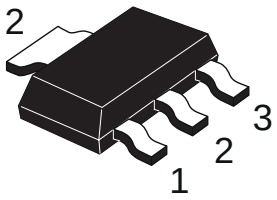
STN3PF06

P-CHANNEL 60V - 0.18Ω - 3A SOT-223
STripFET™ II POWER MOSFET

PRELIMINARY DATA

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STN3PF06	60V	<0.20Ω	2.5A

- TYPICAL $R_{DS}(on)$ = 0.18Ω
- EXCEPTIONAL dv/dt CAPABILITY
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- LOW THRESHOLD DRIVE

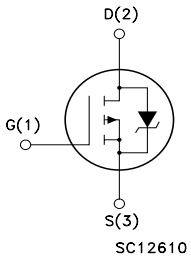


SOT-223

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.)

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 (continuos) at T_C = 25°C	2.5	A
I_D	Drain Current (continuos) at T_C = 100°C	1.5	A
I_{DM} (●)	Drain Current (pulsed)	10	A
P_{TOT}	Total Dissipation at T_C = 25°C	2.5	W
	Derating Factor	0.02	W/°C
dv/dt(1)	Peak Diode Recovery voltage slope	6	V/ns
T_{stg}	Storage Temperature	–65 to 175	°C
T_j	Max. Operating Junction Temperature	150	°C

(●) Pulse width limited by safe operating area

Note: For the P-CHANNEL MOSFET actual poloarity of Voltages and current has to be reversed

(1)I_{SD} ≤3A, di/dt ≤200A/µs, $V_{DD} \le V_{(BR)DSS}$, $T_j \le T_{JMAX.}$

THERMAL DATA

Rthj-pcb	Thermal Resistance Junction-PC Board Max	50	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max (Surface Mounted)	60	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	260	°C

ELECTRICAL CHARACTERISTICS (TCASE = 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			1	µA
		V_{DS} = Max Rating, T_C = 125 °C			10	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		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V, I_D = 1.25 A		0.18	0.20	Ω
$I_{D(on)}$	On State Drain Current	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$, V_{GS} = 10V	2.5			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$, I_D =1.25 A		1.5		S
C_{iss}	Input Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		850		pF
C_{oss}	Output Capacitance			230		pF
C_{rss}	Reverse Transfer Capacitance			75		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = 30V, I_D = 6A		20		ns
t_r	Rise Time	R_G = 4.7Ω V_{GS} = 10V (see test circuit, Figure 3)		40		ns
Q_g	Total Gate Charge	V_{DD} = 48V, I_D = 12A, V_{GS} = 10 V		16	21	nC
Q_{gs}	Gate-Source Charge			4		nC
Q_{gd}	Gate-Drain Charge			6		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD} = 30V, I_D = 6A,		40		ns
t_f	Fall Time	R_G = 4.7Ω, V_{GS} = 10V (see test circuit, Figure 3)		10		ns
$t_{r(off)}$	Off-voltage Rise Time	Vclamp =48V, I_D =12 A R_G = 4.7Ω, V_{GS} = 10V		10		ns
t_f	Fall Time	(see test circuit, Figure 5)		17		ns
t_c	Cross-over Time			30		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				2.5	A
I_{SDM} (1)	Source-drain Current (pulsed)				10	A
V_{SD} (2)	Forward On Voltage	I_{SD} = 2.5A, V_{GS} = 0			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 12A, di/dt = 100A/µs,		100		ns
Q_{rr}	Reverse Recovery Charge	V_{DD} = 30V, T_j = 150°C		260		nC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 5)		5.2		A

