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
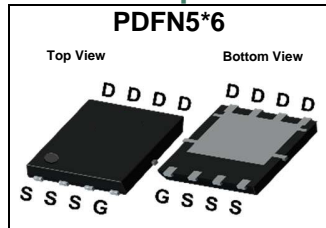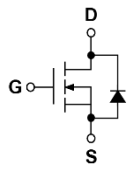
Symbol

Product Summary

Symbol	N-Channel	Unit
V$_{DSS}$	60	V
R$_{DS(ON)-Max}$	2.6	mΩ
ID	142	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
SL142N06Q	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		60	V
V$_{GSS}$	Gate-Source Voltage		±20	V
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	114	A
I$_{DM}$[①]	Pulse Drain Current Tested	T$_C$=25°C	400	A
I$_D$	Continuous Drain Current	T$_C$=25°C	142[①]	A
		T$_C$=100°C	138	
P$_D$	Maximum Power Dissipation	T$_C$=25°C	125	W
		T$_C$=100°C	50	
I$_D$	Continuous Drain Current	T$_A$=25°C	31	A
		T$_A$=70°C	25	
P$_D$	Maximum Power Dissipation	T$_A$=25°C	2.6	W
		T$_A$=70°C	1.7	
I$_{AS}$[②]	Avalanche Current, Single pulse	L=0.1mH	51	A
		L=0.5mH	27	
E$_{AS}$[②]	Avalanche Energy, Single pulse	L=0.1mH	130	mJ
		L=0.5mH	182	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
R$_{θJC}$	Thermal Resistance-Junction to Case	Steady State	1	°C/W
R$_{θJA}$[③]	Thermal Resistance-Junction to Ambient	Steady State	48	°C/W

Note ① : Max. current is limited by bonding limit

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	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	-	2.2	2.6	mΩ
		V$_{GS}$=4.5V, I$_{DS}$=10A		3.2	4.2	
gfs	Forward Transconductance	V$_{DS}$=5V, I$_{DS}$=10A	-	35	-	S
Dynamic Characteristics ⑤						
R$_G$	Gate Resistance	V$_{GS}$=0V,V$_{DS}$=0V, Freq.=1MHz	-	0.75	-	Ω
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=30V, Freq.=1MHz	-	5155	-	pF
C$_{oss}$	Output Capacitance		-	1331	-	
C$_{rss}$	Reverse Transfer Capacitance		-	193	-	
td$_{(ON)}$	Turn-on Delay Time	V$_{GS}$=10V,V$_{DS}$=25V, I$_D$=1A,R$_{GEN}$=3Ω	-	16	-	nS
t$_r$	Turn-on Rise Time		-	5.6	-	
t$_{d(OFF)}$	Turn-off Delay Time		-	54	-	
t$_f$	Turn-off Fall Time		-	101	-	
Q$_g$	Total Gate Charge	V$_{GS}$=4.5V,V$_{DS}$=30V I$_D$=20A	-	45	-	nC
Q$_g$	Total Gate Charge	V$_{GS}$=10V,V$_{DS}$=30V, I$_D$=20A	-	93.7	-	
Q$_{gs}$	Gate-Source Charge		-	20.4	-	
Q$_{gd}$	Gate-Drain Charge		-	20.5	-	
Source-Drain Characteristics						
V$_{SD}$④	Diode Forward Voltage	I$_{SD}$=10A, V$_{GS}$=0V	-	0.8	1.1	V
t$_{rr}$	Reverse Recovery Time	I$_F$=10A, V$_R$=48V dI$_F$/dt=100A/μs	-	45	-	nS
Q$_{rr}$	Reverse Recovery Charge		-	44	-	nC

