N-MOSFET 100V 1.2mΩ 411A

■ Product Summary

- VDS 100V
- ID 411A
- RDS(ON) (at VGS=10V) ＜1.6 mΩ（Typ：1.2mΩ）

■ Features

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

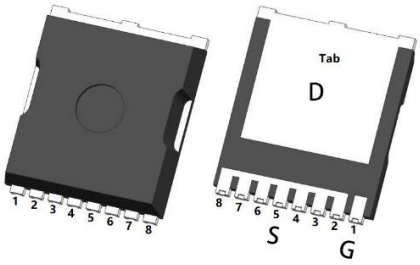
■ Naming convention

MG	V	012	N	10	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)

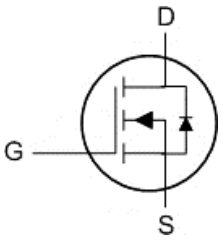
■ Application

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

■ Pin configuration



■ 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℃)	411	A
	Drain Current – Continuous[1,6] (T_C=100℃)	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	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

■ Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient[1]	40	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case[1]	0.25	℃/W

■ Electrical Characteristics

T_J=25°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
$V_{GS(th)}$	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
gfs	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 inch^2 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}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=206A.
4.The power dissipation is limited by 175℃ 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

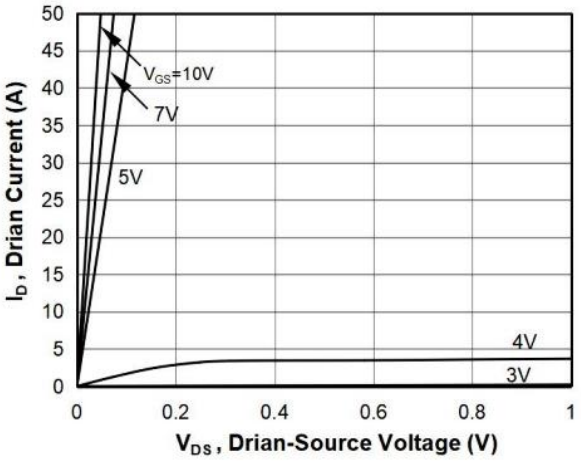


Fig.1 Typical Output Characteristics

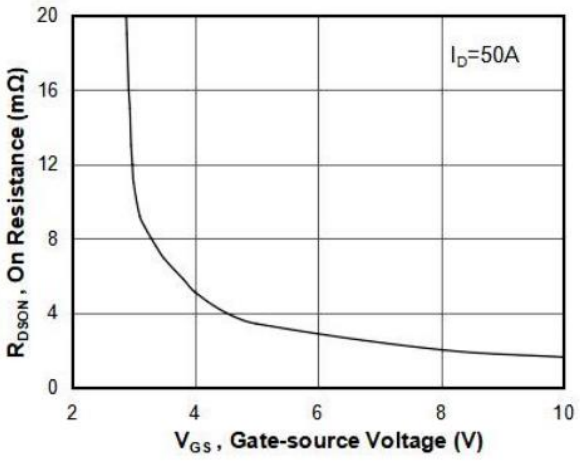


Fig.2 On-Resistance v.s Gate-Source

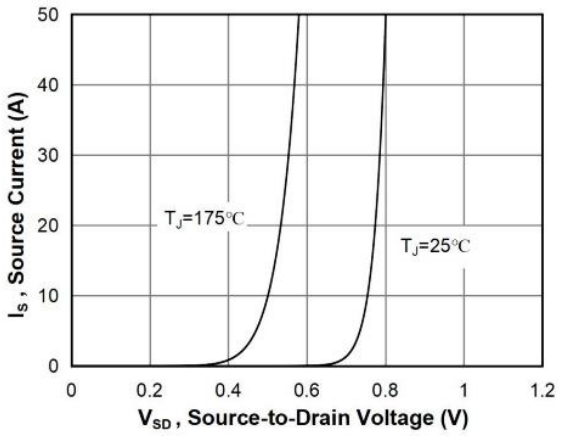


Fig.3 Source Drain Forward Characteristics

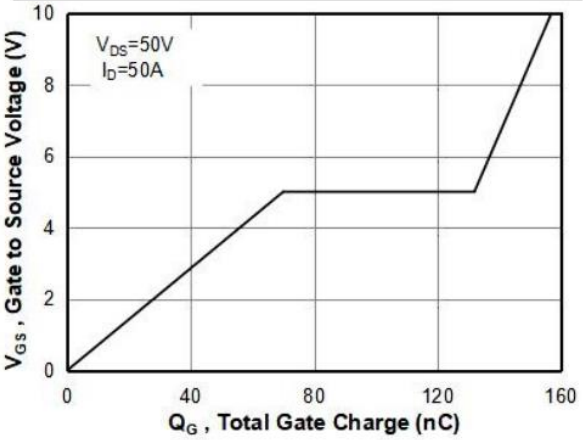


Fig.4 Gate-Charge Characteristics

