

N-MOSFET 100V 3.8mΩ 120A

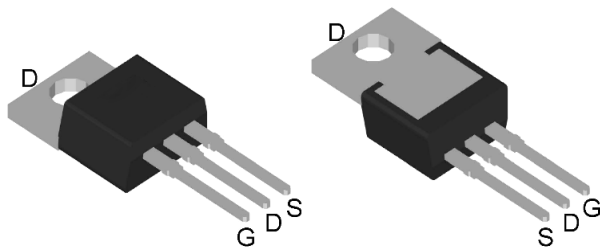
■ Product Summary

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

■ Naming convention

M	G	P	0	3	8	N	1	0	A	N	
Megain		B: PDFN3X3 C: PDFN5X6 P: TO220 H: TO263 S: SOP8 D: TO252	R _{DS(on)} Typ. @V _{GS} =10V		N: N P: P C: N+P D: N+N		15: 150V 12: 120V 10: 100V 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



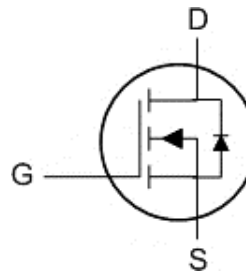
■ Features

- 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
MGP038N10N	TO220	Tube	50 / Tube	MGP038N10N

■ 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 _{θJA}	Thermal Resistance Junction to Ambient ¹	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case ¹	0.5	°C/W

■ Electrical Characteristics

T_J=25°C Unless Otherwise Noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100	-	-	V
R _{DS(ON)}	Drain-Source On-state Resistance ²	V _{GS} =10V, I _D =30A	-	3.8	4.5	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2	3	4	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =100V, V _{GS} =0V	-	-	1	uA
		V _{DS} =100V, V _{GS} =0V	-	-	10	
		T _J =55°C	-	-	-	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±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=1MHz	-	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 =3Ω, 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=1MHz	-	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, 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/us	-	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 ≦ 300us , duty cycle ≦ 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

