



STS6DNF30L

DUAL N - CHANNEL 30V - 0.022Ω - 6A SO-8 STripFET™ POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STS6DNF30L	30 V	< 0.025 Ω	6 A

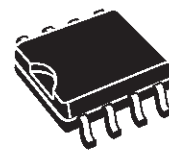
- TYPICAL R_{DS(on)} = 0.022 Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE

DESCRIPTION

This Power MOSFET is the second generation of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

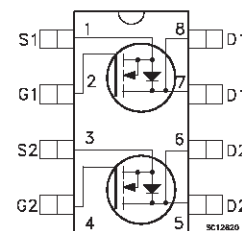
APPLICATIONS

- DC MOTOR DRIVE
- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN PORTABLE/DESKTOP PC_s



SO-8

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	30	V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	30	V
V _{GS}	Gate-source Voltage	± 20	V
I _D	Drain Current (continuous) at T _c = 25 °C Single Operation	6	A
	Drain Current (continuous) at T _c = 100 °C Single Operation	3.8	A
I _{DM} (•)	Drain Current (pulsed)	24	A
P _{tot}	Total Dissipation at T _c = 25 °C Dual Operation	2	W
	Total Dissipation at T _c = 25 °C Single Operation	1.6	W

(•) Pulse width limited by safe operating area

STS6DNF30L

THERMAL DATA

$R_{thj-amb}$	*Thermal Resistance Junction-ambient	Single Operation Dual Operation	78 62.5	$^{\circ}\text{C}/\text{W}$ $^{\circ}\text{C}/\text{W}$
T_j	Maximum Operating Junction Temperature		150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-65 to 150	$^{\circ}\text{C}$

(*) Mounted on FR-4 board (Steady State)

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\ \mu\text{A}$ $V_{GS} = 0$	30			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ $T_c = 125^{\circ}\text{C}$			1 10	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20\ \text{V}$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\ \mu\text{A}$	1	1.6	2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\ \text{V}$ $I_D = 3\ \text{A}$ $V_{GS} = 4.5\ \text{V}$ $I_D = 3\ \text{A}$		0.022 0.025	0.025 0.032	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\ \text{V}$	6			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 3\ \text{A}$		9		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25\ \text{V}$ $f = 1\ \text{MHz}$ $V_{GS} = 0\ \text{V}$		1250 230 50		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{ V}$ $I_D = 3\text{ A}$		22		ns
t_r	Rise Time	$R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, see fig. 3)		30		ns
Q_g	Total Gate Charge	$V_{DD} = 24\text{ V}$ $I_D = 6\text{ A}$ $V_{GS} = 4.5\text{ V}$		17	23	nC
Q_{gs}	Gate-Source Charge			4		nC
Q_{gd}	Gate-Drain Charge			6		nC

www.DataSheet4U.com

SWITCHING OFF

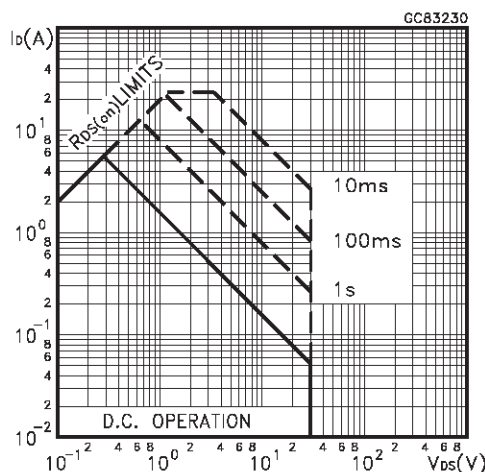
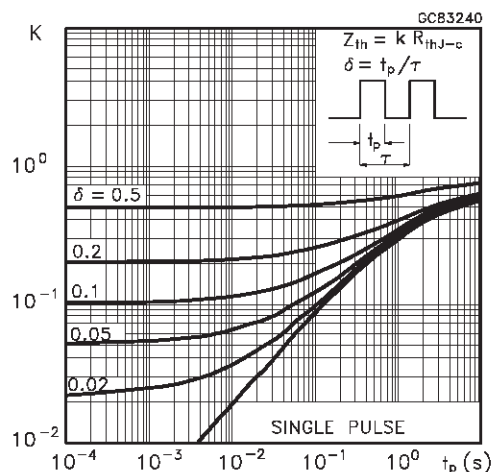
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off Delay Time	$V_{DD} = 15\text{ V}$ $I_D = 3\text{ A}$		55		ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, see fig. 3)		10		ns
$t_r(V_{off})$	Off-voltage Rise Time	$V_{clamp} = 24\text{ V}$ $I_D = 6\text{ A}$		10		ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$		18		ns
t_c	Cross-over Time	(Inductive Load, see fig. 5)		30		ns

