

N-MOSFET 60V 2.2mΩ 142A

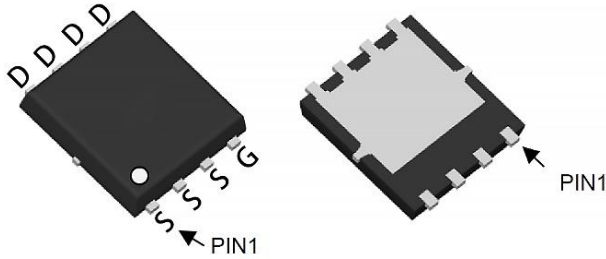
■ Product Summary

- V_{DS} 60V
- I_D 142A
- R_{DS(ON)} (at V_{GS}=10V) <2.8 mΩ (Typ: 2.2 mΩ)

■ Naming convention

M	G	C	0	2	2	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		10: 100V 08: 80V 06: 60V 04: 40V 03: 30V		A:V _{GS} 20/-12 w/o A:V _{GS} ±20	L:V _{DS} (1~2.5V) N:V _{DS} (2~4V)

■ Pin configuration



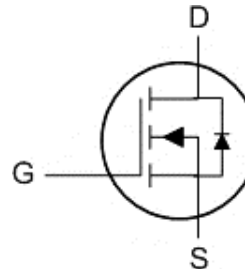
■ Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

■ Application

- Switching and Synchronous Rectification
- BLDC

■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGC022N06L	PDFN 5x6	Tape & Reel	5000 / Tape & Reel	MGC022N06L

■ 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 (T _C =25°C)	142	A
	Drain Current – Continuous (T _C =100°C)	138	
I _{DM}	Drain Current – Pulsed ¹	400	A
I _S	Diode Continuous Forward Current (T _C =25°C)	114	A
I _{AS}	Single Pulse Avalanche Current ² (L=0.1mH)	51	A
	Single Pulse Avalanche Current ² (L=0.5mH)	27	
E _{AS}	Single Pulse Avalanche Energy ² (L=0.1mH)	130	mJ
	Single Pulse Avalanche Energy ² (L=0.5mH)	182	
P _D	Power Dissipation(T _C =25°C)	2.6	W
	Power Dissipation (T _C =70°C)	1.7	
T _J	Operating Junction Temperature Range	-55 to 150	°C
T _{STG}	Storage Temperature Range	-55 to 150	°C

■ Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ³	48	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	1	°C/W

■ Electrical Characteristics

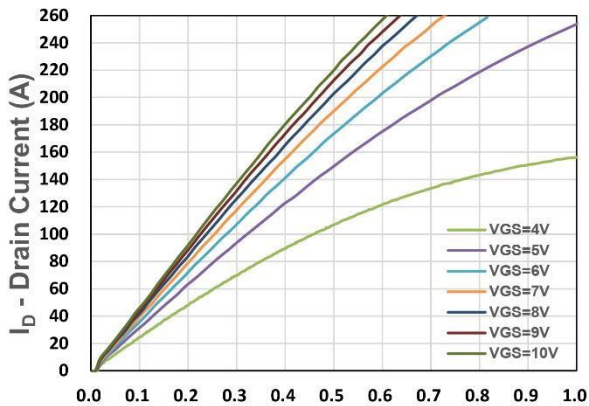
T_J=25°C Unless Otherwise Noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Electrical Characteristics						
B _V D _{SS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, V _{GS} =0V	-	-	1	uA
V _{GS} (th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1	1.7	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS} (ON)	Drain-Source On-state Resistance ⁴	V _{GS} =10V, I _D =20A	-	2.2	2.8	mΩ
		V _{GS} =4.5V, I _D =10A	-	3.2	4.3	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A	-	35	-	S
Dynamic Characteristics ⁵						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	0.75	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, F=1MHz	-	5155	-	pF
C _{oss}	Output Capacitance		-	1331	-	
C _{rss}	Reverse Transfer Capacitance		-	193	-	
T _d (ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =50V, I _D =1A, R _G =3Ω	-	16	-	nS
T _r	Turn-on Rise Time		-	5.6	-	
T _d (OFF)	Turn-off Delay Time		-	54	-	
T _f	Turn-off Fall Time		-	101	-	
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =50V I _D =20A	-	45	-	nC
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =20A	-	93.7	-	
Q _{gs}	Gate-Source Charge		-	20.4	-	
Q _{gd}	Gate-Drain Charge		-	20.5	-	
Source-Drain Characteristics						
V _{SD}	Diode Forward Voltage ⁴	I _{SD} =10A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _F =10A, V _R =48V dI _F /dt=100A/us	-	45	-	nS
Q _{rr}	Reverse Recovery Charge		-	44	-	nC

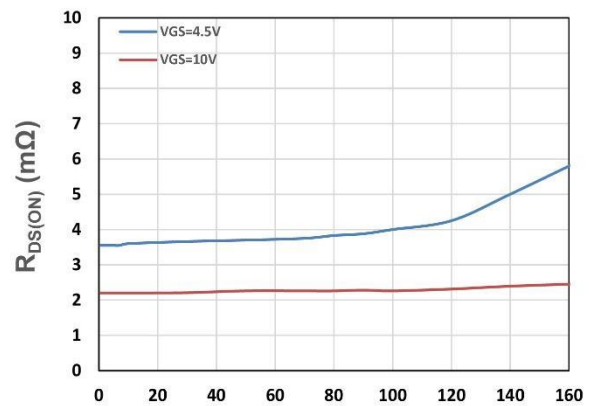
Note :

1. Max. current is limited by bonding wire.
2. UIS tested and pulse width are limited by maximum junction temperature 150°C.
3. Surface Mounted on 1in2 FR-4 board with 1oz.
4. Pulse test (pulse width ≤ 300us, duty cycle ≤ 2%).
5. Guaranteed by design, not subject to production testing.

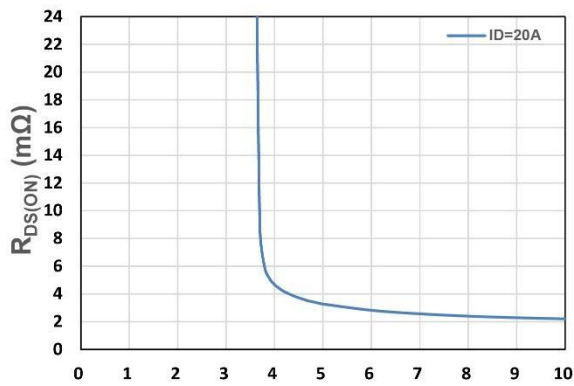
■ Typical Characteristics



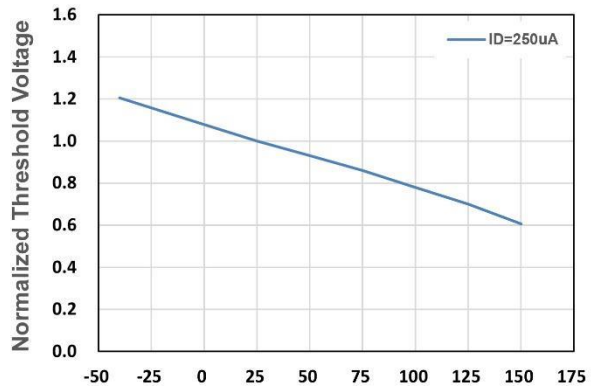
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



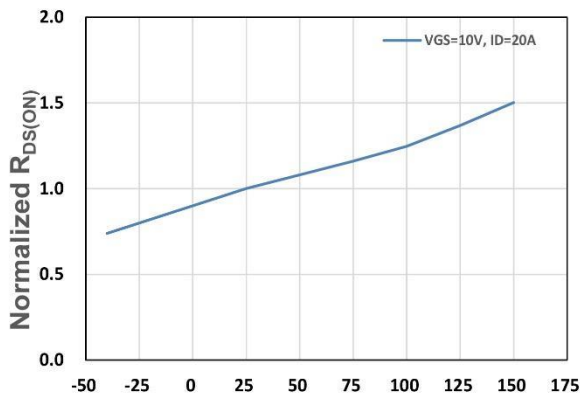
I_D - Drain Current (A)
Figure 2. On-Resistance vs. ID



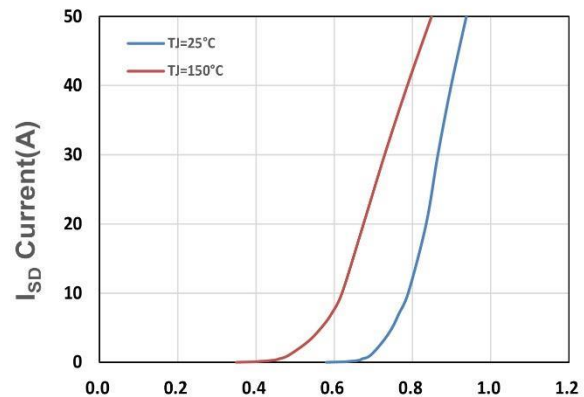
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. VGS



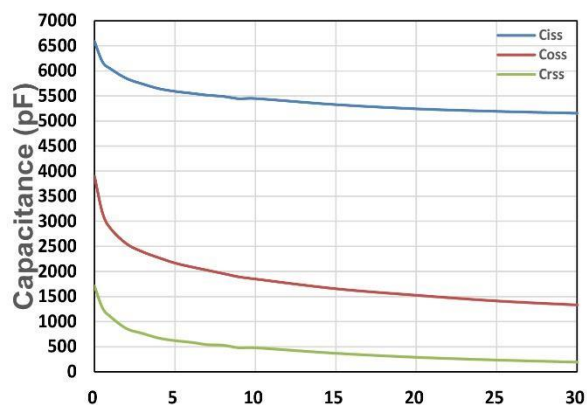
T_J , Junction Temperature(°C)
Figure 4. Gate Threshold Voltage



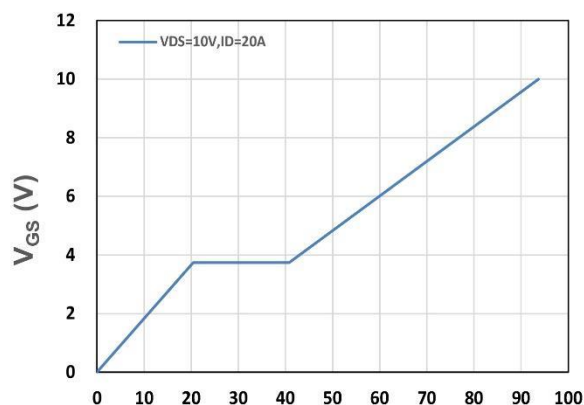
T_J , Junction Temperature(°C)
Figure 5. Drain-Source On Resistance



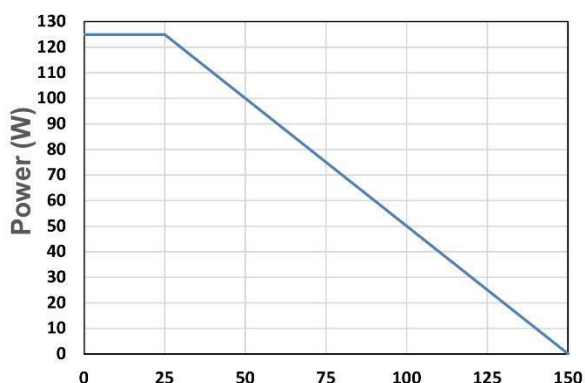
V_{SD} , Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward



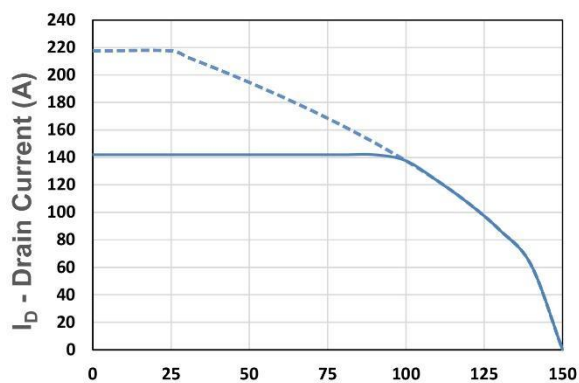
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



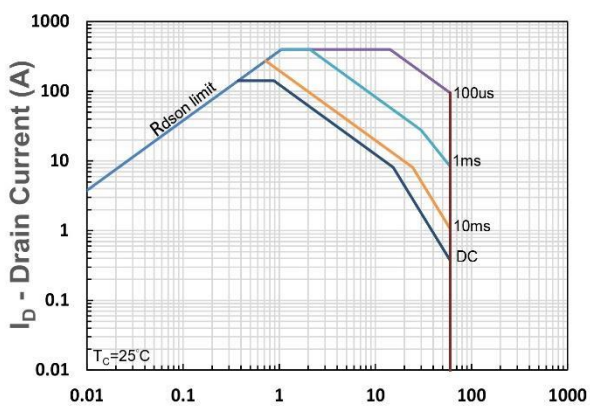
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



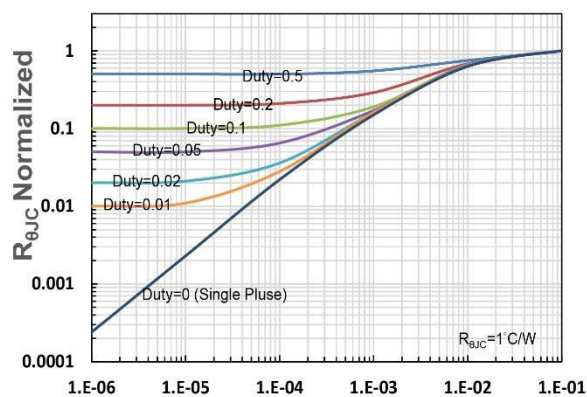
T_c - Case Temperature (°C)
Figure 9. Power Dissipation



T_c - Case Temperature (°C)
Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)
Figure 11. Safe Operating Area

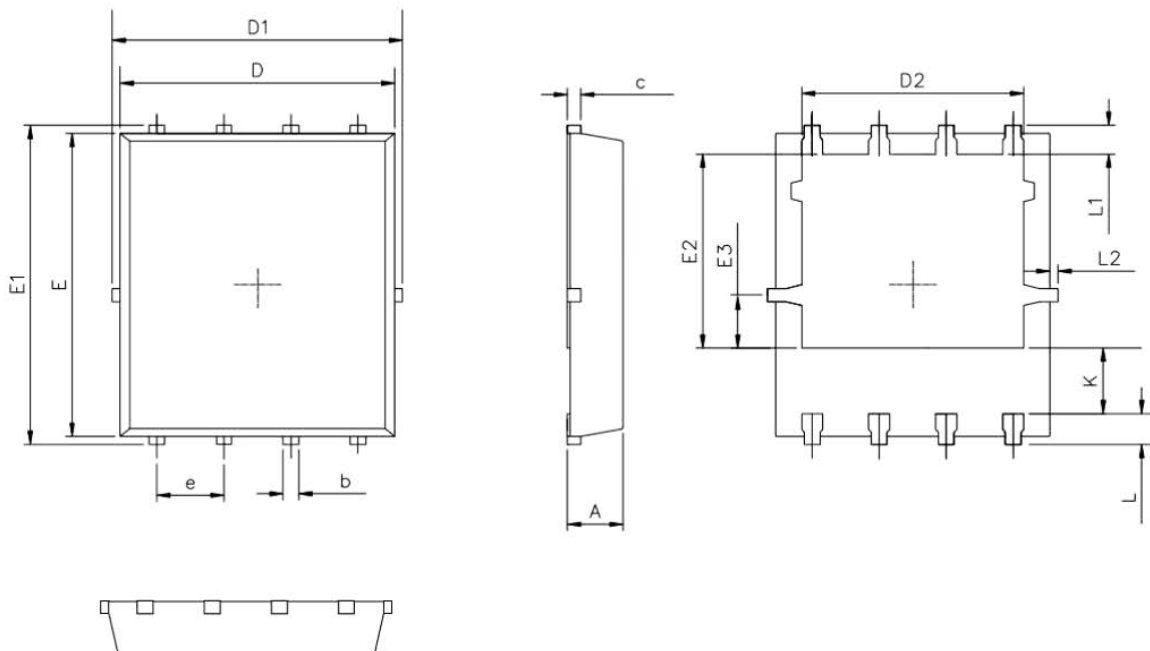


t_1 , Square Wave Pulse Duration(s)
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance

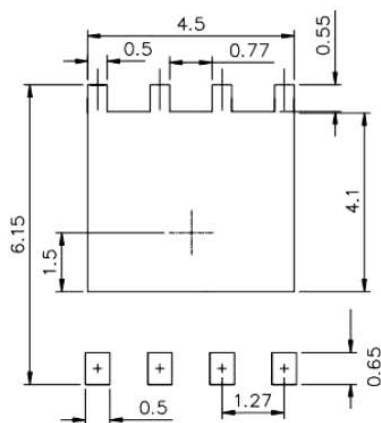
■ Package size

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