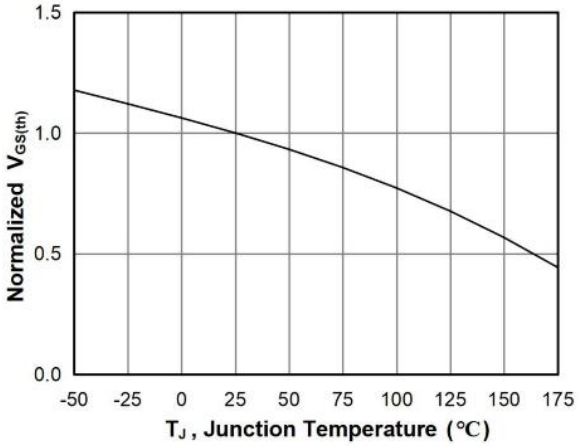


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

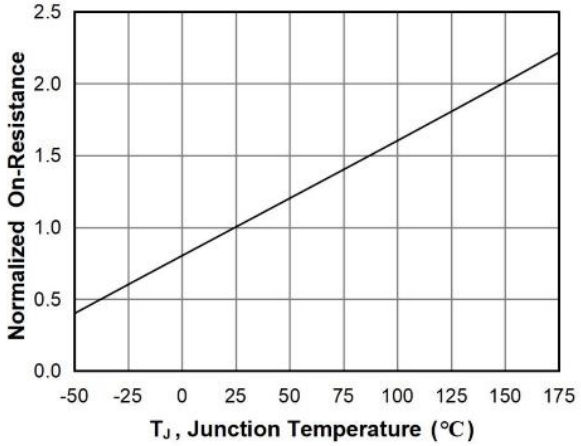


Fig.6 Normalized R_{DSON} v.s T_J

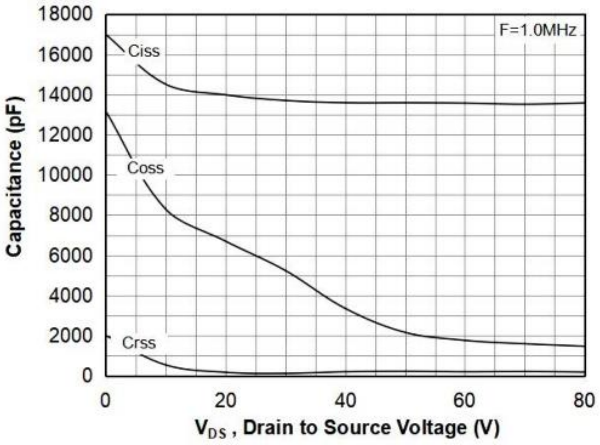


Fig.7 Capacitance

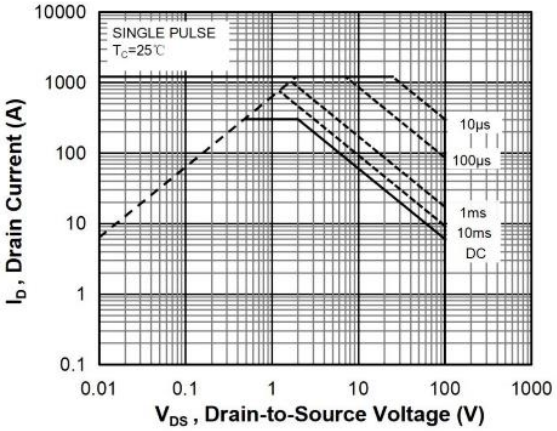


Fig.8 Safe Operating Area

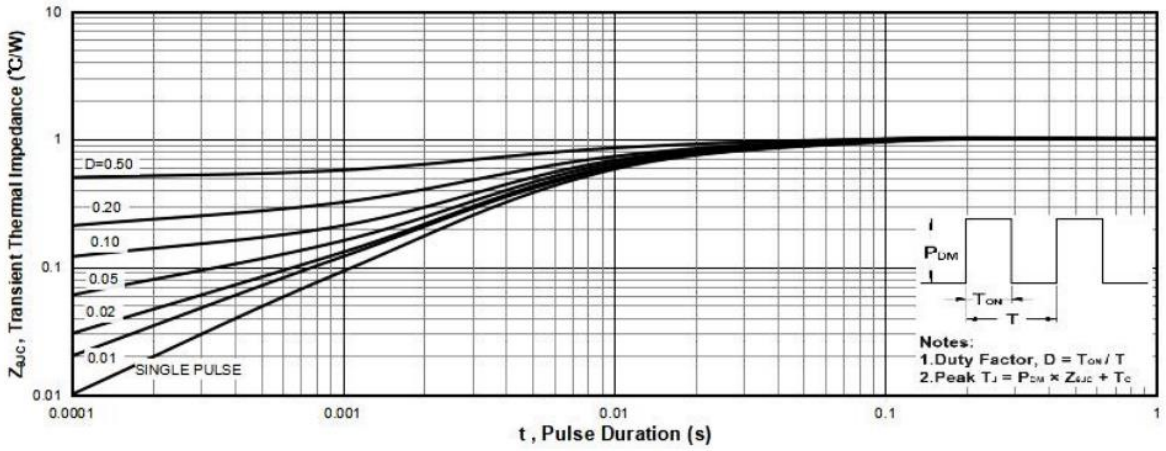


Fig.9 Normalized Maximum Transient Thermal Impedance

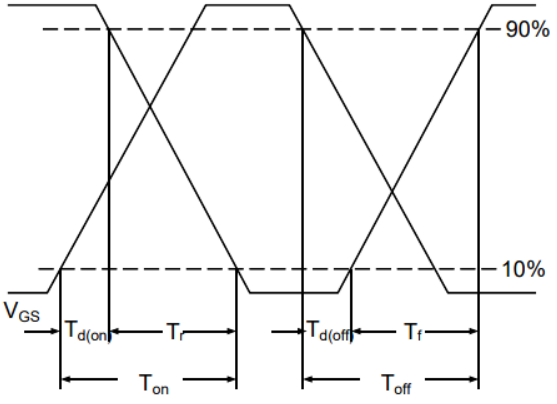


Fig.10 Switching Time Waveform

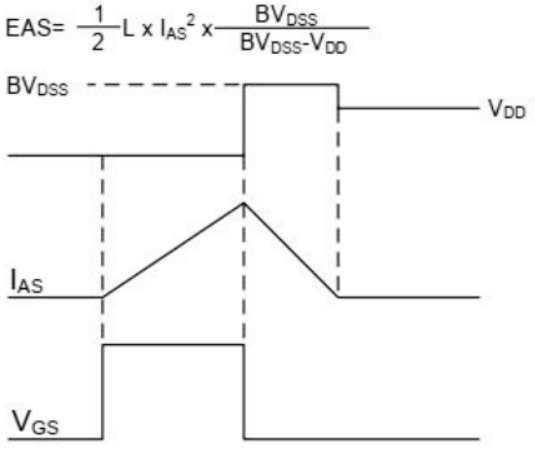
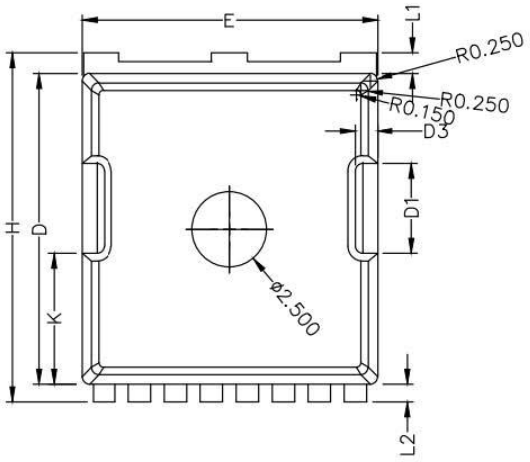


Fig.11 Unclamped Inductive Waveform

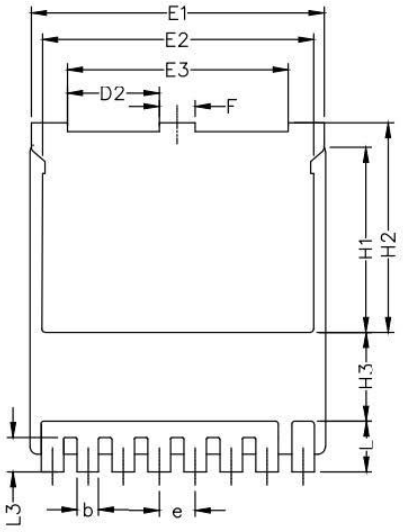
■ Package size

Unit：mm。

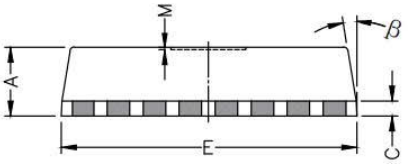
TOLL：



Top View



Bottom View



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