N-Channel Enhancement Mode MOSFET

Pin Description

PDFN5*6

Top View / Bottom View

D D D D / D D D D

S S S G / G S S S

Symbol

D — G — S

Product Summary

Symbol	N-Channel	Unit
V_{DSS}	100	V
$R_{DS(ON)-Max}$	9.6	mΩ
ID	53	A

Feature

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

Applications

- Motor drivers
- DC-DC Converter

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
SL53N10Q	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		100	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	46	A
I_{DM}[①]	Pulse Drain Current Tested	T_C=25°C	132	A
I_D	Continuous Drain Current	T_C=25°C	53	A
		T_C=100°C	33	
P_D	Maximum Power Dissipation	T_C=25°C	50	W
		T_C=100°C	20	
I_D	Continuous Drain Current	T_A=25°C	12	A
		T_A=70°C	9	
P_D	Maximum Power Dissipation	T_A=25°C	2.5	W
		T_A=70°C	1.6	
I_{AS}[②]	Avalanche Current, Single pulse	L=0.1mH	20	A
		L=0.5mH	15	
E_{AS}[②]	Avalanche Energy, Single pulse	L=0.1mH	20	mJ
		L=0.5mH	56	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	2.5	°C/W
$R_{\theta JA}$[③]	Thermal Resistance-Junction to Ambient	Steady State	50	°C/W

Note ① : Max. current is limited by bonding wire

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°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	100	-	-	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=80V, V$_{GS}$=0V	-	-	1	uA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_{DS}$=250uA	2	3	4	V
I$_{GSS}$	Gate Leakage Current	V$_{GS}$=±20V, V$_{DS}$=0V	-	-	±100	nA
R$_{DS(ON)}$●	Drain-Source On-state Resistance	V$_{GS}$=10V, I$_{DS}$=20A	-	8	9.6	mΩ
		V$_{GS}$=6V, I$_{DS}$=20A	-	12	15.5	
gfs	Forward Transconductance	V$_{DS}$=5V, I$_{DS}$=10A	-	14	-	S
Dynamic Characteristics ●						
R$_G$	Gate Resistance	V$_{GS}$=0V,V$_{DS}$=0V, Freq.=1MHz	-	0.9	-	Ω
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=50V, Freq.=1MHz	-	1558	-	pF
C$_{oss}$	Output Capacitance		-	523	-	
C$_{rss}$	Reverse Transfer Capacitance		-	55	-	
td$_{(ON)}$	Turn-on Delay Time	V$_{GS}$=10V,V$_{DS}$=30V, I$_D$=1A,R$_{GEN}$=6Ω	-	10.4	-	nS
t$_r$	Turn-on Rise Time		-	17.5	-	
t$_{d(OFF)}$	Turn-off Delay Time		-	26.5	-	
t$_f$	Turn-off Fall Time		-	68.9	-	
Q$_g$	Total Gate Charge	V$_{GS}$=6V,V$_{DS}$=50V I$_D$=20A	-	19.9	-	nC
Q$_g$	Total Gate Charge	V$_{GS}$=10V,V$_{DS}$=50V, I$_D$=20A	-	30.1	-	
Q$_{gs}$	Gate-Source Charge		-	8.8	-	
Q$_{gd}$	Gate-Drain Charge		-	8.8	-	
Source-Drain Characteristics						
V$_{SD}$●	Diode Forward Voltage	I$_{SD}$=10A, V$_{GS}$=0V	-	0.8	1.1	V
t$_{rr}$	Reverse Recovery Time	I$_F$=10A, V$_R$=50V dI$_F$/dt=100A/μs	-	50.8	-	nS
Q$_{rr}$	Reverse Recovery Charge		-	40	-	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
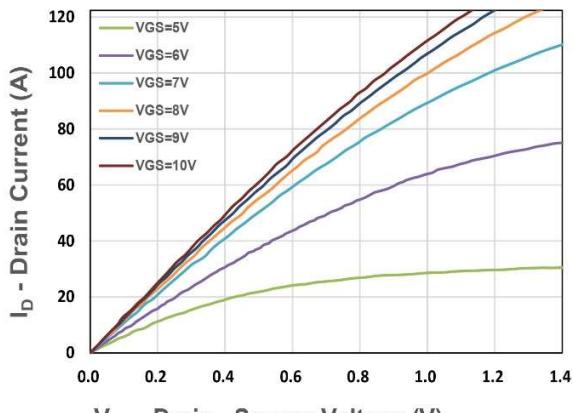
Figure 1. Output Characteristics
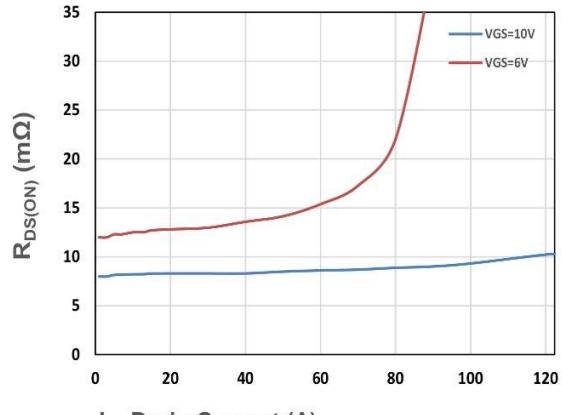
Figure 2. On-Resistance vs. ID
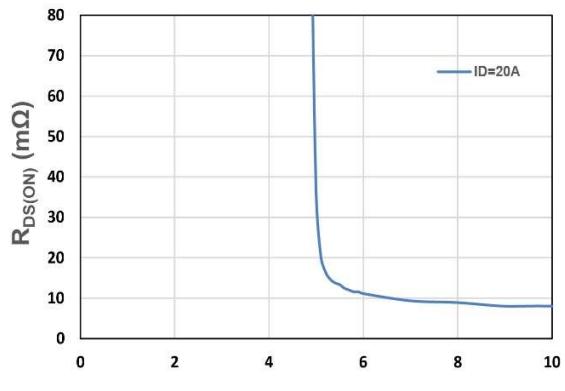

Figure 3. On-Resistance vs. VGS
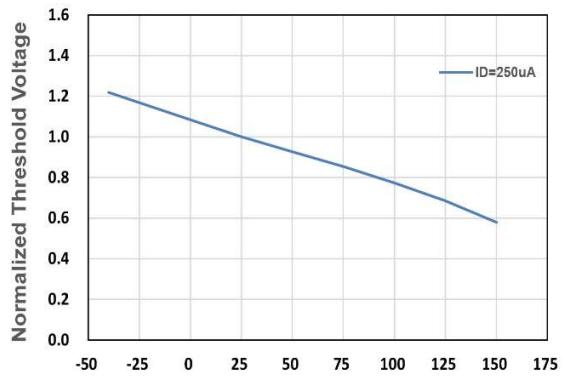
Figure 4. Gate Threshold Voltage
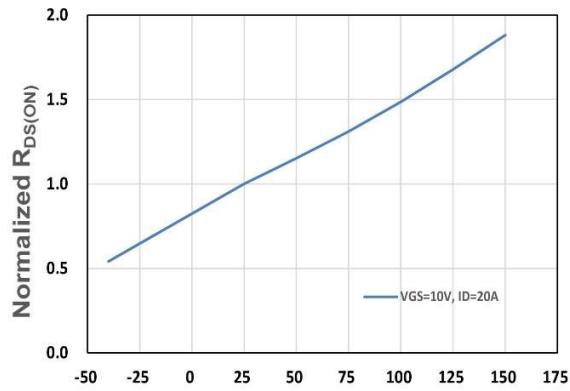
Figure 5. Drain-Source On Resistance
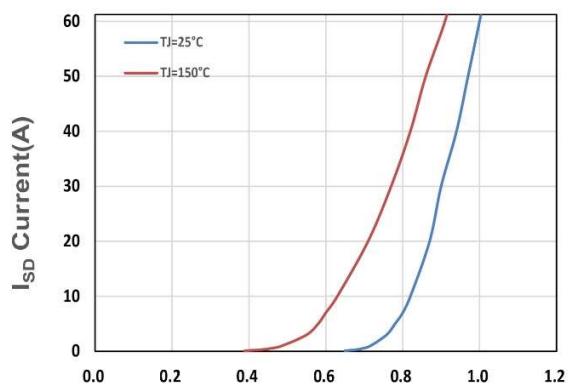
Figure 6. Source-Drain Diode Forward
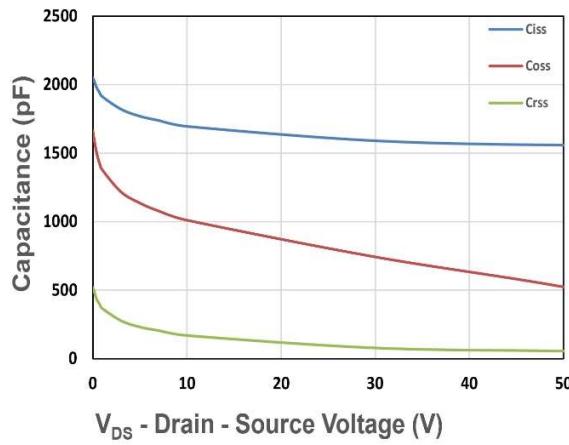
Figure 7. Capacitance
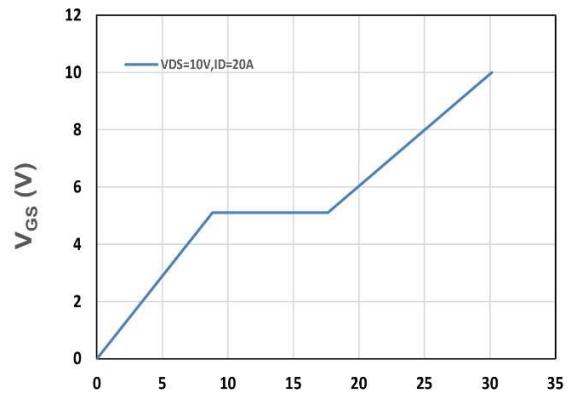
