

N-MOSFET 80V 5.4mΩ 120A

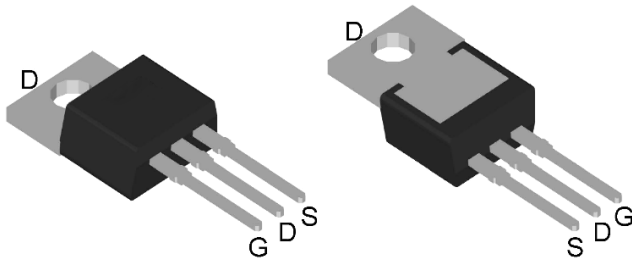
■ Product Summary

- V_{DS} 80V
- I_D 120A
- R_{DS(ON)} (at V_{GS}=10V) <6.5 mΩ (Typ: 5.4 mΩ)

■ Naming convention

M	G	P	0	5	4	N	0	8	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		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



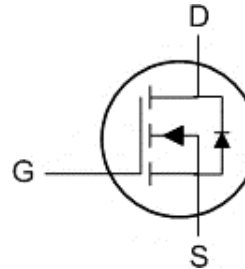
■ Features

- Advanced Trench MOS Technology
- 100% EAS Guaranteed
- Super Low Gate Charge
- Green Device Available

■ Application

- Power Tools.
- UPS
- Synchronous Rectification in SMPS

■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGP054N08N	TO220	Tube	50 / Tube	MGP054N08N

■ Absolute Maximum Ratings

T_C=25°C Unless Otherwise Noted.

Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	80	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current, V _{GS} @ 10V ^{1,6} (T _C =25°C)	120	A
	Continuous Drain Current, V _{GS} @ 10V ^{1,6} (T _C =100°C)	85	A
I _{DM}	Pulsed Drain Current ²	250	A
EAS	Single Pulse Avalanche Energy ³	90.3	mJ
I _{AS}	Avalanche Current	19	A
P _D	Total Power Dissipation ⁴ (T _C =25°C)	150	W
T _{STG}	Storage Temperature Range	-55 to 175	°C
T _J	Operating Junction Temperature Range	-55 to 175	°C

■ Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ¹	60	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case ¹	1	°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	$V_{GS}=0V, I_D=250\mu A$	80	-	-	V
$R_{DS(ON)}$	Drain-Source On-state Resistance ²	$V_{GS}=10V, I_D=20A$	-	5.4	6.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	-	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=64V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=64V, V_{GS}=0V$	-	-	5	
		$T_J=55^{\circ}\text{C}$	-	-	-	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=20A$	-	75	-	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	-	0.5	-	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=40V, V_{GS}=10V, I_D=20A$	-	52.1	-	nC
Q_{gs}	Gate-Source Charge		-	12.8	-	
Q_{gd}	Gate-Drain Charge		-	14.6	-	
$T_{d(ON)}$	Turn-on Delay Time	$V_{DD}=40V, V_{GS}=10V, R_G=3\Omega, I_D=20A$	-	18	-	nS
T_r	Turn-on Rise Time		-	9	-	
$T_{d(OFF)}$	Turn-off Delay Time		-	38	-	
T_f	Turn-off Fall Time		-	8	-	
C_{iss}	Input Capacitance	$V_{DS}=40V, V_{GS}=0V, F=1\text{MHz}$	-	3109	-	pF
C_{oss}	Output Capacitance		-	811	-	
C_{rss}	Reverse Transfer Capacitance		-	19	-	

Diode Characteristics

I_S	Continuous Source Current ^{1,5,6}	$V_G=V_D=0V, \text{Force Current}$	-	-	100	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A$	-	0.77	1.0	V
t_{rr}	Reverse Recovery Time	$I_F=20A, dI_F/dt=100A/\mu s$	-	27	-	nS
Q_{rr}	Reverse Recovery Charge		-	89	-	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 $\leq 2\%$.

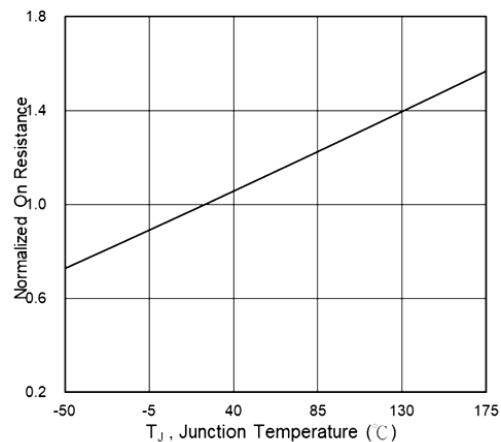
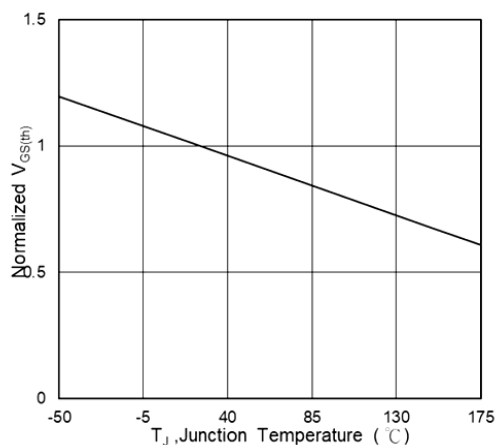
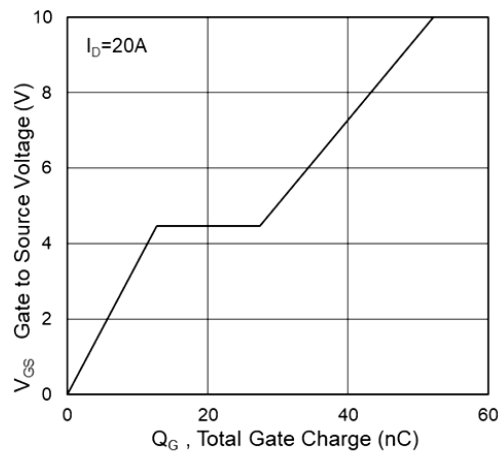
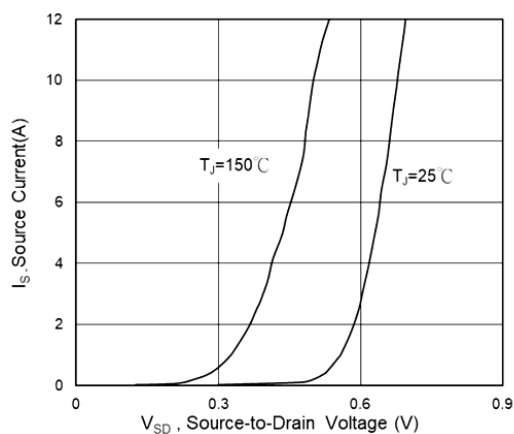
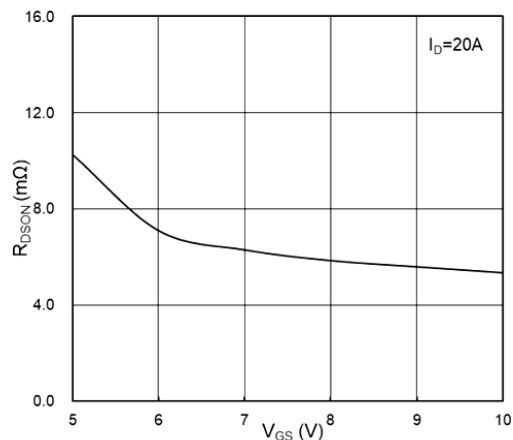
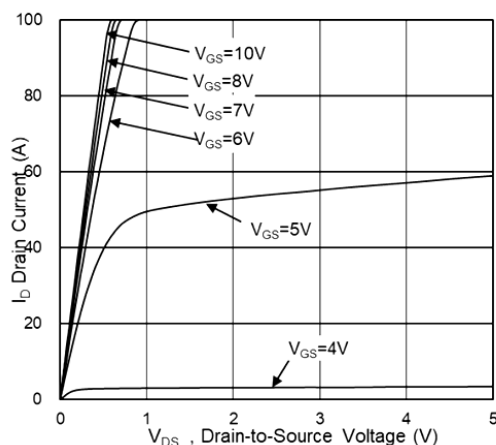
3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=19A$.

4.The power dissipation is limited by 175°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.Bonding wire limitation current is 85A.

■ Typical Characteristics



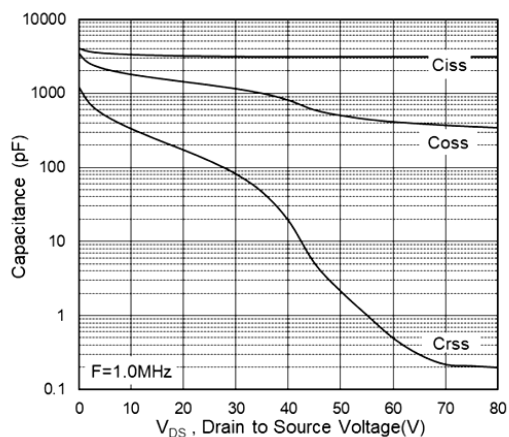


Fig.7 Capacitance

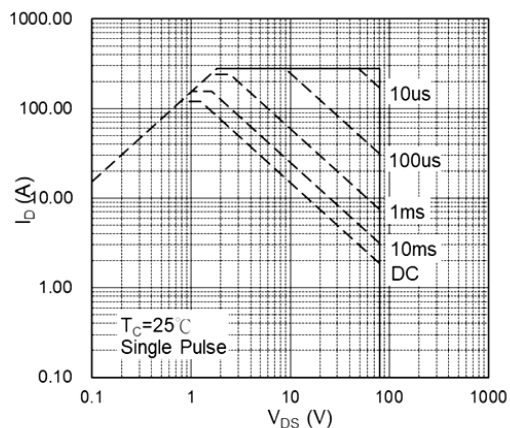


Fig.8 Safe Operating Area

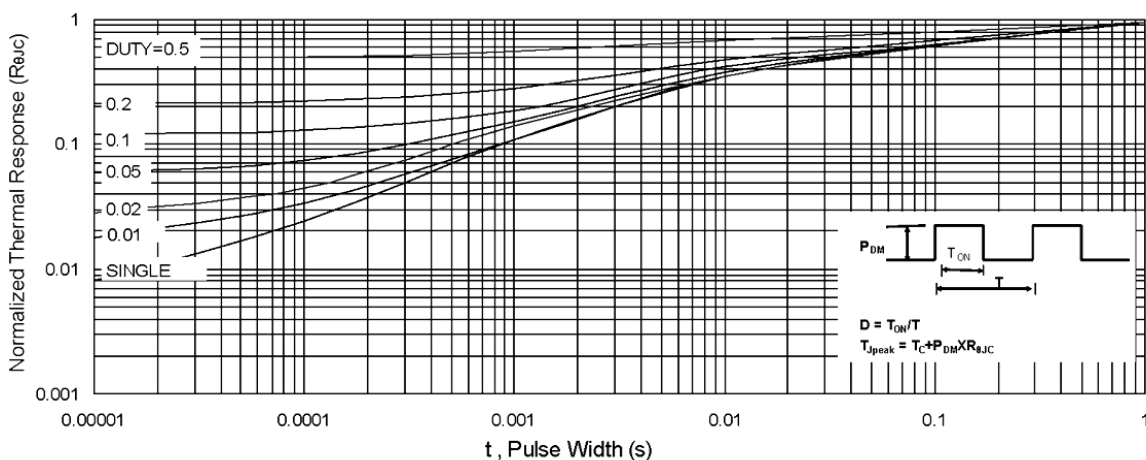


Fig.9 Normalized Maximum Transient Thermal Impedance

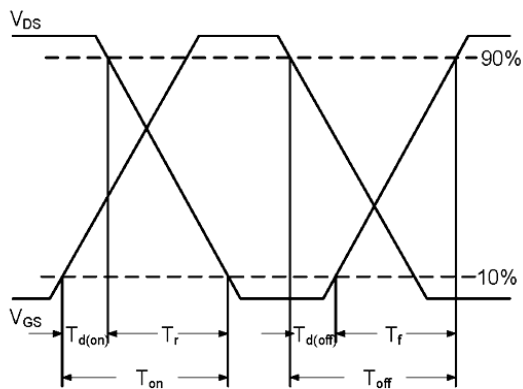


Fig.10 Switching Time Waveform

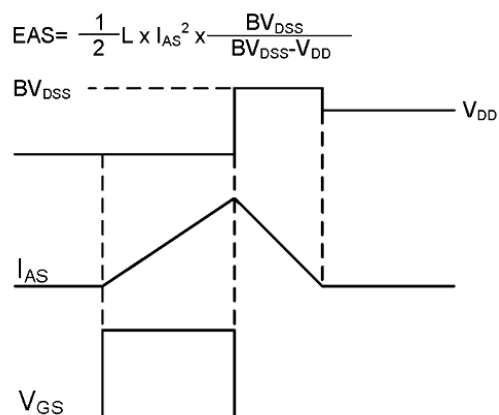


Fig.11 Unclamped Inductive Switching Waveform

■ Package size

Unit: mm.

TO220:

