

N-MOSFET 60V 2.5mΩ 204A

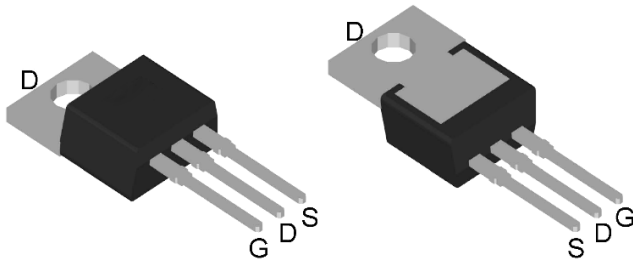
■ Product Summary

- V_{DS} 60V
- ID 204A
- R_{DS(ON)} (at V_{GS}=10V) <3.5mΩ (Typ:2.5 mΩ)

■ Naming convention

M	G	P	0	2	5	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 _{th} (1~2.5V) N:V _{th} (2~4V)	

■ Pin configuration



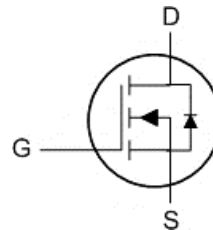
■ Features

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

■ Application

- Switching and Synchronous Rectification
- BLDC

■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity (PCS)	Marking
MGP025N06L	TO220	Tube	50 / Tube	MGP025N06L

■ 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)	204	A
	Drain Current – Continuous (T _C =100°C)	129	
	Drain Current – Continuous (T _A =25°C)	26	
	Drain Current – Continuous (T _A =70°C)	21	
P _D	Power Dissipation(T _C =25°C)	125	W
	Power Dissipation (T _C =100°C)	50	
	Power Dissipation(T _A =25°C)	2.0	
	Power Dissipation (T _A =70°C)	1.3	
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	
T _J	Operating Junction Temperature Range	-55 to 150	°C
T _{STG}	Storage Temperature Range	-55 to 150	°C

■ Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case ³	1.21	$^{\circ}\text{C}/\text{W}$

■ Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Static Electrical Characteristics						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	-	-	V
I _{DSS}	Drain-Source Leakage 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-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS} (ON)	Static Drain-Source On-Resistance ⁴	V _{GS} =10V, I _D =20A	-	2.5	3.5	mΩ
		V _{GS} =4.5V, I _D =10A	-	3.5	5.5	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A	-	36	-	S
Dynamic and switching Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	0.76	-	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		-	195	-	
t _d (ON)	Turn-On Delay Time	V _{GS} =10V, V _{DD} =25V, I _D =1A, R _G =3Ω	-	16	-	nS
T _r	Rise Time		-	5.6	-	
T _d (off)	Turn-off Delay Time		-	54	-	
T _f	Turn-off Fall Time		-	102	-	
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =30V, I _D =20A	-	45	-	nC
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =20A	-	93.7	18	
Q _{gs}	Gate-Source Charge		-	20.4	4	
Q _{gd}	Gate-Drain Charge		-	20.5	6	
Source-Drain Characteristics						
V _{SD}	Diode Forward Voltage ⁴	I _S =10A, V _{GS} =0V	-	-	1	V
t _{rr}	Reverse Recovery Time	I _F =10A, V _R =48V dI _F /dt=100A/μs	-	45	-	nS
Q _{rr}	Reverse Recovery Charge		-	43	-	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. Surface Mounted on 1in2 FR-4 board with 1oz
4. Pulse test (pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$).
5. Guaranteed by design, not subject to production testing.

