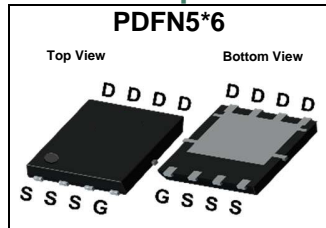
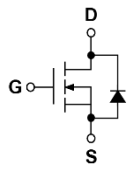


N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	60	V
$R_{DS(ON)-Max}$	2.6	m Ω
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 ($T_J=25^\circ\text{C}$ 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	$T_C=25^\circ\text{C}$	114	A
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	400	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	142 ^①	A
		$T_C=100^\circ\text{C}$	138	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	125	W
		$T_C=100^\circ\text{C}$	50	
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$	31	A
		$T_A=70^\circ\text{C}$	25	
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	2.6	W
		$T_A=70^\circ\text{C}$	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	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	1	$^\circ\text{C}/\text{W}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	48	$^\circ\text{C}/\text{W}$

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

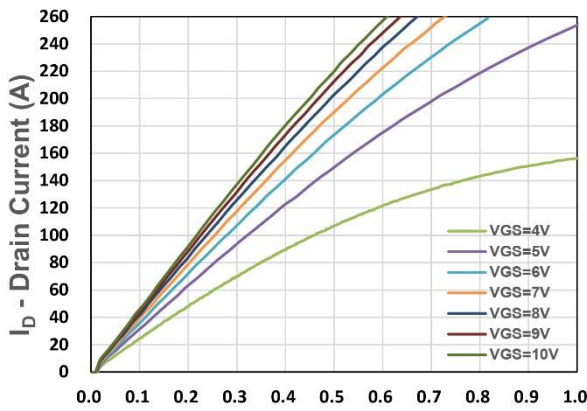
N-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=48V, V_{GS}=0V$	-	-	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1	1.7	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
$R_{DS(on)}^{(4)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=20A$	-	2.2	2.6	m Ω
		$V_{GS}=4.5V, I_{DS}=10A$	-	3.2	4.2	
gfs	Forward Transconductance	$V_{DS}=5V, I_{DS}=10A$	-	35	-	S
Dynamic Characteristics ⁽⁶⁾						
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					
C_{rss}	Reverse Transfer Capacitance					
$t_{d(ON)}$	Turn-on Delay Time	$V_{GS}=10V, V_{DS}=25V,$ $I_D=1A, R_{GEN}=3\Omega$	-	16	-	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	$V_{GS}=4.5V, V_{DS}=30V$ $I_D=20A$	-	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	$I_F=10A, V_R=48V$	-	45	-	nS
Q_{rr}	Reverse Recovery Charge	$di_F/dt=100A/\mu s$	-	44	-	nC

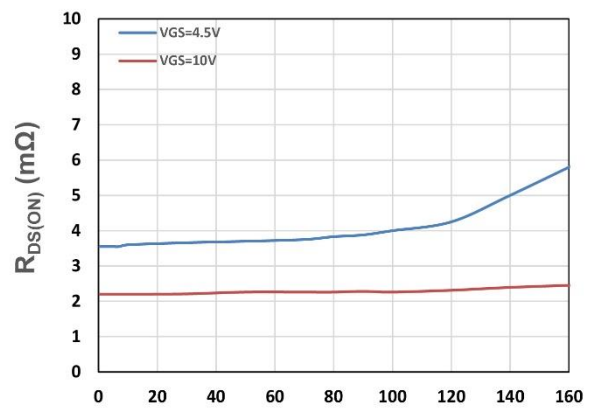
Note ④ : Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

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

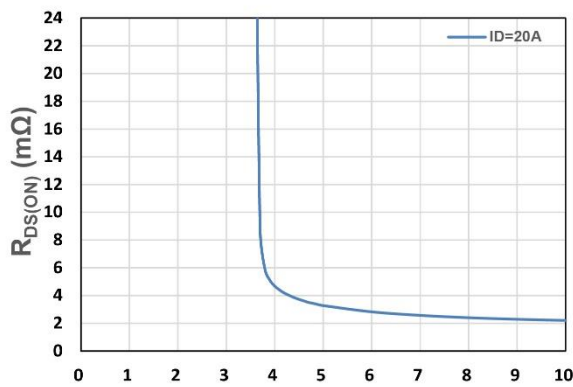
N-Channel Typical Characteristics



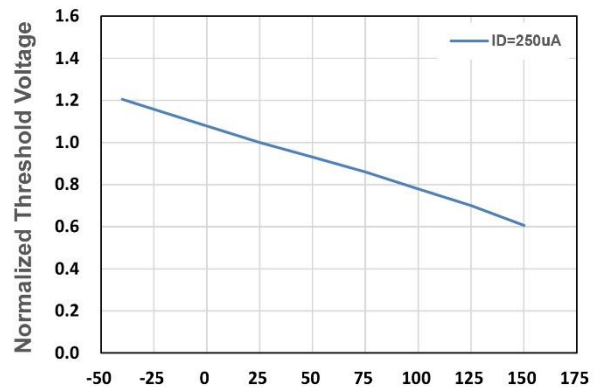
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



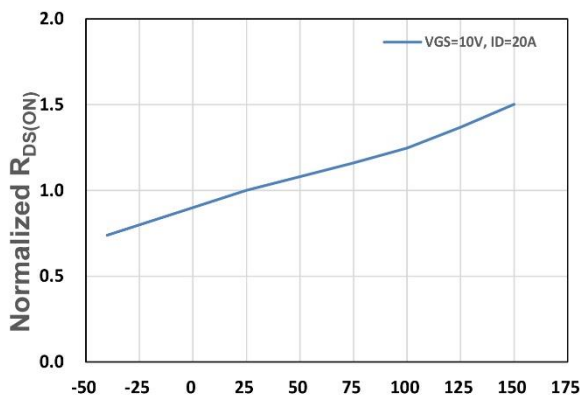
I_D - Drain Current (A)
Figure 2. On-Resistance vs. ID



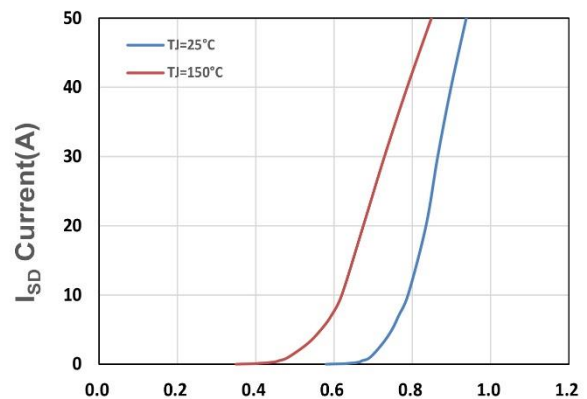
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. VGS



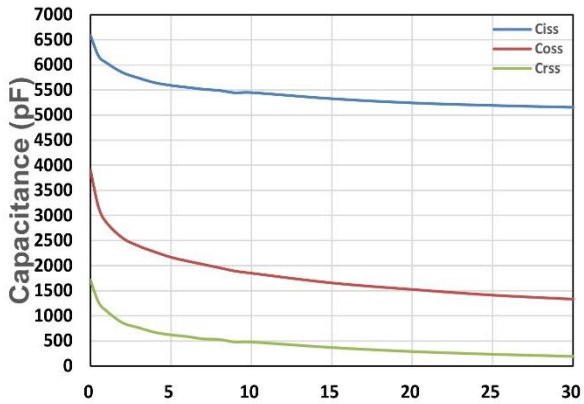
T_j, Junction Temperature(°C)
Figure 4. Gate Threshold Voltage



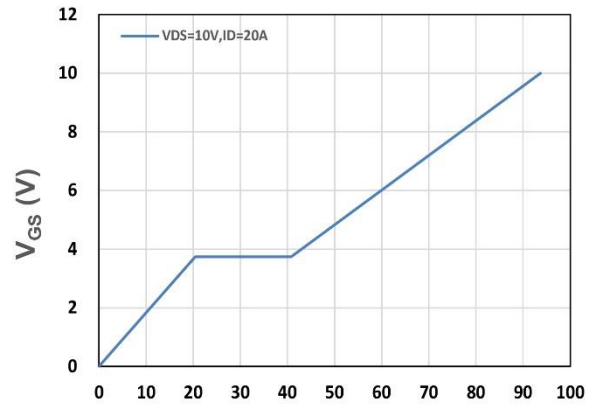
T_j, Junction Temperature(°C)
Figure 5. Drain-Source On Resistance



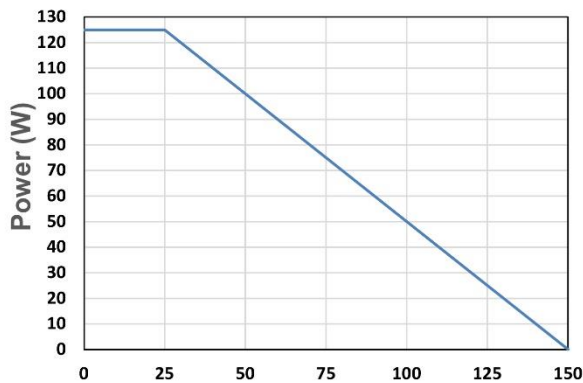
V_{SD}, Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward



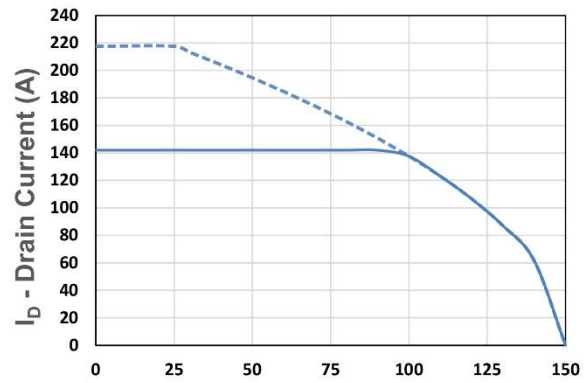
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



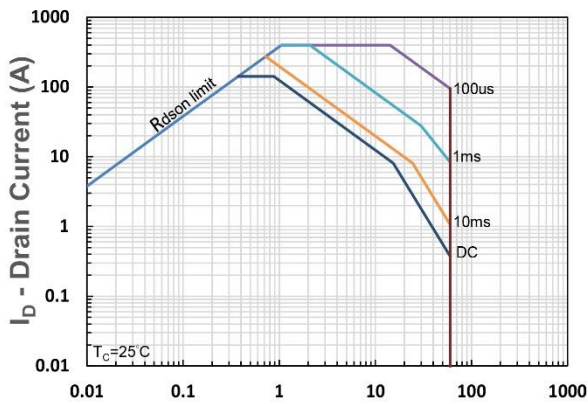
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



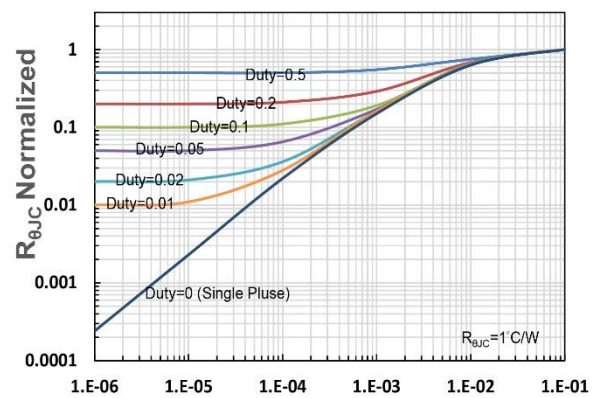
T_c - Case Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



T_c - Case Temperature ($^{\circ}C$)
Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)
Figure 11. Safe Operating Area



t_1 , Square Wave Pulse Duration (s)
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance

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