

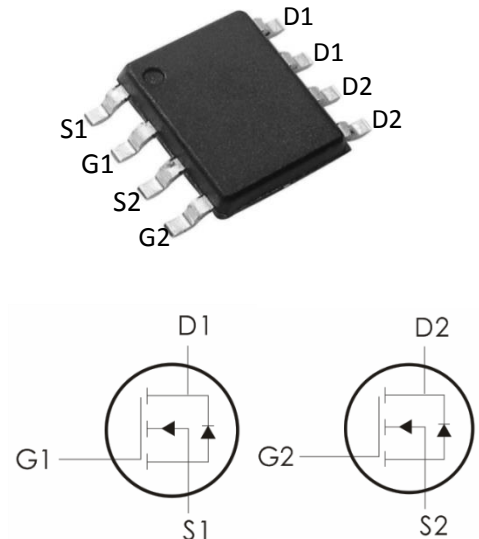
Description:

This Dual N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=60V, I_D=5A, R_{DS(on)} < 36m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current - $T_A=25^\circ\text{C}^1$	5	A
	Continuous Drain Current - $T_A=70^\circ\text{C}^1$	3.5	
I_{DM}	Drain Current-Pulsed ²	18	A
E_{AS}	Single Pulse Avalanche Energy ³	22	mJ
I_{AS}	Avalanche Current	21	A
P_D	Power Dissipation ⁴	1.5	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ¹	85	$^\circ\text{C}/\text{W}$

R_{θJC}	Thermal Resistance Junction-Case ¹	25	°C/W
------------------------	---	----	------

Package Marking and Ordering Information:

Part NO.	Marking	Package
STS5DNF60L-DO	S5DNF 60L	SOP-8D

Electrical Characteristics: (T_C=25 °C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourctce Breakdown Voltage	V _{GS} =0V,I _D =250 μ A	60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =48V,T _J =25 °C	---	---	1	μ A
		V _{GS} =0V, V _{DS} =48V,T _J =55 °C	---	---	5	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1	---	2.5	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V,I _D =4A	---	30	36	m Ω
		V _{GS} =4.5V,I _D =3A	---	34	45	
G _{FS}	Forward Transconductance	V _{DS} =5V, I _D =4A	---	28.3	---	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1020	---	pF
C _{Oss}	Output Capacitance		---	60	---	
C _{rss}	Reverse Transfer Capacitance		---	45	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =30V, I _D =4A R _G =3.3 Ω . V _{GS} =10V,	---	3	---	ns
t _r	Rise Time		---	34	---	ns
t _{d(off)}	Turn-Off Delay Time		---	23	---	ns
t _f	Fall Time		---	6	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =48V,	---	19	---	nC
Q _{gs}	Gate-Source Charge	I _D =4A	---	2.6	---	nC

Q_{gd}	Gate-Drain "Miller" Charge		---	4.1	---	nC
R_G	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.5	---	Ω
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V
I_S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	4.5	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	18	A
T_{rr}	Reverse Recovery Time	I _F =4A, di/dt=100A/μs, T _J =25°C	---	12.1	---	ns
Q_{rr}	Reverse Recovery Charge		---	6.7	---	nC

Notes:

- 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 ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=21A
- 4.The power dissipation is limited by 150°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: (T_C=25°C unless otherwise noted)

