

N-Channel Power MOSFET

General Description

- Very low on-resistance $R_{DS(ON)}$
- Low Gate Charge
- Excellent Gate Charge x $R_{DS(ON)}$ Product

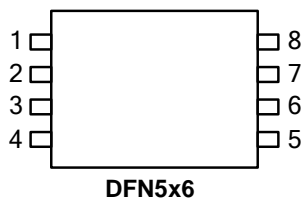
Applications

- High Frequency Switching and Synchronous Rectification

Product Summary

V_{DS}	60V
I_D	75A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 8.5mΩ(Max)
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 12 mΩ(Max)

100% DVDS Tested
 100% UIS Tested
 100% Rg Tested



Part Number	Package Type	Form	Marking
SL75N06Q	DFN5x6	Tape & Reel	SL75N06Q

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	Silicon Limited	75
		$T_C = 100^\circ\text{C}$ ^B	47
Pulsed Drain Current ^A	I_{DM}	280	A
Avalanche Current ^A	I_{AS}	40	A
Single Pulse Avalanche Energy	E_{AS}	80	mJ
Power Dissipation ^C	P_D	$T_C = 25^\circ\text{C}$	41
		$T_A = 25^\circ\text{C}$	2.5
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Case	$R_{\theta JC}$	62	$^\circ\text{C/W}$
Maximum Junction-to-Ambient	$R_{\theta JA}$	1.4	

Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=10mA$	60	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	-	7.1	8.5	$m\Omega$
		$V_{GS}=4.5V, I_D=20A$	-	9.5	12	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	-	2.4	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=20A$	-	30	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Q_g	Total Gate Charge	$I_D=20A$	-	57	-	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=15V$	-	8	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=4.5V$	-	14	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V$	-	16	-	ns
t_r	Rise Time	$I_D=1A$	-	41	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	56	-	ns
t_f	Fall Time	$V_{GS}=10V$	-	16	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	3307	-	pF
C_{oss}	Output Capacitance	$V_{DS}=15V$	-	201	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0MHz$	-	105	-	pF
R_g	Gate Resistance	$f=1.0MHz$	-	1.2	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=20A, V_{GS}=0V$	-	-	1.2	V
t_{rr}	Reverse Recovery Time	$I_S=20A, V_{GS}=0V,$	-	22	-	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	30	-	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=40A$
- 4.The power dissipation is limited by 150 $^{\circ}\text{C}$ junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