SOURCE DRAIN DIODE

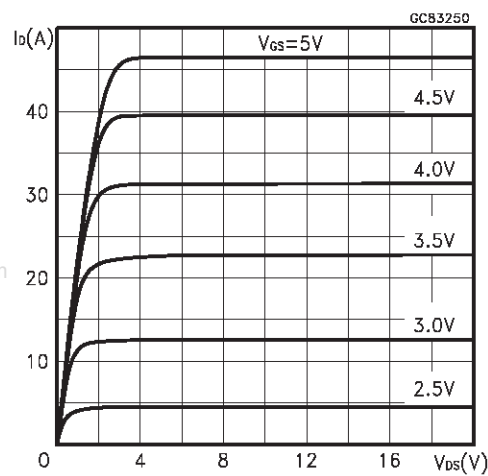
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				6	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				24	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 6\text{ A}$ $V_{GS} = 0$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 6\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 20\text{ V}$ $T_J = 150\text{ }^\circ\text{C}$ (see test circuit, fig. 5)		30		ns
Q_{rr}	Reverse Recovery Charge			30		nC
I_{RRM}	Reverse Recovery Current			2		A

(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

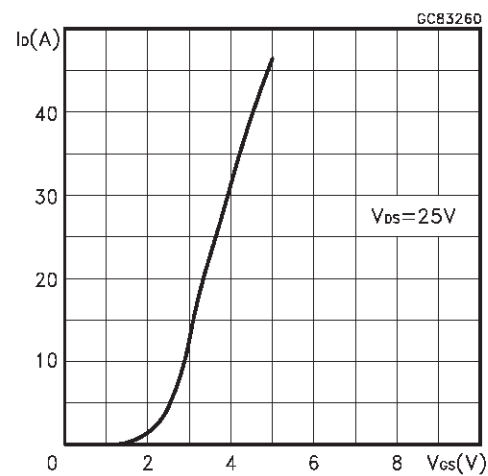
(\bullet) Pulse width limited by safe operating area