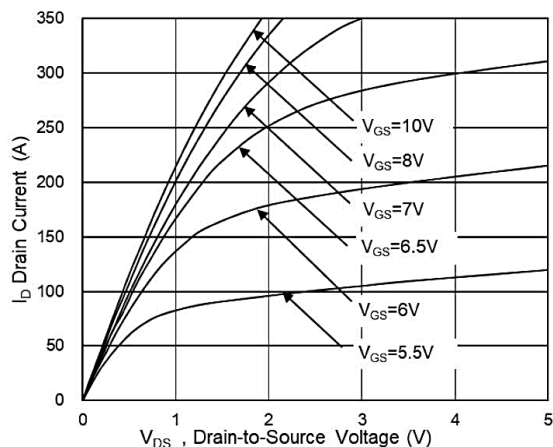


Fig.1 Typical Output Characteristics

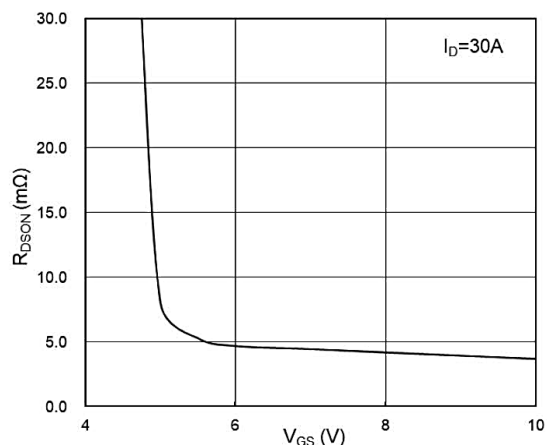


Fig.2 On-Resistance vs G-S Voltage

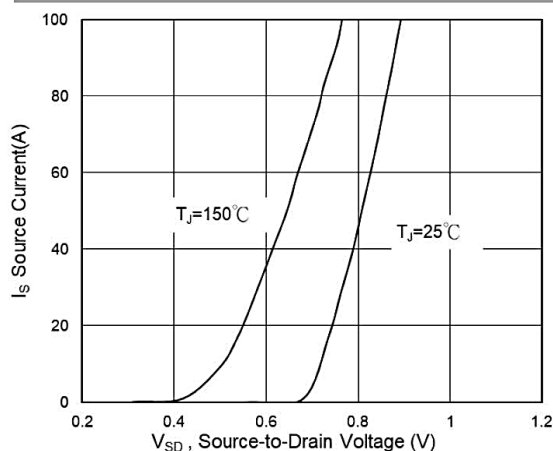


Fig.3 Source Drain Forward Characteristics

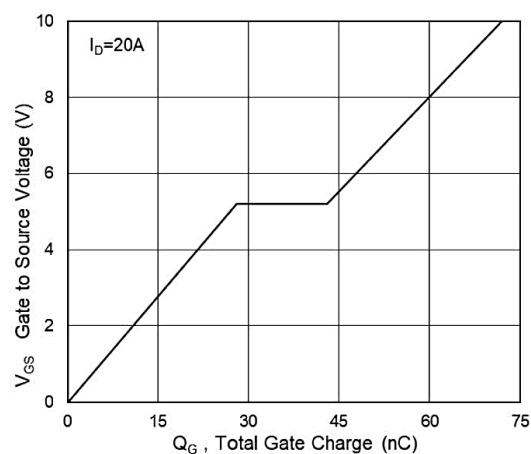


Fig.4 Gate-Charge Characteristics

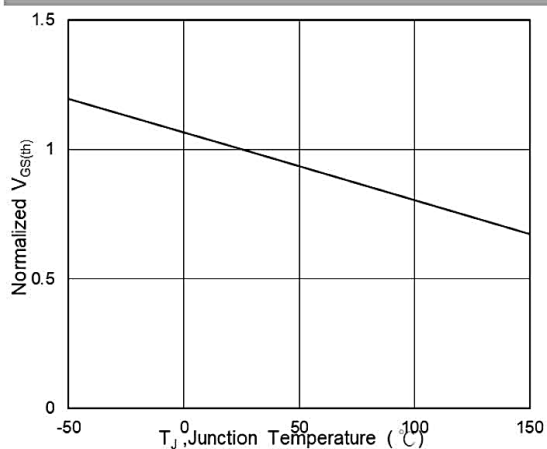


Fig.5 Normalized V_{TH} vs T_J

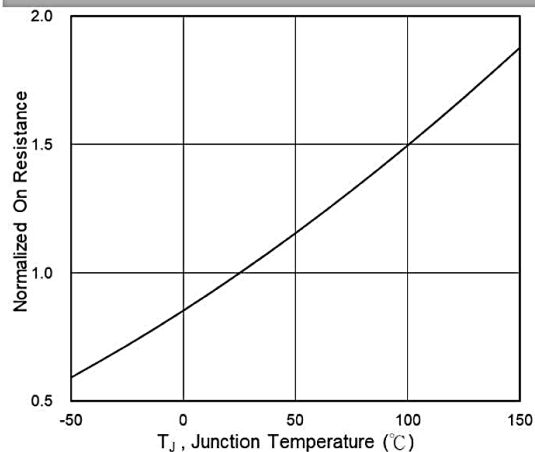


Fig.6 Normalized $R_{DS(on)}$ vs T_J

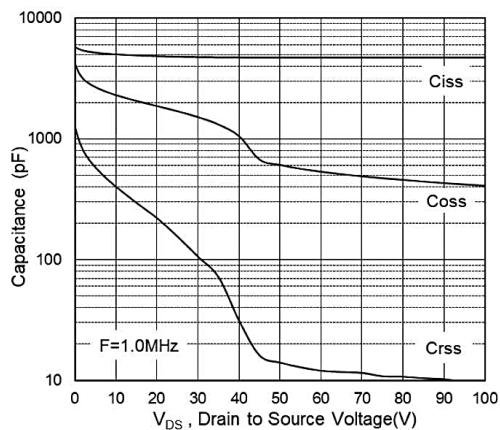


Fig.7 Capacitance

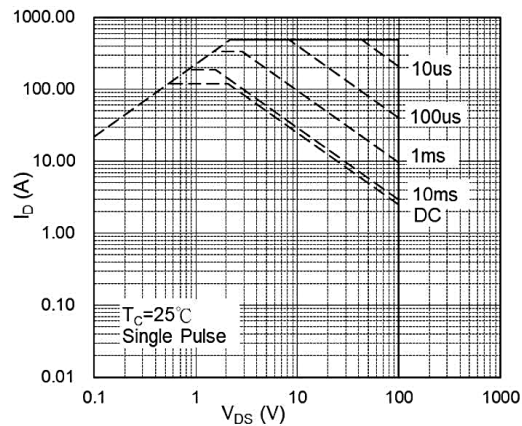


Fig.8 Safe Operating Area

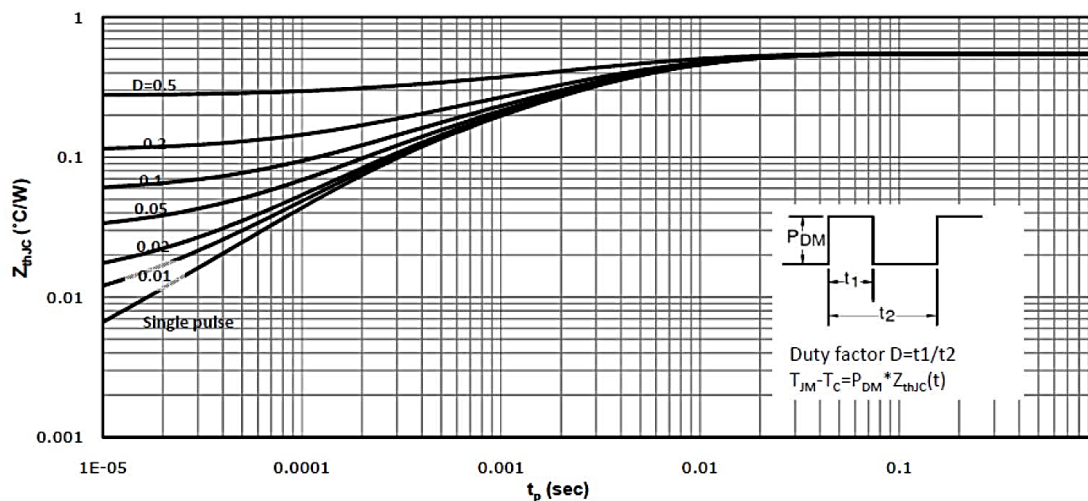


Fig.9 Normalized Maximum Transient Thermal Impedance

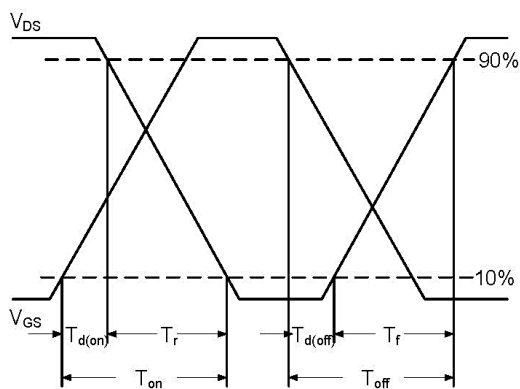


Fig.10 Switching Time Waveform

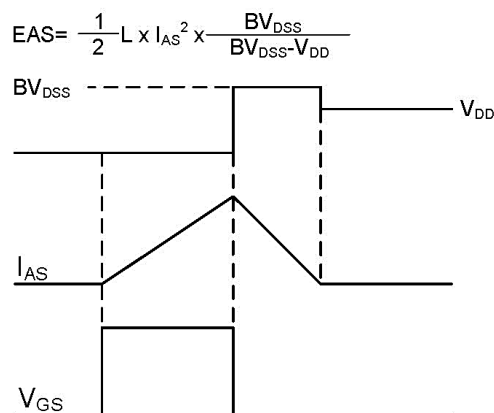


Fig.11 Unclamped Inductive Switching Waveform

■ Package size

Unit: mm.

TO220:

