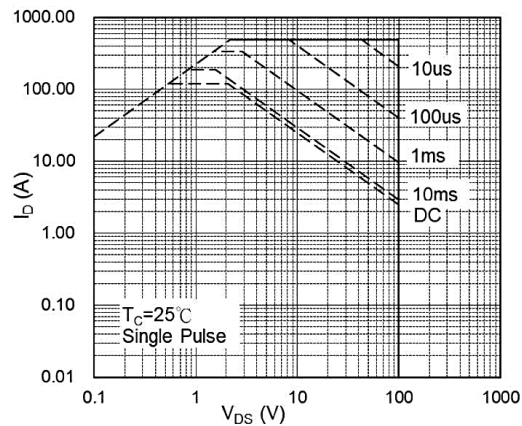


Fig.8 Safe Operating Area

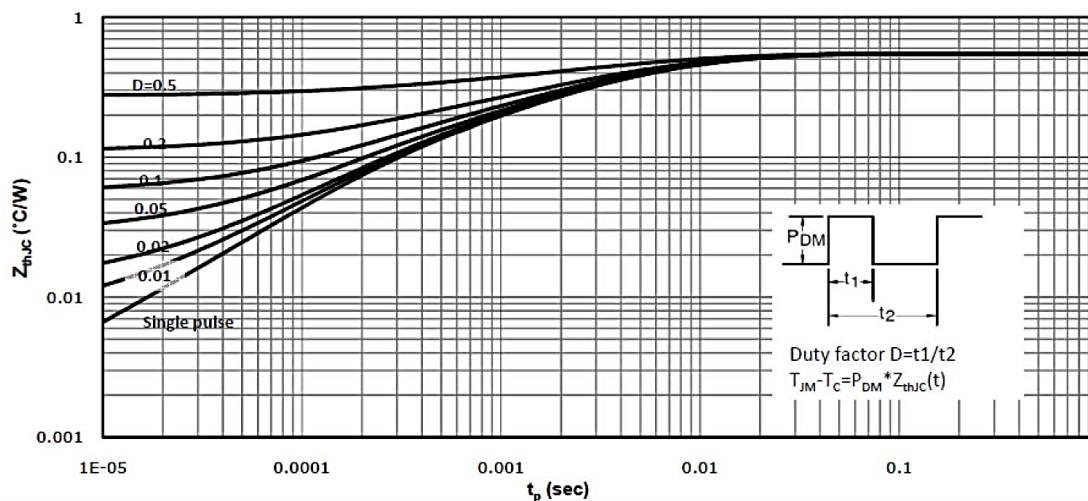


Fig.9 Normalized Maximum Transient Thermal Impedance

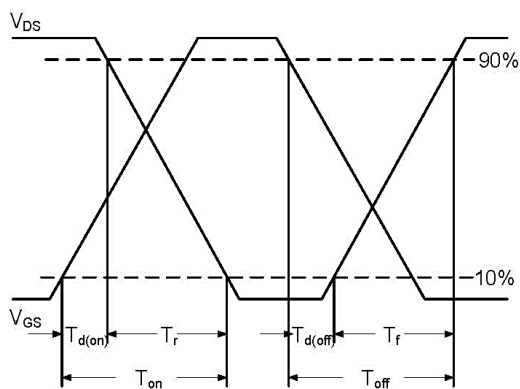


Fig.10 Switching Time Waveform

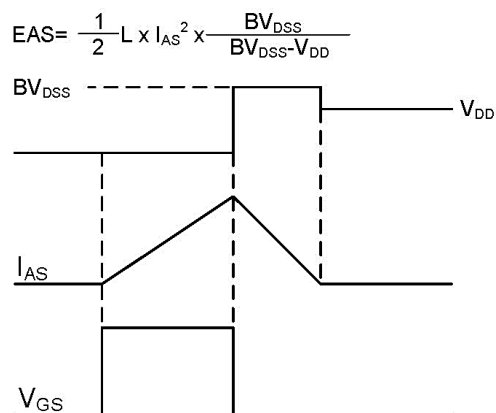


Fig.11 Unclamped Inductive Switching Waveform

■ Package size

Unit: mm.

TO263:

