N-MOSFET 60V 5.4mΩ 72A

■ Product Summary

- VDS 100V
- ID 72A
- RDS(ON) (at VGS=10V) ＜6.6 mΩ（Typ：5.4 mΩ）
- RDS(ON) (at VGS=4.5V) ＜8.6 mΩ（Typ：6.6 mΩ）

■ Features

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

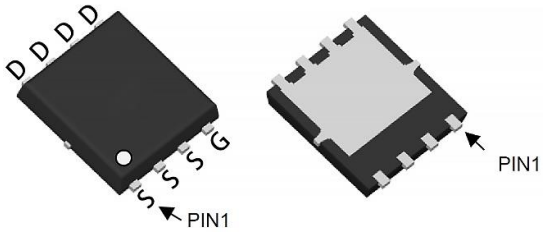
■ Naming convention

MG	C	054	N	06	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_{th}(1~2.5V) N:V_{th}(2~4V)

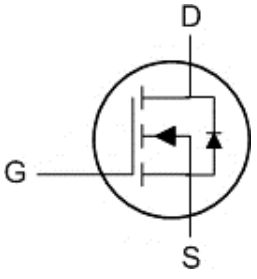
■ Application

- DC/DC converter

■ Pin configuration



■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity（PCS）	Marking
MGC054N06L	PDFN 5x6	Tape & Reel	5000 / Tape & Reel	MGC054N06L

■ 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] (T_C=25℃)	72	A
	Drain Current – Continuous (T_C=100℃)	46	
I_{DM}	Drain Current – Pulsed[1]	180	A
I_S	Diode Continuous Forward Current (T_C=25℃)	17	A
I_{AS}	Single Pulse Avalanche Current[2]（L=0.1mH）	30	A
	Single Pulse Avalanche Current[2]（L=0.5mH）	18	
E_{AS}	Single Pulse Avalanche Energy[2]（L=0.1mH）	45	mJ
	Single Pulse Avalanche Energy[2]（L=0.5mH）	81	
P_D	Power Dissipation(T_C=25°C)	2.5	W
	Power Dissipation（T_C=70°C）	1.6	
T_J	Operating Junction Temperature Range	-55 to 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃

■ Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient[3]	50	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	2.5	℃/W

■ Electrical Characteristics

TJ=25°C Unless Otherwise Noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Electrical Characteristics						
B_{VDSS}	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	-	5.4	6.6	mΩ
		V_{GS}=4.5V, I_D=10A	-	8.2	10.5	
gfs	Forward Transconductance	V_{DS}=5V, I_D=10A	-	21	-	S
Dynamic Characteristics[5]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, F=1MHz	-	1.2	3	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, F=1MHz	-	1609	-	pF
C_{oss}	Output Capacitance		-	484	-	
C_{rss}	Reverse Transfer Capacitance		-	77	-	
$T_{d(ON)}$	Turn-on Delay Time	V_{GS}=10V,V_{DS}=30V, I_D=1A,R_G=1Ω	-	10.9	-	nS
T_r	Turn-on Rise Time		-	6.9	-	
$T_{d(OFF)}$	Turn-off Delay Time		-	24.9	-	
T_f	Turn-off Fall Time		-	37.4	-	
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=30V I_D=20A	-	18.8	-	nC
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=30V, I_D=20A	-	37	-	
Q_{gs}	Gate-Source Charge		-	7.25	-	
Q_{gd}	Gate-Drain Charge		-	8.49	-	
Source-Drain Characteristics						
V_{SD}	Diode Forward Voltage[4]	I_{SD}=10A, V_{GS}=0V	-	0.78	1.1	V
t_{rr}	Reverse Recovery Time	I_F=10A, V_R=30V dI$_F$/dt=100A/us	-	21.9	-	nS
Q_{rr}	Reverse Recovery Charge		-	9.4	-	nC

Note :
1. Max. current is limited by junction temperature.
2. UIS tested and pulse width are limited by maximum junction temperature 150° C
3. Pulse test (pulse width 300us, duty cycle 2%).
4. Guaranteed by design, not subject to production testing.

