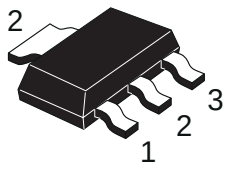
STN3NF06

N-CHANNEL 60V - 0.07Ω - 4A SOT-223
STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STN3NF06	60 V	< 0.1 Ω	4 A

- TYPICAL $R_{DS}(on)$ = 0.07 Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- AVALANCHE RUGGED TECHNOLOGY



SOT-223

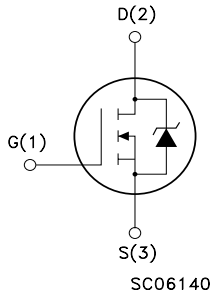
DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronis 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-DC & DC-AC COVERTERS
- DC MOTOR CONTROL (DISK DRIVERS, etc.)
- SYNCHRONOUS RECTIFICATION

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	60	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	60	V
V_{GS}	Gate- source Voltage	± 20	V
I_D	Drain Current (continuous) at T_C = 25°C	4	A
I_D	Drain Current (continuous) at T_C = 100°C	2.9	A
I_{DM}(•)	Drain Current (pulsed)	16	A
P_{tot}	Total Dissipation at T_C = 25°C	3.3	W
	Derating Factor	0.026	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	10	V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	200	mJ
T_{stg}	Storage Temperature	-55 to 150	°C
T_j	Operating Junction Temperature		

(•) Pulse width limited by safe operating area.

(1) I_{SD} ≤4A, di/dt ≤150A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_j ≤ T_{JMAX}
(2) Starting T_j = 25 ºC, I_D = 4A, V_{DD} = 30V

THERMAL DATA

$R_{thj\text{-}pcb}$	Thermal Resistance Junction-PCB (*)	Max	38	°C/W
$R_{thj\text{-}pcb}$	Thermal Resistance Junction-PCB (**)	Max	100	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose (for 10 sec. 1.6 mm from case)	Typ	260	°C

(*) When Mounted on FR-4 board with 1 inch^2 pad, 2 oz of Cu and t $\leq$ 10 sec
(**) When Mounted on minimum recommended footprint

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0	60			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating T_C = 125°C			1 10	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250 µA	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 1.5 A		0.07	0.10	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 15 V I_D = 1.5A		3		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		315 70 30		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 30 V I_D = 1.5 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 1)		7 18		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 48V I_D = 3A V_{GS} = 10V (see test circuit, Figure 2)		10 3.5 3.5	13	nC nC nC

SWITCHING OFF

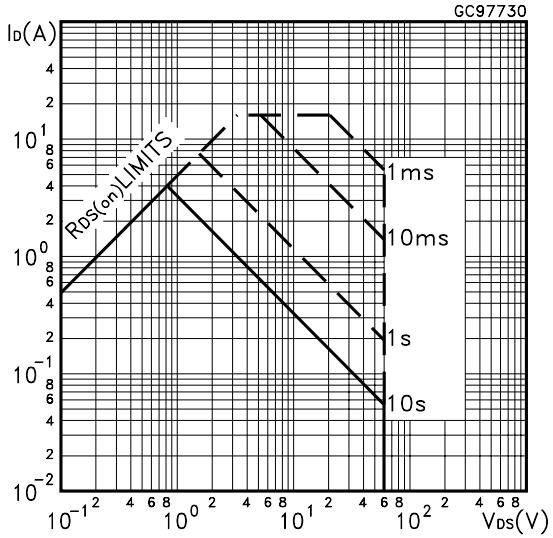
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 30 V I_D = 1.5 A R_G = 4.7Ω, V_{GS} = 10 V (Resistive Load, Figure 1)		17 6		ns ns

SOURCE DRAIN DIODE

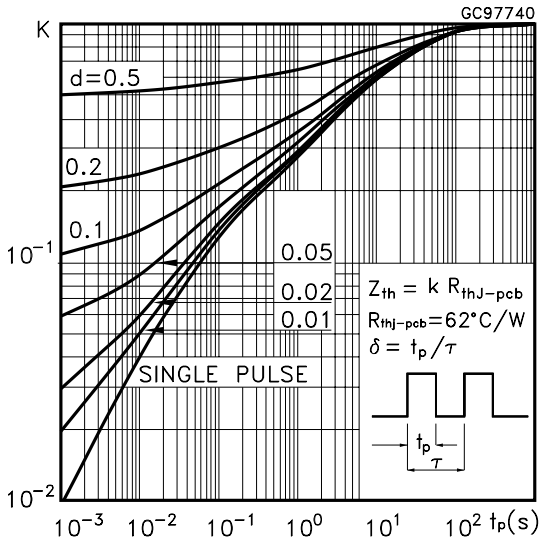
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				4 16	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 4 A V_{GS} = 0			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 4 A di/dt = 100A/µs V_{DD} = 25 V T_j = 150°C (see test circuit, Figure 3)		50 88 3.5		ns nC A

(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

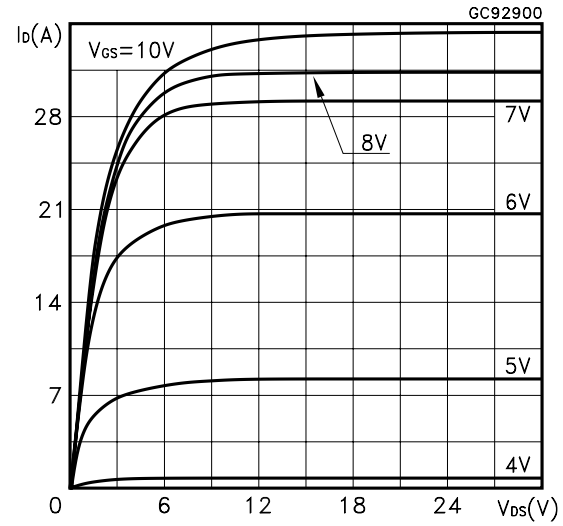
Safe Operating Area



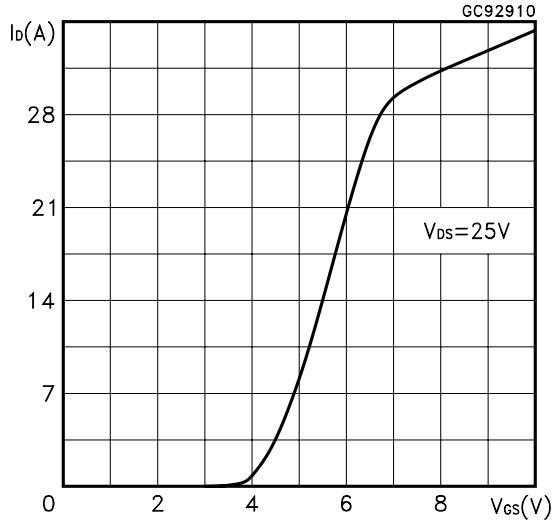
Thermal Impedance



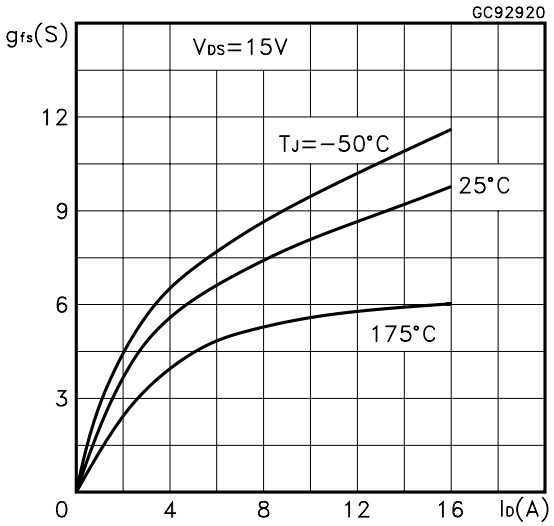
Output Characteristics



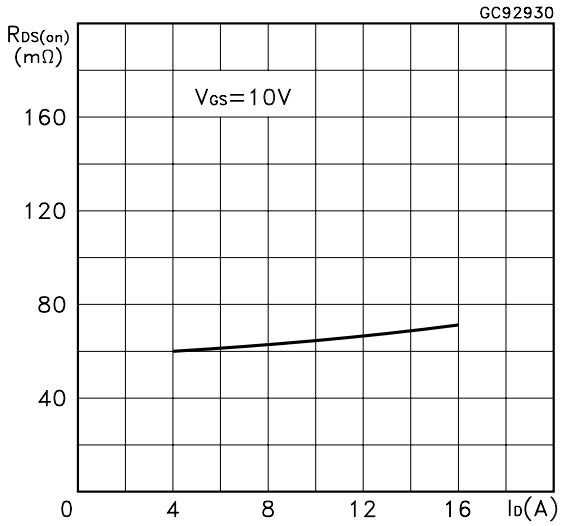
Transfer Characteristics



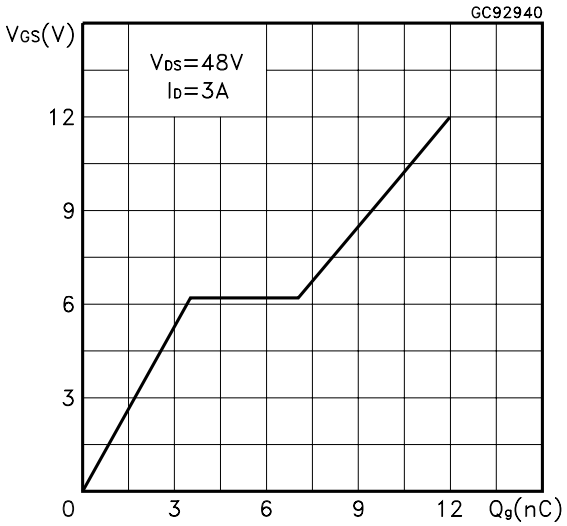
Transconductance



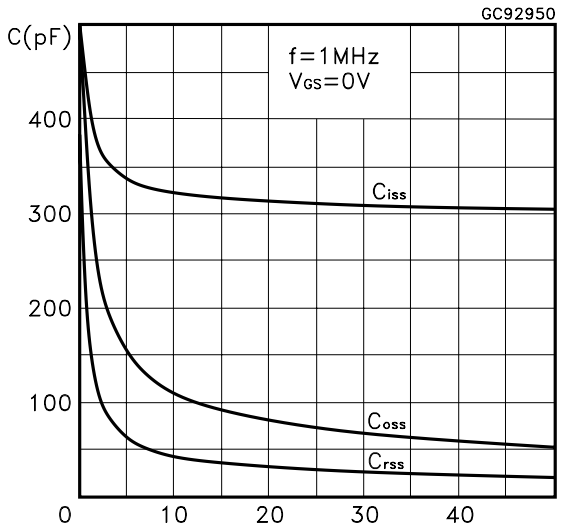
Static Drain-source On Resistance



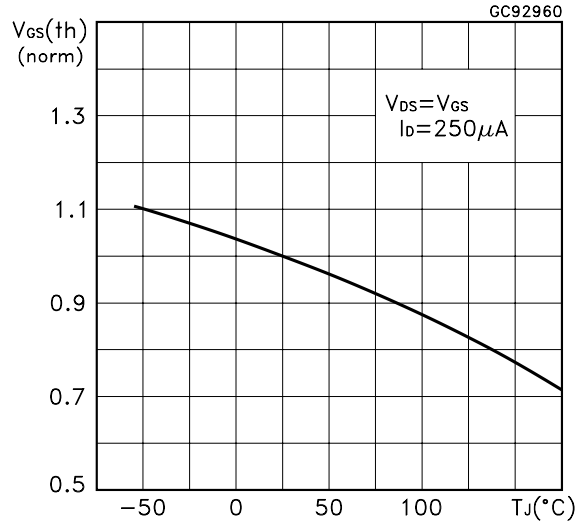
Gate Charge vs Gate-source Voltage



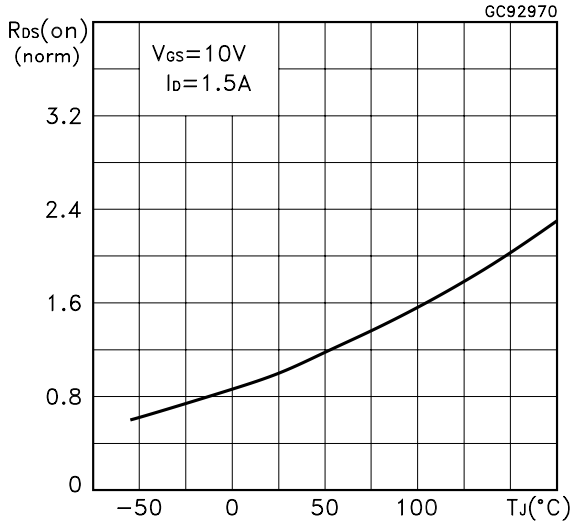
Capacitance Variations



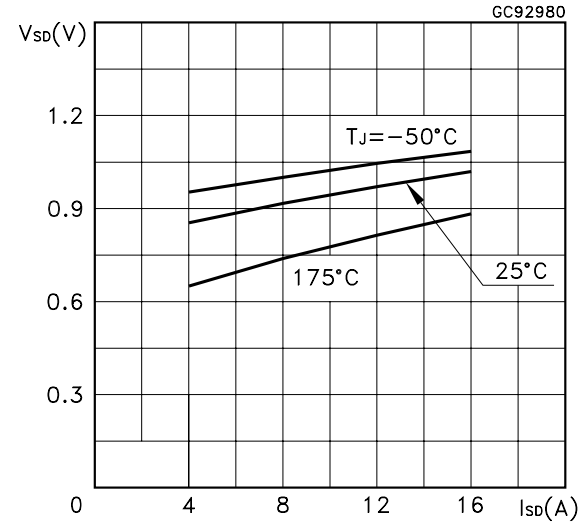
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature.

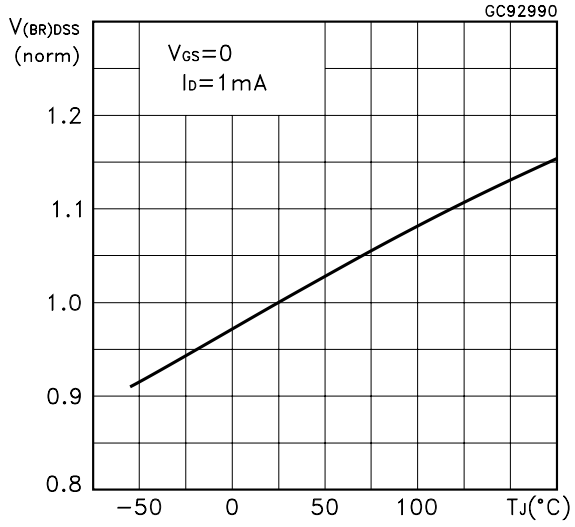


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Fig. 1: Switching Times Test Circuits For Resistive Load

