



STN7NF10

N-CHANNEL 100V - 0.055 Ω - 5A SOT-223 LOW GATE CHARGE STripFET™ II POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STN7NF10	100 V	< 0.065 Ω	5 A

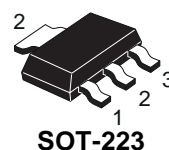
- TYPICAL R_{DS(on)} = 0.055 Ω
- APPLICATION ORIENTED CHARACTERIZATION

DESCRIPTION

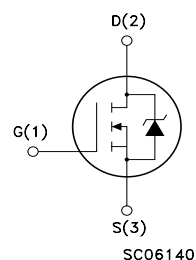
This Power MOSFET series realized with STMicroelectronics unique STripFET process has specifically been designed to minimize input capacitance and gate charge. It is therefore suitable as primary switch in advanced high-efficiency isolated DC-DC converters for Telecom and Computer application. It is also intended for any application with low gate charge drive requirements.

APPLICATIONS

- HIGH-EFFICIENCY DC-DC CONVERTERS
- UPS AND MOTOR CONTROL



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	100	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 k Ω)	100	V
V _{GS}	Gate- source Voltage	± 20	V
I _D	Drain Current (continuous) at T _C = 25°C	5	A
I _D	Drain Current (continuous) at T _C = 100°C	3.4	A
I _{DM} (●)	Drain Current (pulsed)	20	A
P _{TOT}	Total Dissipation at T _C = 25°C	3.3	W
	Derating Factor	0.026	W/°C
T _{stg}	Storage Temperature	-55 to 150	°C
T _j	Operating Junction Temperature		

(●) Pulse width limited by safe operating area

STN7NF10

THERMAL DATA

Rthj-PCB	Thermal Resistance Junction-PCB Max(*)	38	°C/W
Rthj-PCB	Thermal Resistance Junction-PCB Max(**)	100	°C/W
T _l	Maximum Lead Temperature For Soldering Purpose (1.6 mm from case, for 10s)	260	°C

Note: (*) When mounted on 1 in² FR-4 BOARD, 2 oz Cu, t<10s.

Note: (**) When mounted on minimum 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	100			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 = 250µA	2	3	4	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V, I _D = 1.5 A		0.055	0.065	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} = 15 V, I _D = 1.5 A		12		S
C _{iss}	Input Capacitance	V _{DS} = 25 V, f = 1 MHz, V _{GS} = 0		870		pF
C _{oss}	Output Capacitance			125		pF
C _{rss}	Reverse Transfer Capacitance			52		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 50\text{ V}$, $I_D = 12\text{ A}$		58		ns
t_r	Rise Time	$R_G = 4.7\Omega$, $V_{GS} = 10\text{ V}$ (see test circuit, Figure 3)		45		ns
Q_g	Total Gate Charge	$V_{DD} = 80\text{ V}$, $I_D = 24\text{ A}$,		30	41	nC
Q_{gs}	Gate-Source Charge	$V_{GS} = 10\text{ V}$		6		nC
Q_{gd}	Gate-Drain Charge			10		nC

SWITCHING OFF

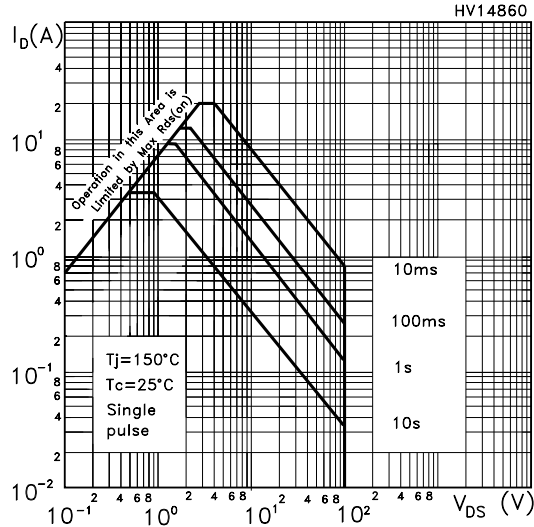
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 50\text{ V}$, $I_D = 12\text{ A}$,		49		ns
t_f	Fall Time	$R_G = 4.7\Omega$, $V_{GS} = 10\text{ V}$ (see test circuit, Figure 3)		17		ns