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

Fig. 1: Unclamped Inductive Load Test Circuit

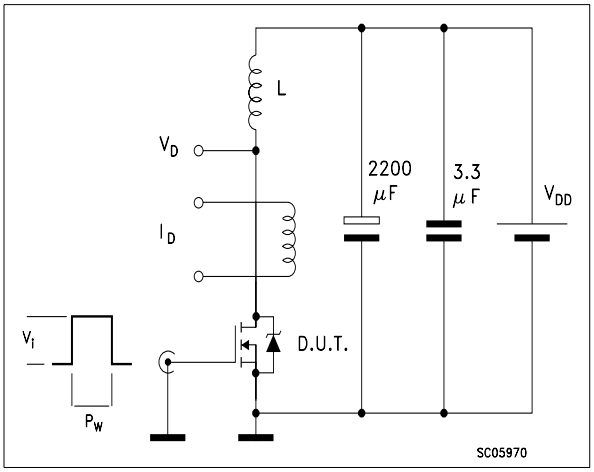


Fig. 2: Unclamped Inductive Waveform

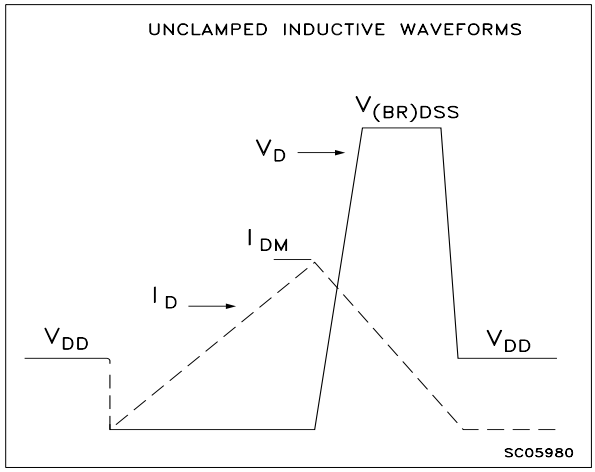


Fig. 3: Switching Times Test Circuit For Resistive Load

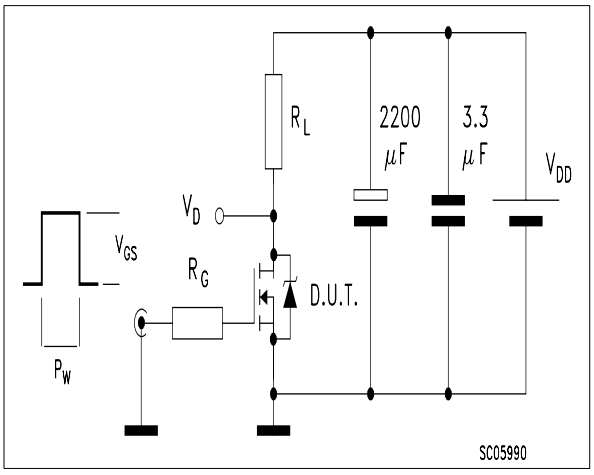


Fig. 4: Gate Charge test Circuit

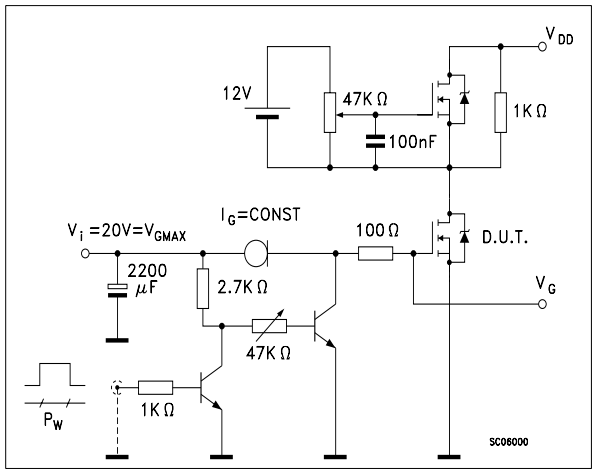
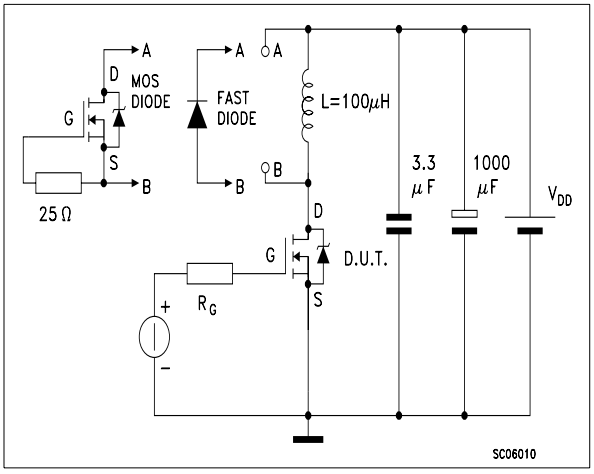
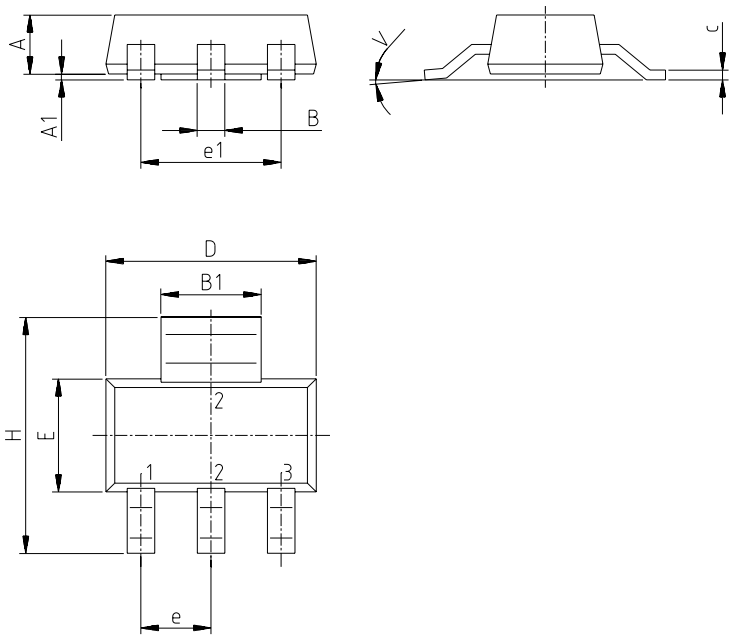


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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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