

N-MOSFET 40V 3.6mΩ 50A

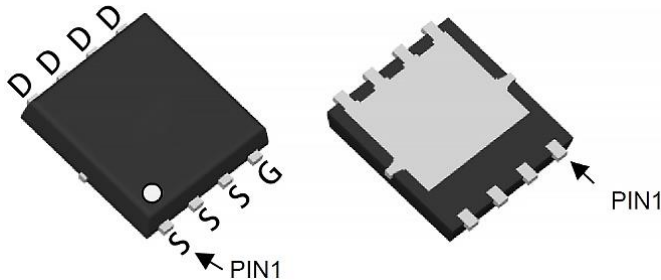
Product Summary

- V_{DS} 40V
- I_D 50A
- R_{DS(ON)} (at V_{GS}=10V) <4.2mΩ (Typ: 3.6mΩ)

Naming convention

M	G	C	0	3	6	N	0	4	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)

Pin configuration



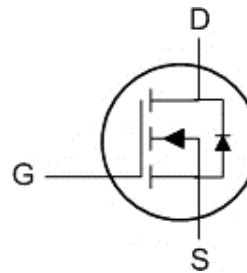
Features

- Advanced Trench MOS Technology
- Low R_{DS(ON)}
- 100% EAS Guaranteed
- Green Device Available

Application

- SMPS Synchronous Rectification
- DC/DC Converters
- Or-ing

Symbol



Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGC036N04L	PDFN 5x6	Tape & Reel	5000 / Tape & Reel	MGC036N04L

Absolute Maximum Ratings

T_C=25°C Unless Otherwise Noted.

Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current, V _{GS} @ 10V ¹ (T _C =25°C)	50	A
	Continuous Drain Current, V _{GS} @ 10V ¹ (T _C =100°C)	50	A
	Continuous Drain Current, V _{GS} @ 10V ¹ (T _A =25°C)	17.5	A
	Continuous Drain Current, V _{GS} @ 10V ¹ (T _A =70°C)	14	A
I _{DM}	Pulsed Drain Current ²	200	A
EAS	Single Pulse Avalanche Energy ³	105	mJ
I _{AS}	Avalanche Current	46	A
P _D	Total Power Dissipation ⁴ (T _C =25°C)	46	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
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ¹	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case ¹	2.7	°C/W

■ Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
B _{VDSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40	-	-	V
R _{DS(ON)}	Drain-Source On-state Resistance ²	V _{GS} =10V, I _D =20A	-	3.6	4.2	mΩ
		V _{GS} =4.5V, I _D =20A	-	5.1	6.0	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.2	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =32V, V _{GS} =0V	-	-	1	uA
		V _{DS} =32V, V _{GS} =0V T _J =55℃	-	-	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	-	0.8	-	Ω
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V I _D =20A	-	16	-	nC
Q _{gs}	Gate-Source Charge		-	4.6	-	
Q _{gd}	Gate-Drain Charge		-	7.9	-	
T _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, V _{GS} =10V, R _G =3Ω, I _D =20A	-	23.8	-	nS
T _r	Turn-on Rise Time		-	11.5	-	
T _{d(OFF)}	Turn-off Delay Time		-	39	-	
T _f	Turn-off Fall Time		-	14	-	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, F=1MHz	-	1523	-	pF
C _{oss}	Output Capacitance		-	475	-	
C _{rss}	Reverse Transfer Capacitance		-	67	-	
Diode Characteristics						
I _s	Continuous Source Current ^{1,6}	V _G =V _D =0V,Force Current	-	-	50	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _s =1A	-	-	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 $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=46A$.

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.Package limitation current is 50A.