■ Typical Characteristics

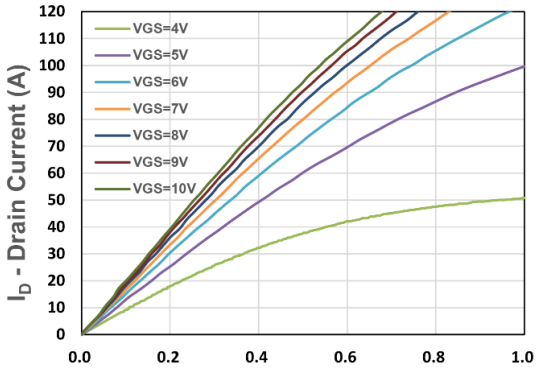


Figure 1. Output Characteristics

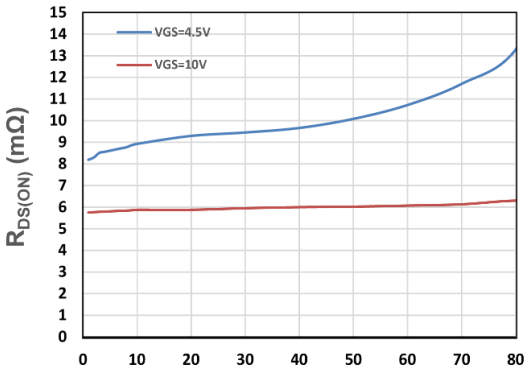


Figure 2. On-Resistance vs. ID

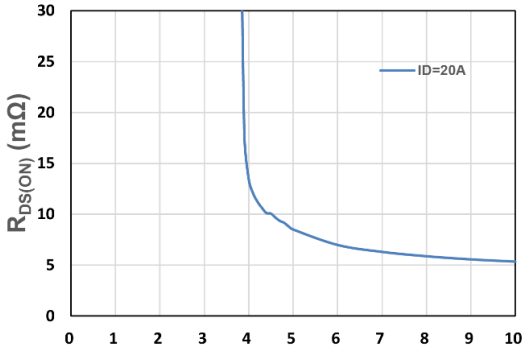


Figure 3. On-Resistance vs. VGS

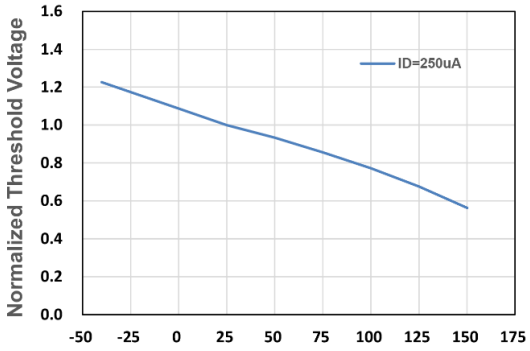


Figure 4. Gate Threshold Voltage

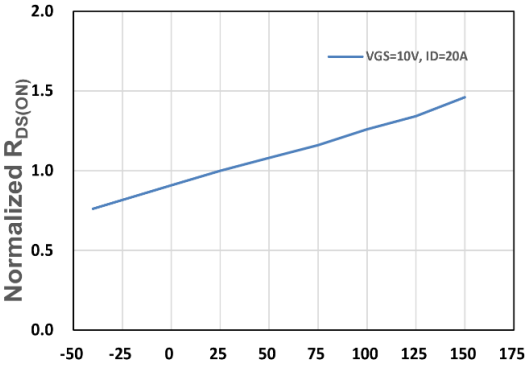


Figure 5. Drain-Source On Resistance

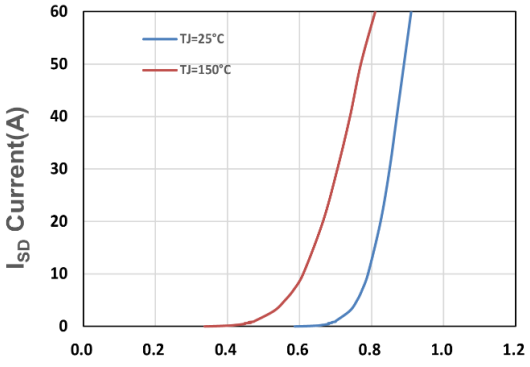
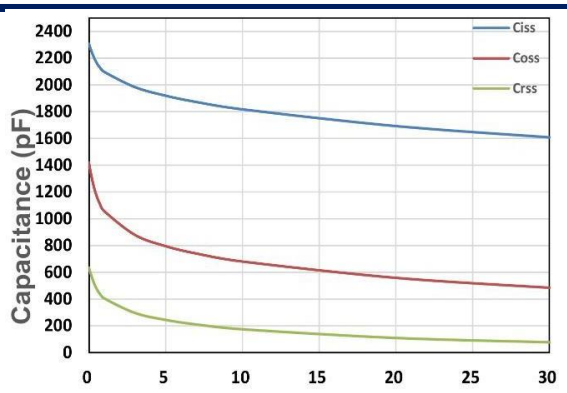
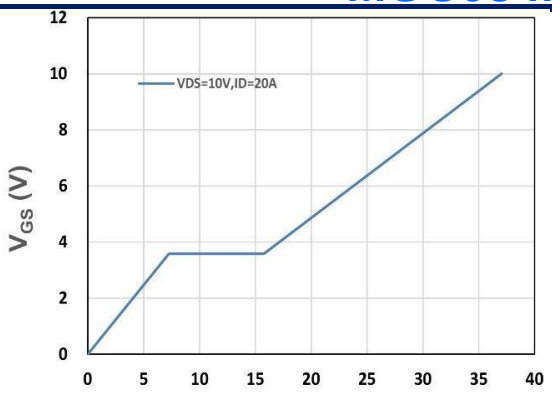


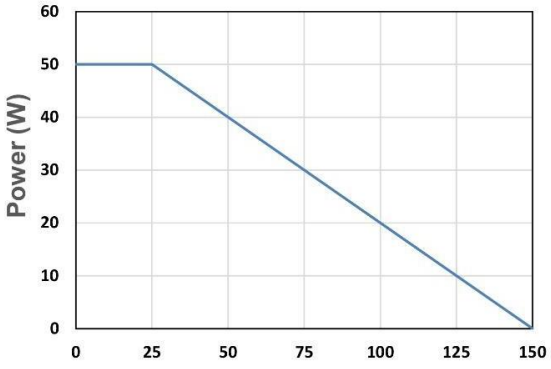
Figure 6. Source-Drain Diode Forward



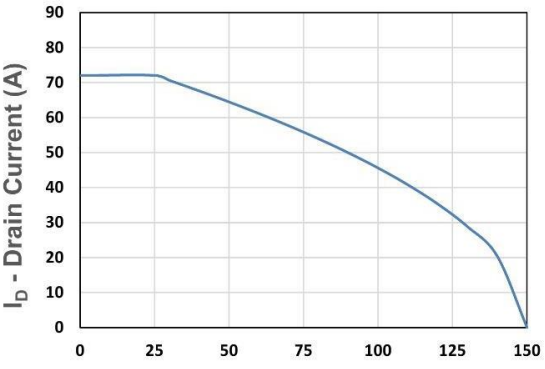
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



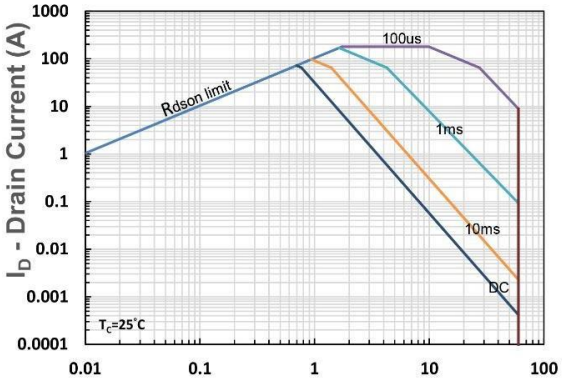
Qg, Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



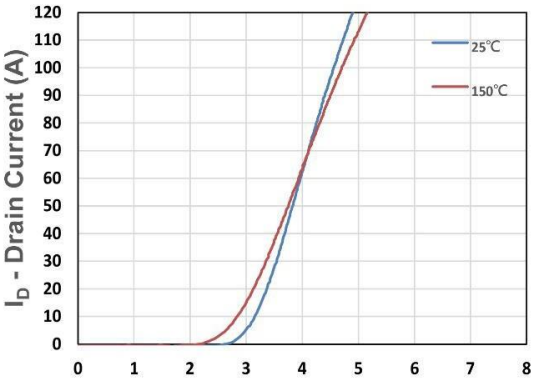
Tc - Case Temperature (°C)
Figure 9. Power Dissipation



