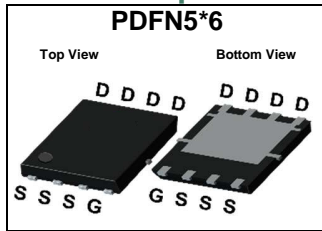
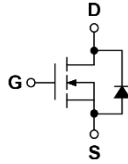


N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	40	V
$R_{DS(ON)-Max}$	1	m Ω
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	400 ^①	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 1in² 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	$V_{GS}=0V, I_{DS}=250\mu A$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=32V, V_{GS}=0V$	-	-	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1	1.7	2.3	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
$R_{DS(on)}^{(4)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=20A$	-	0.8	1.0	m Ω
		$V_{GS}=4.5V, I_{DS}=10A$	-	1.25	1.6	
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_{DS}=10A$	-	45	-	S
Dynamic Characteristics⁽⁶⁾						
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					
C_{rss}	Reverse Transfer Capacitance					
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=10V, V_{DS}=20V,$ $I_D=20A, R_{GEN}=3\Omega$	-	10.7	-	nS
t_r	Turn-on Rise Time					
$t_{d(off)}$	Turn-off Delay Time					
t_f	Turn-off Fall Time					
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=20V,$ $I_D=20A$	-	69	-	nC
Q_{gs}	Gate-Source Charge					
Q_{gd}	Gate-Drain Charge					
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	$I_F=20A, V_R=20V$	-	48.6	-	nS
Q_{rr}	Reverse Recovery Charge	$di_F/dt=100A/\mu s$	-	35.5	-	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

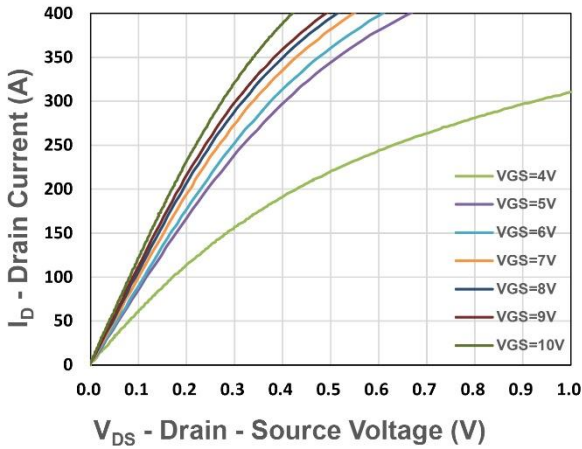


Figure 1. Output Characteristics

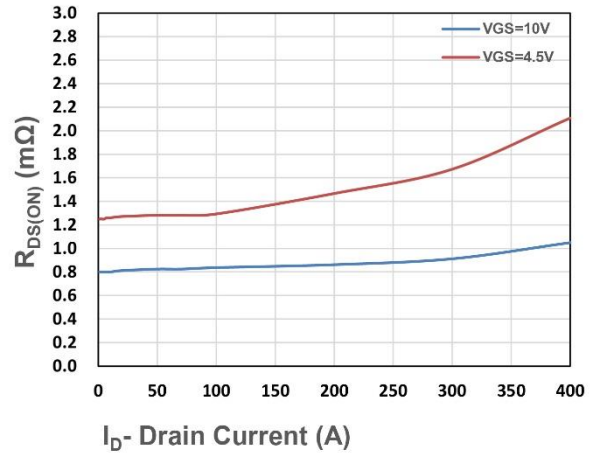


Figure 2. On-Resistance vs. ID

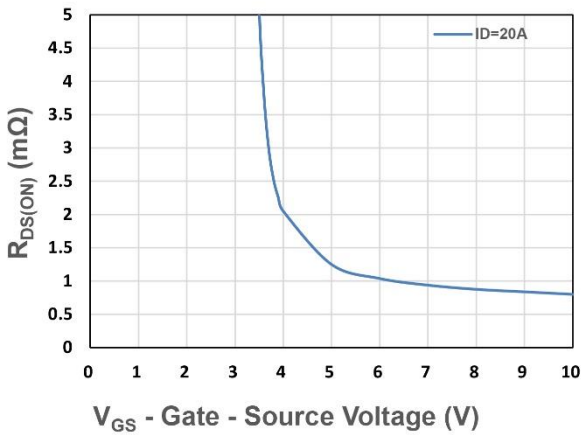


Figure 3. On-Resistance vs. VGS

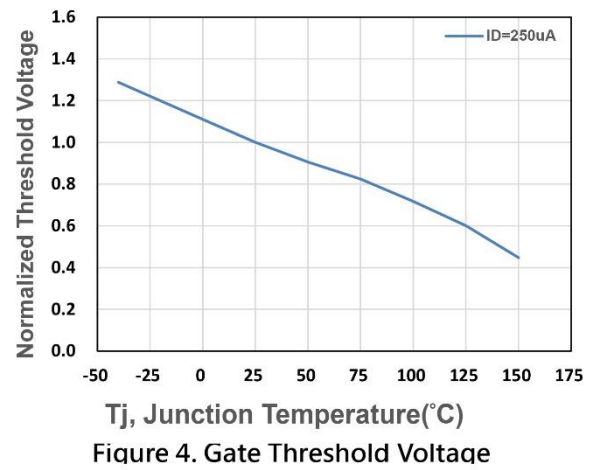


Figure 4. Gate Threshold Voltage

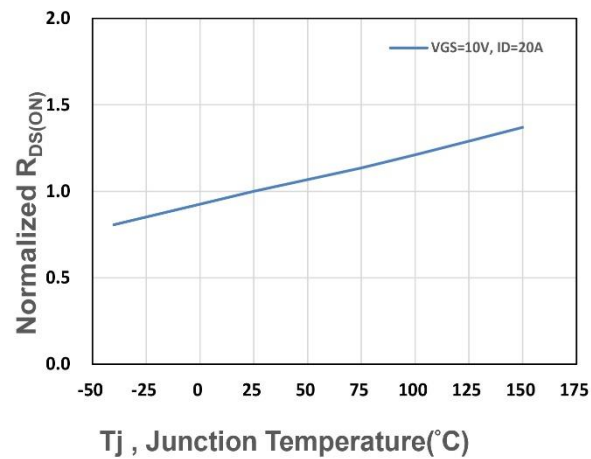


Figure 5. Drain-Source On Resistance

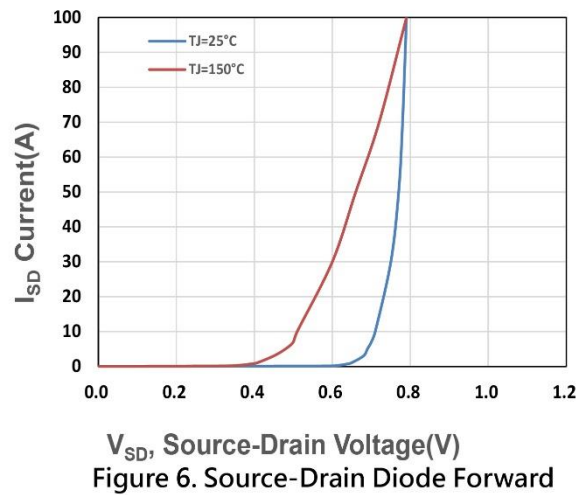
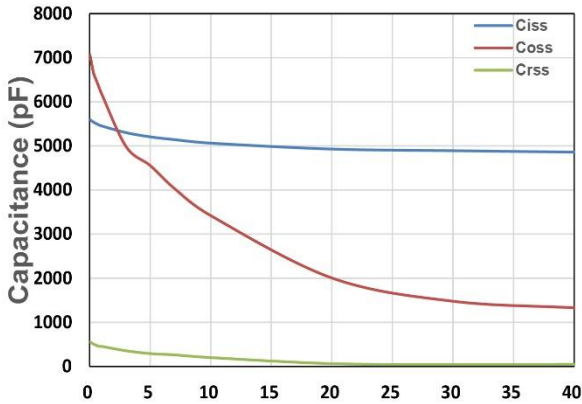
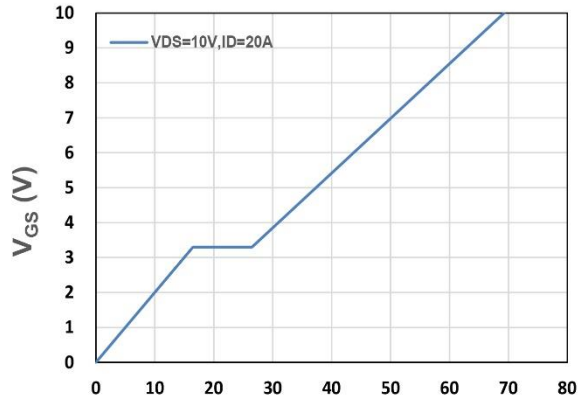