SOURCE DRAIN DIODE

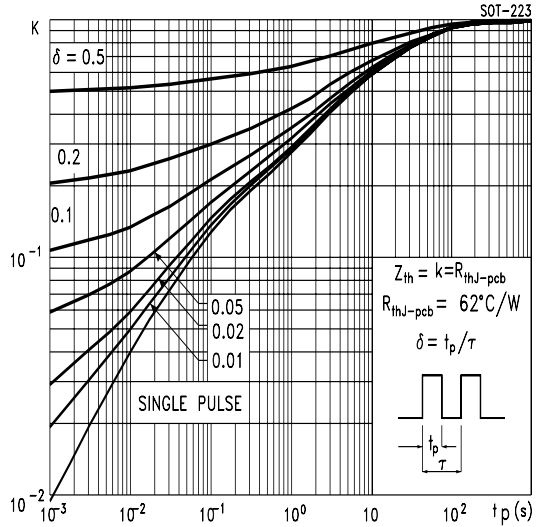
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				5	A
$I_{SDM(1)}$	Source-drain Current (pulsed)				20	A
$V_{SD(2)}$	Forward On Voltage	$I_{SD} = 5\text{ A}$, $V_{GS} = 0$			1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 5\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$,		100		ns
Q_{rr}	Reverse Recovery Charge	$V_{DD} = 30\text{ V}$, $T_j = 150^\circ\text{C}$		375		nC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 5)		7.5		A

Note: 1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
2. Pulse width limited by safe operating area.

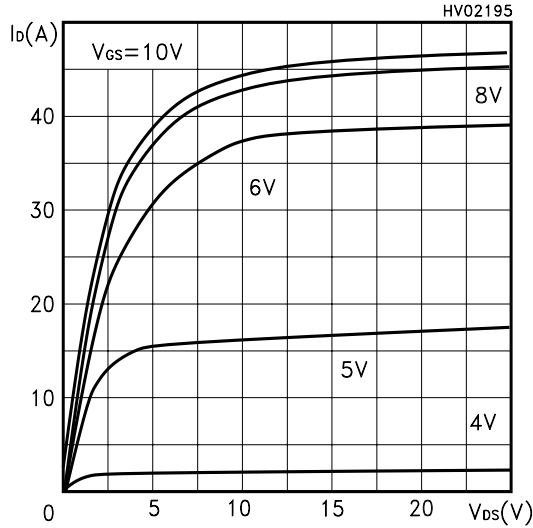
Safe Operating Area



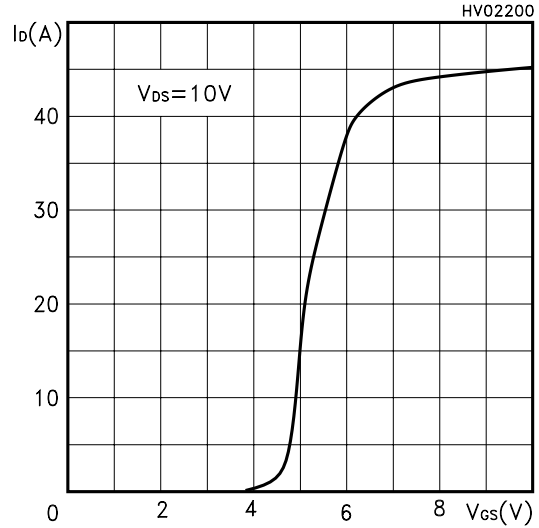
Thermal Impedance



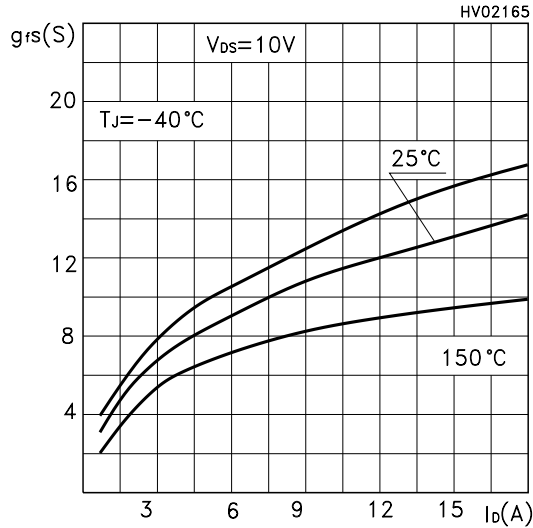
Output Characteristics



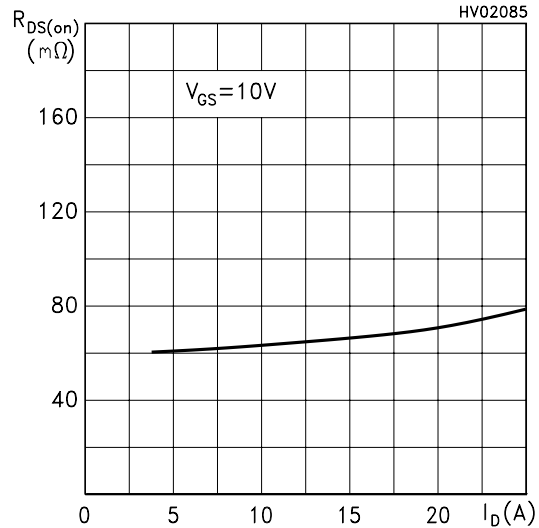
Transfer Characteristics



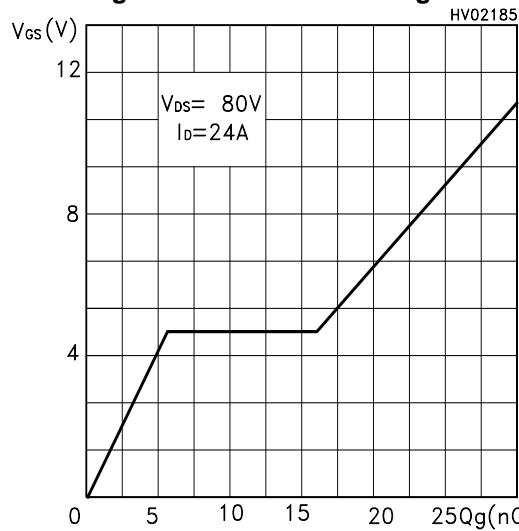
Transconductance



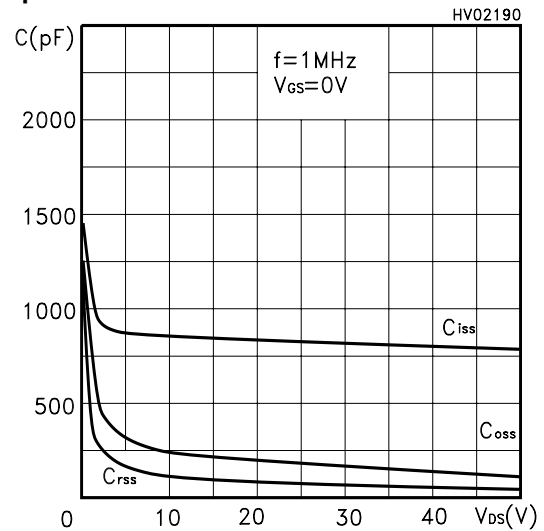
Static Drain-source On Resistance



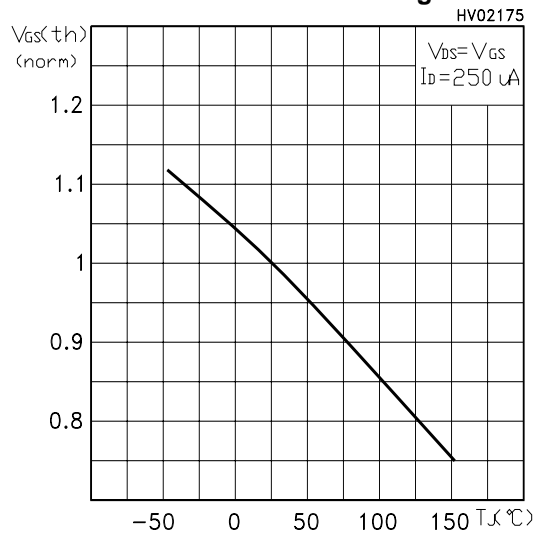
Gate Charge vs Gate-source Voltage



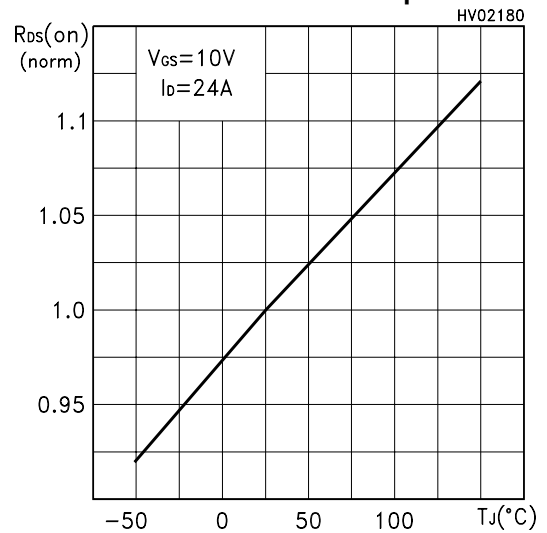
Capacitance Variations



Normalized Gate Threshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

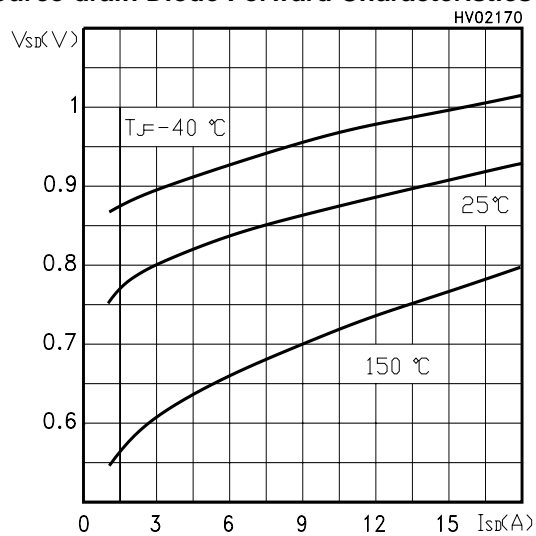


Fig. 1: Unclamped Inductive Load Test Circuit

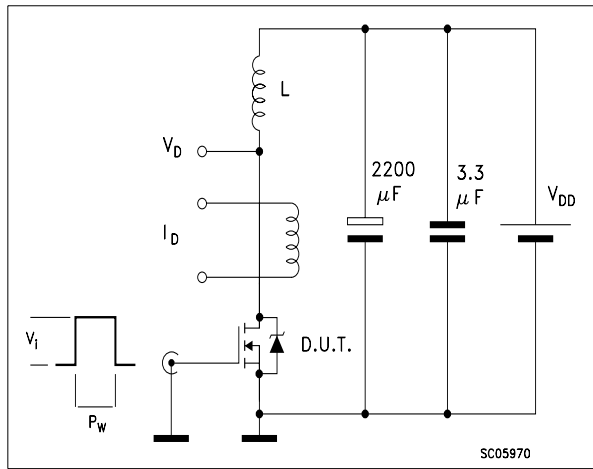


Fig. 2: Unclamped Inductive Waveform

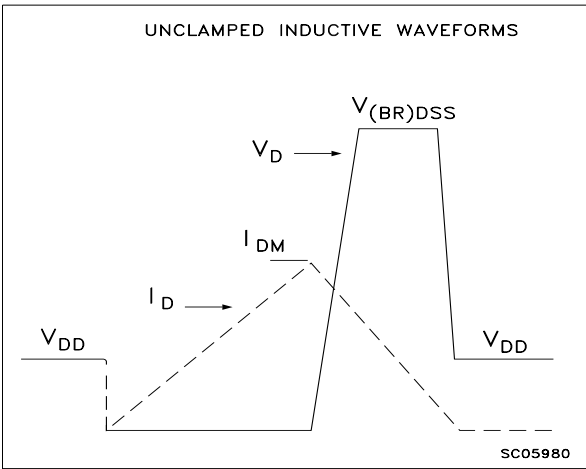