Safe Operating Area**Thermal Impedance**

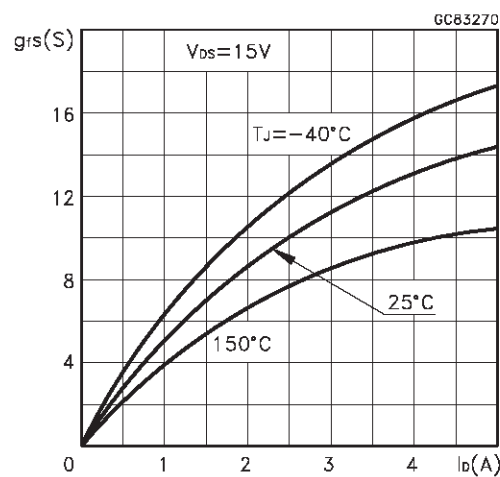
Output Characteristics



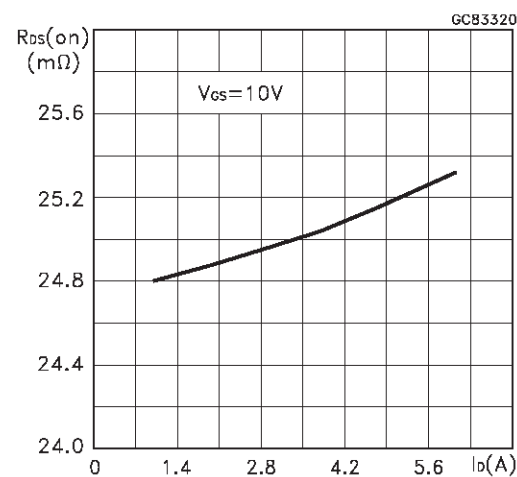
Transfer Characteristics



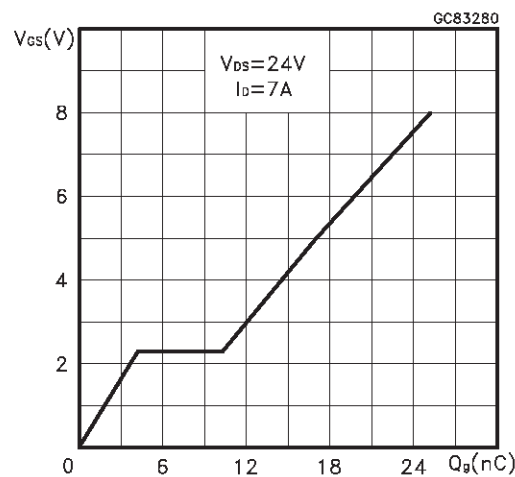
Transconductance



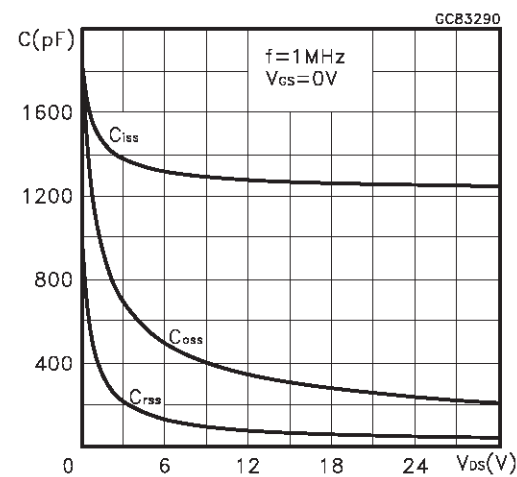
Static Drain-source On Resistance



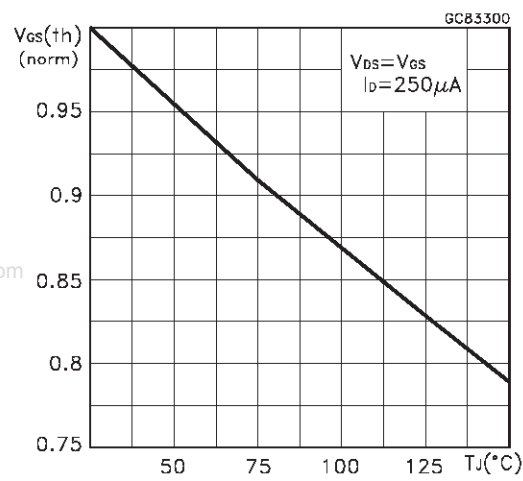
Gate Charge vs Gate-source Voltage



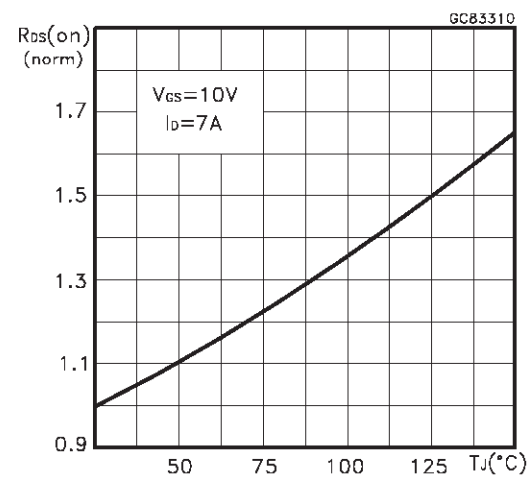
Capacitance Variations



Normalized Gate Threshold Voltage vs Temperature



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

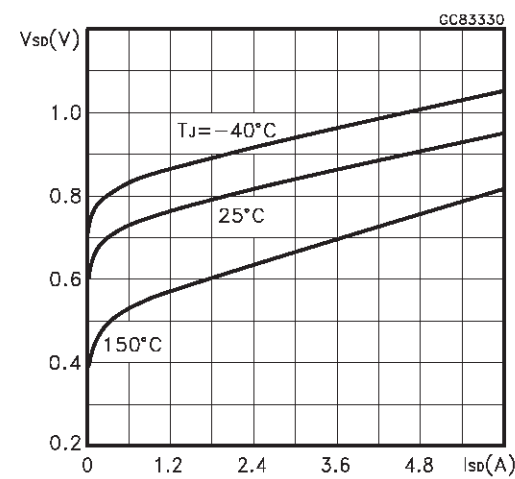


Fig. 1: Unclamped Inductive Load Test Circuit

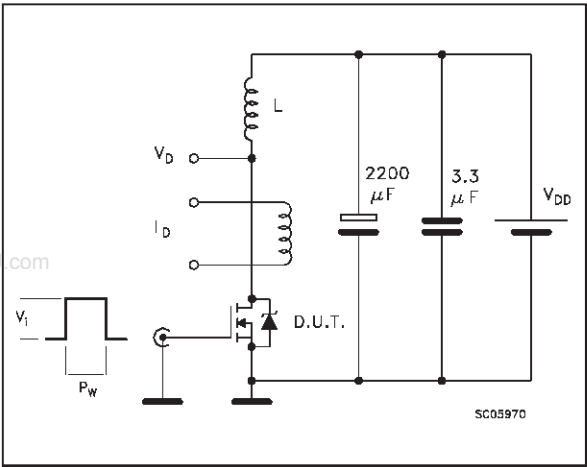


Fig. 2: Unclamped Inductive Waveform



Fig. 3: Switching Times Test Circuits For Resistive Load



Fig. 4: Gate Charge test Circuit

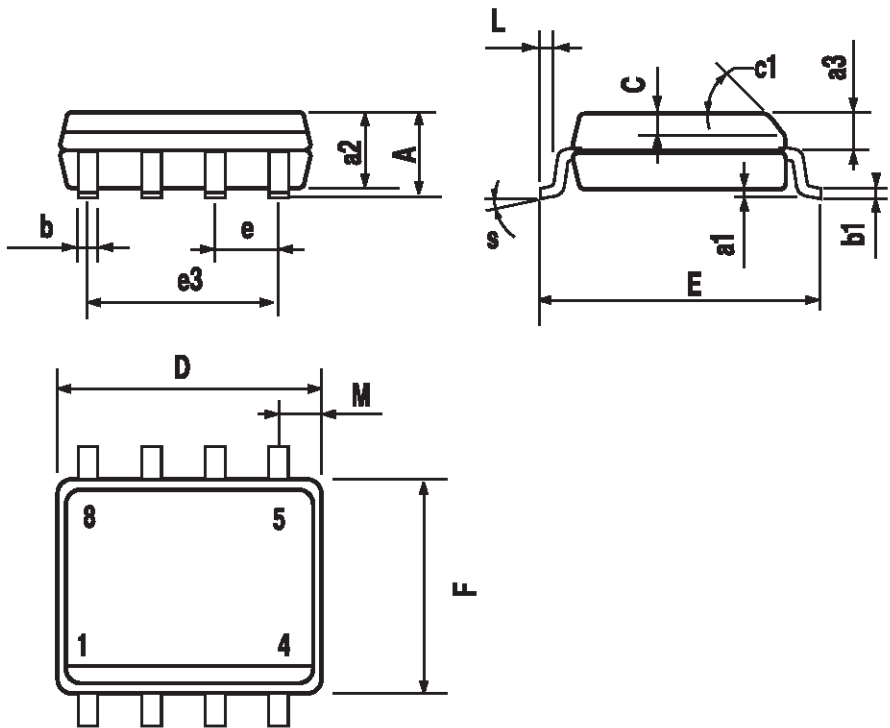


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



SO-8 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45 (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8 (max.)					



0016023

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 1999 STMicroelectronics – Printed in Italy – All Rights Reserved
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.