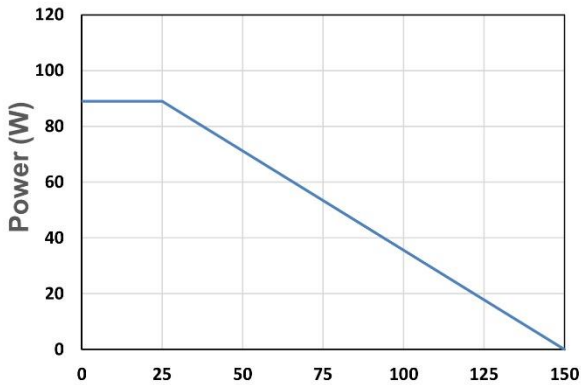
Figure 6. Source-Drain Diode Forward



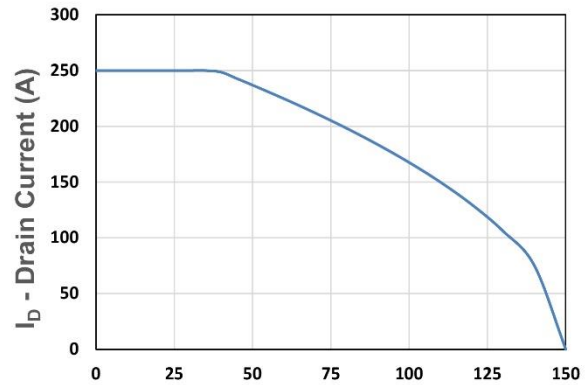
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



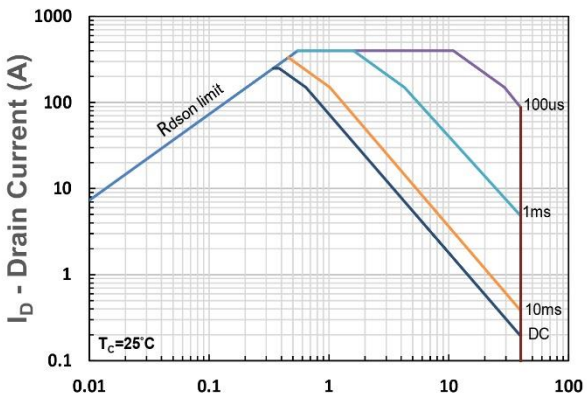
Qg, Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



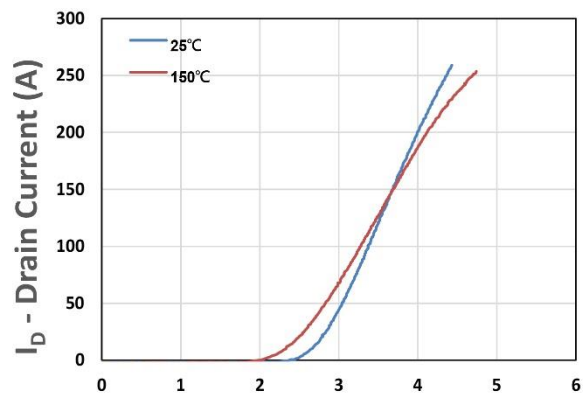
Tc - Case Temperature (°C)
Figure 9. Power Dissipation



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

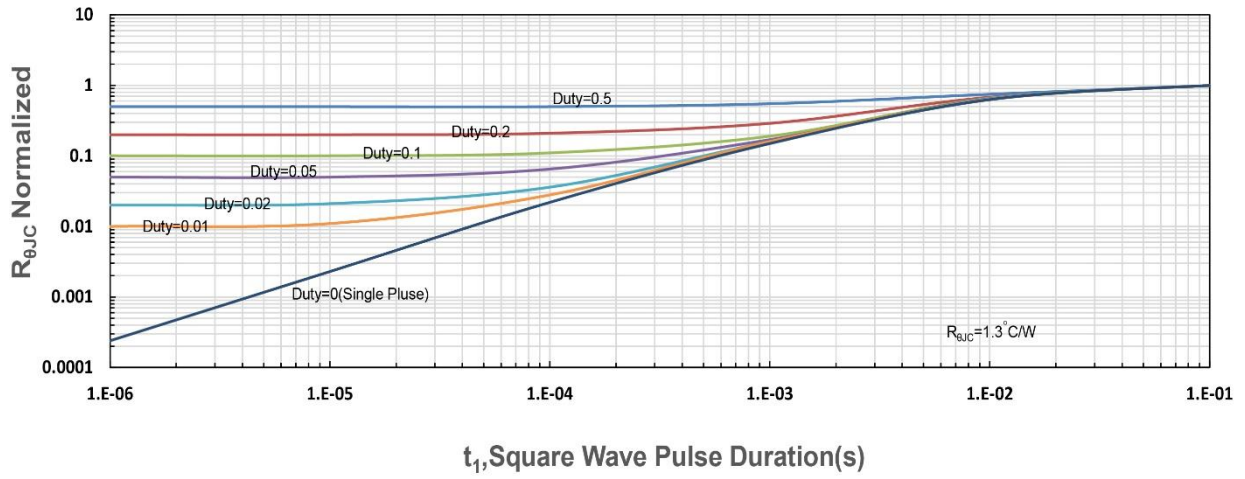


Figure 13. $R_{\theta JC}$ Transient Thermal Impedance