

N-MOSFET 60V 28mΩ 23A

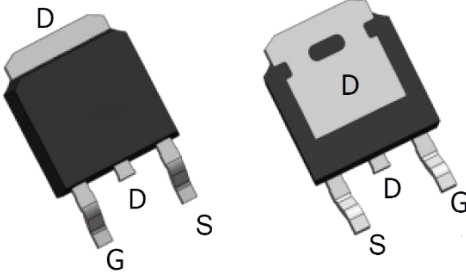
■ Product Summary

- V_{DS} 60V
- ID 23A
- R_{DS(ON)} (at V_{GS}=10V) <35mΩ (Typ: 28 mΩ)

■ Naming convention

M	G	D	2	8	N	0	6	A	L
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 14: 135V 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



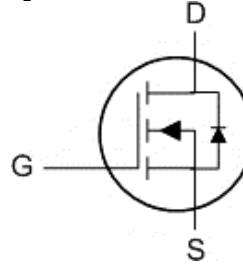
■ Features

- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

■ Application

- Load Switch
- PWM Application
- Power management

■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGD28N06L	TO252	Tape & Reel	2500 / Tape & Reel	MGD28N06L

■ Absolute Maximum Ratings

T_C=25°C Unless Otherwise Noted.

Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current, V _{GS} @ 10V ¹ (T _C =25°C)	23	A
	Continuous Drain Current, V _{GS} @ 10V ¹ (T _C =100°C)	15	A
	Drain Current – Continuous, V _{GS} @ 10V ¹ (T _A =25°C)	5.6	A
	Drain Current – Continuous, V _{GS} @ 10V ¹ (T _A =70°C)	4.5	A
I _{DM}	Pulsed Drain Current ²	46	A
EAS	Single Pulse Avalanche Energy ³	25.5	mJ
I _{AS}	Avalanche Current	22.6	A
P _D	Total Power Dissipation ⁴ (T _C =25°C)	34.7	W
P _D	Total Power Dissipation ⁴ (T _A =25°C)	2	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

■ Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	-	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	-	3.6	°C/W

■ Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
B _V D _{SS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	-	-	V
ΔB _V D _{SS} /ΔT _J	B _V D _{SS} Temperature Coefficient	Reference to 25℃, I _D =1mA	-	0.063	-	V/℃
R _{DS} (ON)	Drain-Source On-state Resistance ²	V _{GS} =10V, I _D =15A	-	28	35	mΩ
		V _{GS} =4.5V, I _D =10A	-	33	41	mΩ
V _{GS} (th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	-	2.5	V
ΔV _{GS} (th)	V _{GS} (th) Temperature Coefficient		-	-5.24	-	mV/℃
I _{DSS}	Drain-Source Leakage Current	V _{DS} =48V, V _{GS} =0V T _J =25℃	-	-	1	uA
		V _{DS} =48V, V _{GS} =0V T _J =55℃	-	-	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =15A	-	17	-	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	-	3.2	-	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =48V, V _{GS} =4.5V I _D =12A	-	12.6	-	nC
Q _{gs}	Gate-Source Charge		-	3.2	-	
Q _{gd}	Gate-Drain Charge		-	6.3	-	
T _d (ON)	Turn-on Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =10A	-	8	-	nS
T _r	Turn-on Rise Time		-	14.2	-	
T _d (OFF)	Turn-off Delay Time		-	24.4	-	
T _f	Turn-off Fall Time		-	4.6	-	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHz	-	1378	-	pF
C _{oss}	Output Capacitance		-	86	-	
C _{rss}	Reverse Transfer Capacitance		-	64	-	
Diode Characteristics						
I _s	Continuous Source Current ^{1,5}	V _G =V _D =0V,Force Current	-	-	23	A
I _{SM}	Pulsed Source Current ^{2,5}		-	-	46	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _s =1A , T _J =25℃	-	-	1.2	V

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

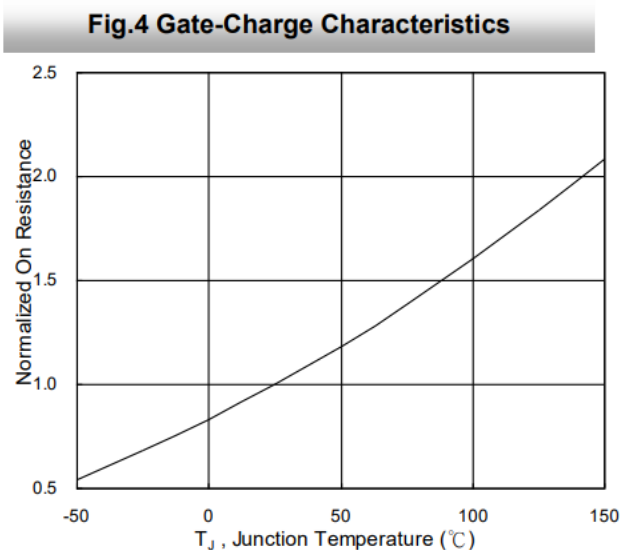
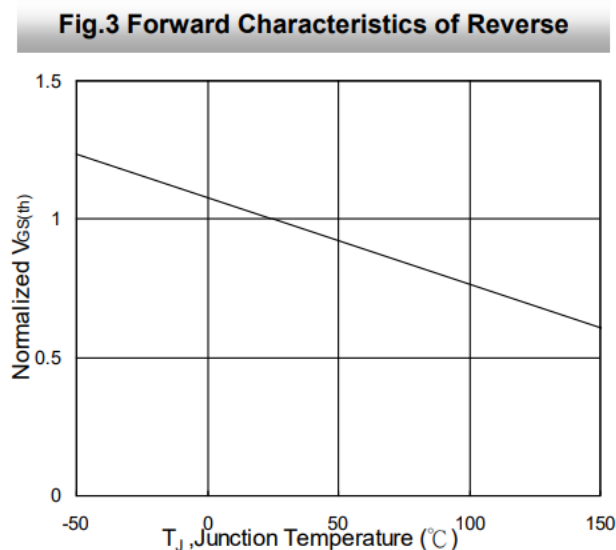
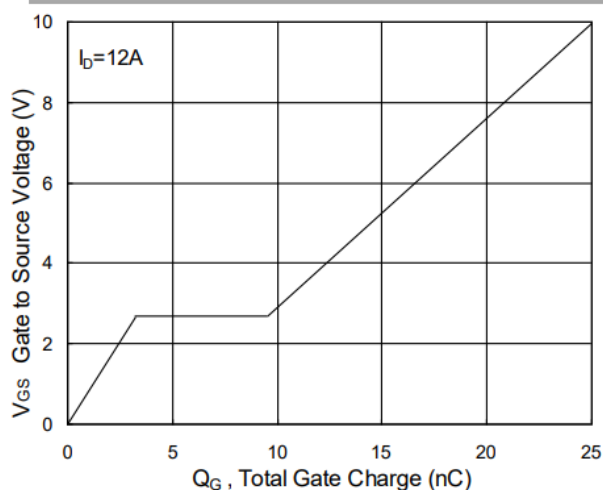
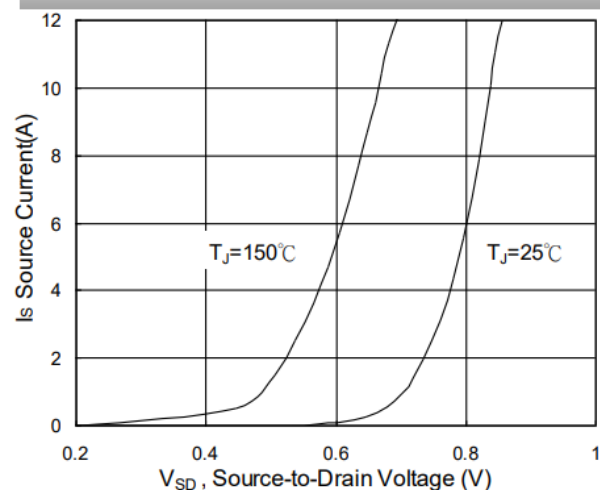
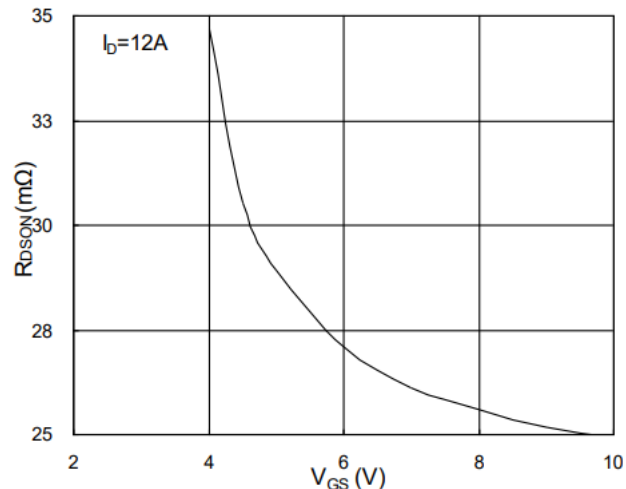
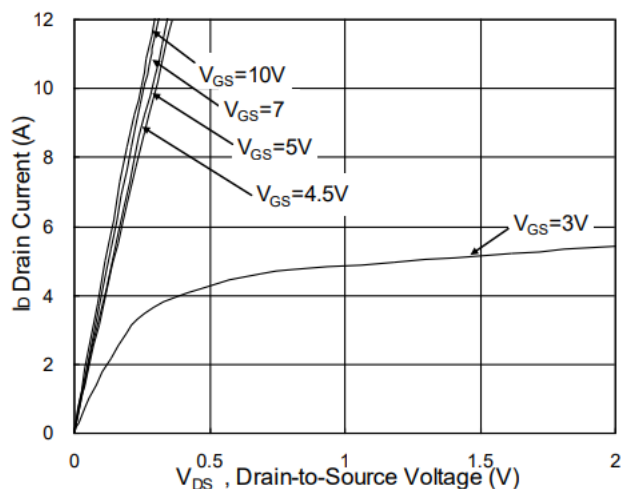
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

3. The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=22.6A$

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.

■ Typical Characteristics



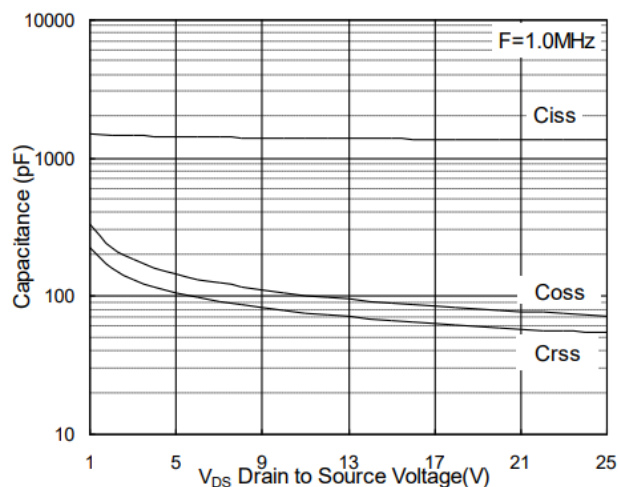


Fig.7 Capacitance

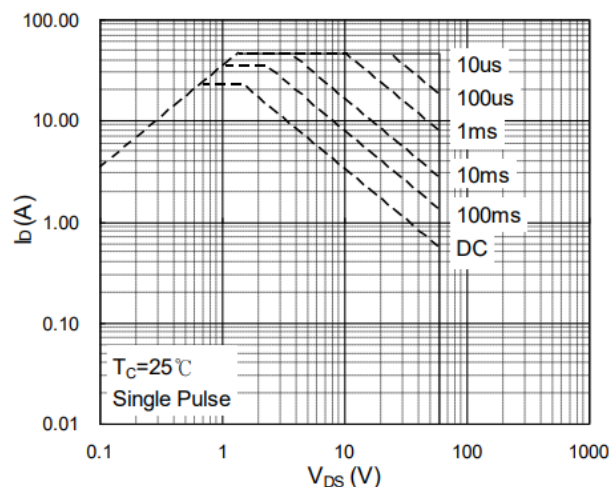


Fig.8 Safe Operating Area