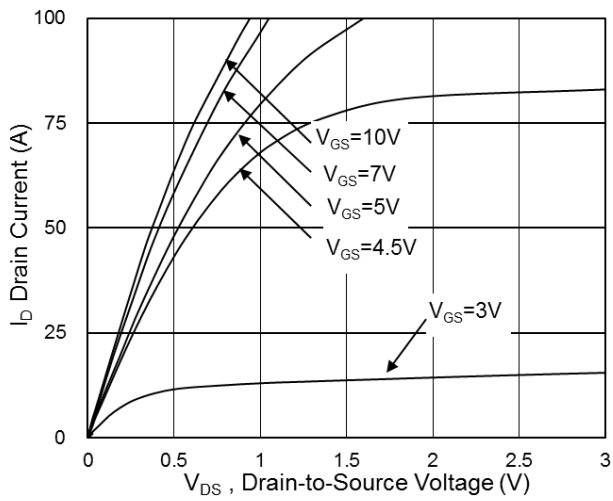


Fig.1 Typical Output Characteristics

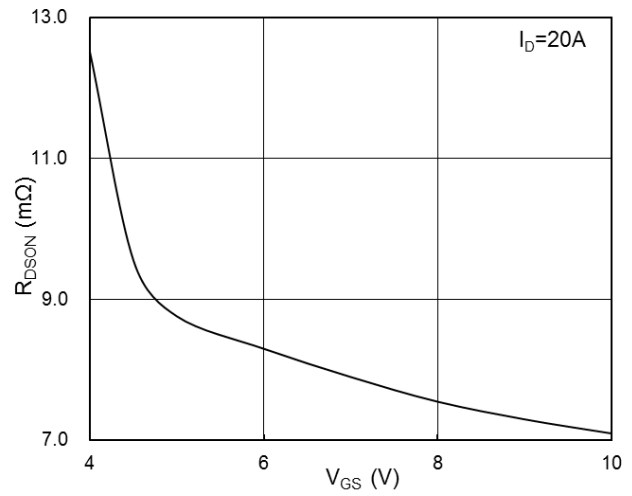


Fig.2 On-Resistance vs Gate-Source Voltage

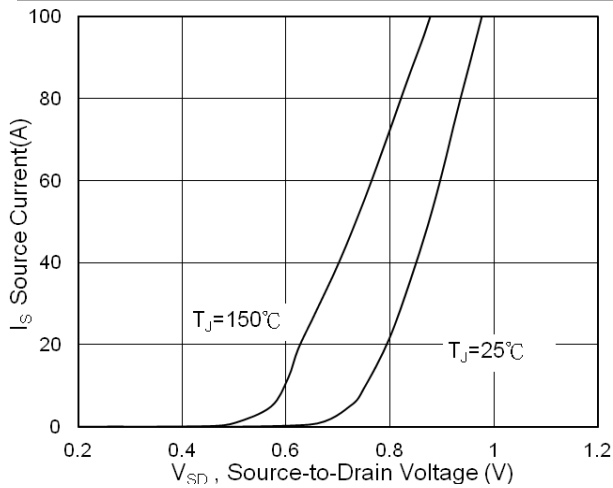


Fig.3 Forward Characteristics of Reverse

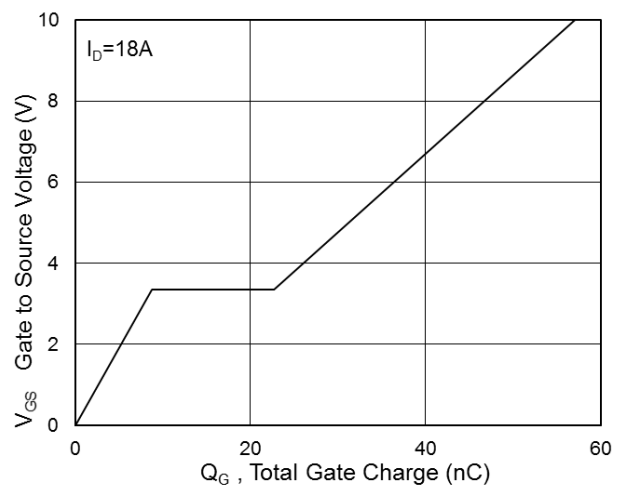


Fig.4 Gate-Charge Characteristics

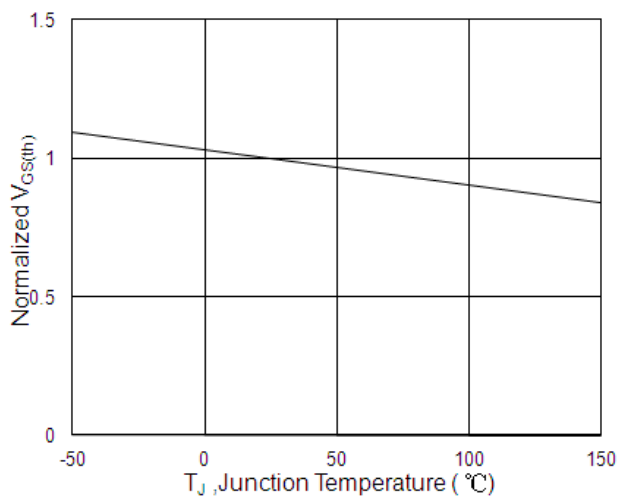


Fig.5 Normalized $V_{GS(th)}$ vs T_J

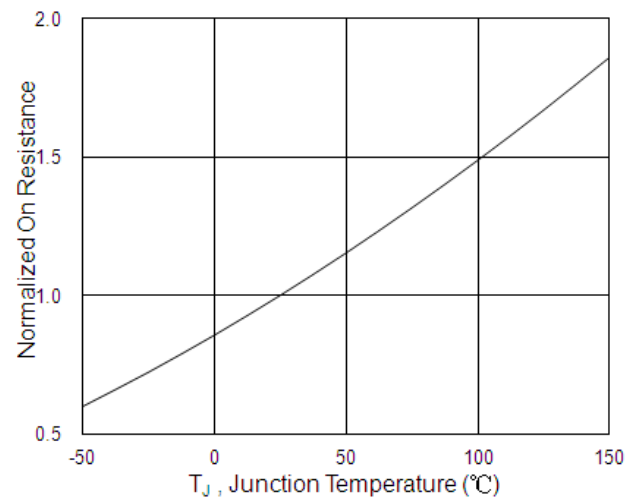


Fig.6 Normalized $R_{DS(on)}$ vs T_J

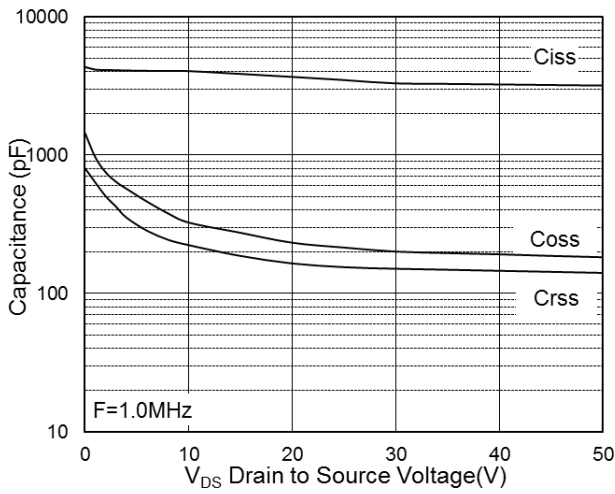


Fig.7 Capacitance

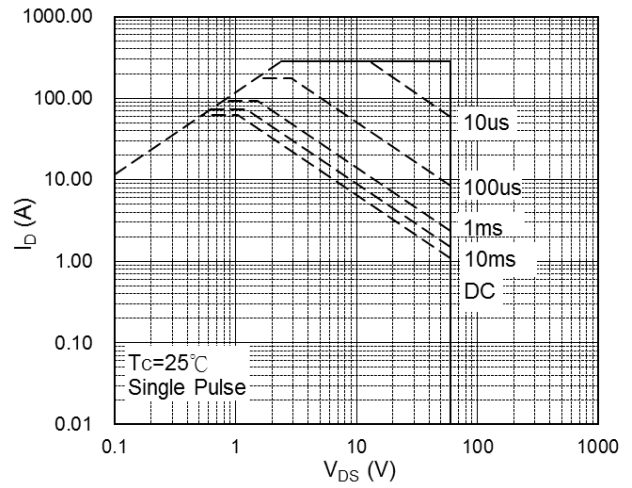


Fig.8 Safe Operating Area

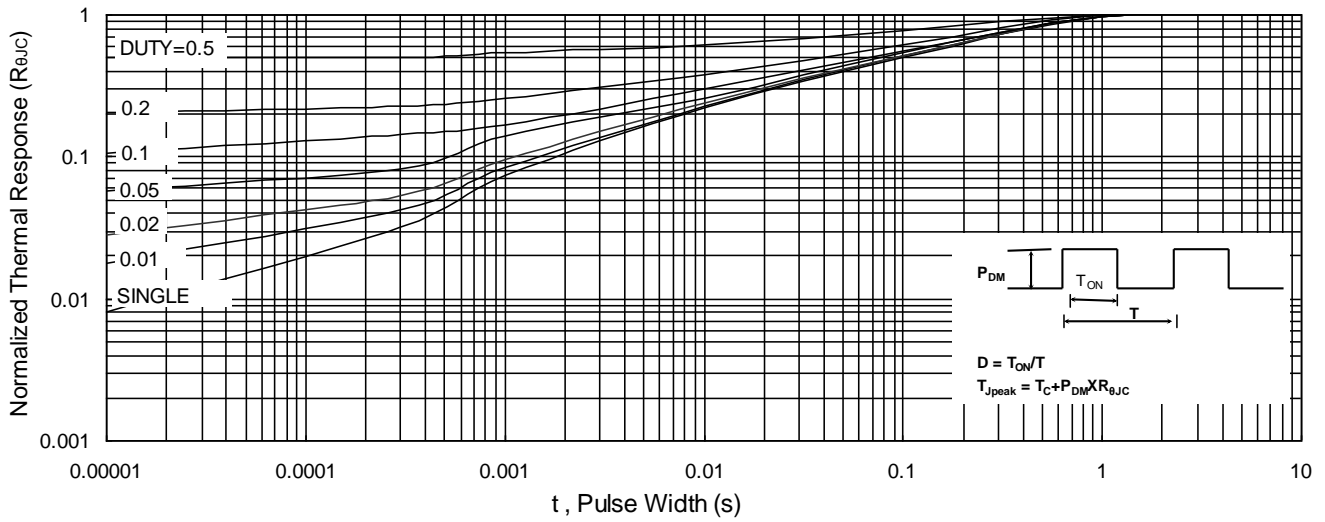


Fig.9 Normalized Maximum Transient Thermal Impedance

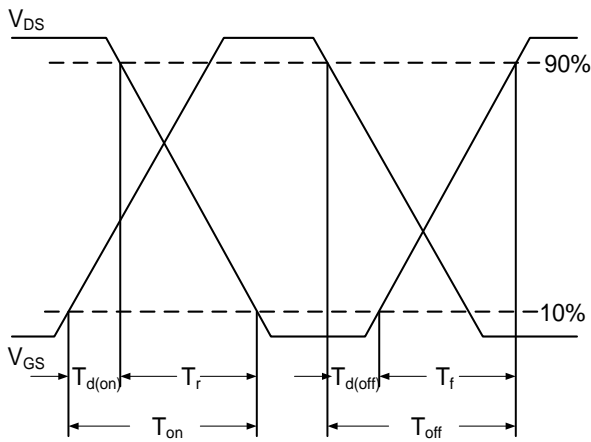


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

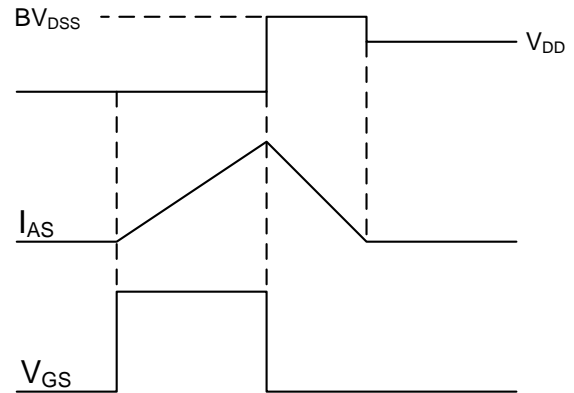
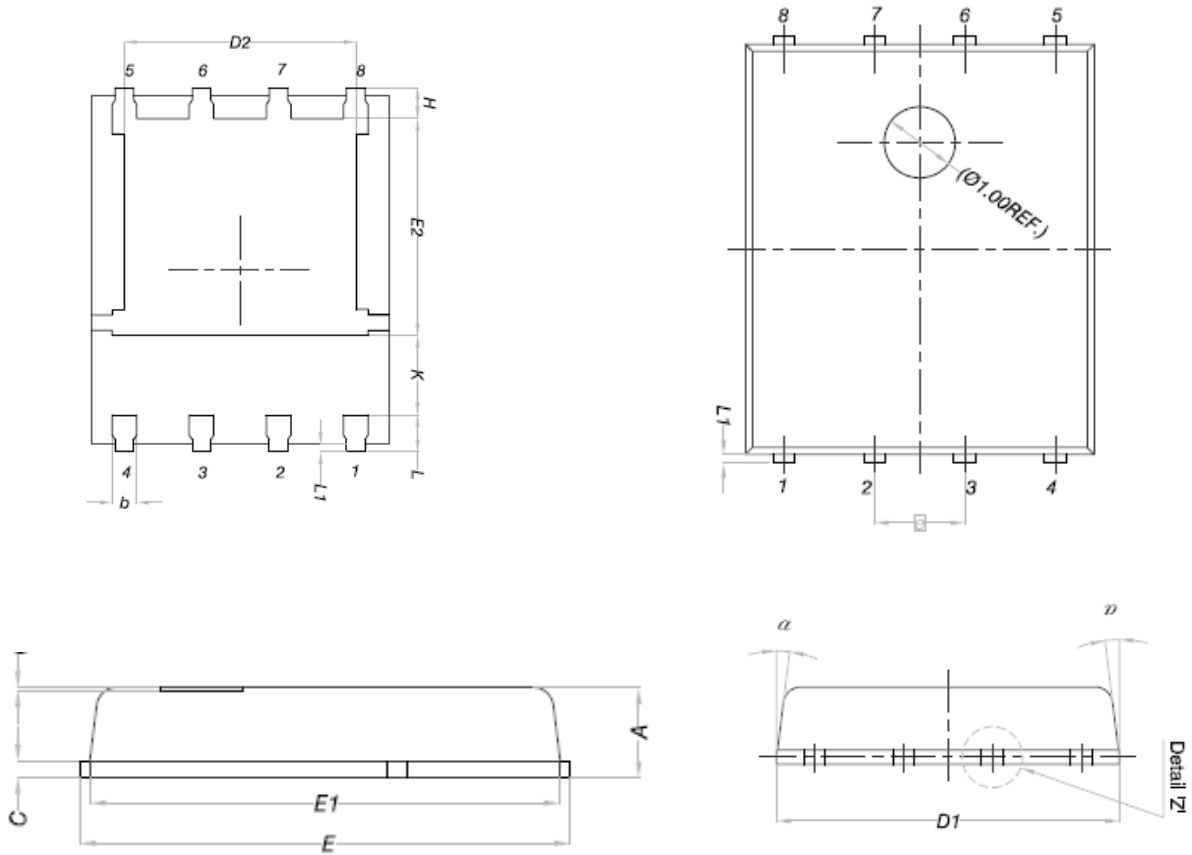


Fig.11 Unclamped Inductive Switching Waveform

DFN5x6


DIM.	MILLIMETERS			DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	0.90	1.00	1.10	E	5.90	6.00	6.10
A1	0	-	0.05	E1	5.70	5.75	5.80
b	0.33	0.41	0.51	E2	3.38	3.58	3.78
C	0.20	0.25	0.30	e	1.27 BSC		
D1	4.80	4.90	5.00	H	0.41	0.51	0.61
D2	3.61	3.81	3.96	K	1.10	-	-
				L	0.51	0.61	0.71
				L1	0.06	0.13	0.20
				α	0°	-	12°