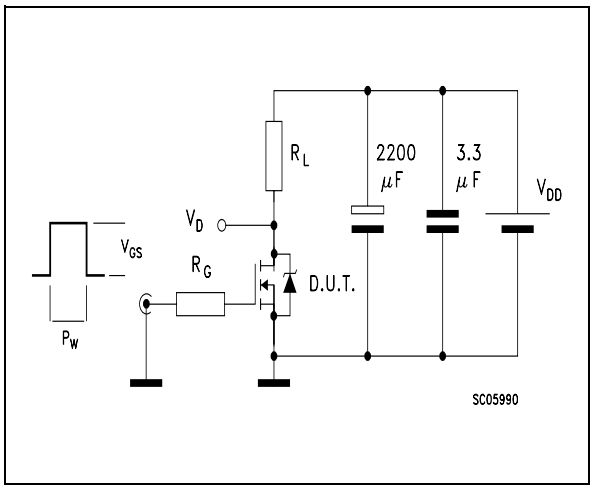


Fig. 2: Gate Charge test Circuit

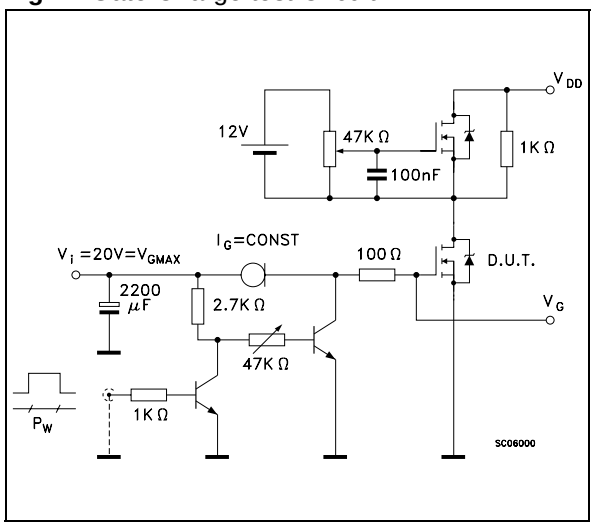
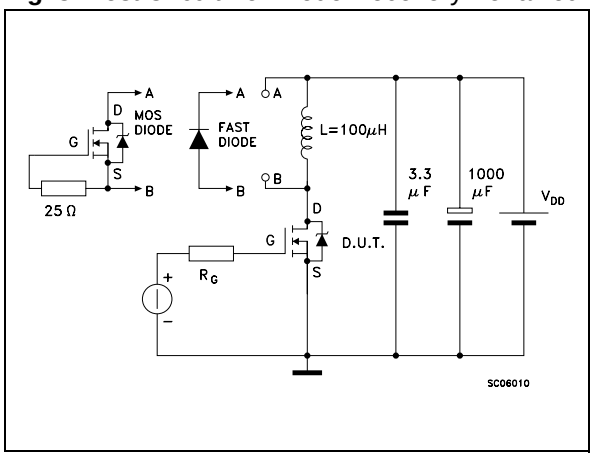
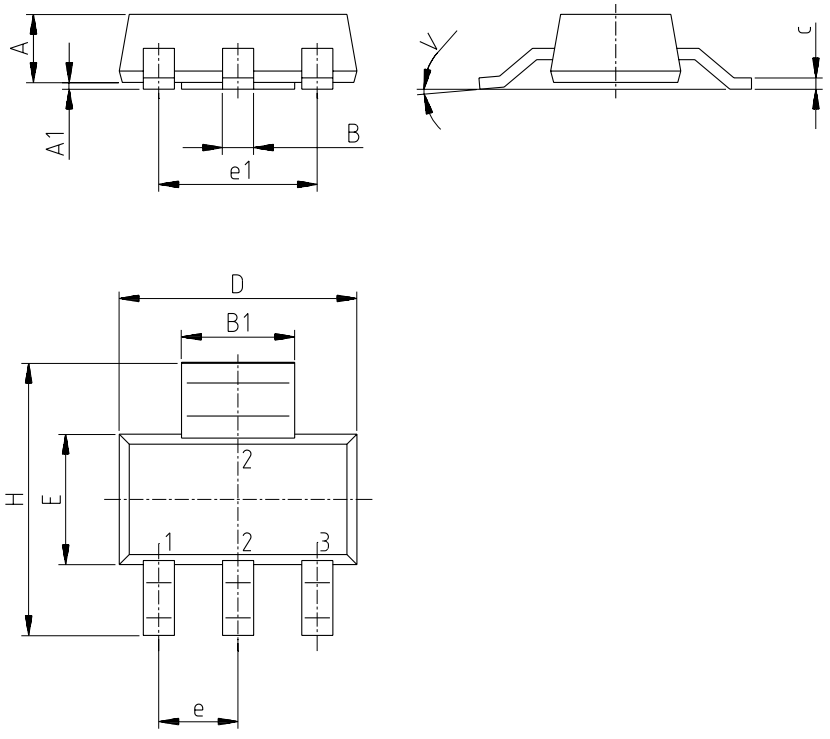


Fig. 3: Test Circuit For Diode Recovery Behaviour



SOT-223 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.80			0.071
B	0.60	0.70	0.80	0.024	0.027	0.031
B1	2.90	3.00	3.10	0.114	0.118	0.122
c	0.24	0.26	0.32	0.009	0.010	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
e		2.30			0.090	
e1		4.60			0.181	
E	3.30	3.50	3.70	0.130	0.138	0.146
H	6.70	7.00	7.30	0.264	0.276	0.287
V			10^o			10^o
A1		0.02				



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