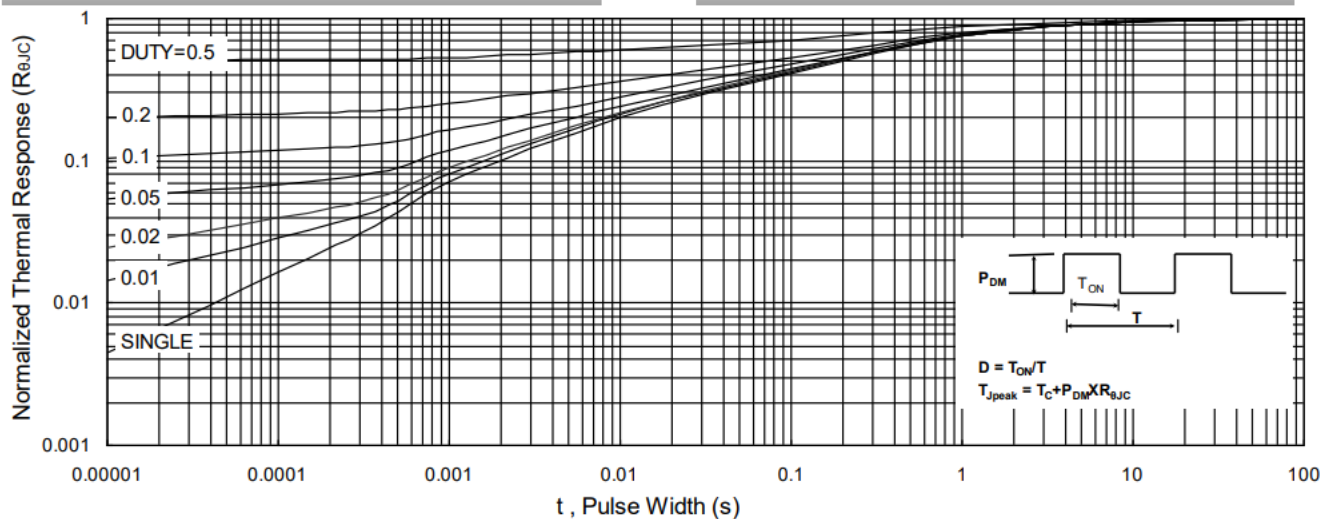


Fig.9 Normalized Maximum Transient Thermal Impedance

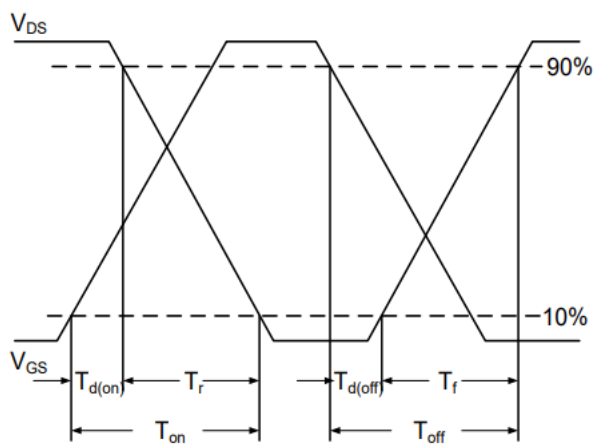


Fig.10 Switching Time Waveform

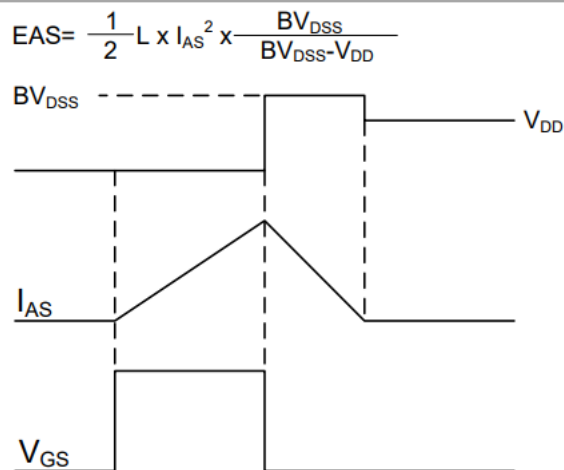


Fig.11 Unclamped Inductive Waveform

■ Package size

Unit: mm.

TO252:

