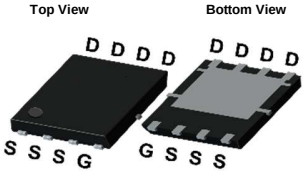
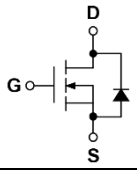
N-Channel Enhancement Mode MOSFET

Pin Description

PDFN5*6



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	40	V
$R_{DS(ON)-Max}$	1	mΩ
ID	250	A

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested
- Moisture Sensitivity Level MSL1

Applications

- DC-to-DC converters
- Switch Mode Power Supply
- Brushless DC motor control

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
SL250N04Q	PDFN5*6	Tape & Reel	5000 / Tape & Reel	

Absolute Maximum Ratings (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	100	A
I_{DM}	Pulse Drain Current Tested	T_C=25°C	400①	A
I_D	Continuous Drain Current	T_C=25°C	250	A
		T_C=100°C	162	
P_D	Maximum Power Dissipation	T_C=25°C	89	W
		T_C=100°C	36	
I_D	Continuous Drain Current	T_A=25°C	39	A
		T_A=70°C	31	
P_D	Maximum Power Dissipation	T_A=25°C	2.1	W
		T_A=70°C	1.3	
I_{AS}②	Avalanche Current, Single pulse	L=0.1mH	64	A
		L=0.5mH	34	
E_{AS}②	Avalanche Energy, Single pulse	L=0.1mH	204	mJ
		L=0.5mH	290	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	1.3	°C/W
$R_{\theta JA}$③	Thermal Resistance-Junction to Ambient	Steady State	60	°C/W

Note ① : Max. current is limited by bonding

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

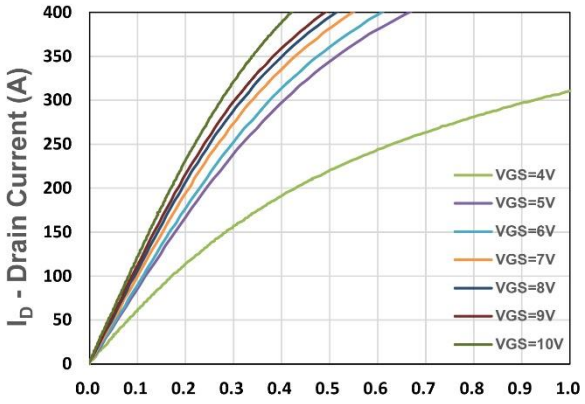
Note ③ : Surface Mounted on 1in^2 FR-4 board with 1oz

N-Channel Electrical Characteristics (T_J=25°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	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V, V_{GS}=0V	-	-	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1	1.7	2.3	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	-	0.8	1.0	mΩ
		V_{GS}=4.5V, I_{DS}=10A	-	1.25	1.6	
gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=10A	-	45	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	1.2	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, Freq.=1MHz	-	4928	-	pF
C_{oss}	Output Capacitance		-	2000	-	
C_{rss}	Reverse Transfer Capacitance		-	65	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=10V,V_{DS}=20V, I_D=20A,R_{GEN}=3Ω	-	10.7	-	nS
t_r	Turn-on Rise Time		-	25.3	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	65.2	-	
t_f	Turn-off Fall Time		-	53.6	-	
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=20V, I_D=20A	-	69	-	nC
Q_{gs}	Gate-Source Charge		-	16.5	-	
Q_{gd}	Gate-Drain Charge		-	10	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=10A, V_{GS}=0V	-	0.72	1.1	V
t_{rr}	Reverse Recovery Time	I_F=20A, V_R=20V dI$_F$/dt=100A/μs	-	48.6	-	nS
Q_{rr}	Reverse Recovery Charge		-	35.5	-	nC

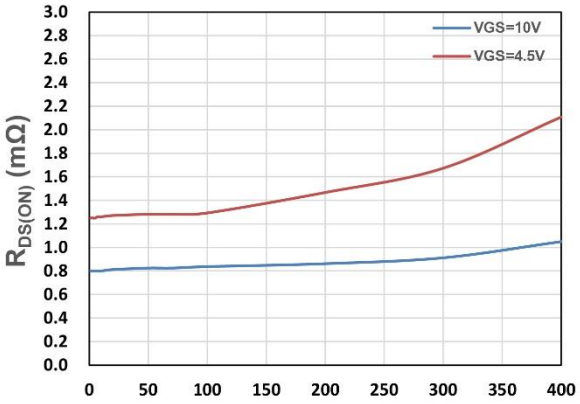
Note ④：Pulse test (pulse width≤300us, duty cycle≤2%).
Note ⑤：Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics



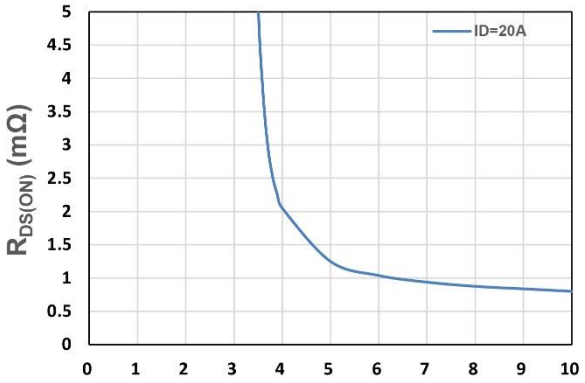
V_{DS} - Drain - Source Voltage (V)

Figure 1. Output Characteristics



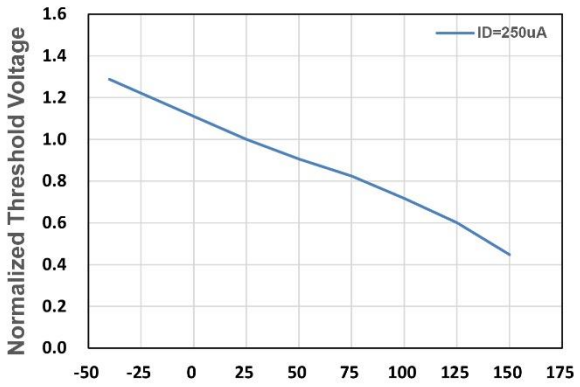
I_D- Drain Current (A)

Figure 2. On-Resistance vs. ID



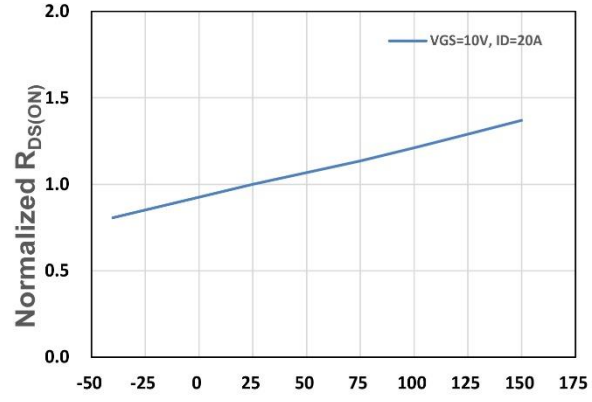
V_{GS} - Gate - Source Voltage (V)

Figure 3. On-Resistance vs. VGS



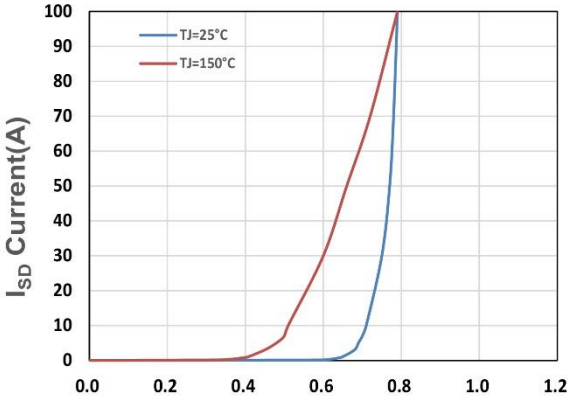
Tj, Junction Temperature(°C)

Figure 4. Gate Threshold Voltage



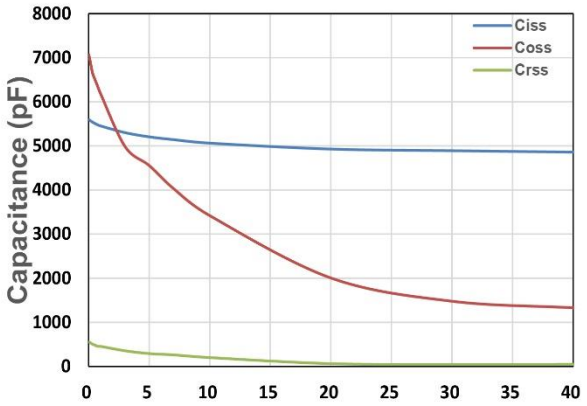
Tj , Junction Temperature(°C)

Figure 5. Drain-Source On Resistance

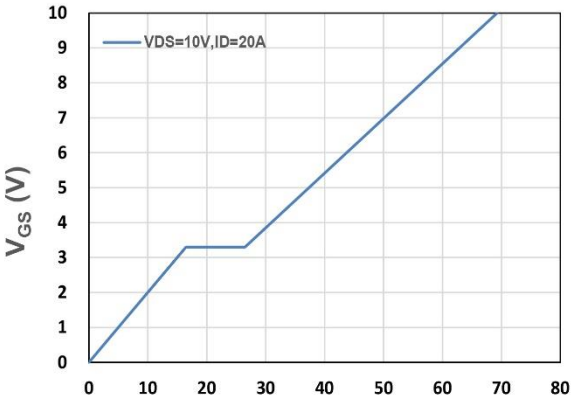


V_{SD}, Source-Drain Voltage(V)

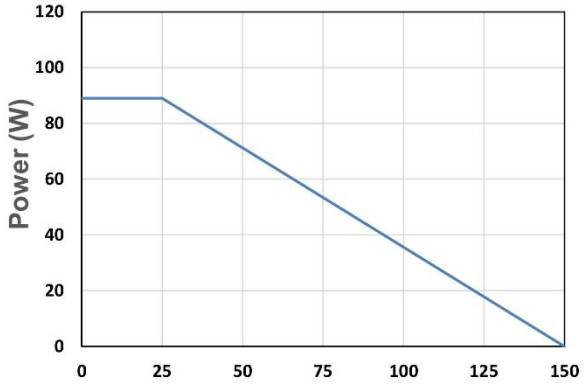
Figure 6. Source-Drain Diode Forward



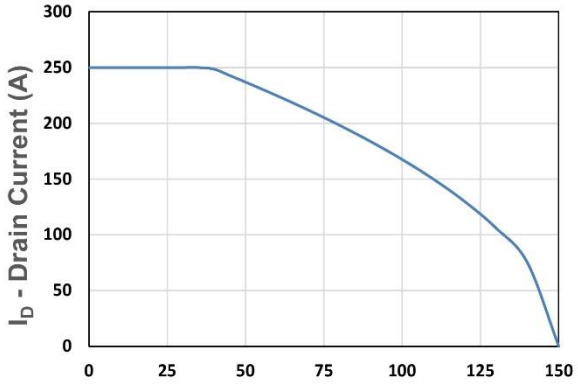
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



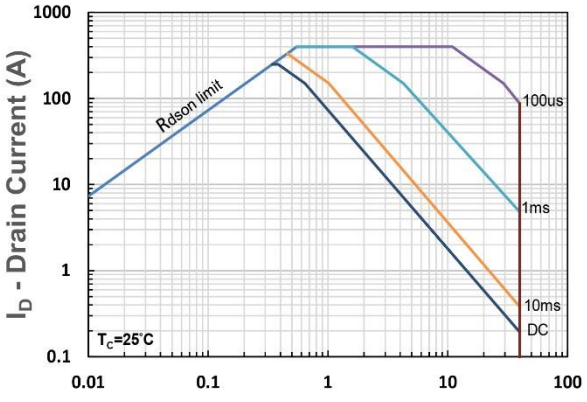
Qg, Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



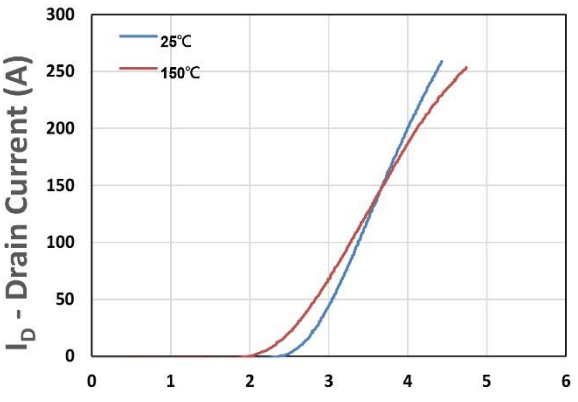
Tc - Case Temperature (°C)
Figure 9. Power Dissipation



Tc - Case Temperature (°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

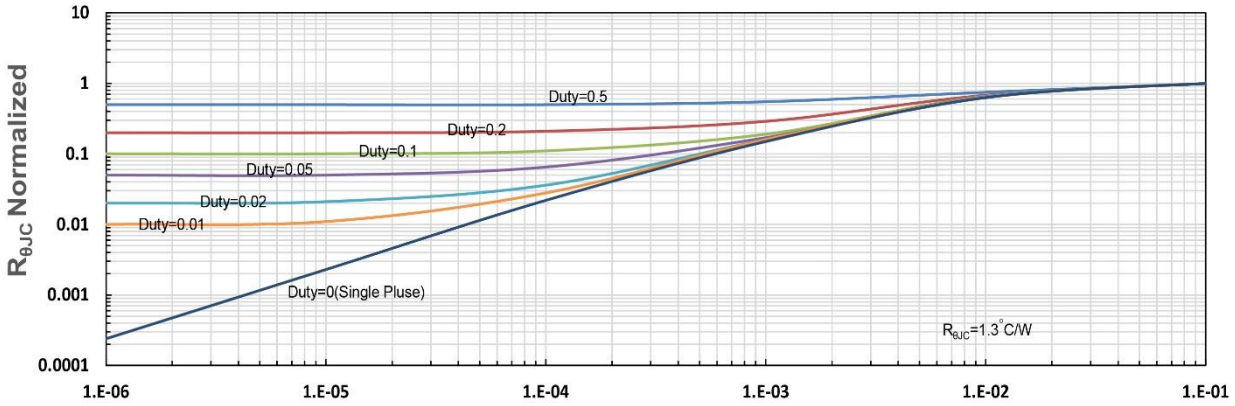


Figure 13. RθJC Transient Thermal Impedance

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