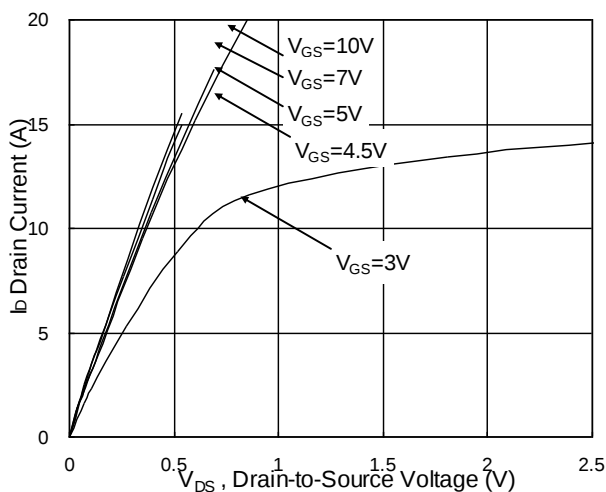


Fig.1 Typical Output Characteristics

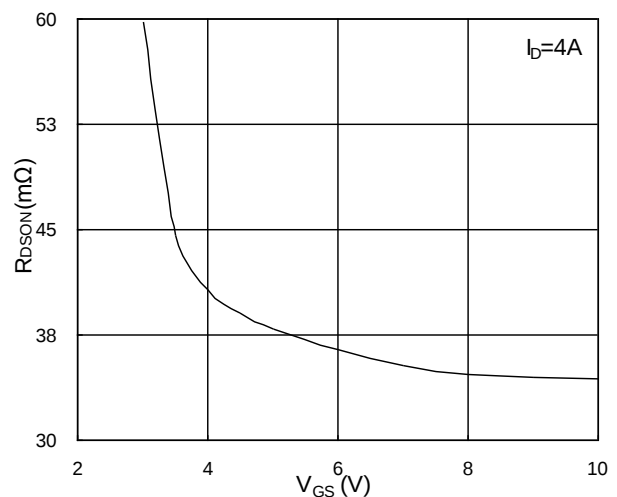


Fig.2 On-Resistance vs. Gate-Source

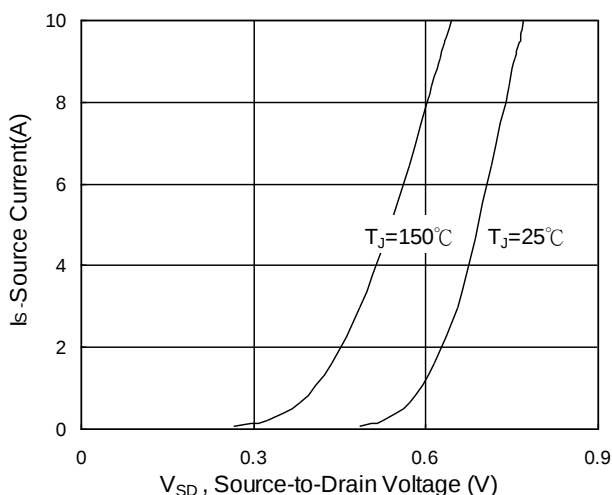


Fig.3 Forward Characteristics Of Reverse

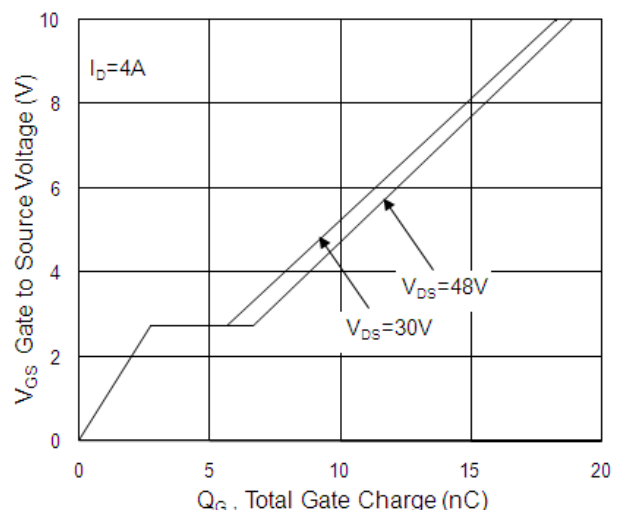


Fig.4 Gate-Charge Characteristics

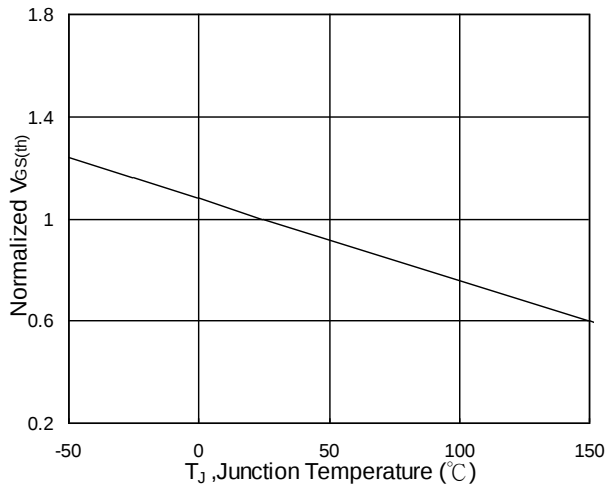


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

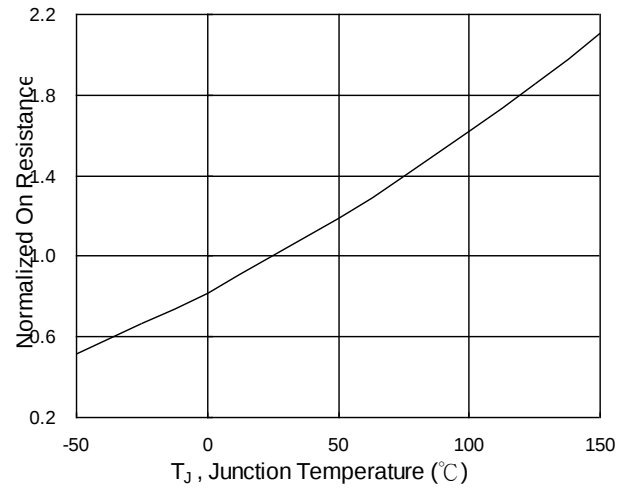


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

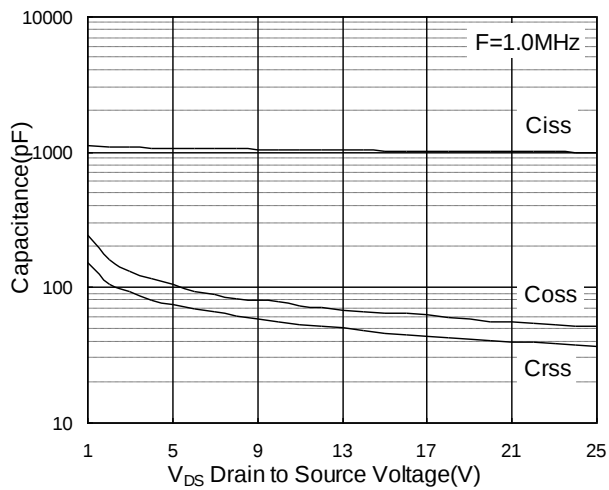


Fig.7 Capacitance

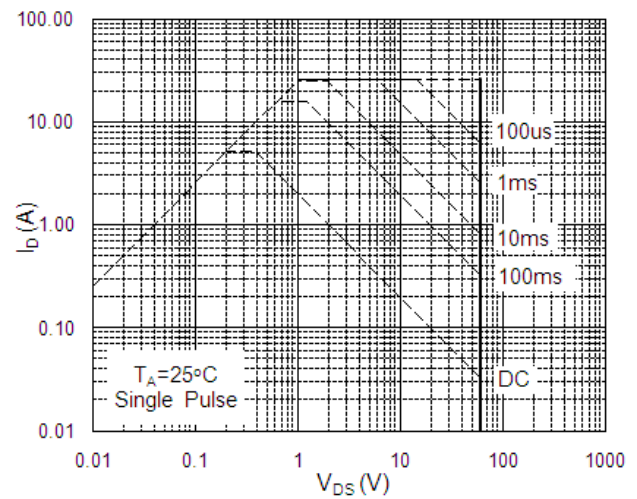


Fig.8 Safe Operating Area

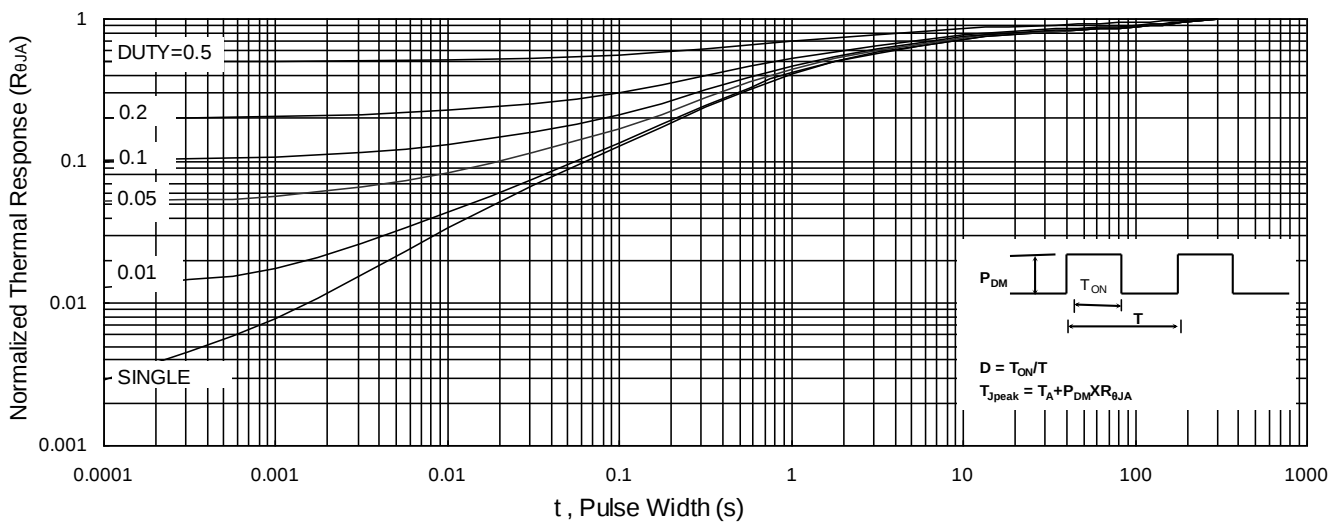


Fig.9 Normalized Maximum Transient Thermal Impedance

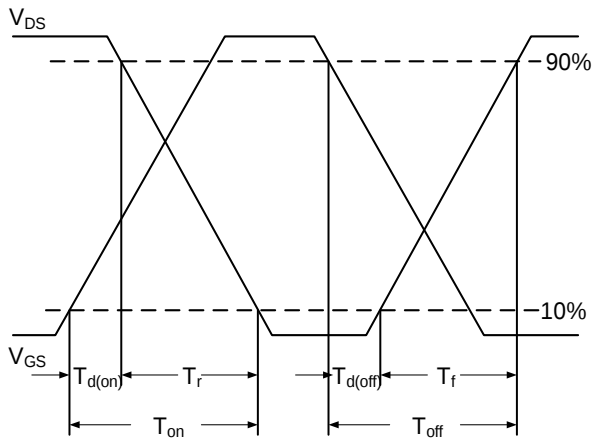


Fig.10 Switching Time Waveform

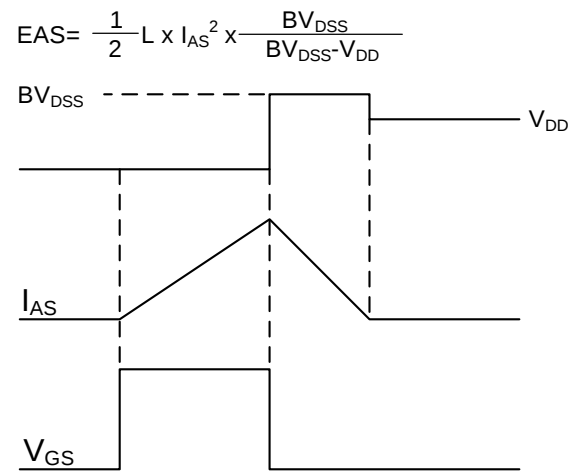


Fig.11 Unclamped Inductive Switching Waveform