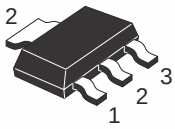
STN4NF03L

N-CHANNEL 30V - 0.039Ω - 6.5A SOT-223
STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STN4NF03L	30V	<0.05Ω	6.5A

- TYPICAL $R_{DS}(on)$ = 0.039Ω
- LOW THRESHOLD DRIVE

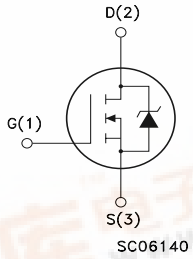


SOT-223

DESCRIPTION

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

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- DC-DC & DC-AC CONVERTERS
- DC MOTOR CONTROL (DISK DRIVES, etc.)
- SYNCHRONOUS RECTIFICATION

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	±16	V
I_D	Drain Current (continuous) at T_C = 25°C	6.5	A
I_D	Drain Current (continuous) at T_C = 100°C	4.5	A
I_{DM} (●)	Drain Current (pulsed)	26	A
P_{TOT}	Total Dissipation at T_C = 25°C	3.3	W
	Derating Factor	0.026	W/°C
E_{AS} (1)	Single Pulse Avalanche Energy	200	mJ
T_{stg}	Storage Temperature	–55 to 175	°C
T_j	Operating Junction Temperature		

(●) Pulse width limited by safe operating area

(1) Starting T_j=25°C, I_D=6.5A, V_{DD}=15V

THERMAL DATA

Rthj-PCB	Thermal Resistance Junction-PC Board 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 in^2 FR-4 board , 2 oz Cu, t<10s.
Note: (**) 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	30			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating			1	µA
		V_{DS} = Max Rating, T_C = 125 °C			10	µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ±16V			±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	1			V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V, I_D = 2 A		0.039	0.05	Ω
		V_{GS} = 5 V, I_D = 2 A		0.046	0.06	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} = 10 V , I_D =2 A	1	3		S
C_{iss}	Input Capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0		330		pF
C_{oss}	Output Capacitance			90		pF
C_{rss}	Reverse Transfer Capacitance			40		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = 15 V, I_D = 2 A		11		ns
t_r	Rise Time	R_G = 4.7Ω V_{GS} = 4.5 V (see test circuit, Figure 3)		100		ns
Q_g	Total Gate Charge	V_{DD} = 24 V, I_D = 4 A,		6.5	9	nC
Q_{gs}	Gate-Source Charge	V_{GS} = 10 V		3.6		nC
Q_{gd}	Gate-Drain Charge			2		nC

SWITCHING OFF

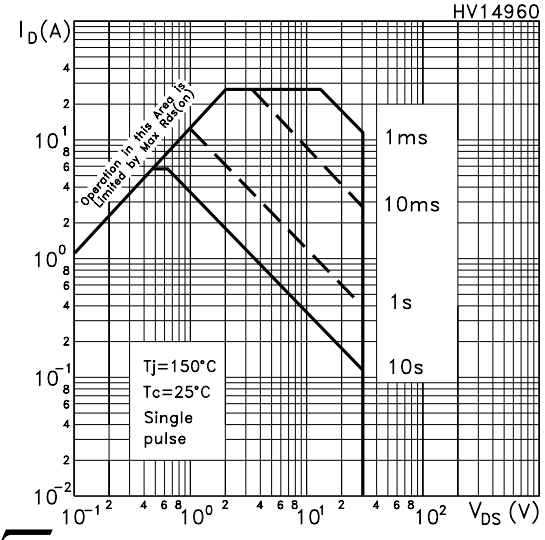
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD} = 15 V, I_D = 2 A, R_G = 4.7Ω, V_{GS} = 4.5 V (see test circuit, Figure 3)		25		ns
t_f	Fall Time			22		ns

SOURCE DRAIN DIODE

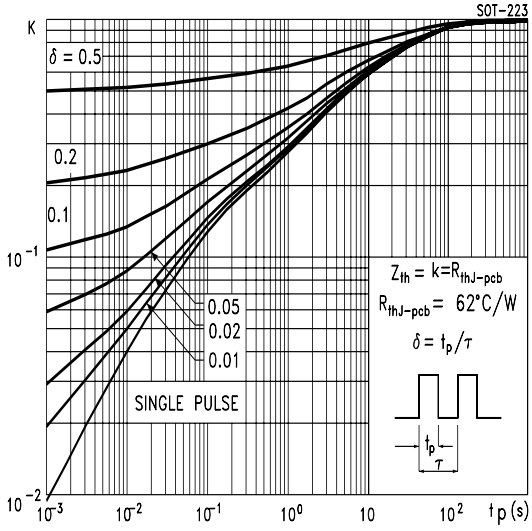
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				6.5	A
I_{SDM} (2)	Source-drain Current (pulsed)				26	A
V_{SD} (1)	Forward On Voltage	I_{SD} = 6.5 A, V_{GS} = 0			1.5	V
t_{rr}	Reverse Recovery Time	I_{SD} = 6.5 A, di/dt = 100 A/µs,		35		ns
Q_{rr}	Reverse Recovery Charge	V_{DD} = 15 V, T_j = 150°C		25		nC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 5)		1.4		A

