



## STT5PF20V

P-CHANNEL 20V - 0.065Ω - 5A SOT23-6L  
2.5V-DRIVE STripFET™ II POWER MOSFET

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STT5PF20V	20 V	< 0.080 Ω (@4.5V) < 0.10 Ω (@2.5V)	5 A

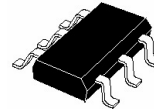
- TYPICAL R<sub>DS(on)</sub> = 0.065Ω (@4.5V)
- TYPICAL R<sub>DS(on)</sub> = 0.085Ω (@2.5V)
- ULTRA LOW THRESHOLD GATE DRIVE (2.5V)
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY

### 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.

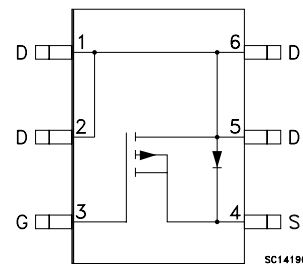
### APPLICATIONS

- MOBILE PHONE APPLICATIONS
- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT



SOT23-6L

### INTERNAL SCHEMATIC DIAGRAM



### ORDERING INFORMATION

SALES TYPE	MARKING	PACKAGE	PACKAGING
STT5PF20V	STPN	SOT23-6L	TAPE & REEL

# STT5PF20V

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	20	V
V <sub>DGR</sub>	Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)	20	V
V <sub>GS</sub>	Gate- source Voltage	± 8	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C	5	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	3.1	A
I <sub>DM</sub> (•)	Drain Current (pulsed)	20	A
P <sub>TOT</sub>	Total Dissipation at T <sub>C</sub> = 25°C	1.6	W

(•) Pulse width limited by safe operating area

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

## THERMAL DATA

R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient Max	78	°C/W
T <sub>j</sub>	Max. Operating Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature	-55 to 150	°C

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE SPECIFIED)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	Drain-source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0	20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0)	V <sub>DS</sub> = Max Rating V <sub>DS</sub> = Max Rating, T <sub>C</sub> = 125 °C			1 10	μA μA
I <sub>GSS</sub>	Gate-body Leakage Current (V <sub>DS</sub> = 0)	V <sub>GS</sub> = ± 8V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	0.45			V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.5 A V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 2.5 A		0.065 0.085	0.080 0.10	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (1)	Forward Transconductance	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 2.5 A		6.6		S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 15 V, f = 1 MHz, V <sub>GS</sub> = 0		412		pF
C <sub>oss</sub>	Output Capacitance			179		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			42.5		pF

**ELECTRICAL CHARACTERISTICS (CONTINUED)****SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 10\text{ V}$ , $I_D = 2.5\text{ A}$		11		ns
$t_r$	Rise Time	$R_G = 4.7\Omega$ , $V_{GS} = 2.5\text{ V}$ (see test circuit, Figure 1)		47		ns
$Q_g$	Total Gate Charge	$V_{DD} = 10\text{ V}$ , $I_D = 5\text{ A}$ ,		4.5		nC
$Q_{gs}$	Gate-Source Charge	$V_{GS} = 2.5\text{ V}$		0.73		nC
$Q_{gd}$	Gate-Drain Charge	(see test circuit, Figure 2)		1.75		nC

**SWITCHING OFF**

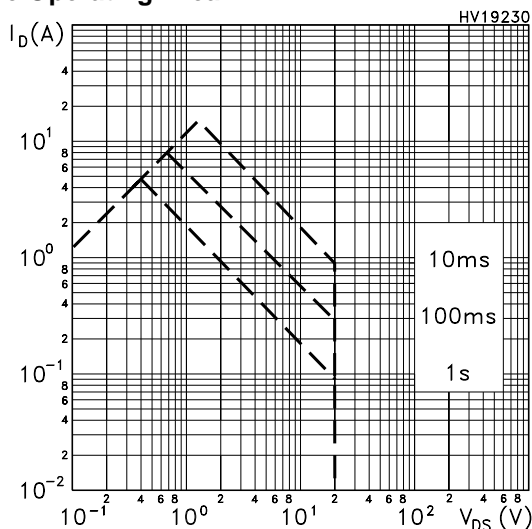
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 10\text{ V}$ , $I_D = 2.5\text{ A}$ ,		38		ns
$t_f$	Fall Time	$R_G = 4.7\Omega$ , $V_{GS} = 2.5\text{ V}$ (see test circuit, Figure 1)		20		ns