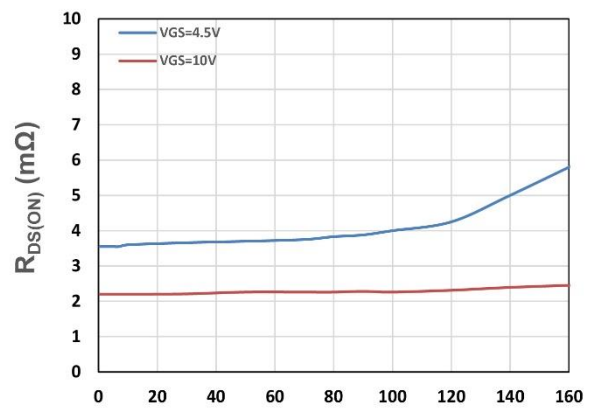Note ④：Pulse test (pulse width≤300us, duty cycle≤2%).
Note ⑤：Guaranteed by design, not subject to production testing.
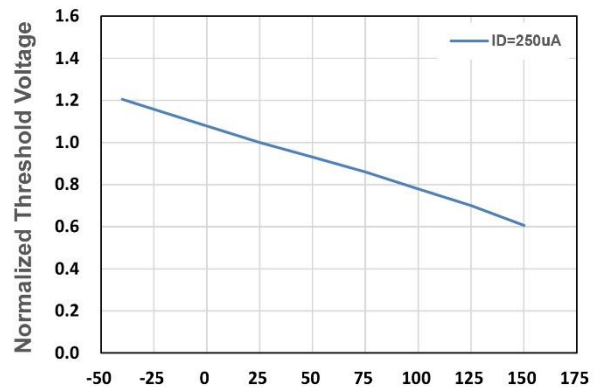
N-Channel Typical Characteristics
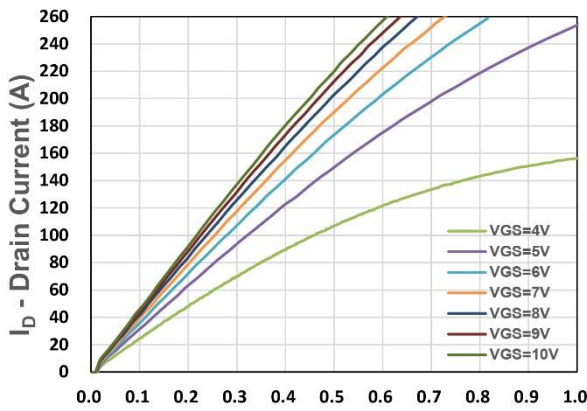
Figure 1. Output Characteristics

Figure 2. On-Resistance vs. ID
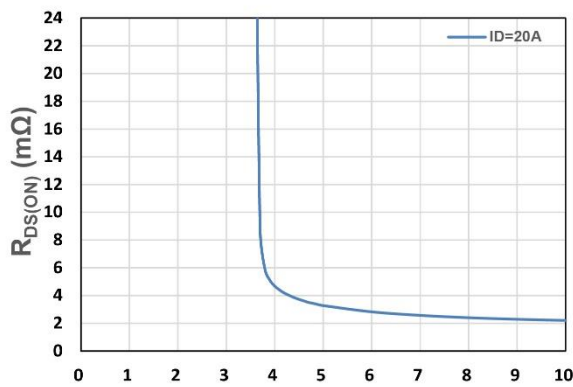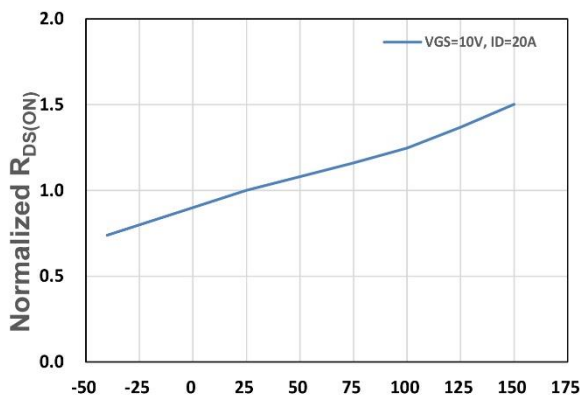

Figure 3. On-Resistance vs. VGS

Figure 4. Gate Threshold Voltage

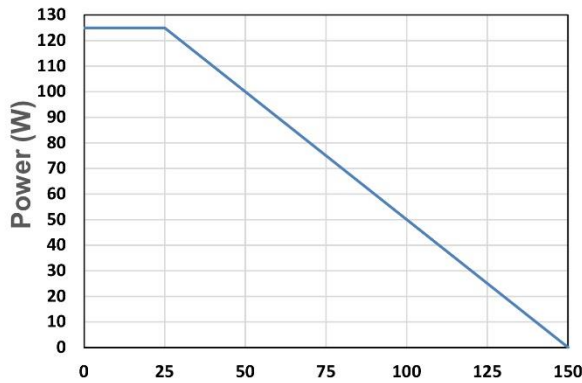Figure 5. Drain-Source On Resistance
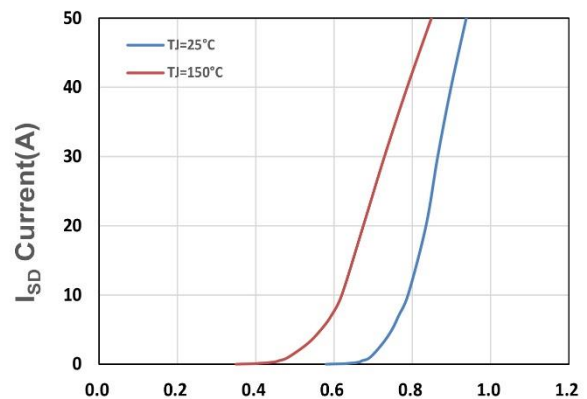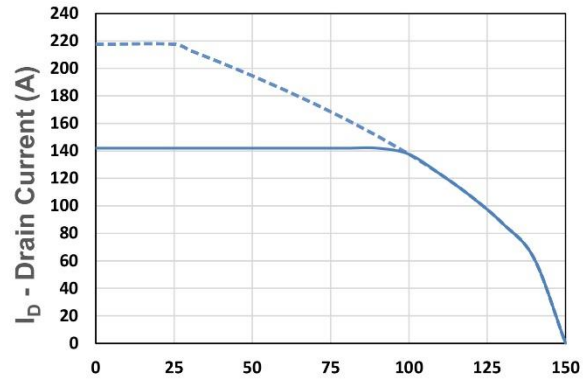

Figure 6. Source-Drain Diode Forward
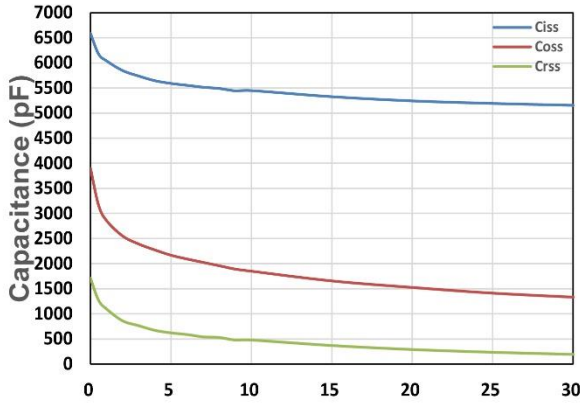
V$_{DS}$ - Drain - Source Voltage (V)
Figure 7. Capacitance
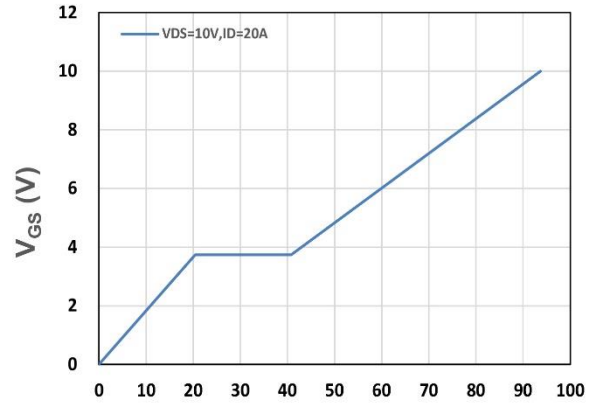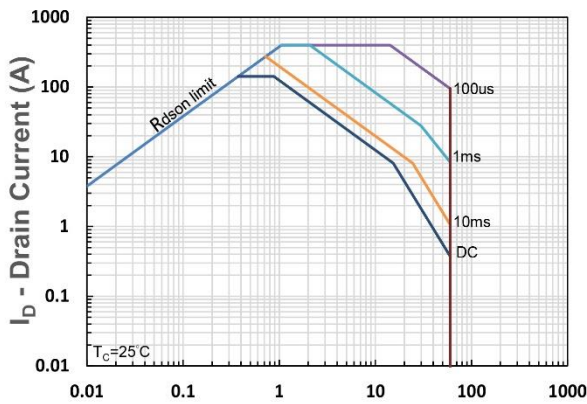

Qg, Total Gate Charge (nC)
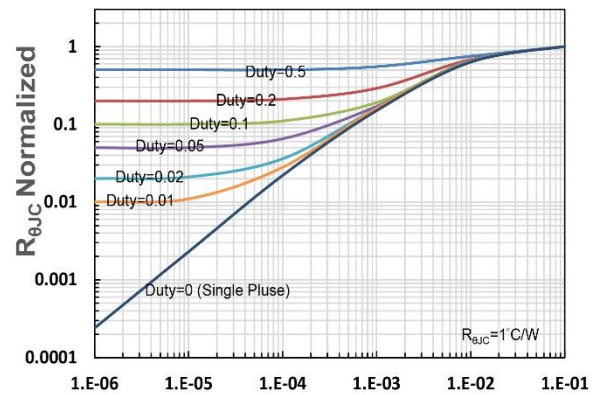Figure 8. Gate Charge Characteristics

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

t$_1$,Square Wave Pulse Duration(s)
Figure 12. R$_{θJC}$ Transient Thermal Impedance