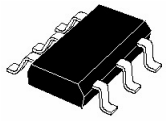
STT5NF30L

N-CHANNEL 30V - 0.039Ω - 4A SOT23-6L
STripFET™II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STT5NF30L	30 V	< 0.050 Ω (@ 10V)	4 A

- TYPICAL $R_{DS}(on)$ = 0.039Ω @10V
- LOW Q_g
- LOW THRESHOLD DRIVE



SOT23-6L

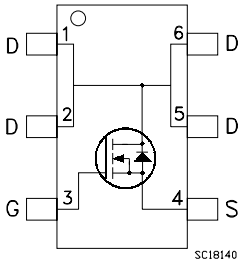
DESCRIPTION

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-DC CONVERTERS
- POWER MANAGEMENT IN PORTABLE/ DESKTOP PCs
- SYNCHRONOUS RECTIFICATION
- DC MOTOR CONTROL (DISK DRIVERS, etc)

INTERNAL SCHEMATIC DIAGRAM



ORDERING INFORMATION

SALES TYPE	MARKING	PACKAGE	PACKAGING
STT5NF30L	STFN	SOT23-6L	TAPE & REEL

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	4	A
I_D	Drain Current (continuous) at T_C = 100°C	2.5	A
I_{DM} (•)	Drain Current (pulsed)	16	A
P_{TOT}	Total Dissipation at T_C = 25°C	1.6	W
E_{AS} (1)	Single Pulse Avalanche Energy	50	mJ

(•)Pulse width limited by safe operating area
(1) Starting T_j =25°C, I_d = 2 A, V_{DD} = 15V.

THERMAL DATA

Rthj-amb	Thermal Resistance Junction-ambient	Max	78	°C/W
T_l	Max. Operating Junction Temperature		- 55 to 150	°C
T_{stg}	Storage Temperature		- 55 to 150	°C

ON/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	µA
$V_{GS(th)}$	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	0.050	Ω
		V_{GS} = 5 V, I_D = 2 A		0.046	0.060	Ω

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25 °C UNLESS OTHERWISE SPECIFIED)
DYNAMIC

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

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 15 V, I_D = 2 A R_G = 4.7Ω V_{GS} = 4.5 V (see test circuit, Figure 3)		11 100		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 24 V, I_D = 4 A, V_{GS} = 5 V		6.5 3.6 2	9	nC nC nC

SWITCHING OFF

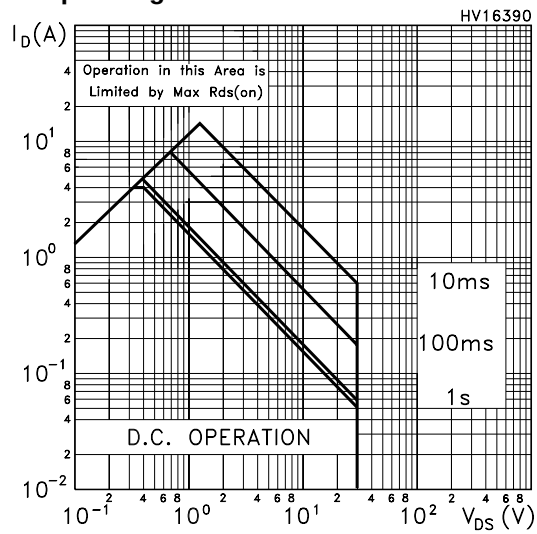
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-Off Delay Time Fall Time	V_{DD} = 15 V, I_D = 2 A, R_G = 4.7Ω, V_{GS} = 4.5 V (see test circuit, Figure 5)		25 22		ns ns

SOURCE DRAIN DIODE

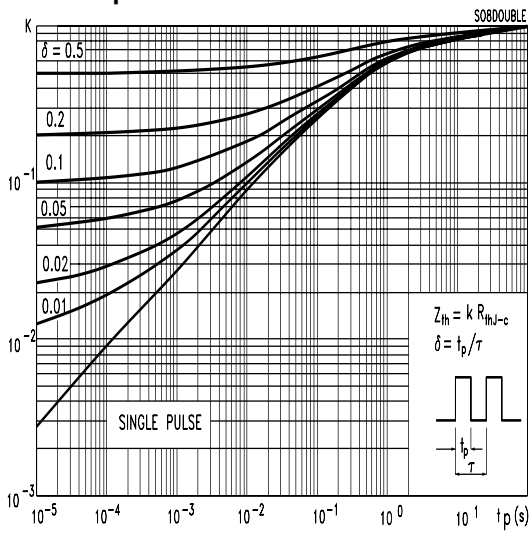
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (2)	Source-drain Current Source-drain Current (pulsed)				4 16	A A
V_{SD} (1)	Forward On Voltage	I_{SD} = 4 A, V_{GS} = 0			1.2	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 4 A, di/dt = 100 A/µs, V_{DD} = 20 V, T_j = 150°C (see test circuit, Figure 5)		35 25 14		ns nC A

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

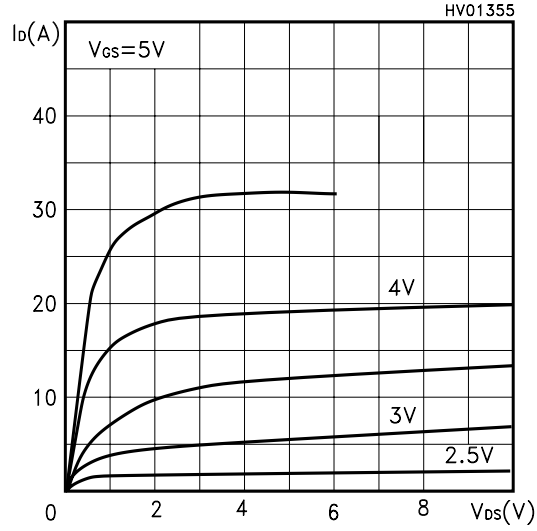
Safe Operating Area



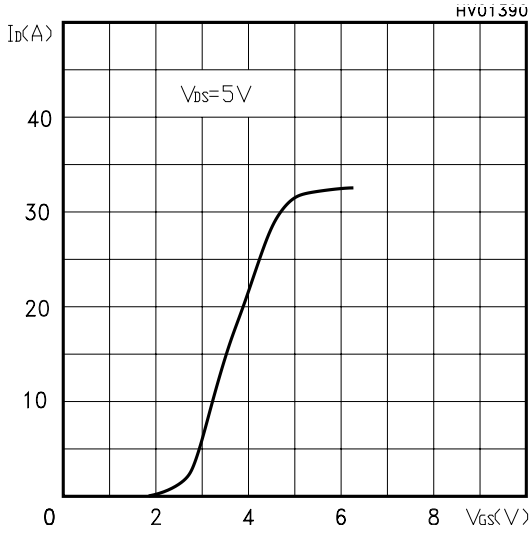
Thermal Impedence Junction-PCB



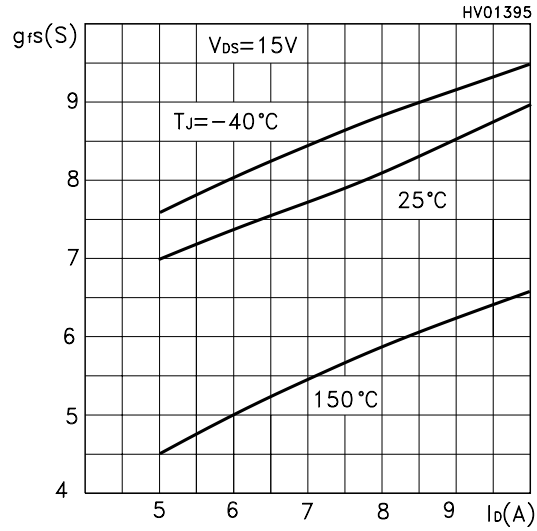
Output Characteristics



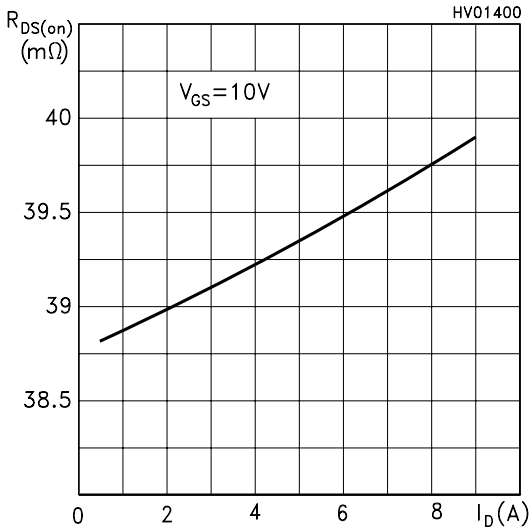
Transfer Characteristics



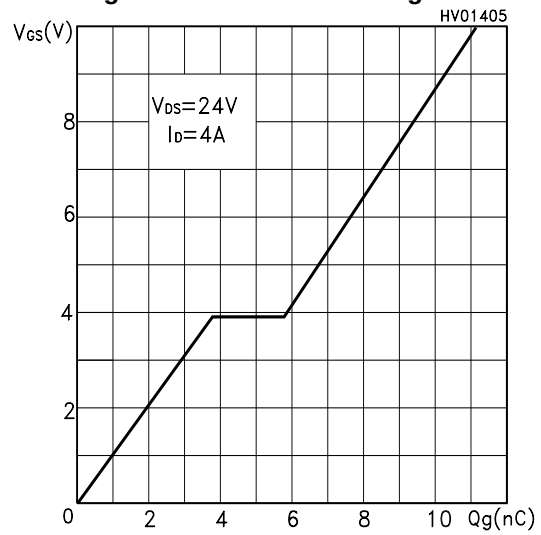
Transconductance



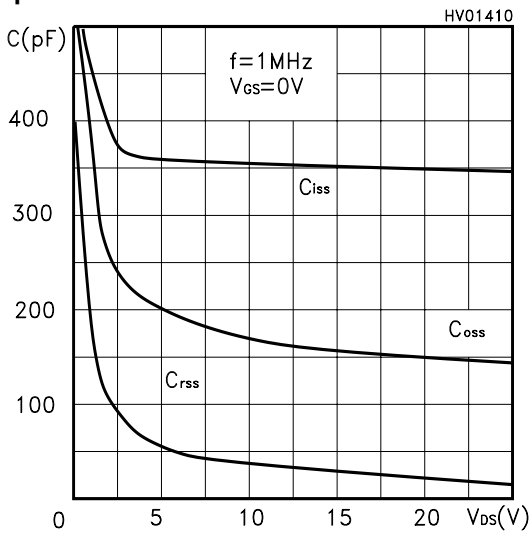
Static Drain-source On Resistance



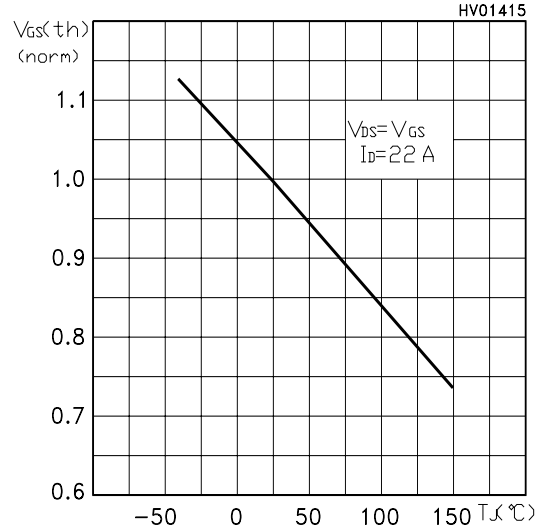