■ Typical Characteristics

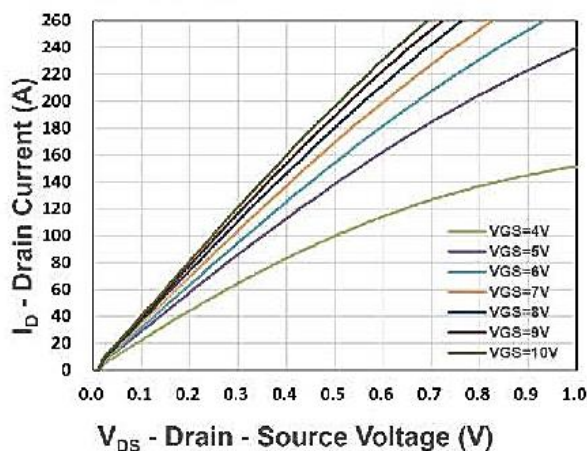


Figure 1. Output Characteristics

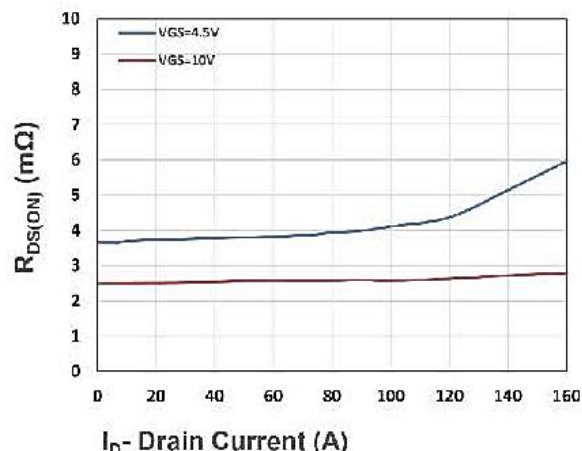


Figure 2. On-Resistance vs. ID

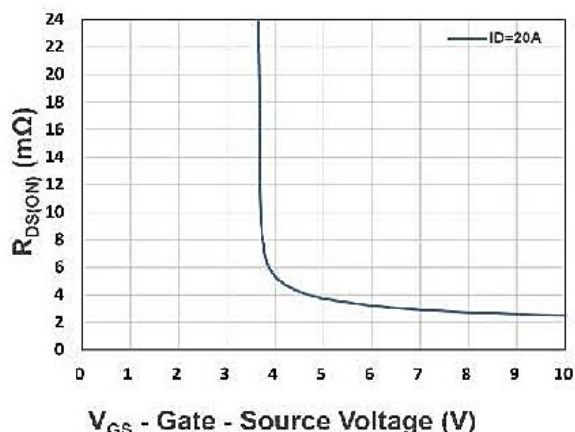


Figure 3. On-Resistance vs. VGS

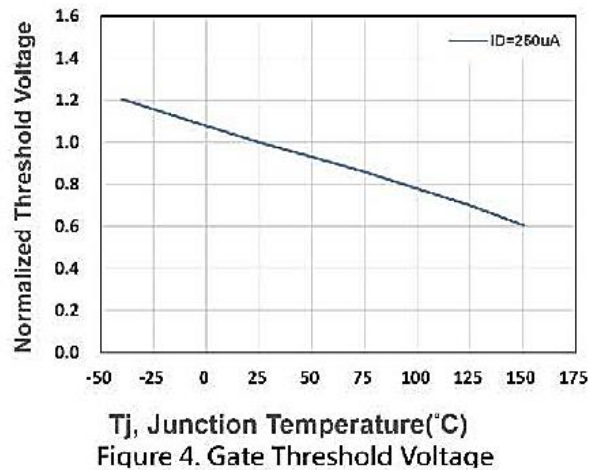


Figure 4. Gate Threshold Voltage

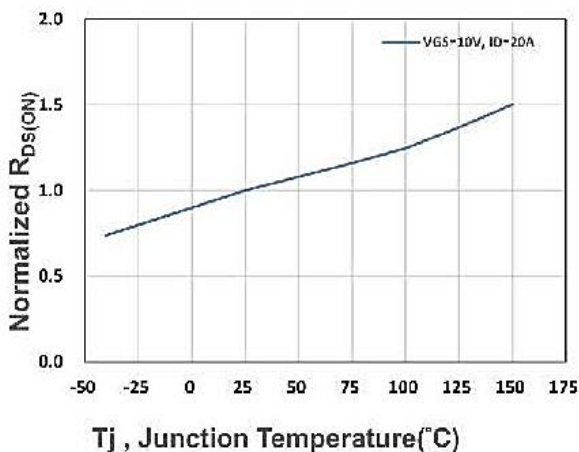


Figure 5. Drain-Source On Resistance

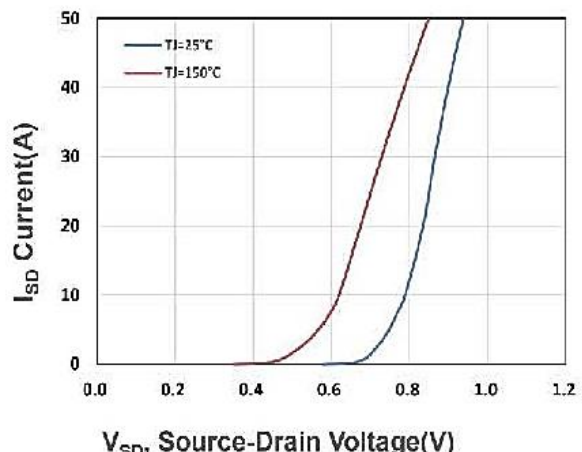
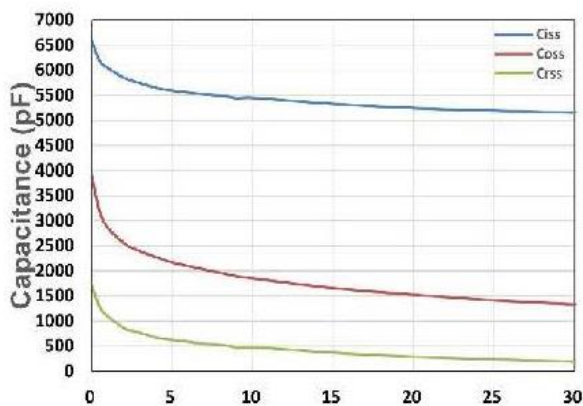
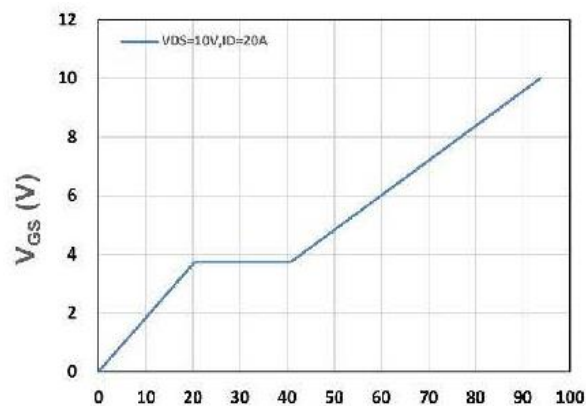


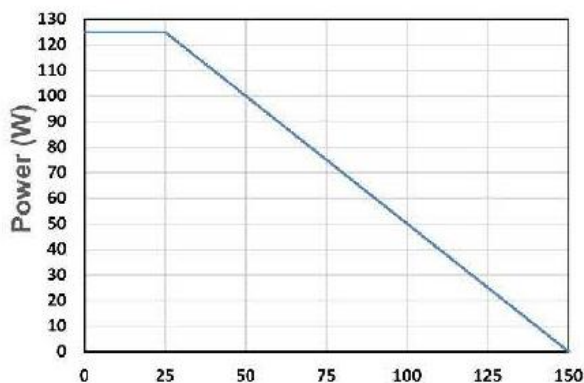
Figure 6. Source-Drain Diode Forward



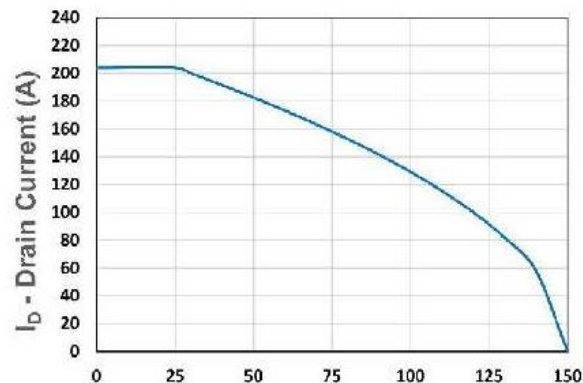
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



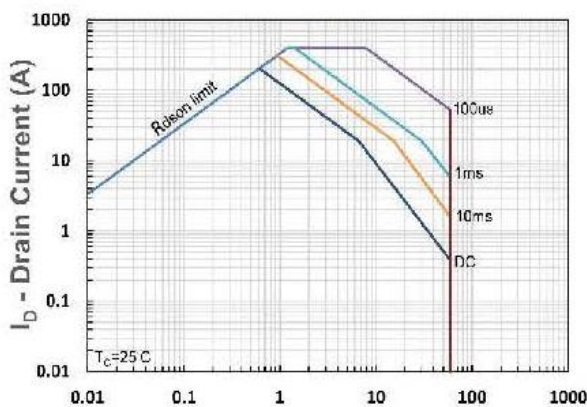
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



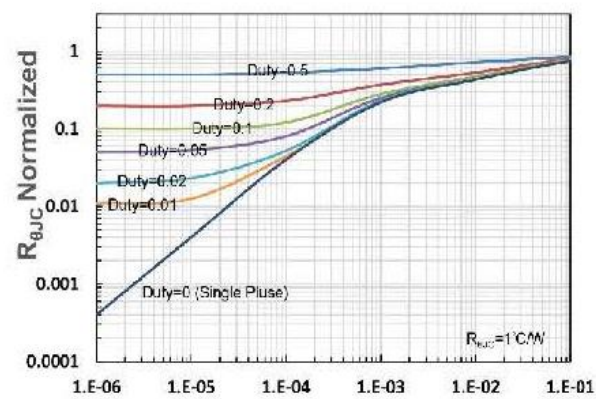
T_c - Case Temperature (°C)
Figure 9. Power Dissipation



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.

TO220:

