

N-MOSFET 40V 3.2mΩ 50A

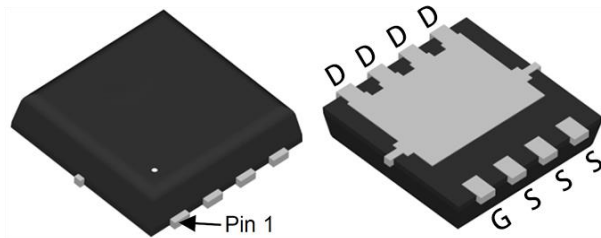
Product Summary

- V_{DS} 40V
- I_D 50A
- R_{DS(ON)} (at V_{GS}=10V) <3.9 mΩ (Typ: 3.2 mΩ)

Naming convention

M	G	B	0	3	2	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



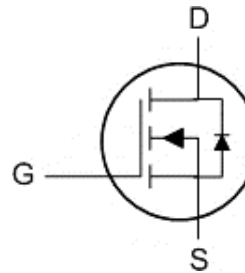
Features

- Advanced Trench MOS Technology
- Low Gate Charge
- Fast Switching Speed
- 100% EAS Guaranteed
- Green Device Available

Application

- Synchronous Rectification for DC-DC converter
- Battery Powered Systems.
- Backlighting.

Symbol



Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGB032N04L	PDFN 3x3	Tape & Reel	3000 / Tape & Reel	MGB032N04L

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	Drain Current – Continuous ^{1,6} (T _C =25°C)	50	A
	Drain Current – Continuous ^{1,6} (T _C =100°C)	39	A
I _{DM}	Pulsed Drain Current ²	200	A
EAS	Single Pulse Avalanche Energy ³	48	mJ
I _{AS}	Avalanche Current	31	A
P _D	Total Power Dissipation ⁴ (T _C =25°C)	62.5	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 (Steady State)	55	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case ¹	2	°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	40	-	-	V
R _{DS} (ON)	Drain-Source On-state Resistance ²	V _{GS} =10V, I _D =20A	-	3.2	3.9	mΩ
		V _{GS} =4.5V, I _D =20A	-	4.6	6.0	mΩ
V _{GS} (th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.3	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =32V, V _{GS} =0V T _J =25℃	-	-	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	-	1.5	-	Ω
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V I _D =20A	-	24.9	-	nC
Q _{gs}	Gate-Source Charge		-	6.5	-	
Q _{gd}	Gate-Drain Charge		-	2.6	-	
T _d (ON)	Turn-on Delay Time	V _{DD} =20V, V _{GS} =10V, I _D =20A, R _G =3Ω	-	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	-	1587	-	pF
C _{oss}	Output Capacitance		-	491	-	
C _{rss}	Reverse Transfer Capacitance		-	61	-	
Diode Characteristics						
I _S	Continuous Source Current ^{1,5,6}	V _G =V _D =0V,Force Current	-	-	50	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A T _J =25℃	-	-	1	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 $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=31A$

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

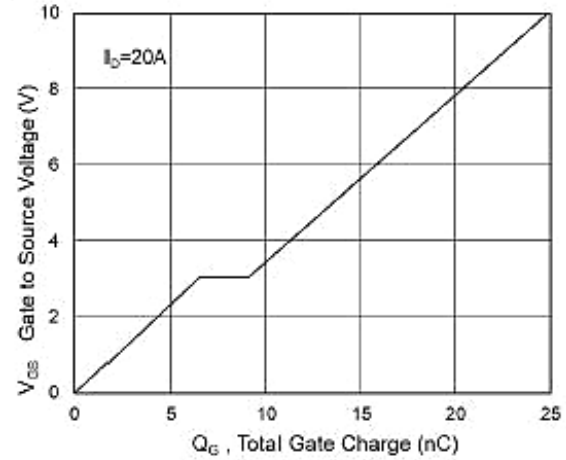
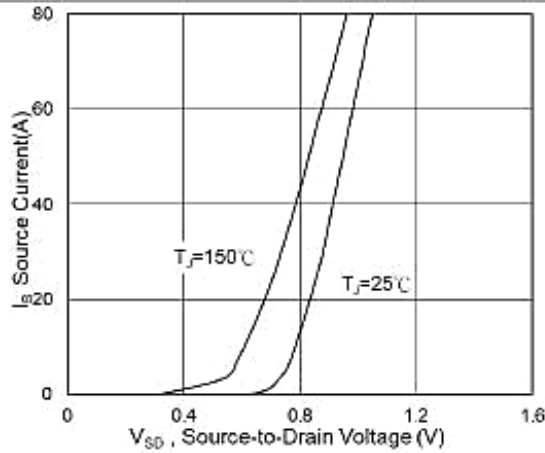
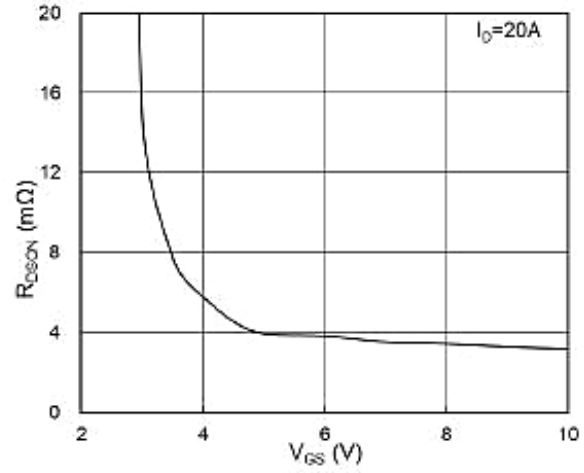
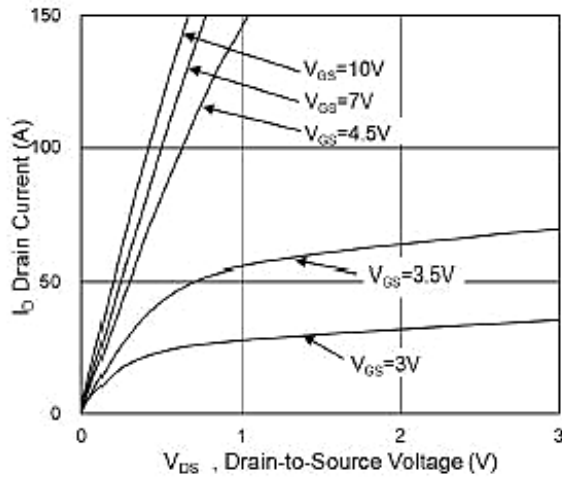
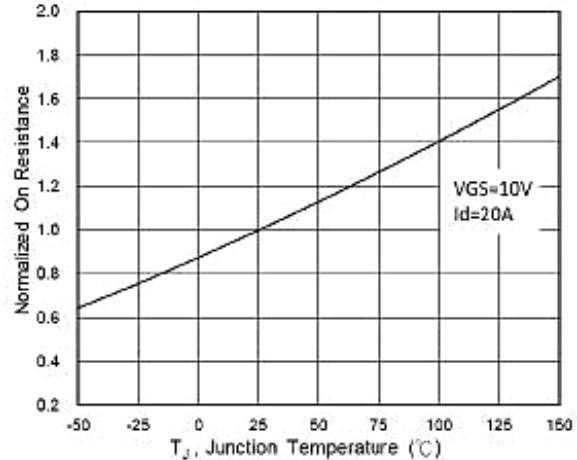
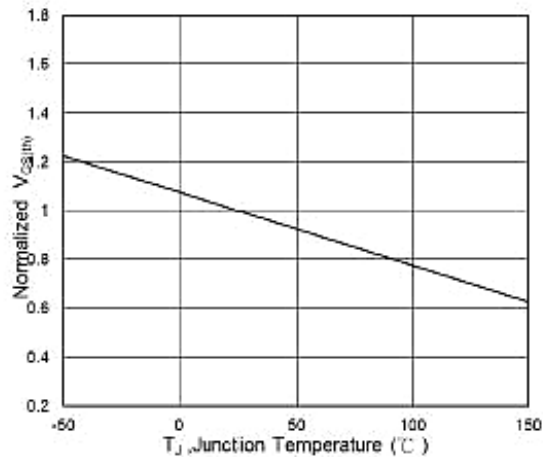


Fig.3 Source Drain Forward Characteristics

Fig.4 Gate-Charge Characteristics



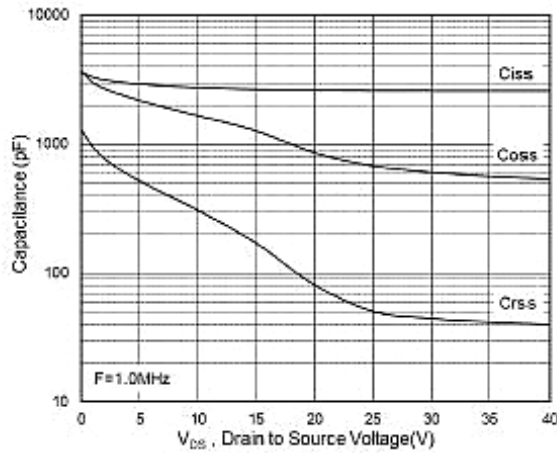


Fig.7 Capacitance

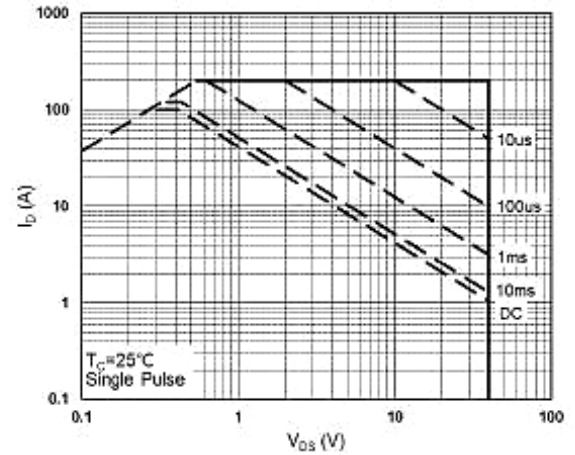


Fig.8 Safe Operating Area

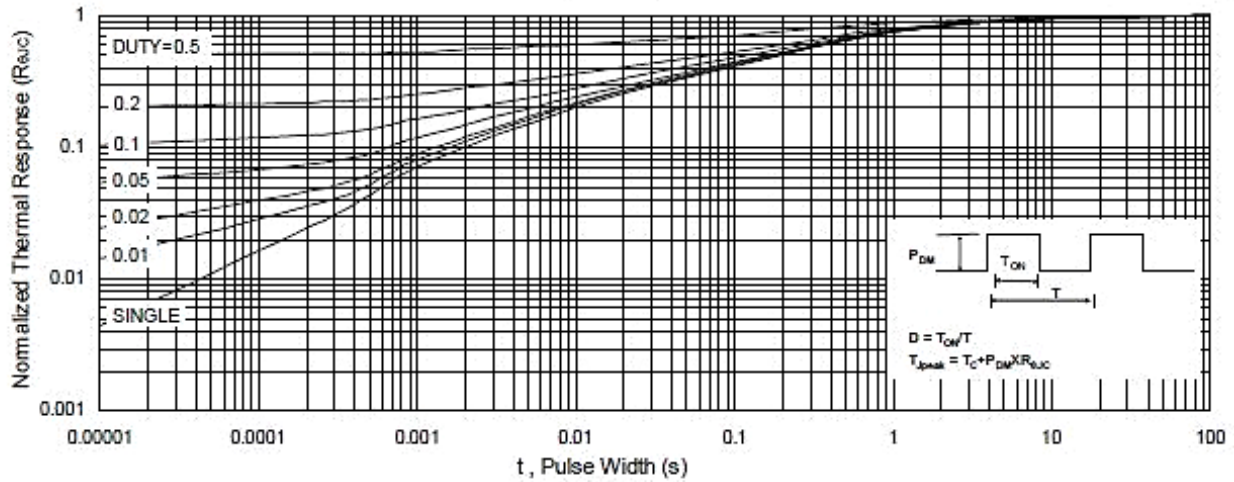


Fig.9 Normalized Maximum Transient Thermal Impedance

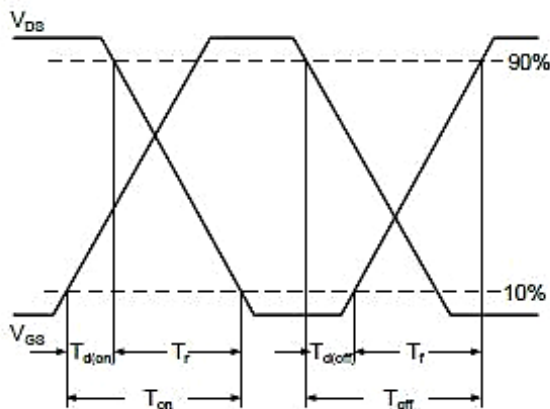


Fig.10 Switching Time Waveform