Figure 8. Gate Charge Characteristics
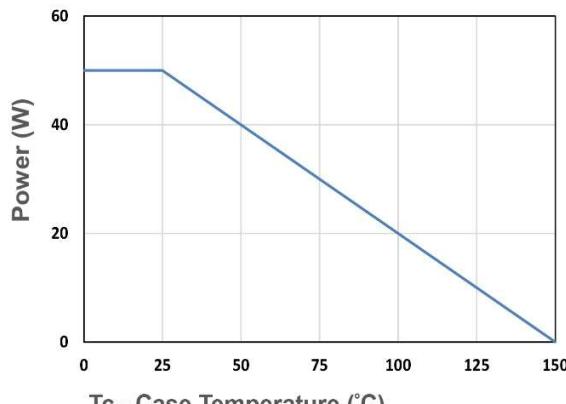
Figure 9. Power Dissipation
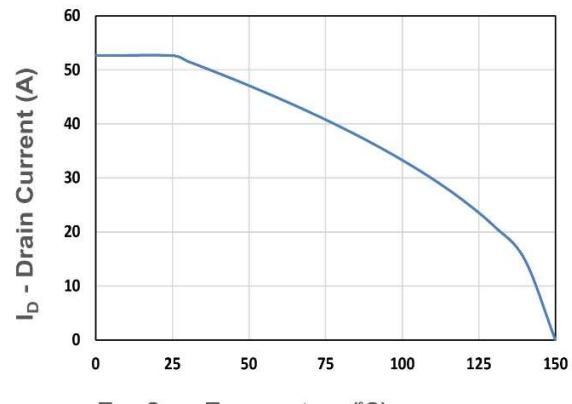
Figure 10. Drain Current
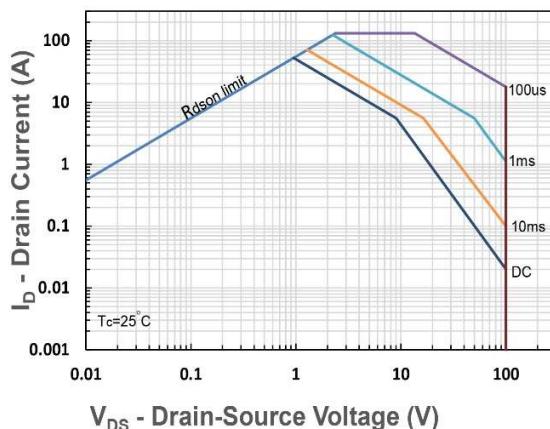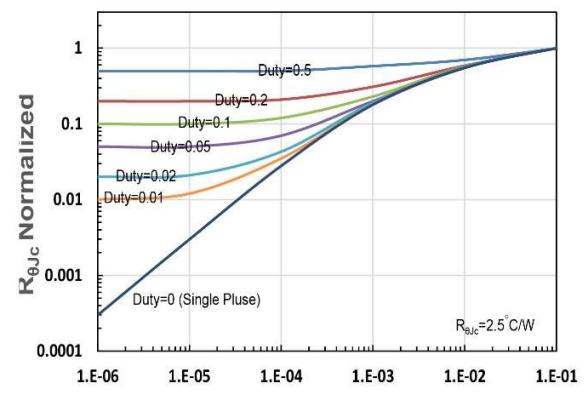
Figure 11. Safe Operating Area

Figure 12. RθJc Transient Thermal Impedance