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

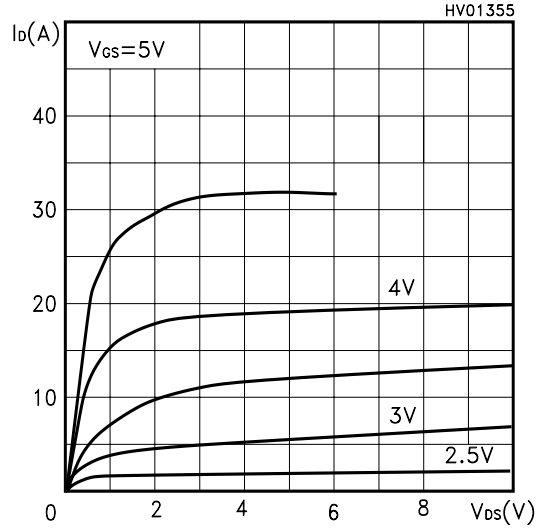
Safe Operating Area



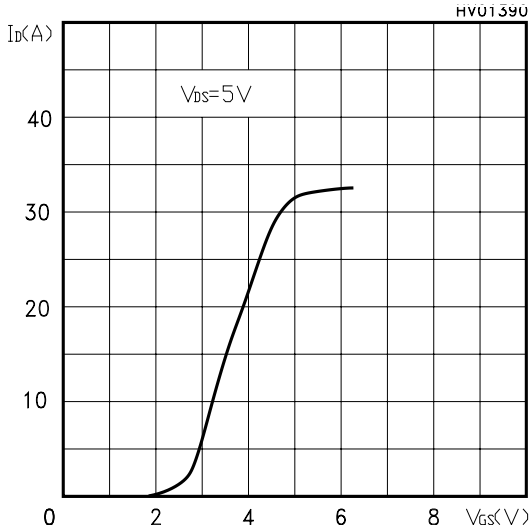
Thermal Impedence Junction-PCB



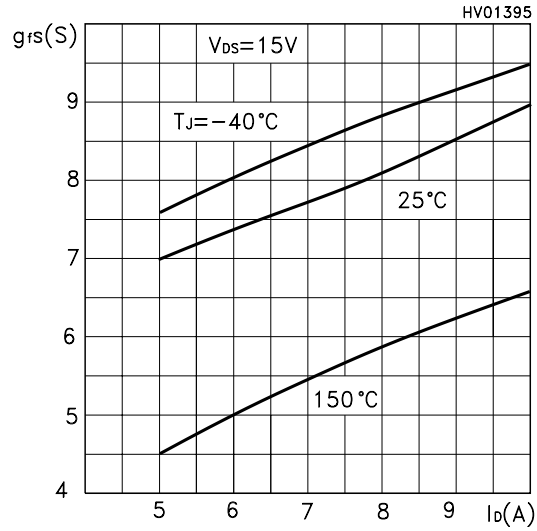
Output Characteristics



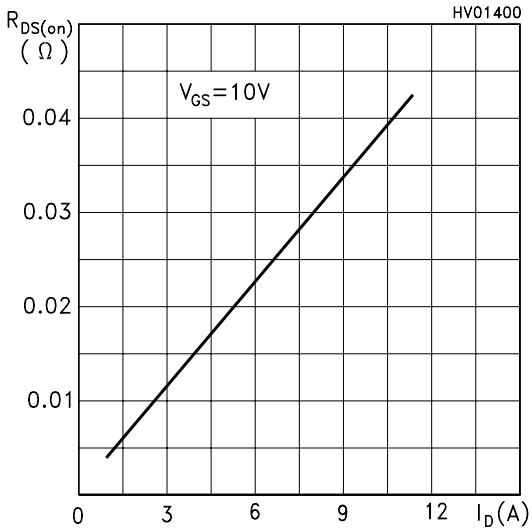
Transfer Characteristics



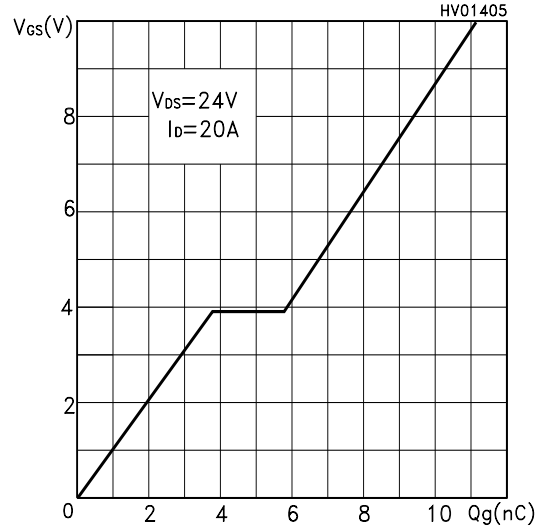
Transconductance



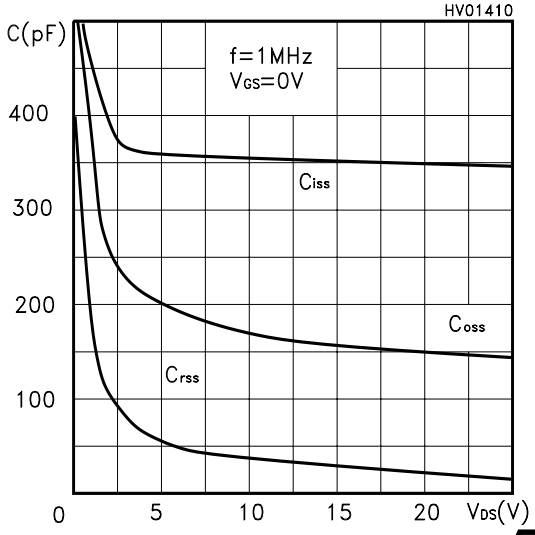
Static Drain-source On Resistance



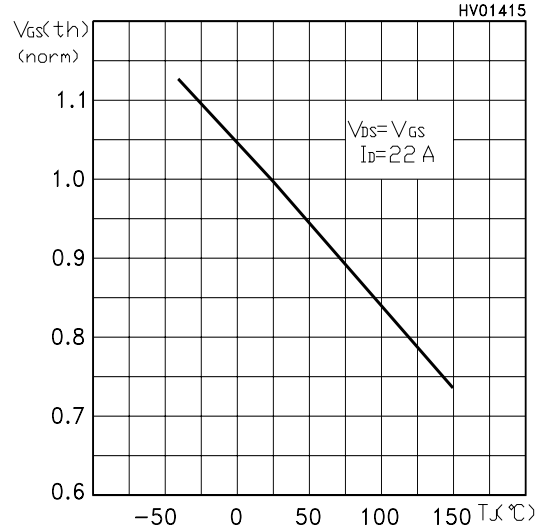
Gate Charge vs Gate-source Voltage



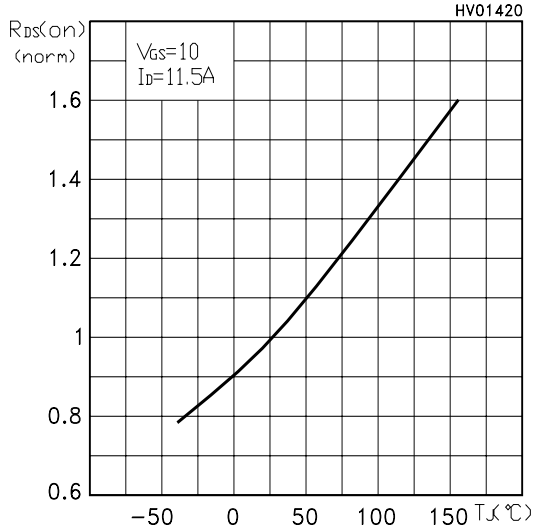
Capacitance Variations



Normalized Gate Thereshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

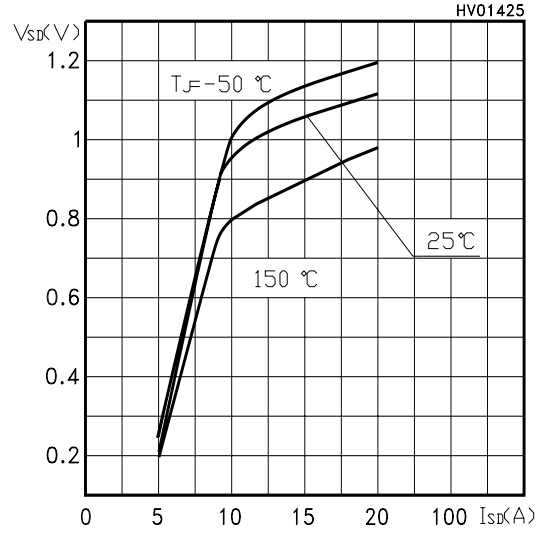


Fig. 1: Unclamped Inductive Load Test Circuit

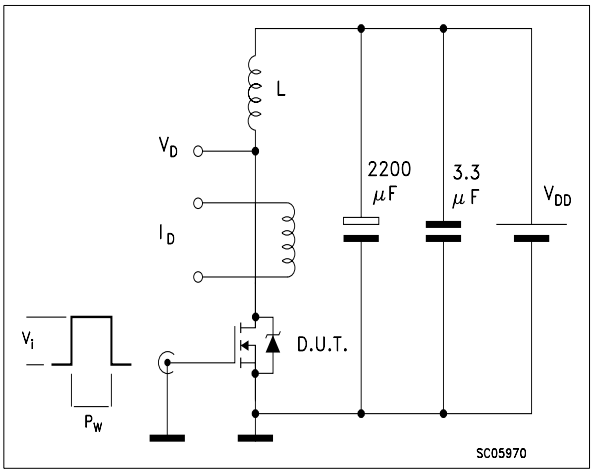


Fig. 2: Unclamped Inductive Waveform

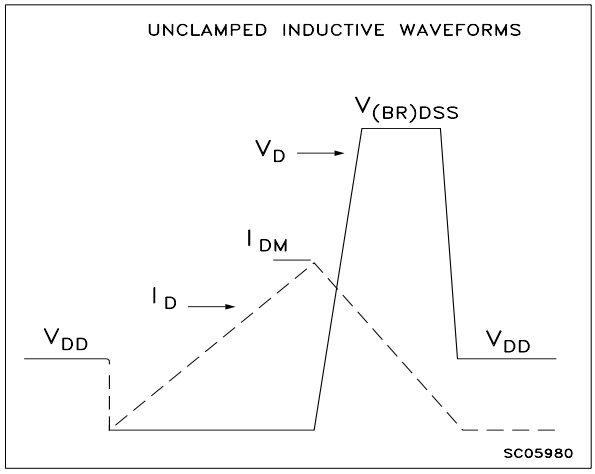


Fig. 3: Switching Times Test Circuit For Resistive Load

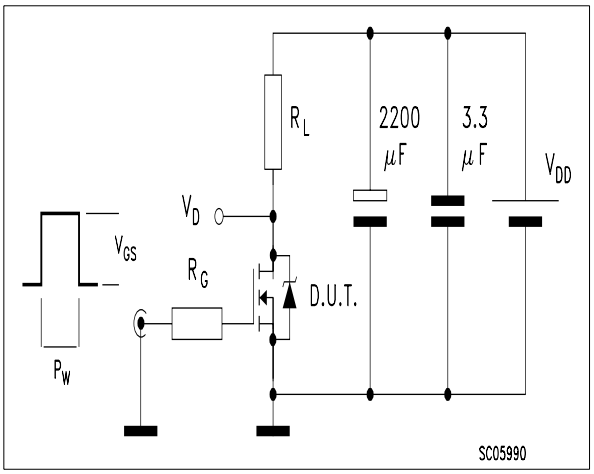


Fig. 4: Gate Charge test Circuit

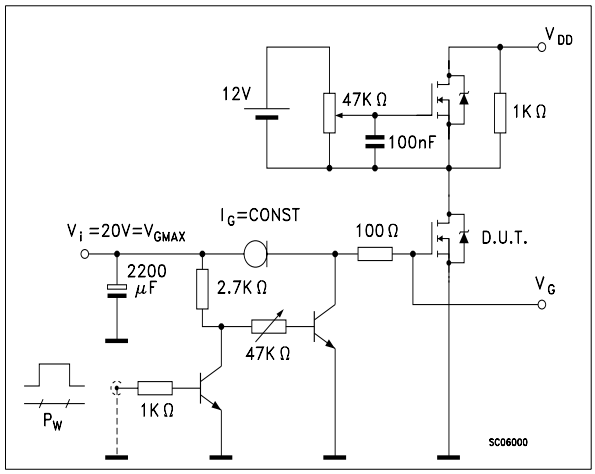
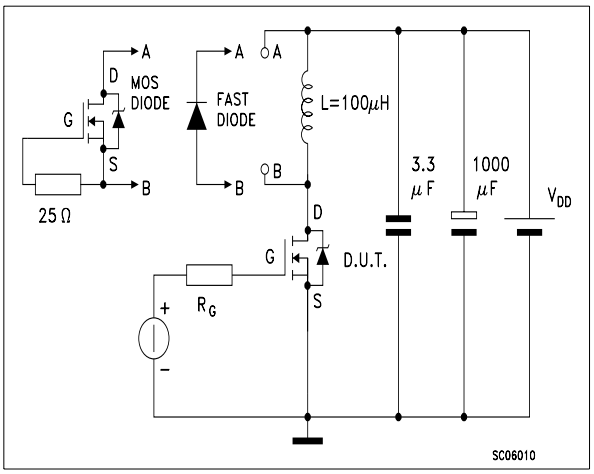
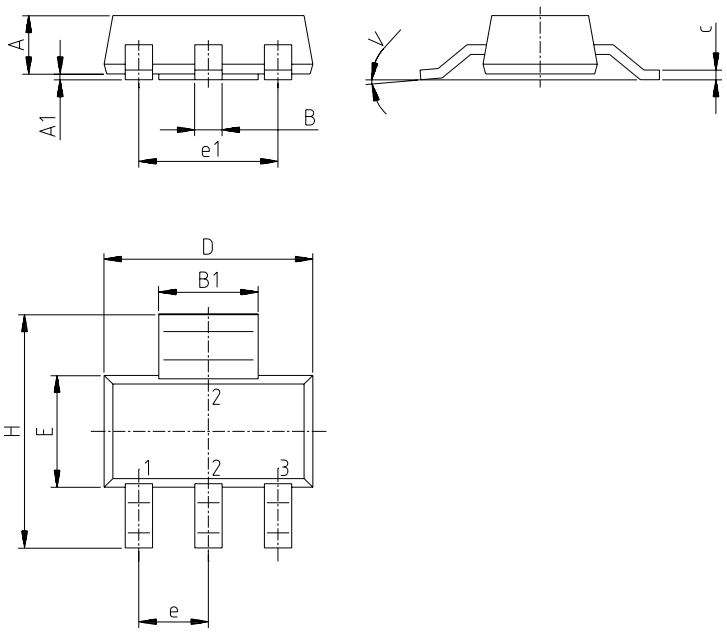


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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^o			10^o
A1		0.02				



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