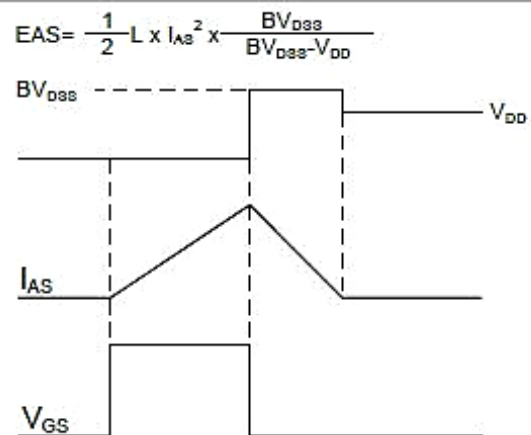
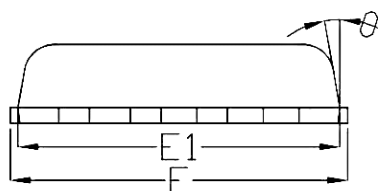
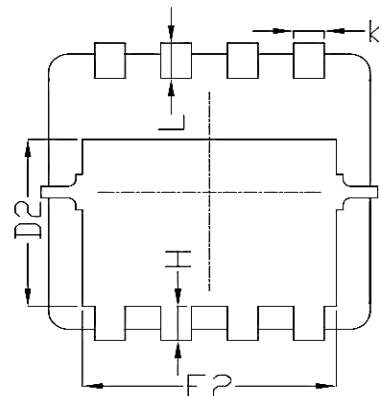
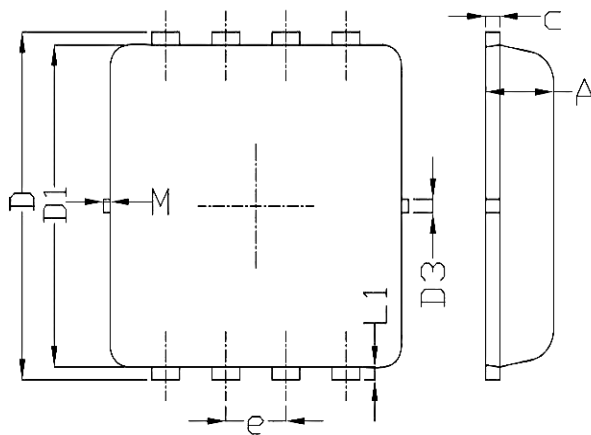


Fig.11 Unclamped Inductive Waveform

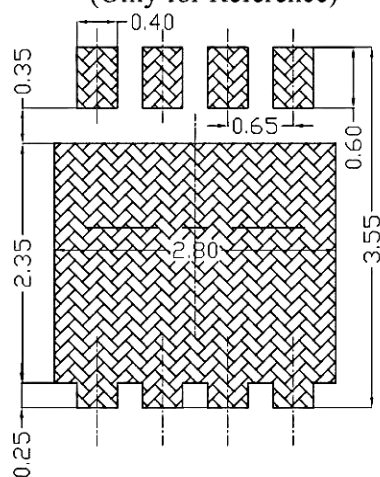
■ Package size

Unit: mm。

PDFN 3X3:



Land Pattern
(Only for Reference)



SYMBOL	DIMENSIONAL REQOMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			