Gate Charge vs Gate-source Voltage



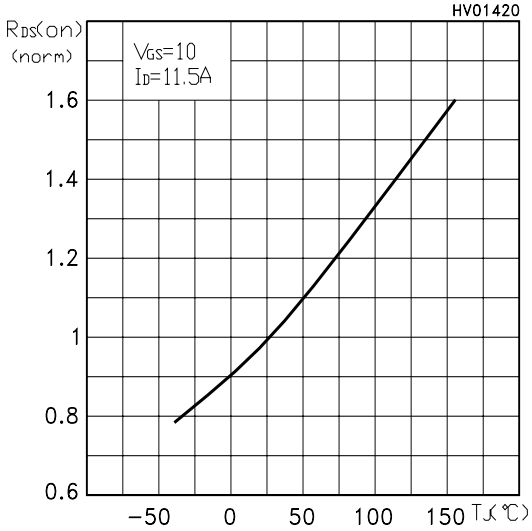
Capacitance Variations



Normalized Gate Thereshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

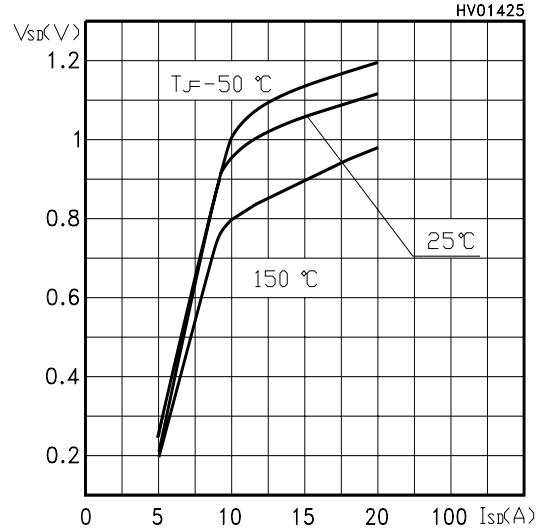


Fig. 1: Unclamped Inductive Load Test Circuit

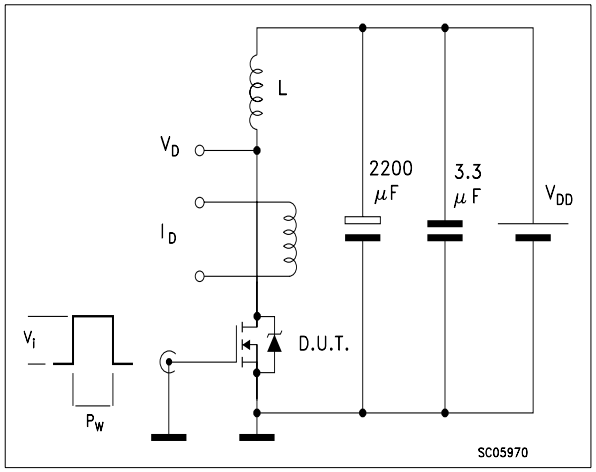


Fig. 2: Unclamped Inductive Waveform

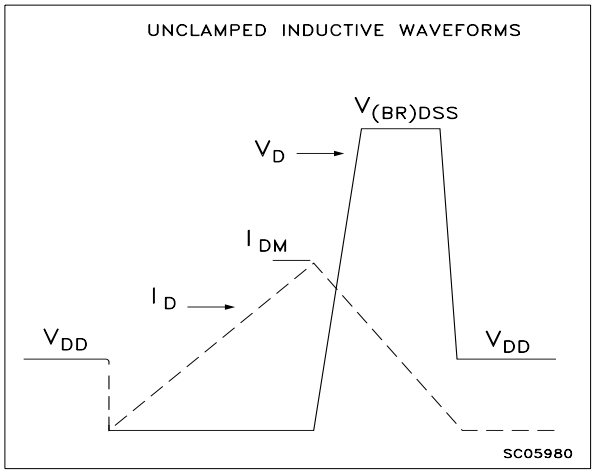


Fig. 3: Switching Times Test Circuit For Resistive Load

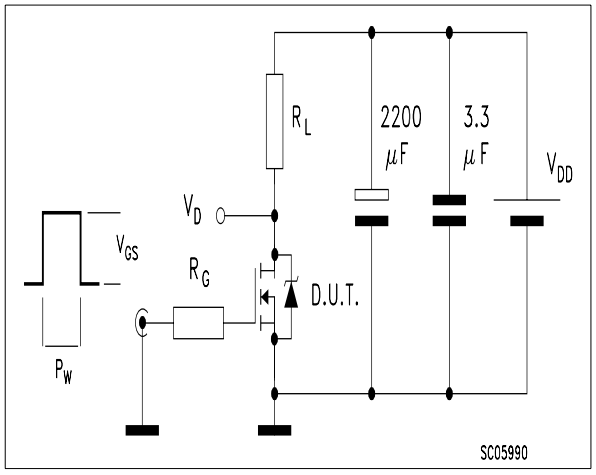


Fig. 4: Gate Charge test Circuit

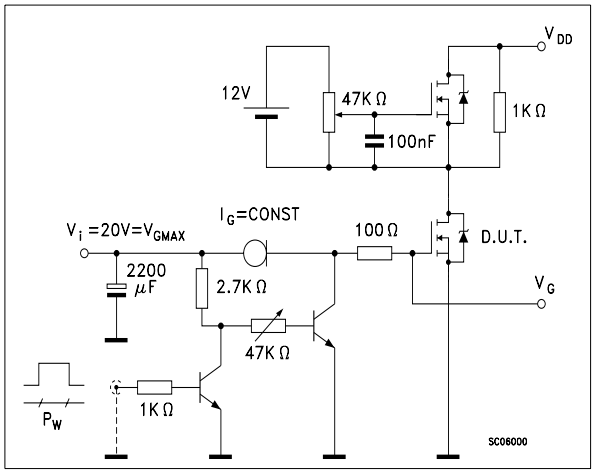
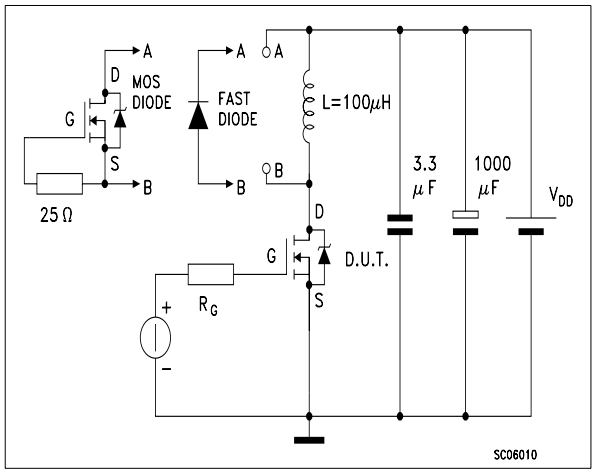


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



SOT23-6L MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.90		1.45	0.035		0.057
A1	0.00		0.15	0.000		0.006
A2	0.90		1.30	0.035		0.051
b	0.25		0.50	0.010		0.020
C	0.09		0.20	0.004		0.008
D	2.80		3.10	0.110		0.122
E	2.60		3.00	0.102		0.118
E1	1.50		1.75	0.059		0.069
L	0.35		0.55	0.014		0.022
e		0.95			0.037	
e1		1.90			0.075