**SOURCE DRAIN DIODE**

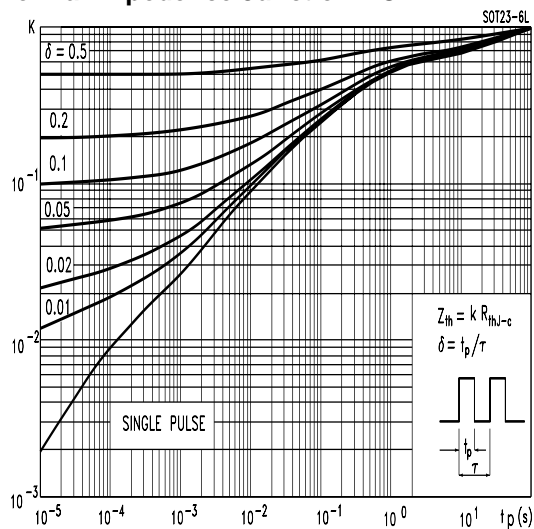
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				5	A
$I_{SDM}$	Source-drain Current (pulsed)				20	A
$V_{SD(1)}$	Forward On Voltage	$I_{SD} = 5\text{ A}$ , $V_{GS} = 0$			1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 5\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ ,		32		ns
$Q_{rr}$	Reverse Recovery Charge	$V_{DD} = 16\text{ V}$ , $T_j = 150^\circ\text{C}$		12.8		nC
$I_{RRM}$	Reverse Recovery Current	(see test circuit, Figure 3)		0.8		A

Note: 1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.

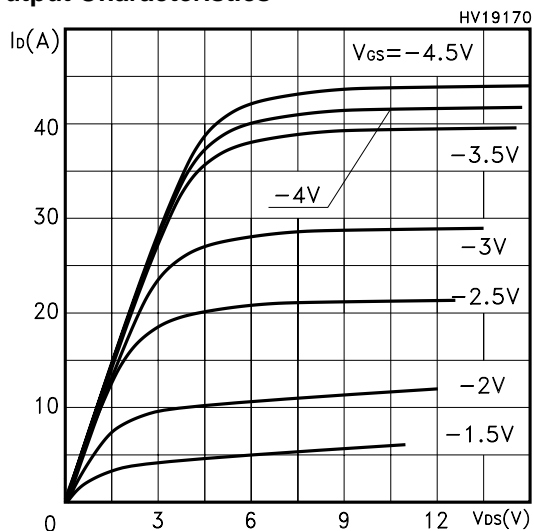
Safe Operating Area



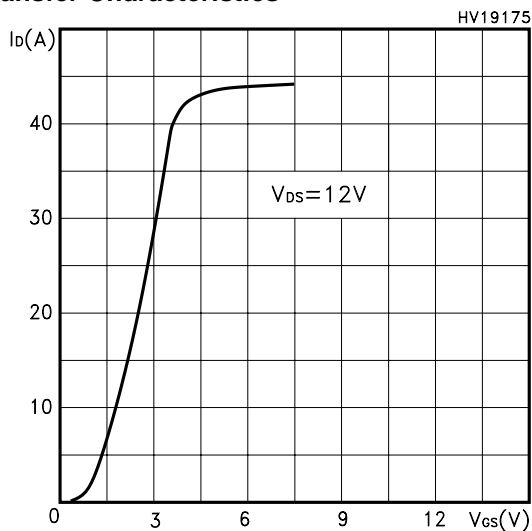
Thermal Impedance Junction-PCB



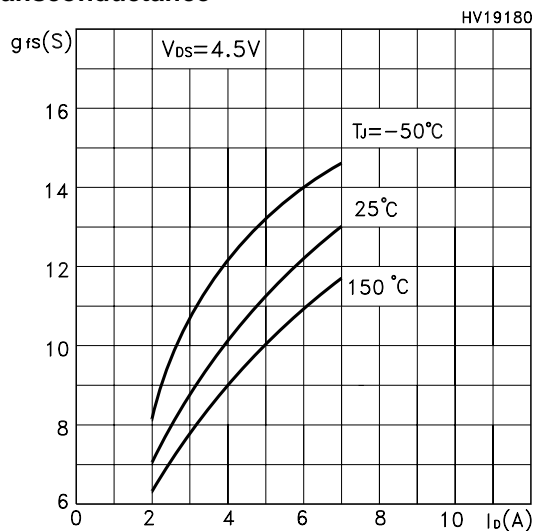
Output Characteristics



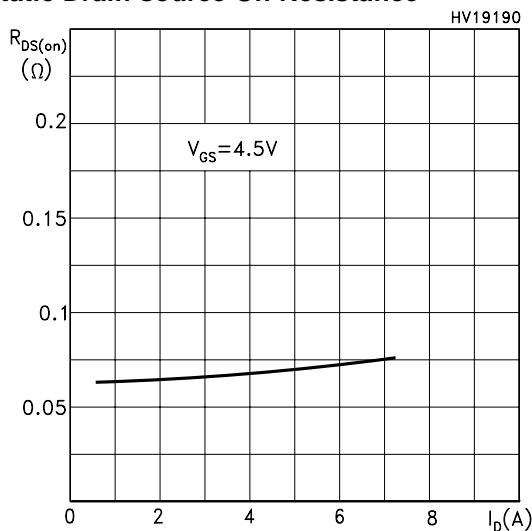
Transfer Characteristics



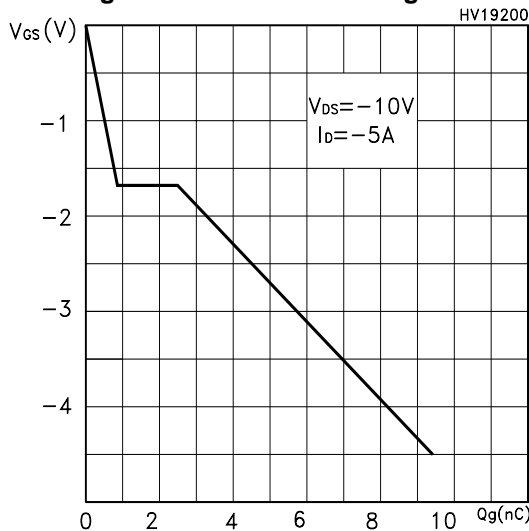
Transconductance



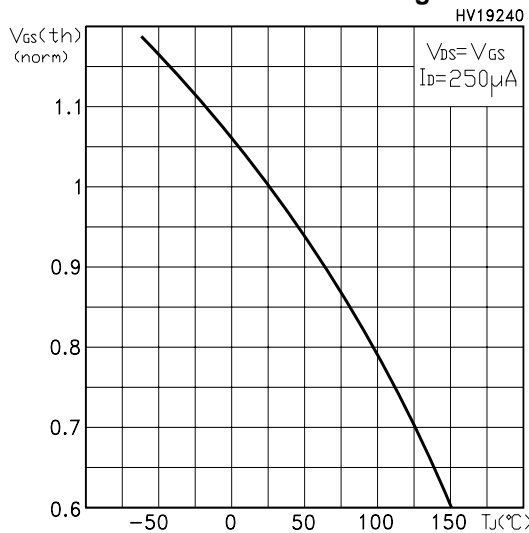
Static Drain-source On Resistance



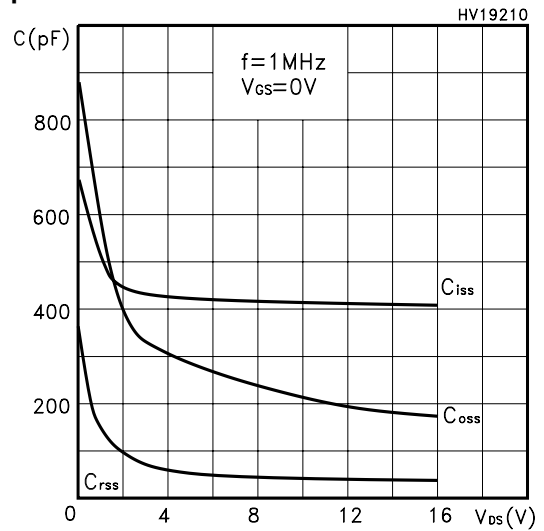
Gate Charge vs Gate-source Voltage



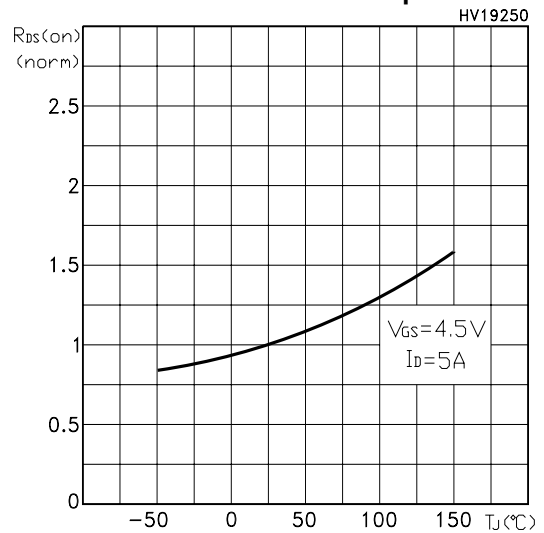
Normalized Gate Threshold Voltage vs Temp.



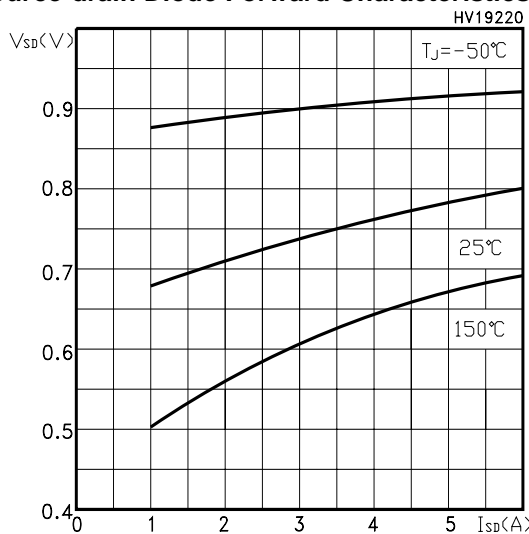
Capacitance Variations



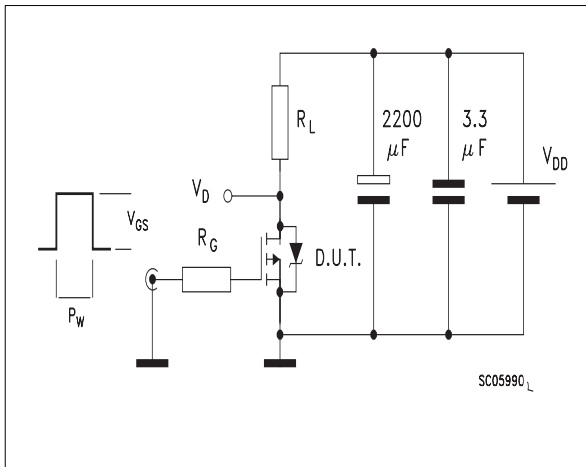
Normalized On Resistance vs Temperature



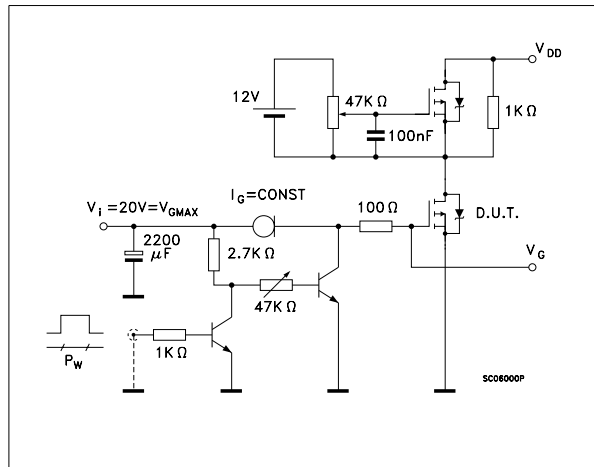
Source-drain Diode Forward Characteristics



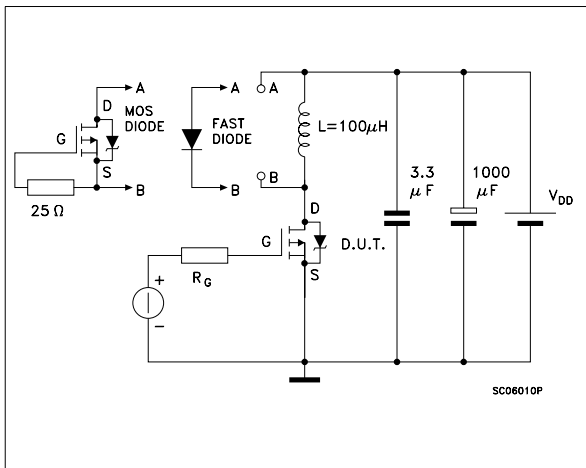
**Fig. 1: Switching Times Test Circuit For Resistive Load**



**Fig. 2: Gate Charge test Circuit**

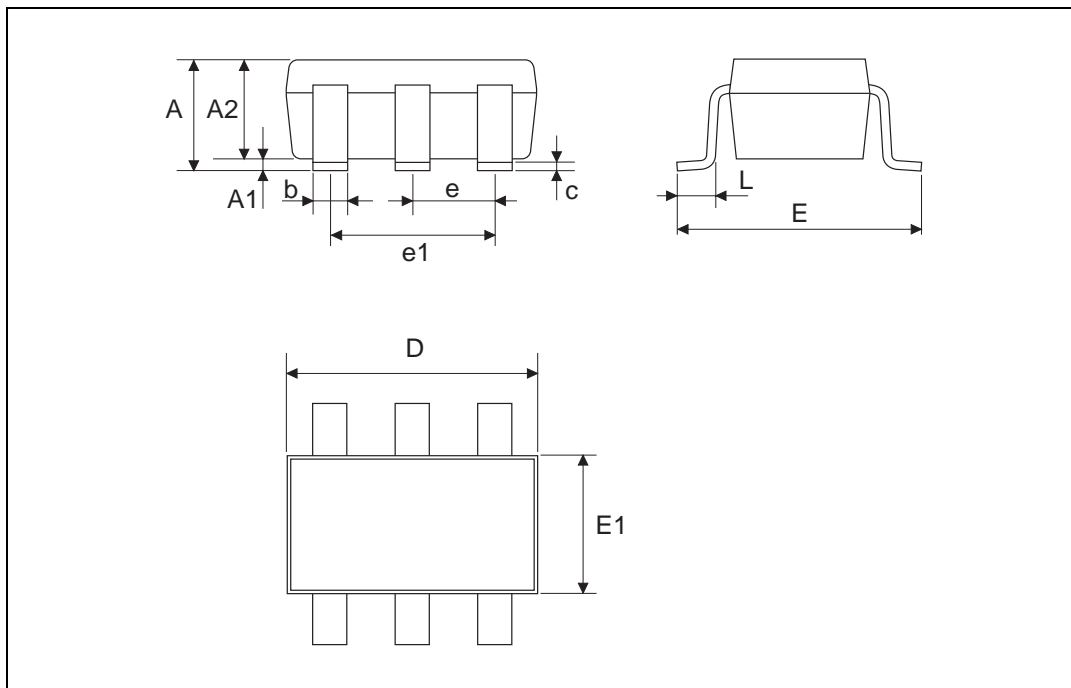


**Fig. 3: Test Circuit For Diode Recovery Behaviour**



## TSOP-6 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	



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

© <http://www.st.com>