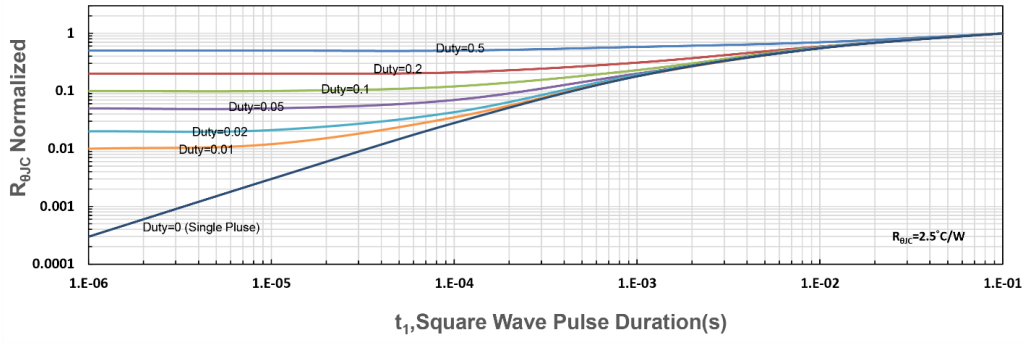
Tc - Case Temperature (°C)
Figure 10. Drain Current



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



V_{GS} - Gate - Source Voltage (V)
Figure 12. Transfer Characteristics



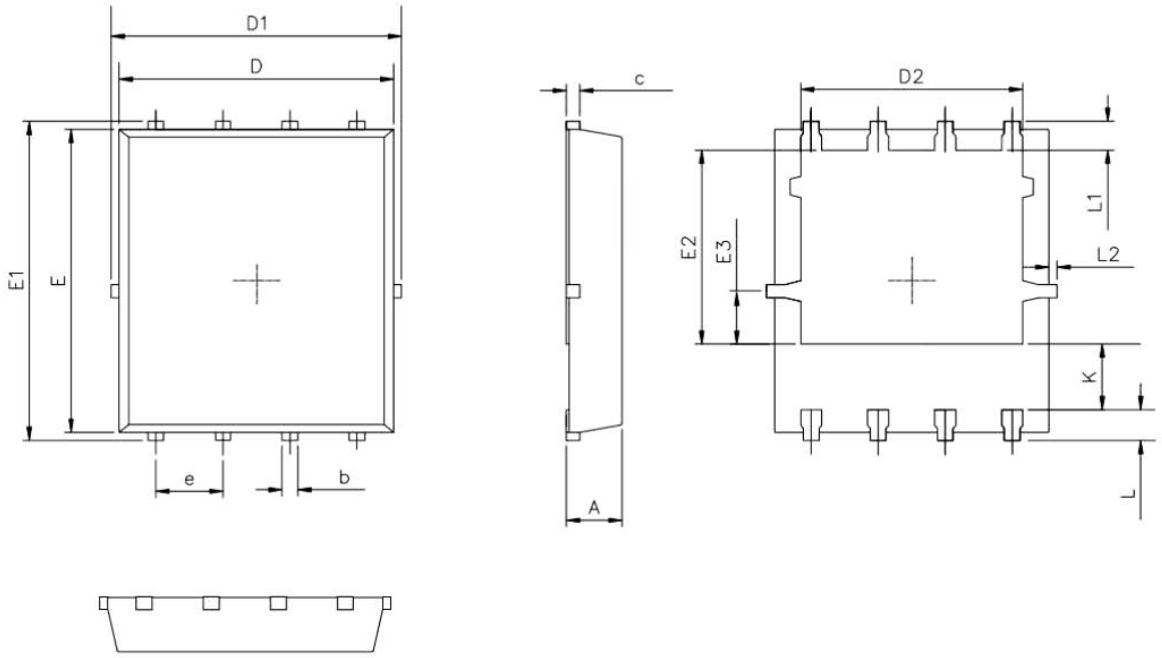
t_1,Square Wave Pulse Duration(s)

Figure 13. $R_{\theta JC}$ Transient Thermal Impedance

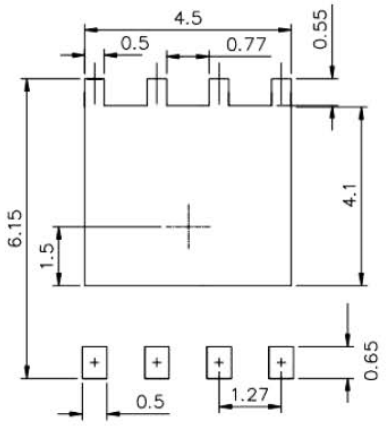
■ Package size

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