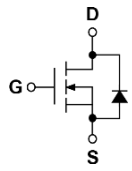


N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	60	V
$R_{DS(ON)-Max}$	7.2	m Ω
ID	100	A

Feature

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

Applications

- Switching and Synchronous Rectification
- BLDC

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
MGP060N06L	TO-220-3L	Tube	50 / Tube	

Note : □□□□□□ = Lot Code

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	A
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	100 ⁽¹⁾
		$T_C=100^\circ\text{C}$	45
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	50
		$T_C=100^\circ\text{C}$	20
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$	13
		$T_A=70^\circ\text{C}$	11
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	2.0
		$T_A=70^\circ\text{C}$	1.3
$I_{AS}^{(2)}$	Avalanche Current, Single pulse	L=0.1mH	51
		L=0.5mH	27
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse	L=0.1mH	130
		L=0.5mH	182

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	1
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	Steady State	62.5

Note ① : Max. current is limited by junction temperature

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C

Note ③ : Surface Mounted on 1in^2 FR-4 board with 1oz

N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =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 _{DS} =V _{GS} , I _{DS} =250uA	1	1.7	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^④	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A	-	6.0	7.2	mΩ
		V _{GS} =4.5V, I _{DS} =10A		9.0	11.5	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	21	-	S
Dynamic Characteristics ^⑤						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	1.2	3	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Freq.=1MHz	-	1609	-	pF
C _{oss}	Output Capacitance		-	484	-	
C _{rss}	Reverse Transfer Capacitance		-	77	-	
td(ON)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =25V, Id=1A, RGEN=3Ω	-	10.9	-	nS
tr	Turn-on Rise Time		-	6.9	-	
td(OFF)	Turn-off Delay Time		-	25	-	
tf	Turn-off Fall Time		-	37.5	-	
Qg	Total Gate Charge	V _{GS} =4.5V, V _{DS} =30V Id=20A	-	18.8	-	nC
Qg	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, Id=20A	-	37	-	
Qgs	Gate-Source Charge		-	7.25	-	
Qgd	Gate-Drain Charge		-	8.49	-	
Source-Drain Characteristics						
VSD ^④	Diode Forward Voltage	ISD=10A, VGS=0V	-	0.8	1.1	V
ttr	Reverse Recovery Time	IF=10A, VR=48V	-	21.9	-	nS
Qrr	Reverse Recovery Charge	dIF/dt=100A/μs	-	9.4	-	nC

Note ④: Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

Note ⑤: Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

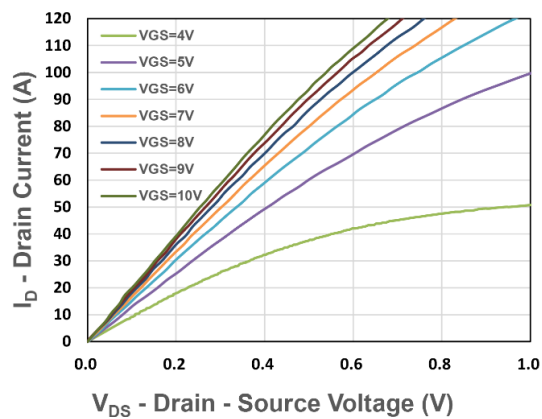


Figure 1. Output Characteristics

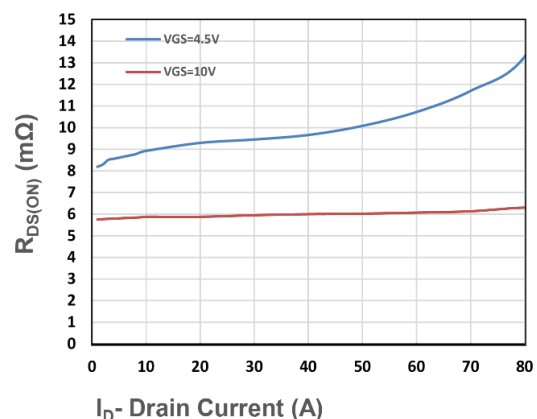


Figure 2. On-Resistance vs. ID

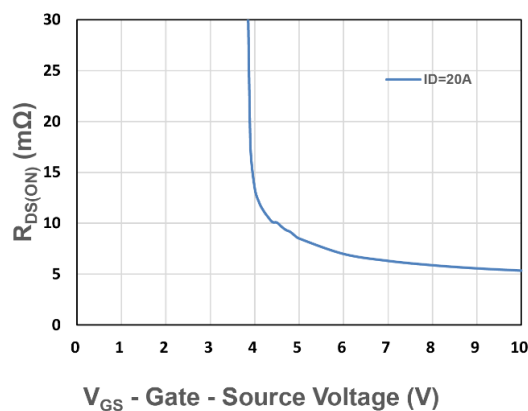


Figure 3. On-Resistance vs. VGS

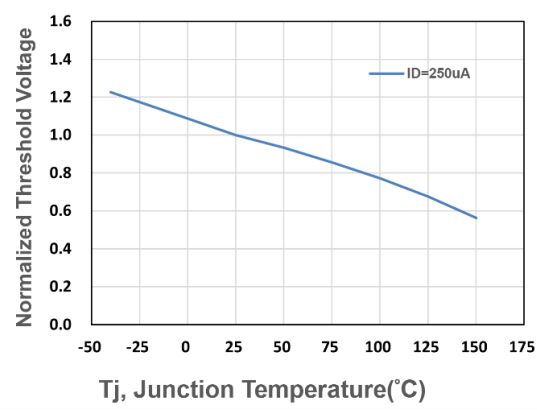


Figure 4. Gate Threshold Voltage

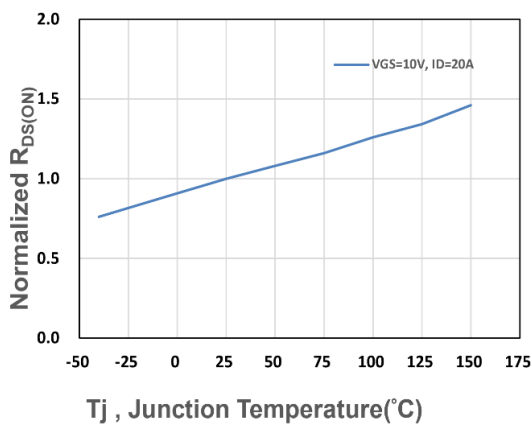


Figure 5. Drain-Source On Resistance

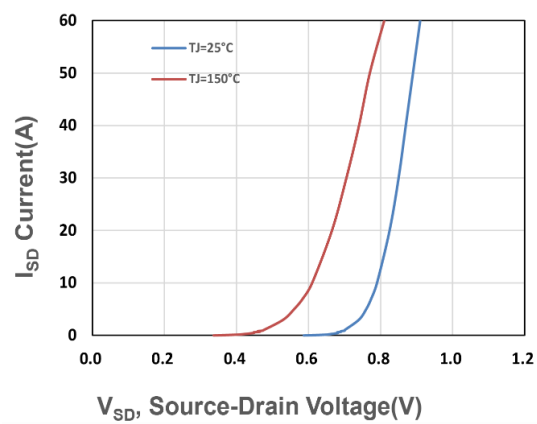
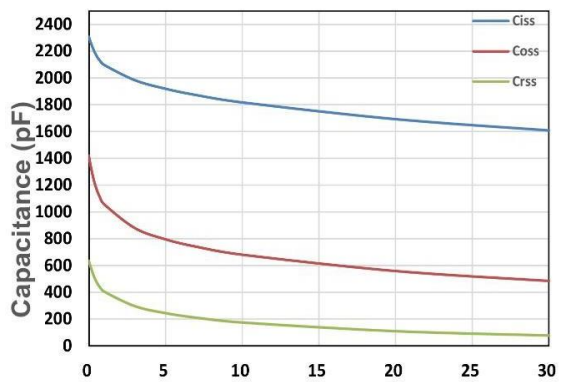
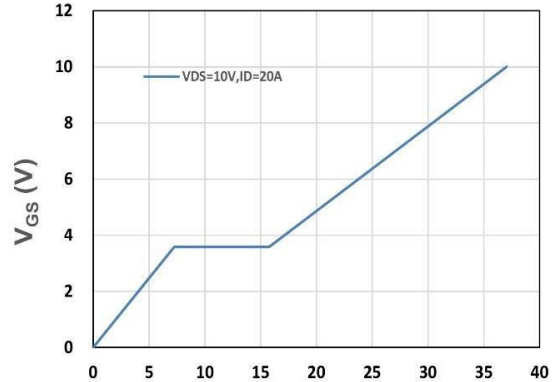


