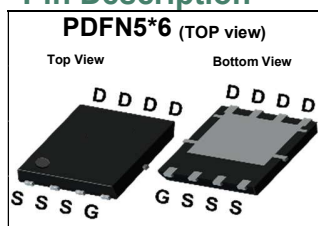
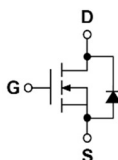


## N-Channel Enhancement Mode MOSFET

### Pin Description



### Symbol



### Product Summary

Symbol	N-Channel	Unit
$V_{DSS}$	100	V
$R_{DS(ON)-Max}$	8.6	m $\Omega$
$I_D$	87	A

### Feature

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

### Applications

- Power Management in DC/DC Converters
- USB Power Delivery (USB PD)

### Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
SL87N10Q	PDFN5*6	Tape & Reel	5000 / Tape & Reel	

### Absolute Maximum Ratings (T<sub>J</sub>=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	$T_C=25^\circ\text{C}$	60	A
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	218	
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$	87	A
		$T_C=100^\circ\text{C}$	55	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	66	W
		$T_C=100^\circ\text{C}$	26	
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	17	A
		$T_A=70^\circ\text{C}$	13.6	
$P_D$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	2.5	W
		$T_A=70^\circ\text{C}$	1.6	
$I_{AS}^{(2)}$	Avalanche Current, Single pulse	L=0.1mH	30	A
		L=0.5mH	18	
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse	L=0.1mH	45	mJ
		L=0.5mH	81	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	1.9	°C/W
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	Steady State	50	°C/W

Note ① : Max. current is limited by junction temperature

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

Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz

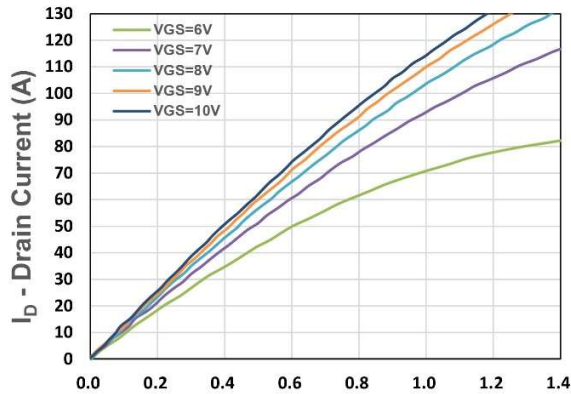
**N-Channel Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	100	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=80V, V_{GS}=0V$	-	-	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2	3	4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
$R_{DS(ON)}^{\bullet}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=20A$	-	7.2	8.6	m $\Omega$
<b>gfs</b>	Forward Transconductance	$V_{DS}=5V, I_{DS}=10A$	-	15.6	-	S
<b>Dynamic Characteristics <sup>●</sup></b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V,$ Freq.=1MHz	-	0.6	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=50V,$ Freq.=1MHz	-	2053	-	pF
$C_{oss}$	Output Capacitance		-	710	-	
$C_{rss}$	Reverse Transfer Capacitance		-	45	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{GS}=10V, V_{DS}=50V,$ $I_D=1A, R_{GEN}=1\Omega$	-	12.7	-	nS
$t_r$	Turn-on Rise Time		-	7.3	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	29.6	-	
$t_f$	Turn-off Fall Time		-	84	-	
$Q_g$	Total Gate Charge	$V_{GS}=6V, V_{DS}=50V$ $I_D=20A$	-	23.4	-	nC
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=50V,$ $I_D=20A$	-	35.5	-	
$Q_{gs}$	Gate-Source Charge		-	10.7	-	
$Q_{gd}$	Gate-Drain Charge		-	9.6	-	
<b>Source-Drain Characteristics</b>						
$V_{SD}^{\bullet}$	Diode Forward Voltage	$I_{SD}=10A, V_{GS}=0V$	-	0.8	1.1	V
$t_{rr}$	Reverse Recovery Time	$I_F=10A, V_R=50V$	-	42.6	-	nS
$Q_{rr}$	Reverse Recovery Charge	$di_F/dt=100A/\mu s$	-	40.5	-	nC

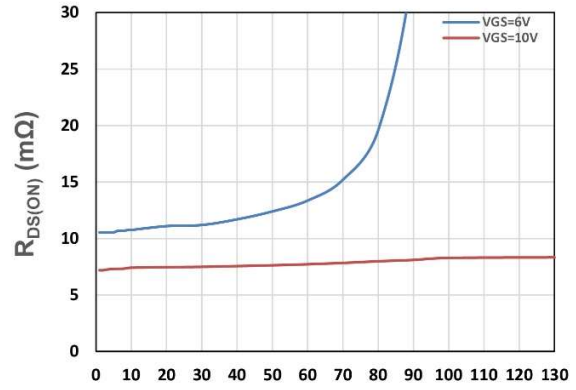
Note ④ : Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