■ Typical Characteristics

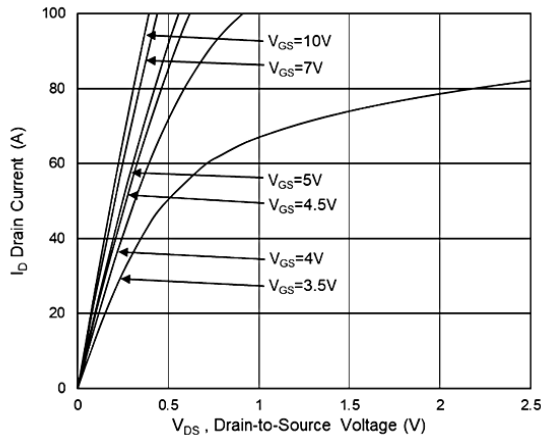


Fig.1 Typical Output Characteristics

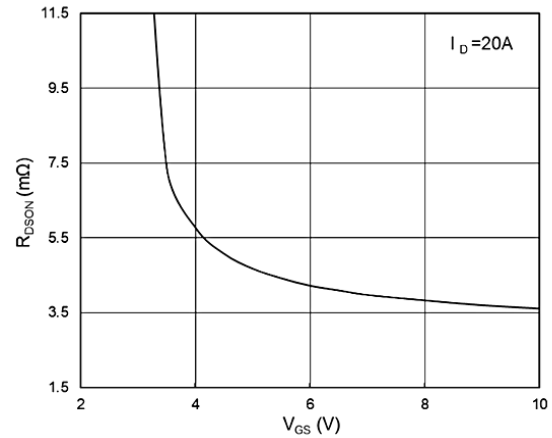


Fig.2 On-Resistance vs G-S Voltage

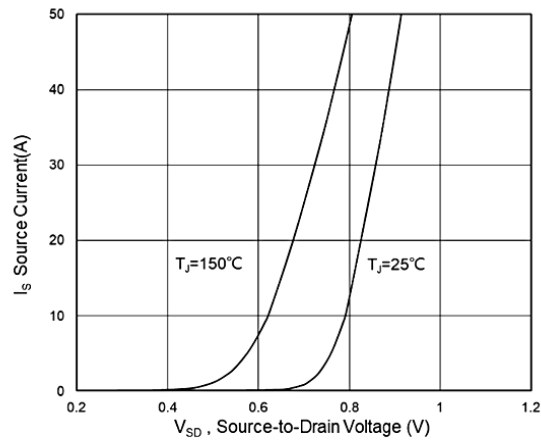


Fig.3 Source Drain Forward Characteristics

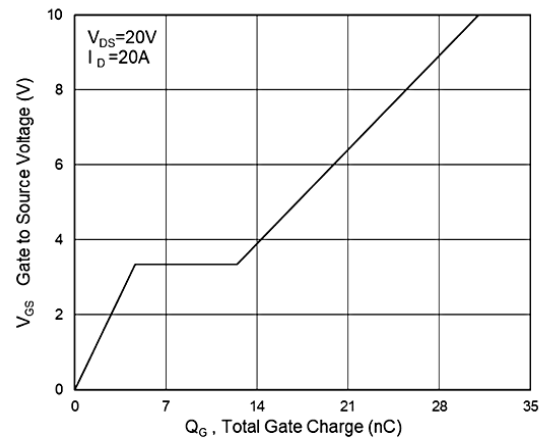


Fig.4 Gate-Charge Characteristics

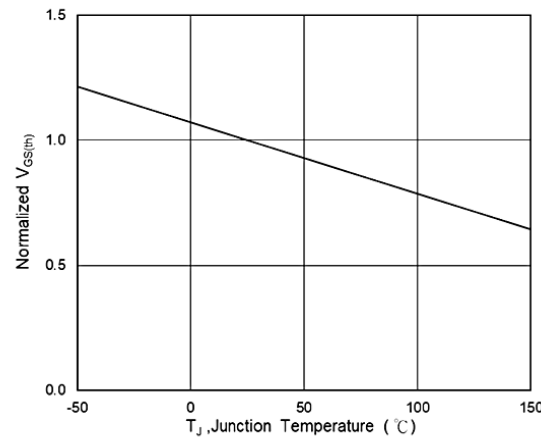


Fig.5 Normalized $V_{GS(th)}$ vs T_J

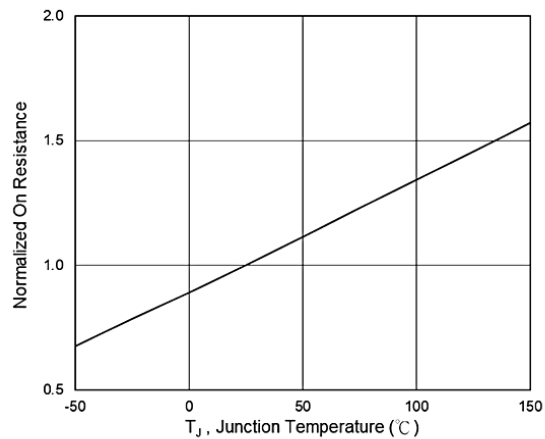


Fig.6 Normalized $R_{DS(on)}$ vs T_J

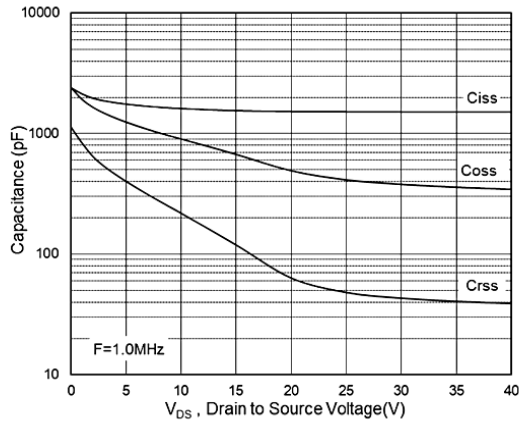


Fig.7 Capacitance

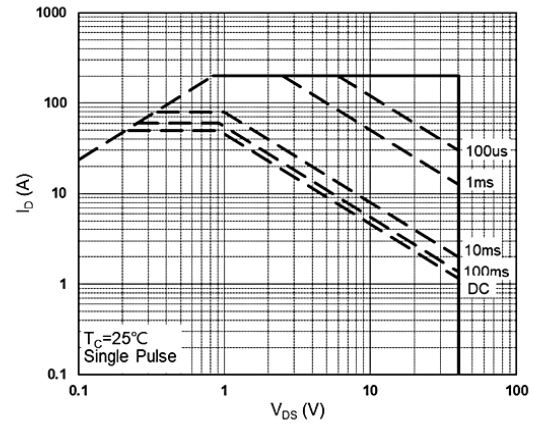


Fig.8 Safe Operating Area

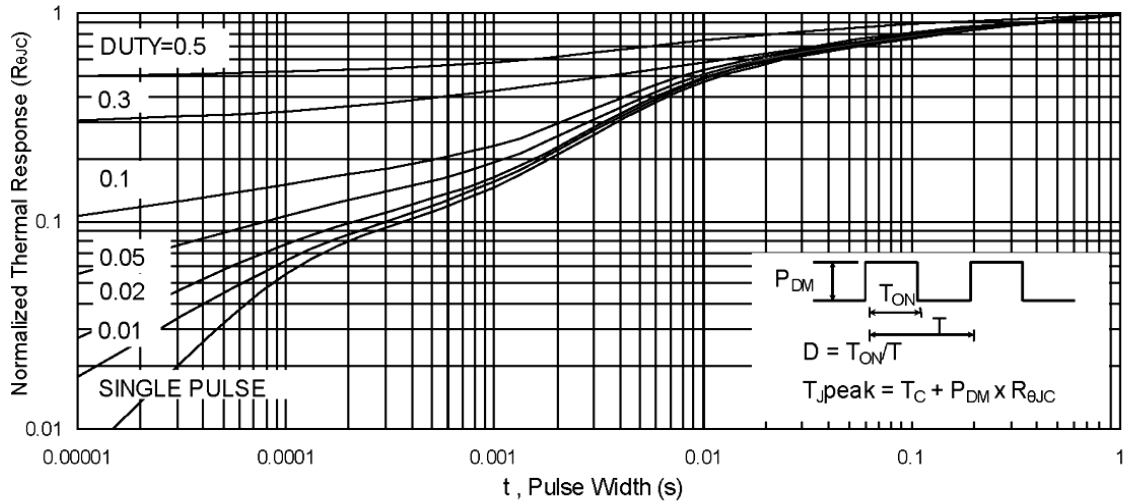


Fig.9 Normalized Maximum Transient Thermal Impedance

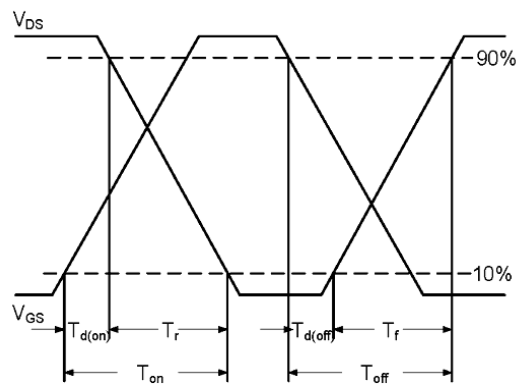


Fig.10 Switching Time Waveform

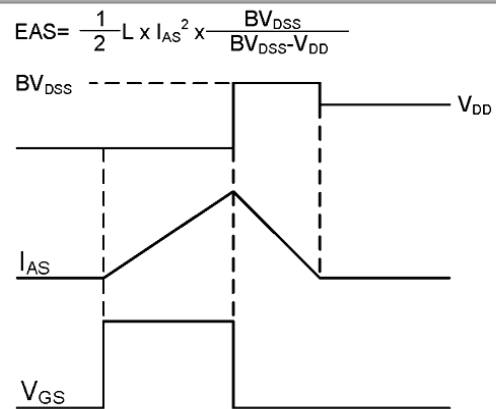
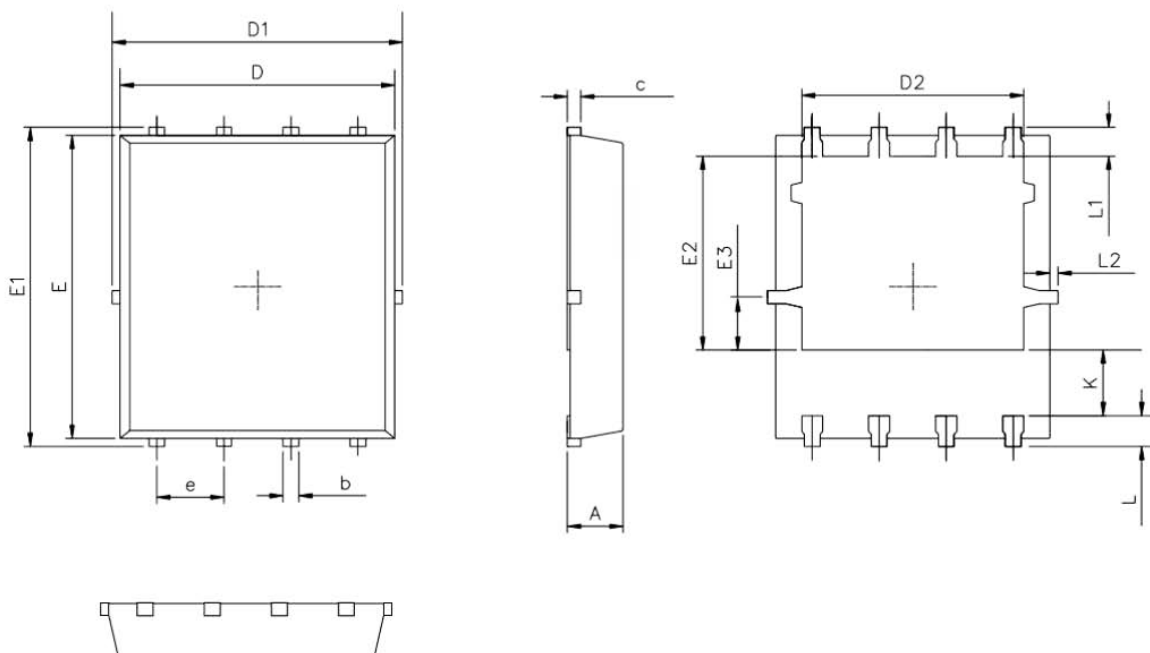


Fig.11 Unclamped Inductive Waveform

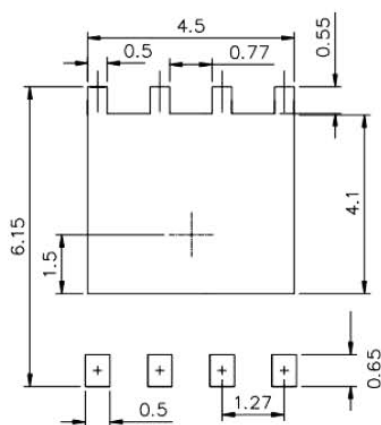
■ Package size

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