Fig. 3: Switching Times Test Circuit For Resistive Load

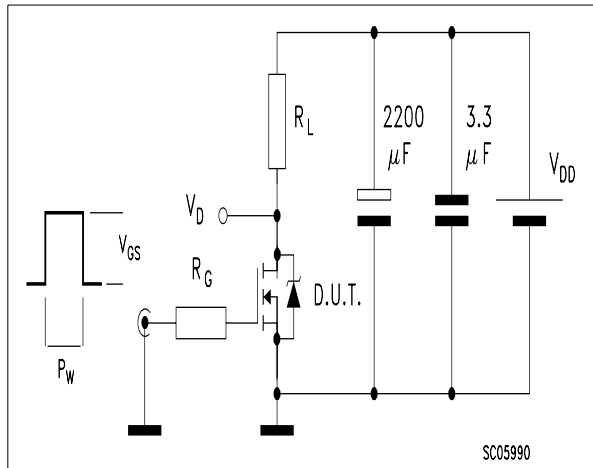


Fig. 4: Gate Charge test Circuit

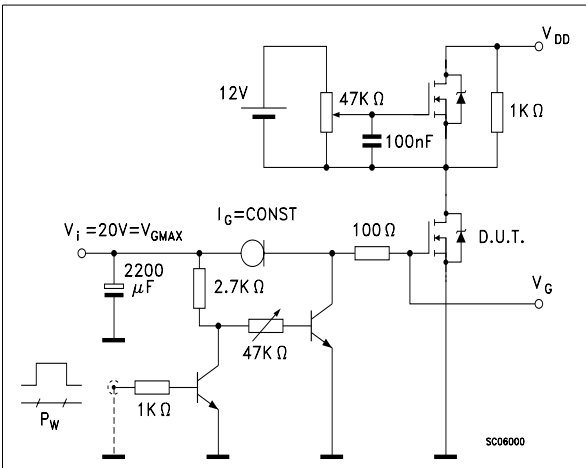
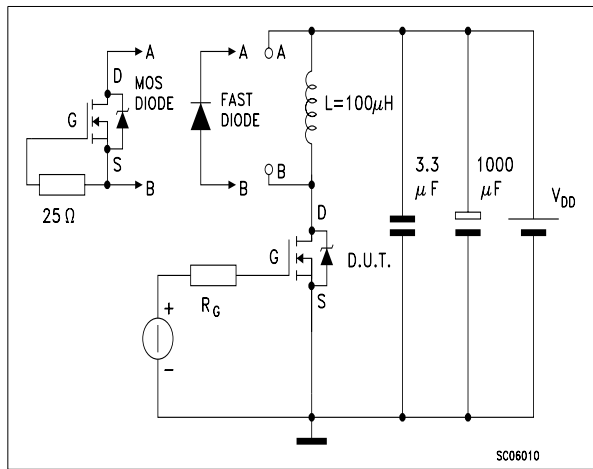
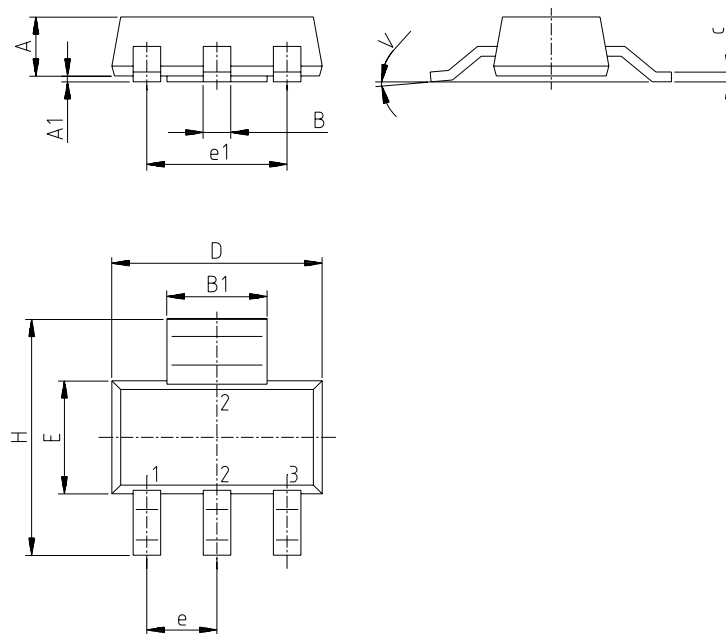


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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°			10°
A1		0.02				



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