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

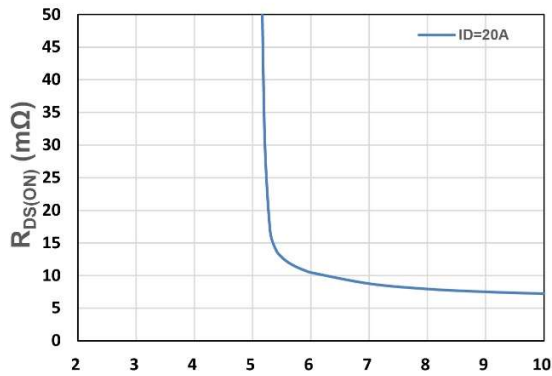
## N-Channel Typical Characteristics



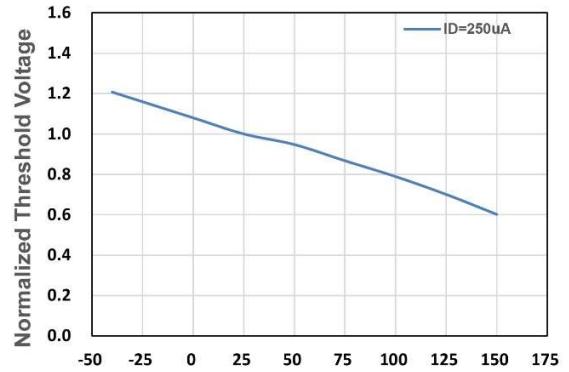
$V_{DS}$  - Drain - Source Voltage (V)  
Figure 1. Output Characteristics



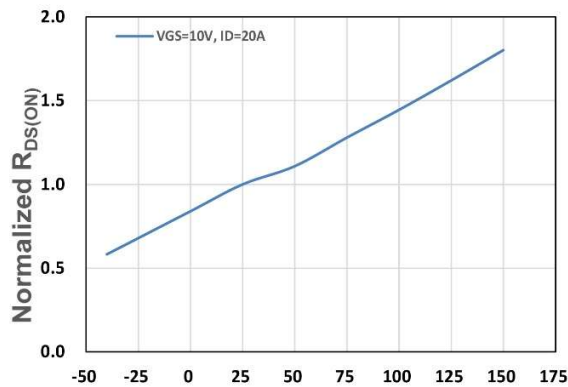
$I_D$ - Drain Current (A)  
Figure 2. On-Resistance vs. ID



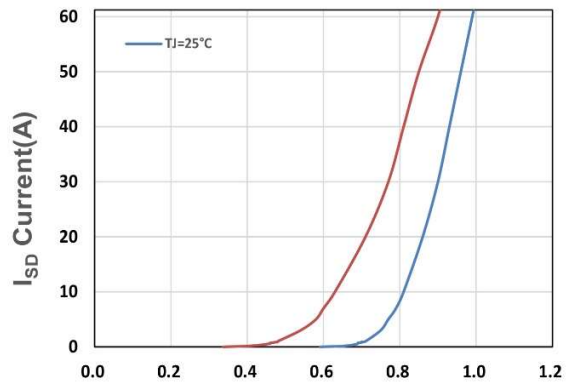
$V_{GS}$  - Gate - Source Voltage (V)  
Figure 3. On-Resistance vs. VGS



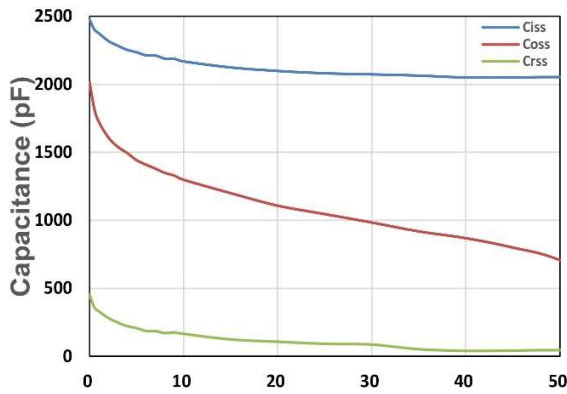
$T_j$ , Junction Temperature( $^{\circ}C$ )  
Figure 4. Gate Threshold Voltage



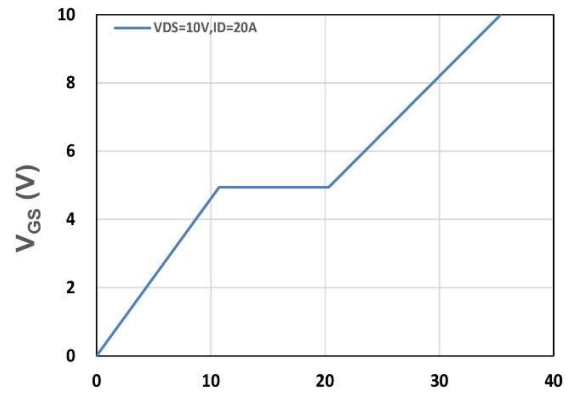
$T_j$ , Junction Temperature( $^{\circ}C$ )  
Figure 5. Drain-Source On Resistance



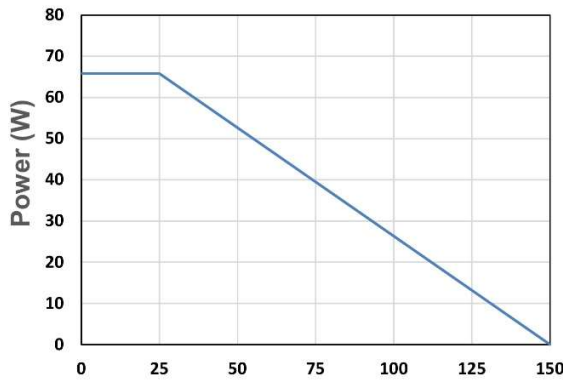
$V_{SD}$ , Source-Drain Voltage(V)  
Figure 6. Source-Drain Diode Forward



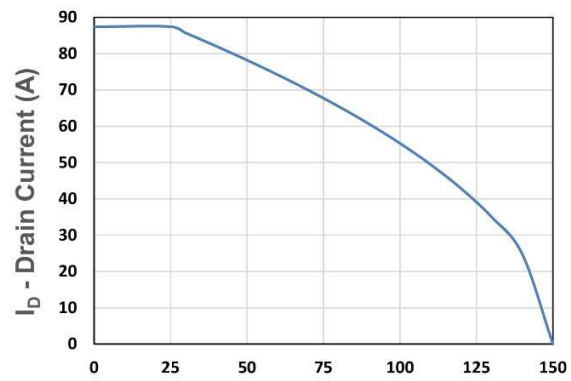
**V<sub>DS</sub> - Drain - Source Voltage (V)**  
Figure 7. Capacitance



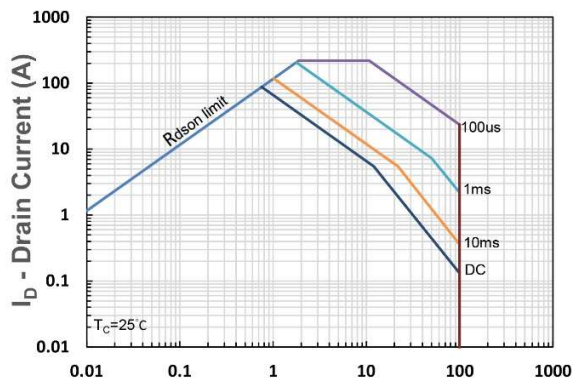
**Qg, Total Gate Charge (nC)**  
Figure 8. Gate Charge Characteristics



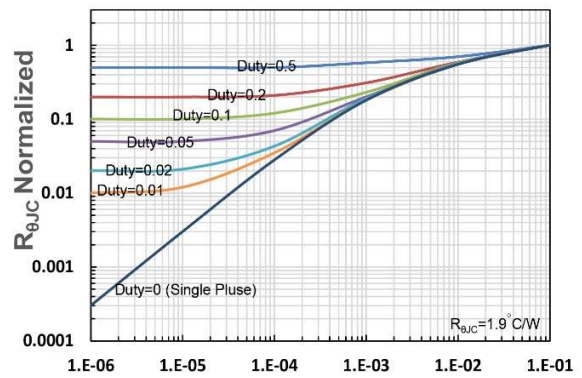
**Tc - Case Temperature (°C)**  
Figure 9. Power Dissipation



**Tc - Case Temperature (°C)**  
Figure 10. Drain Current



**V<sub>DS</sub> - Drain-Source Voltage (V)**  
Figure 11. Safe Operating Area



**t<sub>1</sub>, Square Wave Pulse Duration(s)**  
Figure 12. R<sub>θJC</sub> Transient Thermal Impedance

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