N-MOSFET 100V 4mΩ 122A

■ Product Summary

- VDS 100V
- ID 122A
- RDS(ON) (at VGS=10V) ＜5mΩ（Typ:4 mΩ）

■ Features

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

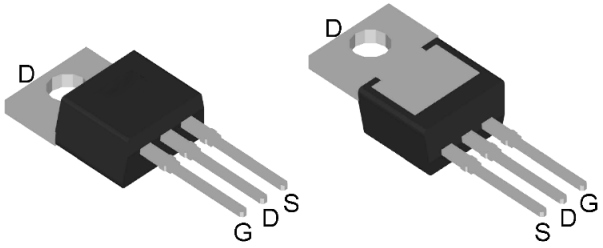
■ Naming convention

M	G	P	0	4	0	N	1	0	A	N
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 06: 60V 08: 80V 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)

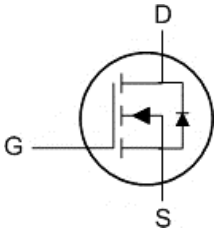
■ Application

- High Efficiency Synchronous Rectification in SMPS
- Hard Switched and High Frequency Circuits
- USB Power Delivery (USB PD)

■ Pin configuration



■ Symbol



■ Ordering Information

Order code	Package	Form	Quantity（PCS）	Marking
MGP040N10N	TO220	Tube	50 / Tube	MGP040N10N

■ Absolute Maximum Ratings

T_C=25°C Unless Otherwise Noted.

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous[1] (T_C=25℃)	122	A
	Drain Current – Continuous (T_C=100℃)	102	
	Drain Current – Continuous (T_A=25℃)	20.4	
	Drain Current – Continuous (T_A=70℃)	16.3	
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]	305	A
I_S	Diode Continuous Forward Current (T_C=25℃)	113	A
I_{AS}	Single Pulse Avalanche Current[2]（L=0.1mH）	56	A
	Single Pulse Avalanche Current[2]（L=0.5mH）	31	
E_{AS}	Single Pulse Avalanche Energy[2]（L=0.1mH）	157	mJ
	Single Pulse Avalanche Energy[2]（L=0.5mH）	240	
T_J	Operating Junction Temperature Range	-55 to 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃

■ Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case[3]	1	℃/W

■ Electrical Characteristics

T_J=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	100	-	-	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V, V_{GS}=0V	-	-	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250uA	2	3	4	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	-	4	4.8	mΩ
gfs	Forward Transconductance	V_{DS}=5V, I_D=10A	-	40	-	S
Dynamic and switching Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, F=1MHz	-	0.7	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, F=1MHz	-	4175	-	pF
C_{oss}	Output Capacitance		-	1190	-	
C_{rss}	Reverse Transfer Capacitance		-	35	-	
$t_{d(ON)}$	Turn-On Delay Time	V_{GS}=10V, V_{DS}=25V, I_D=1A, R_G=3Ω	-	12.8	-	nS
T_r	Rise Time		-	6.3	-	
$T_{d(off)}$	Turn-off Delay Time		-	35	-	
T_f	Turn-off Fall Time		-	65	-	
Q_g	Total Gate Charge	V_{GS}=6V,V_{DS}=50V, I_D=20A	-	47	-	nC
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=50V, I_D=20A	-	72.8	-	
Q_{gs}	Gate-Source Charge		-	21.5	-	
Q_{gd}	Gate-Drain Charge		-	20.6	-	
Source-Drain Characteristics						
V_{SD}	Diode Forward Voltage[4]	I_S=10A, V_{GS}=0V	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I_F=10A, V_R=50V dI$_F$/dt=100A/μs	-	40.4	-	nS
Q_{rr}	Reverse Recovery Charge		-	80.2	-	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 1in^2 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

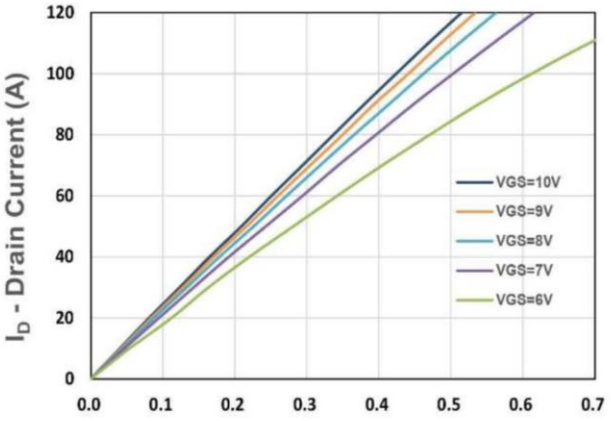


Figure 1. Output Characteristics

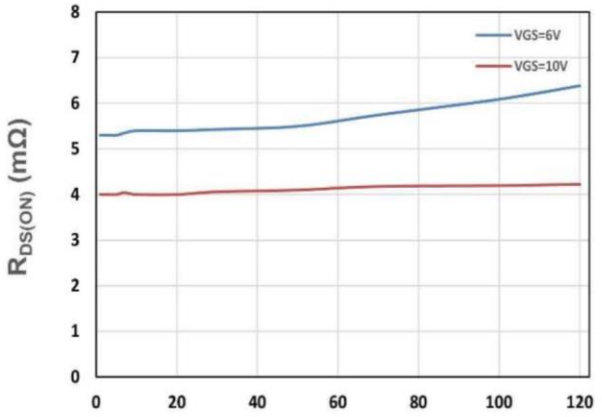


Figure 2. On-Resistance vs. ID

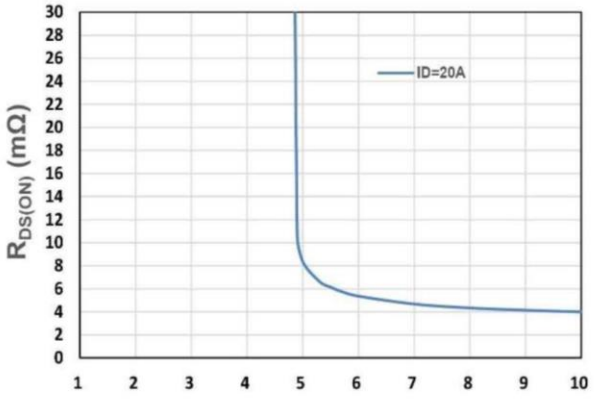


Figure 3. On-Resistance vs. VGS

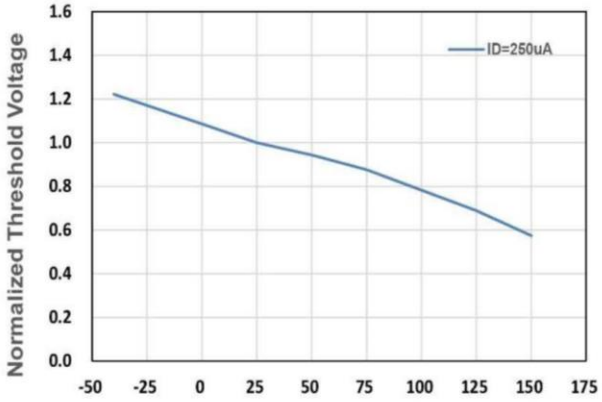


Figure 4. Gate Threshold Voltage

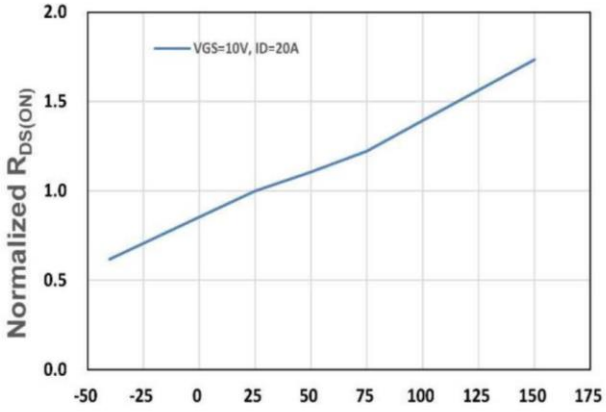


Figure 5. Drain-Source On Resistance

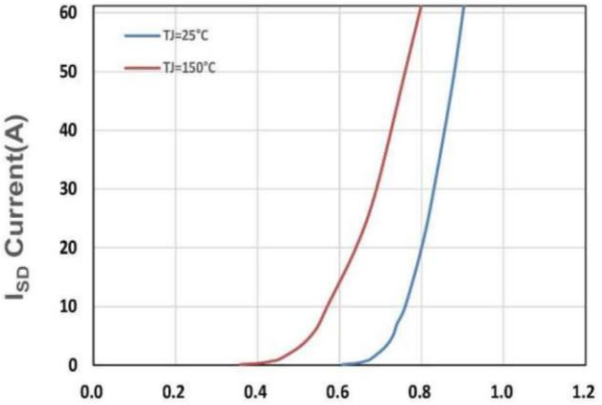


Figure 6. Source-Drain Diode Forward

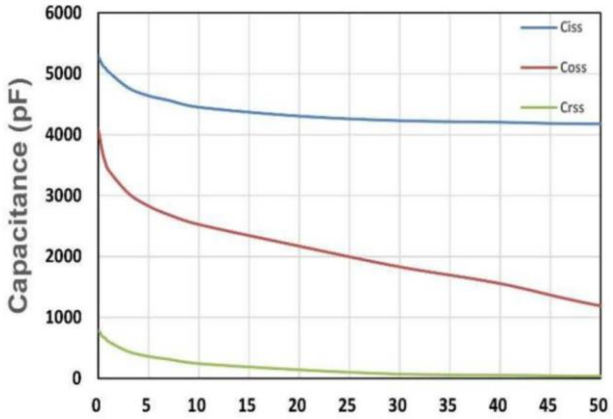


Figure 7. Capacitance

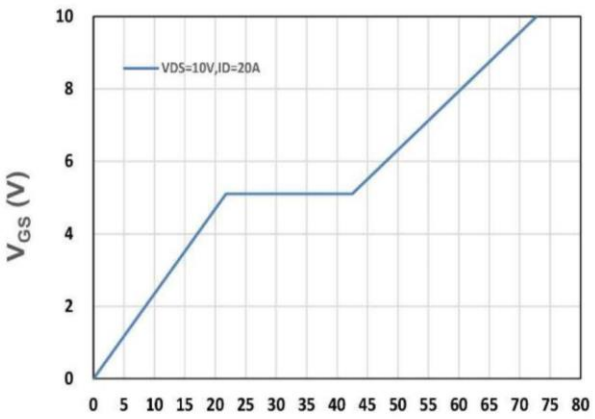


Figure 8. Gate Charge Characteristics

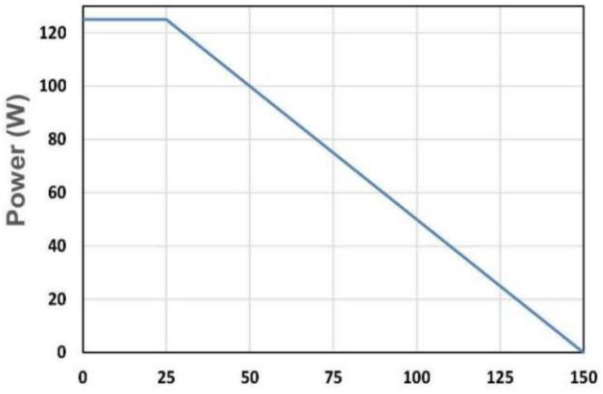


Figure 9. Power Dissipation

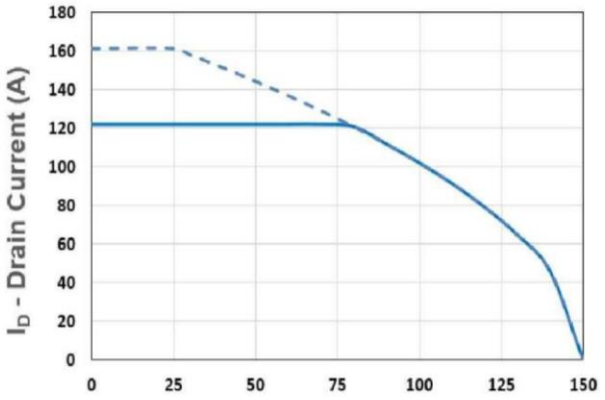


Figure 10. Drain Current

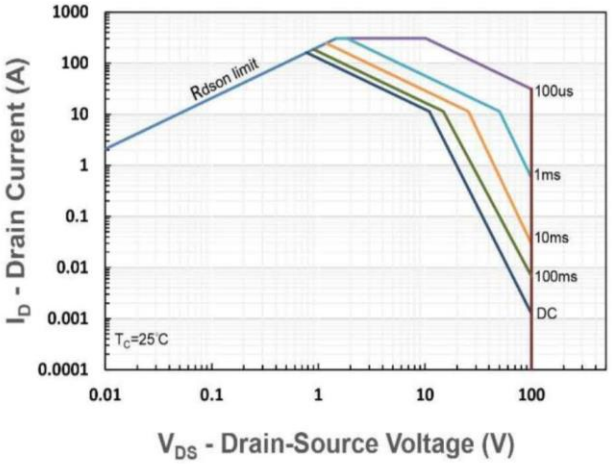


Figure 11. Safe Operating Area

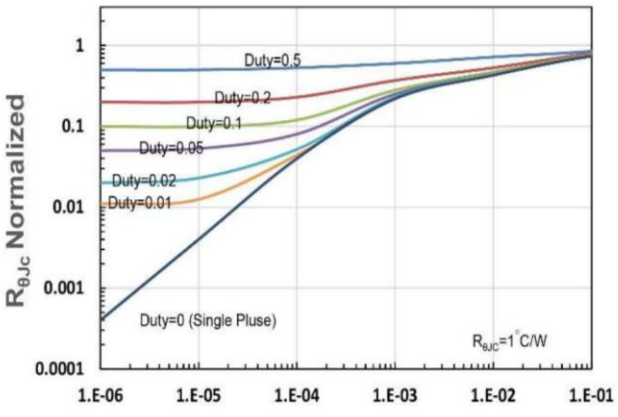


Figure 12. RθJC Transient Thermal Impedance

■ Package size

Unit：mm。

TO220：