

N-MOSFET 100V 1.2mΩ 411A

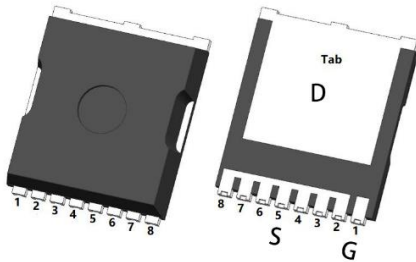
■ Product Summary

- V_{DS} 100V
- I_D 411A
- R_{DS(ON)} (at V_{GS}=10V) <1.6 mΩ (Typ: 1.2mΩ)

■ Naming convention

M	G	V	0	1	2	N	1	0	A	N
Megain		B: PDFN3X3 C: PDFN5X6 P: TO220 H: TO263 S: SOP8 V: TOLL	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} ±12 w/o A:V _{GS} ±20	L:V _{th} (1~2.5V) N:V _{th} (2~4V)			

■ Pin configuration



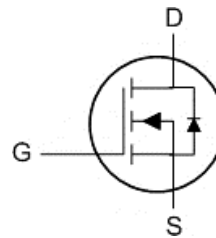
■ Features

- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Low Thermal resistance
- Low R_{DS(ON)} to minimize Conductive loss
- Advanced high cell density Trench technology

■ Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGV012N10N	TOLL	Tape & Reel	2000/Tape & Reel	MGV012N10N

■ 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)	411	A
	Drain Current – Continuous ^{1,6} (T _C =100°C)	290	
I _{DM}	Pulsed Drain Current ²	1645	A
EAS	Single Pulse Avalanche Energy ³	2121	mJ
I _{AS}	Avalanche Current	206	A
P _D	Total Power Dissipation ⁴ (T _C =25°C)	600	W
P _D	Total Power Dissipation ⁴ (T _C =100°C)	300	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	40	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case ¹	0.25	°C/W

■ Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
B _{VDSS}	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 =50A	-	1.2	1.6	mΩ
	Drain-Source On-state Resistance ²	V _{GS} =4.5V, I _D =50A	-	2.2	4.0	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	3.2	4.0	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V T _J =25℃	-	-	1	uA
		V _{DS} =80V, V _{GS} =0V T _J =100℃	-	-	100	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A	-	44	-	S
Q _g	Total Gate Charge	V _{DS} =50V, V _{GS} =10V I _D =50A	-	157	-	nC
Q _{gs}	Gate-Source Charge		-	70	-	
Q _{gd}	Gate-Drain Charge		-	62	-	
T _{d(ON)}	Turn-on Delay Time	V _{DD} =50V, V _{GS} =10V, R _G =4.5Ω,R _L =1Ω, I _D =50A	-	40	-	nS
T _r	Turn-on Rise Time		-	122	-	
T _{d(OFF)}	Turn-off Delay Time		-	144	-	
T _f	Turn-off Fall Time		-	127	-	
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	-	11074	-	pF
C _{oss}	Output Capacitance		-	1736	-	
C _{rss}	Reverse Transfer Capacitance		-	176	-	
Diode Characteristics						
I _S	Continuous Source Current ^{1,5,6}	V _G =V _D =0V,Force Current	-	-	411	A
I _{SM}	Pulsed Source Current ^{2,5}		-	-	823	A
V _{SD}	Diode Forward Voltage ²	I _S =50A,V _{GS} =0V, T _J =25℃	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _F =50A, dI/dt=100A/us, T _J =25℃	-	120	-	nS
Q _{rr}	Reverse Recovery Charge		-	347	-	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 $V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=206A$.

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.

■ Typical Characteristics

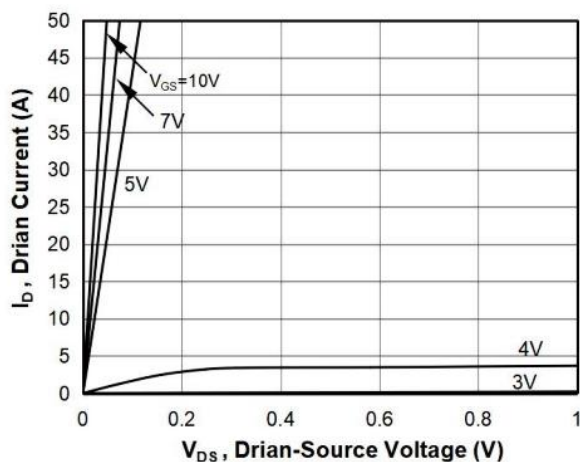


Fig.1 Typical Output Characteristics

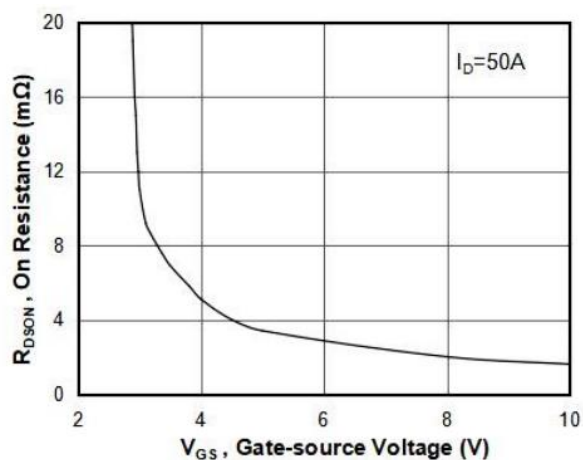


Fig.2 On-Resistance v.s Gate-Source

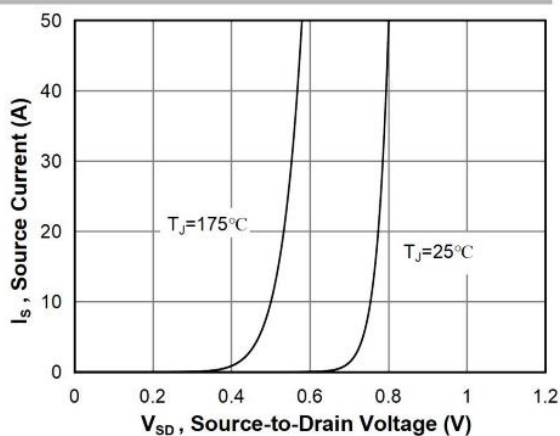


Fig.3 Source Drain Forward Characteristics

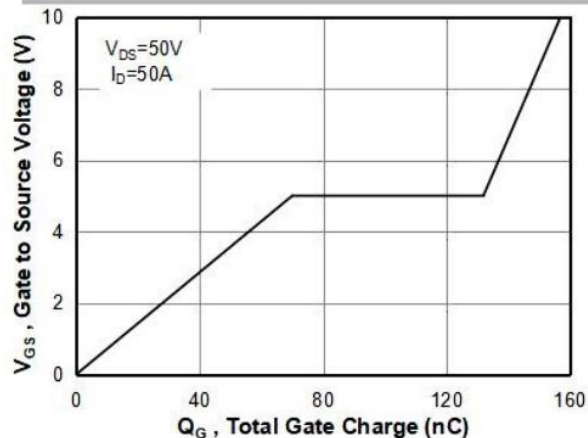


Fig.4 Gate-Charge Characteristics

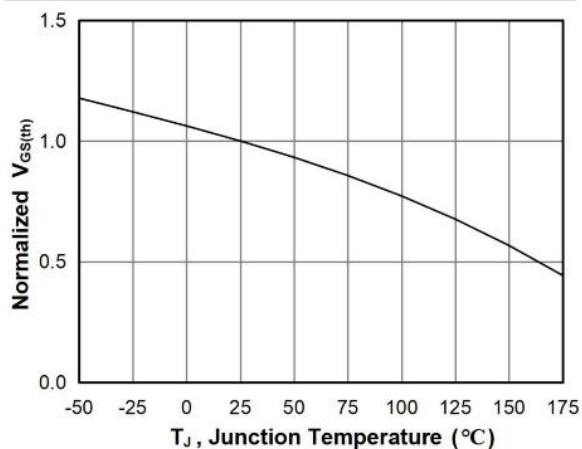


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

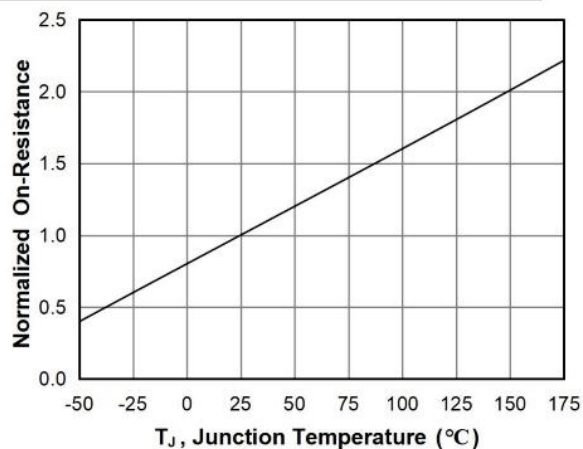


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

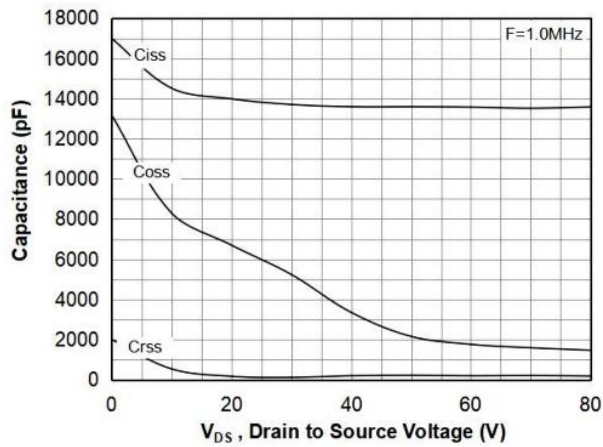


Fig.7 Capacitance

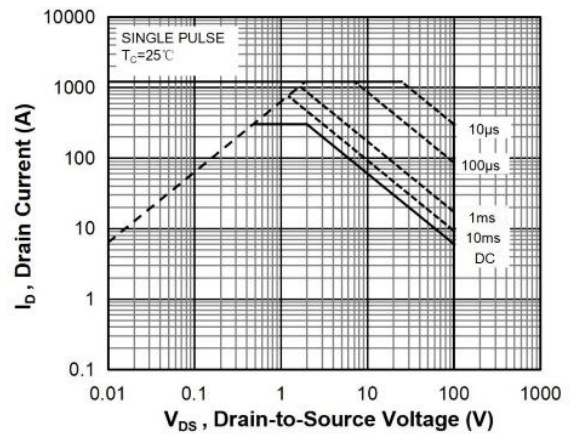


Fig.8 Safe Operating Area

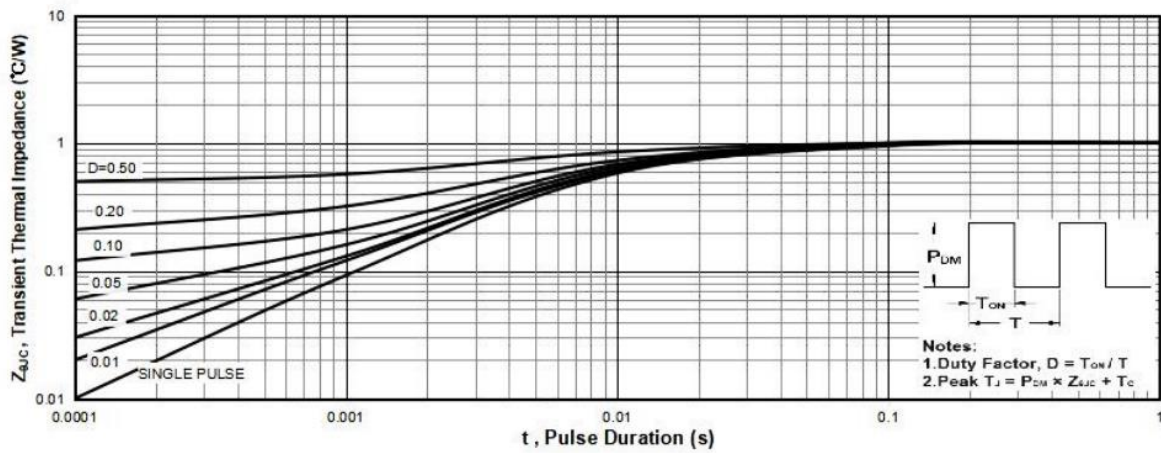


Fig.9 Normalized Maximum Transient Thermal Impedance

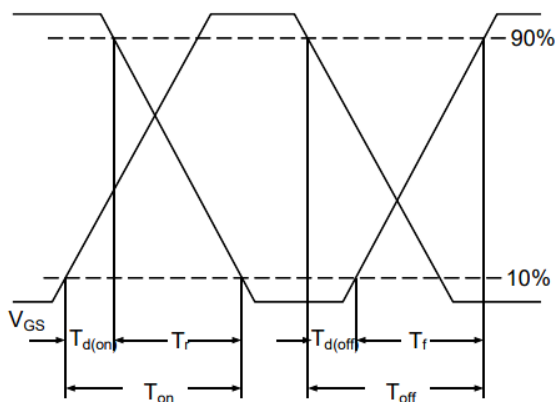


Fig.10 Switching Time Waveform

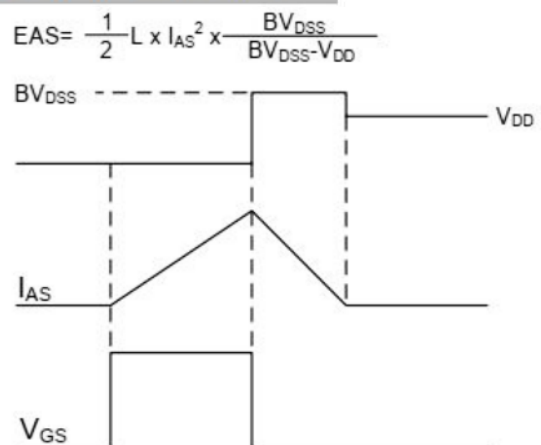
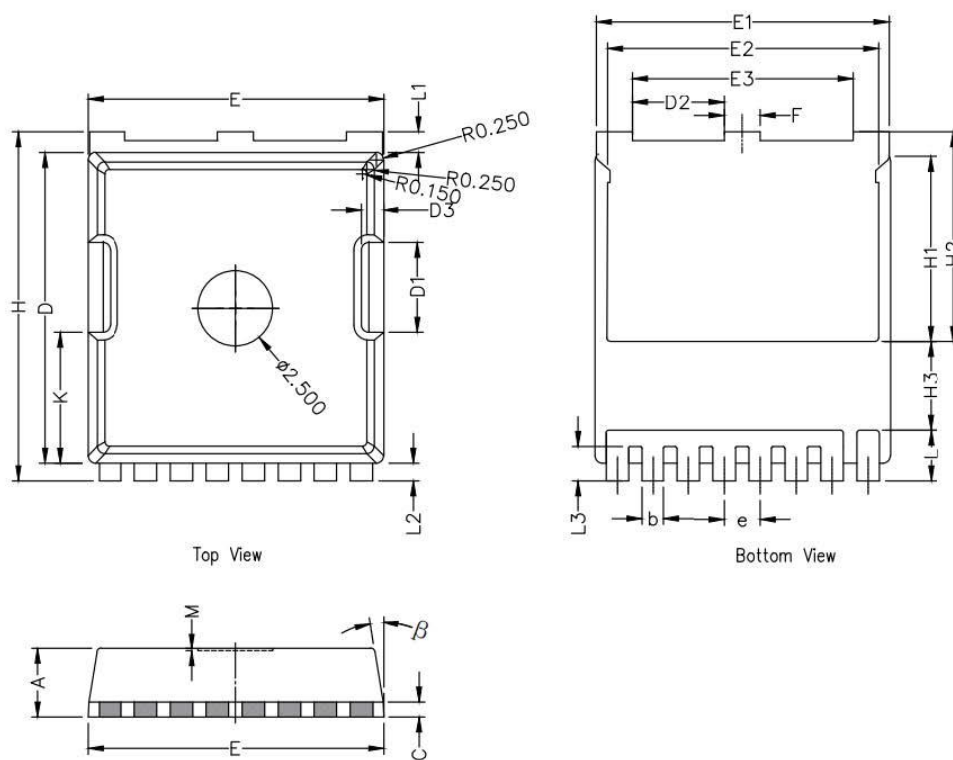


Fig.11 Unclamped Inductive Waveform

■ Package size

Unit: mm。

TOLL:



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C	0.508 REF		
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3	0.75 REF		
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e	1.20 BSC		
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3	3.00 BSC		
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M	0.08 REF		
β	8°	10°	12°
K	4.25	4.40	4.55