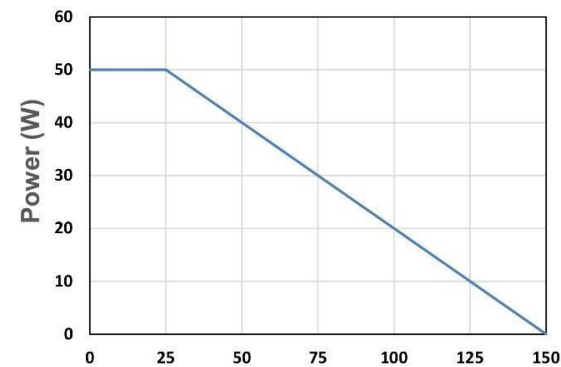
Figure 6. Source-Drain Diode Forward



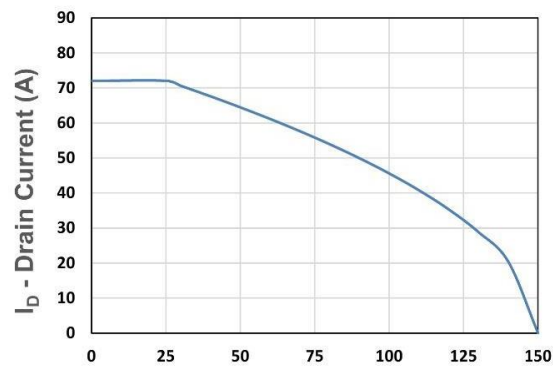
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



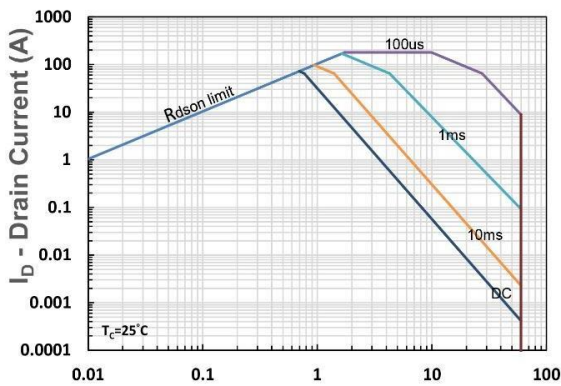
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



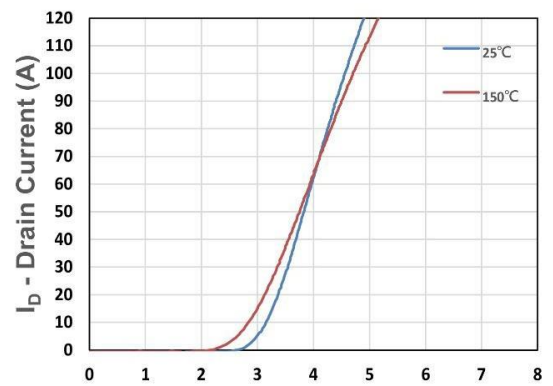
T_c - Case Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



T_c - Case Temperature ($^{\circ}C$)
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