

N-MOSFET 60V 3.1mΩ 85A

■ Product Summary

- VDS 60V
- ID 85A
- RDS(ON) (at VGS=10V) <3.6 mΩ (Typ: 3.1 mΩ)
- RDS(ON) (at VGS=4.5V) <5.4 mΩ (Typ: 4.4 mΩ)

■ Naming convention

M	G	C	0	3	1	N	0	6	A	L	
Megain		B: PDFN3X3 C: PDFN5X6 P: TO220 H: TO263 S: SOP8 D: TO252	RDS(on) Typ. @VGS=10V		N: N P: P C: N+P D: N+N		10: 100V 08: 80V 06: 60V 04: 40V 03: 30V		A:VGS 20/-12 w/o A:VGS±20		L:VIN(1~2.5V) N:VIN(2~4V)

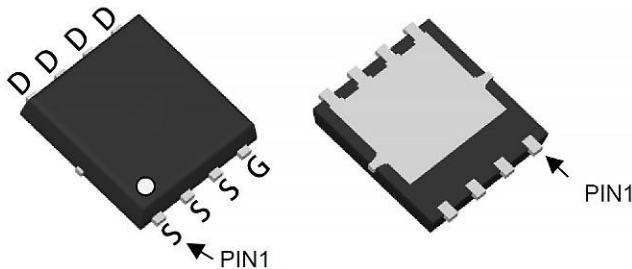
■ Features

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

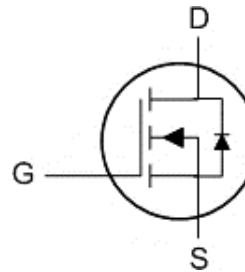
■ Application

- Motor Drive
- Power Tools
- LED Lighting
- Quick Charger

■ Pin configuration



■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGC031N06L	PDFN 5x6	Tape & Reel	5000 / Tape & Reel	MGC031N06L

■ 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	Drain Current – Continuous ^{1,6} (T _C =25°C)	85	A
	Drain Current – Continuous ^{1,6} (T _C =100°C)	66	A
I _{DM}	Pulsed Drain Current ²	240	A
EAS	Single Pulse Avalanche Energy ³	101	mJ
I _{AS}	Avalanche Current	45	A
P _D	Total Power Dissipation ⁴ (T _C =25°C)	83	W
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-Ambient ¹	55	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	1.5	°C/W

■ Electrical Characteristics

T_J=25°C Unless Otherwise Noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	-	-	V
R _{DS} (ON)	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =20A	-	3.1	3.6	mΩ
		V _{GS} =4.5V, I _D =15A	-	4.4	5.4	
V _{GS} (th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	-	2.3	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =48V, V _{GS} =0V	-	-	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 =20A	-	65	-	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V, f=1MHz	-	0.7	-	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =30V, V _{GS} =10V I _D =20A	-	58	-	nC
Q _{gs}	Gate-Source Charge		-	16	-	
Q _{gd}	Gate-Drain Charge		-	4	-	
T _d (ON)	Turn-on Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =3Ω,I _D =20A	-	18	-	ns
T _r	Turn-on Rise Time		-	8	-	
T _d (OFF)	Turn-off Delay Time		-	50	-	
T _f	Turn-off Fall Time		-	10.5	-	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	-	3458	-	pF
C _{oss}	Output Capacitance		-	1522	-	
C _{rss}	Reverse Transfer Capacitance		-	22	-	
Diode Characteristics						
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V,Force Current	-	-	45	A
V _{SD}	Diode Forward Voltage ²	I _S =1A, V _{GS} =0V	-	-	1.1	V
t _{rr}	Reverse Recovery Time	I _F =20A,dI/dt=100A/us	-	24	-	nS
Q _{rr}	Reverse Recovery Charge		-	85	-	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}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=40A

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.The maximum current rating is package limited.

■ Typical Characteristics

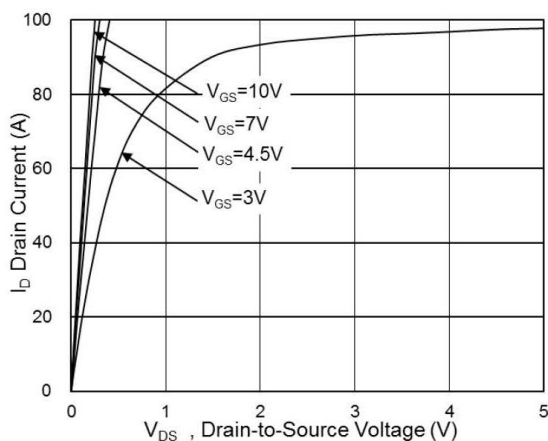


Fig.1 Typical Output Characteristics

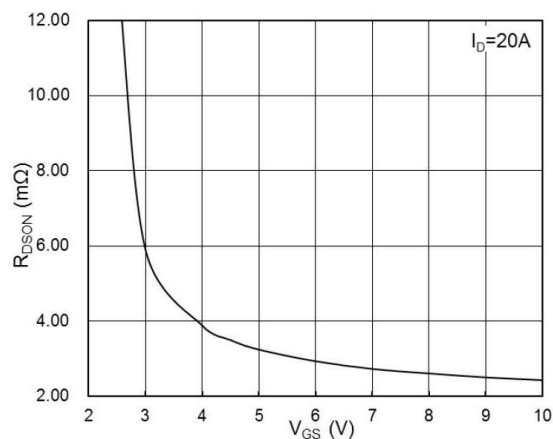


Fig.2 On-Resistance vs G-S Voltage

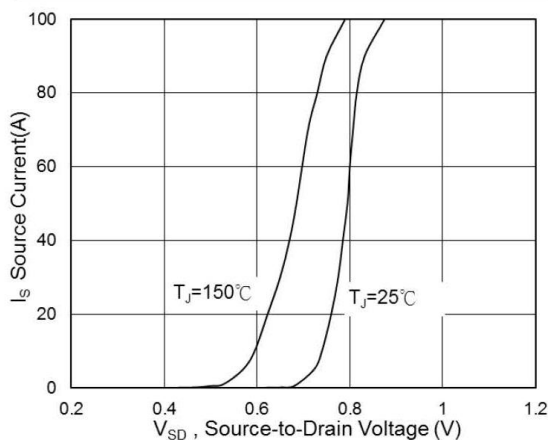


Fig.3 Diode Forward Voltage vs. Current

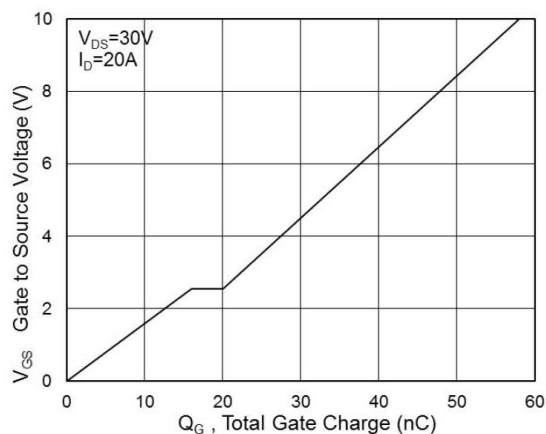


Fig.4 Gate-Charge Characteristics

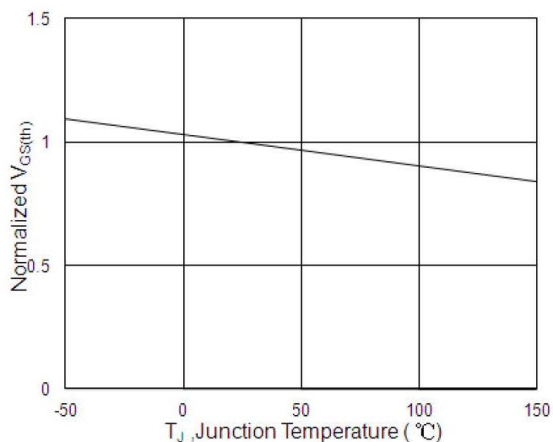


Fig.5 Normalized $V_{GS(th)}$ vs T_J

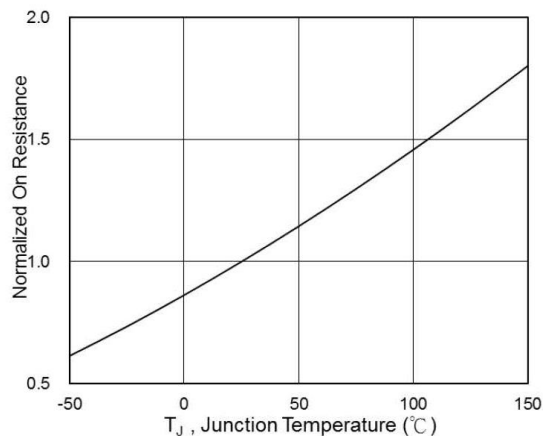


Fig.6 Normalized $R_{DS(on)}$ vs T_J

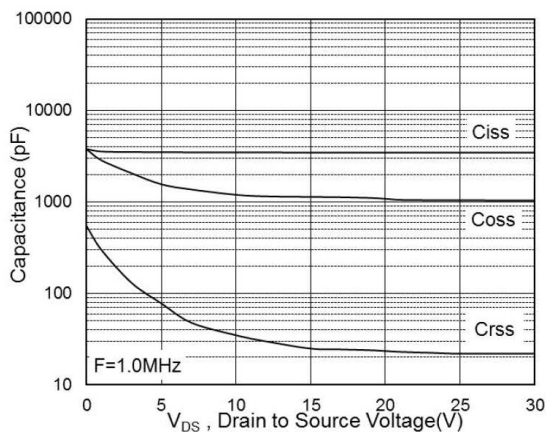


Fig.7 Capacitance

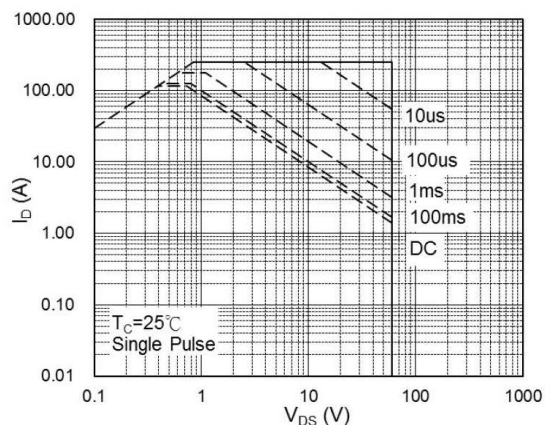


Fig.8 Safe Operating Area

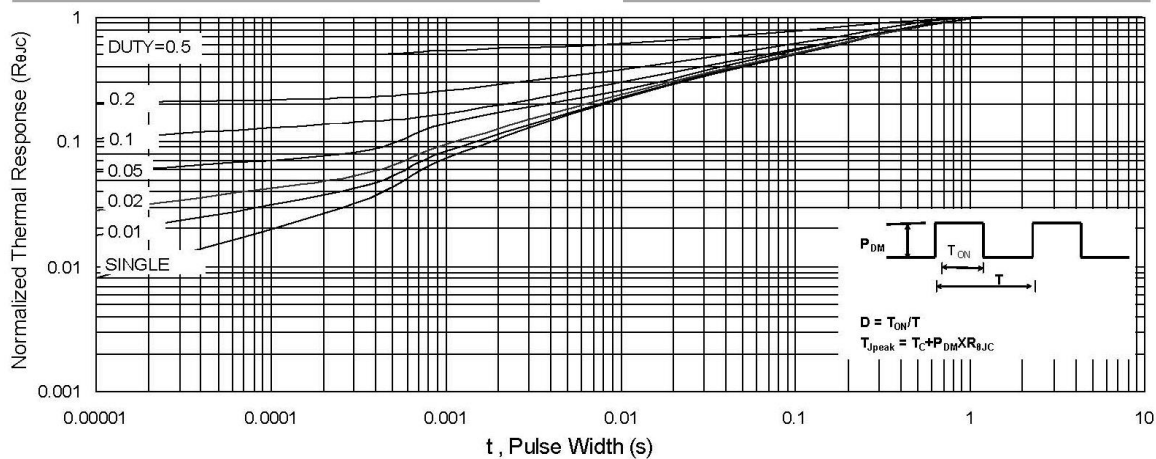


Fig.9 Normalized Maximum Transient Thermal Impedance

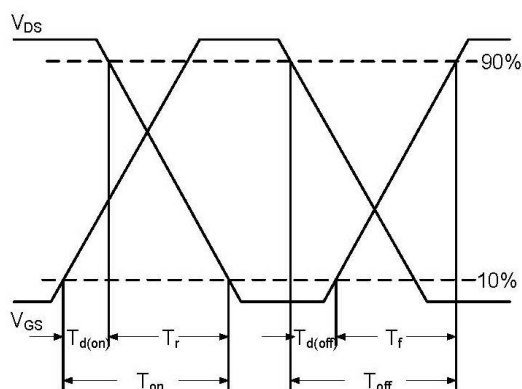


Fig.10 Switching Time Waveform

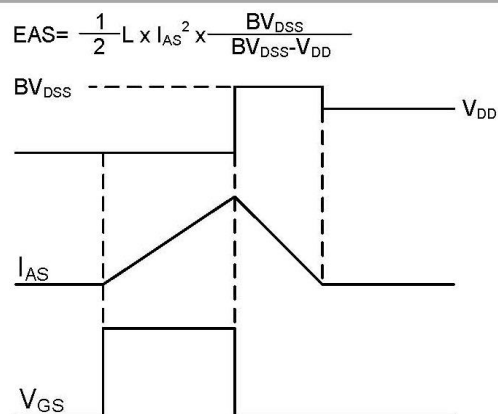
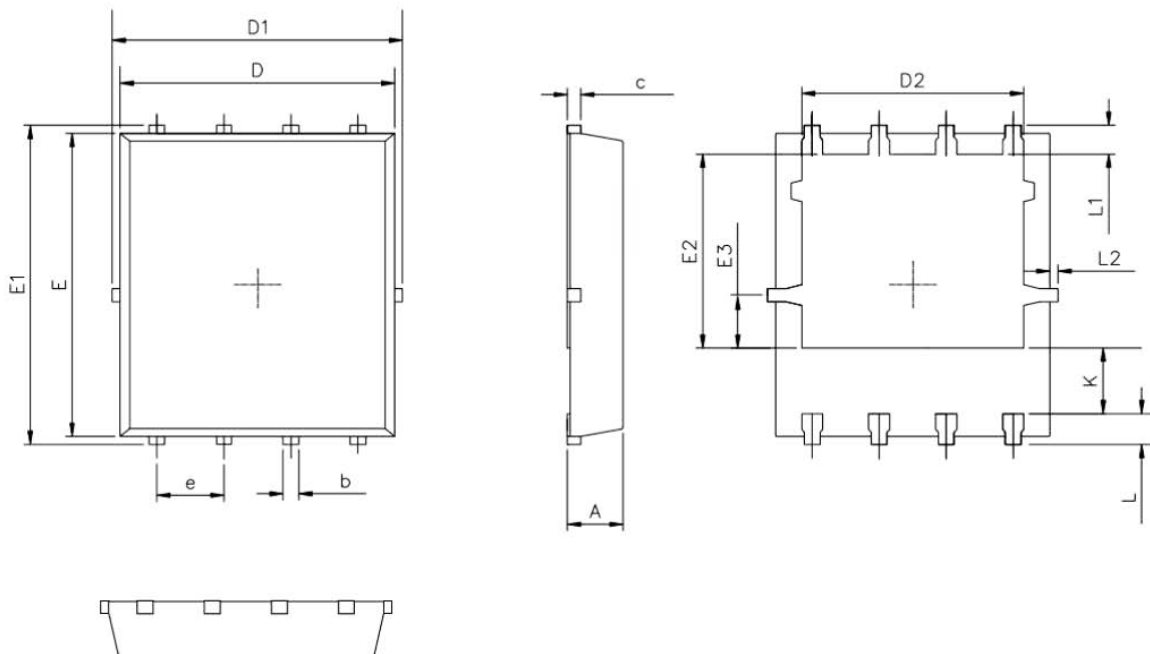


Fig.11 Unclamped Inductive Switching Waveform

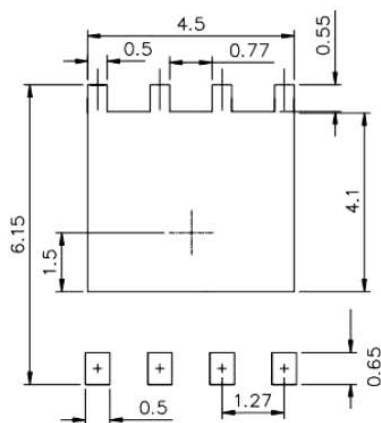
■ Package size

Unit: mm。

PDFN 5X6:



RECOMMENDED LAND PATTERN



UNIT:mm

	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.25	0.35	0.50
c	0.10	0.20	0.30
D	4.80	5.00	5.30
D1	4.90	5.10	5.50
D2	3.92	4.02	4.20
E	5.65	5.75	5.85
E1	5.90	6.05	6.20
E2	3.325	3.525	3.775
E3	0.80	0.90	1.00
e		1.27	
L	0.40	0.55	0.70
L1		0.65	
L2	0.00		0.15
K	1.00	1.30	1.50