



## 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

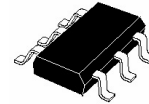
- TYPICAL R<sub>DS(on)</sub> = 0.065Ω (@4.5V)
- TYPICAL R<sub>DS(on)</sub> = 0.085Ω (@2.5V)
- ULTRA LOW THRESHOLD GATE DRIVE (2.5V)
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY

### 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.

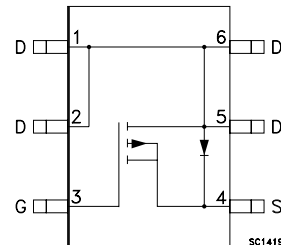
### APPLICATIONS

- 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
$V_{DS}$	Drain-source Voltage ( $V_{GS} = 0$ )	20	V
$V_{DGR}$	Drain-gate Voltage ( $R_{GS} = 20 \text{ k}\Omega$ )	20	V
$V_{GS}$	Gate- source Voltage	$\pm 8$	V
$I_D$	Drain Current (continuous) at $T_C = 25^\circ\text{C}$	5	A
$I_D$	Drain Current (continuous) at $T_C = 100^\circ\text{C}$	3.1	A
$I_{DM} (\bullet)$	Drain Current (pulsed)	20	A
$P_{TOT}$	Total Dissipation at $T_C = 25^\circ\text{C}$	1.6	W

( $\bullet$ ) 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

$R_{thj-amb}$	Thermal Resistance Junction-ambient Max	78	$^\circ\text{C/W}$
$T_j$	Max. Operating Junction Temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage Temperature	-55 to 150	$^\circ\text{C}$

### ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE SPECIFIED)

#### OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250 \mu\text{A}$ , $V_{GS} = 0$	20			V
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ , $T_C = 125^\circ\text{C}$			1 10	$\mu\text{A}$ $\mu\text{A}$
$I_{GSS}$	Gate-body Leakage Current ( $V_{DS} = 0$ )	$V_{GS} = \pm 8\text{V}$			$\pm 100$	nA

#### ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$	0.45			V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 4.5\text{V}$ , $I_D = 2.5 \text{ A}$ $V_{GS} = 2.5\text{V}$ , $I_D = 2.5 \text{ A}$		0.065 0.085	0.080 0.10	$\Omega$ $\Omega$

#### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (1)$	Forward Transconductance	$V_{DS} = 15 \text{ V}$ , $I_D = 2.5 \text{ A}$		6.6		S
$C_{iss}$	Input Capacitance	$V_{DS} = 15 \text{ V}$ , $f = 1 \text{ MHz}$ , $V_{GS} = 0$		412		pF
$C_{oss}$	Output Capacitance			179		pF
$C_{rss}$	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

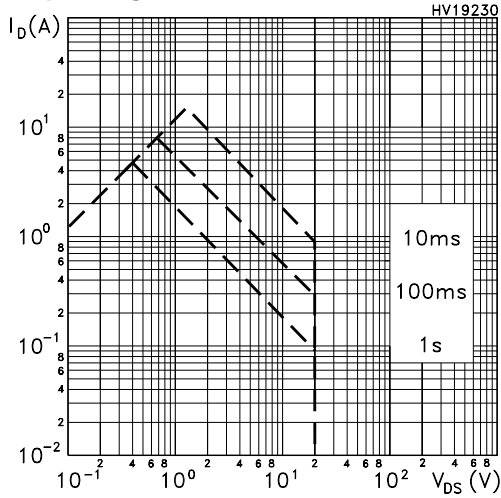
**SOURCE DRAIN DIODE**

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

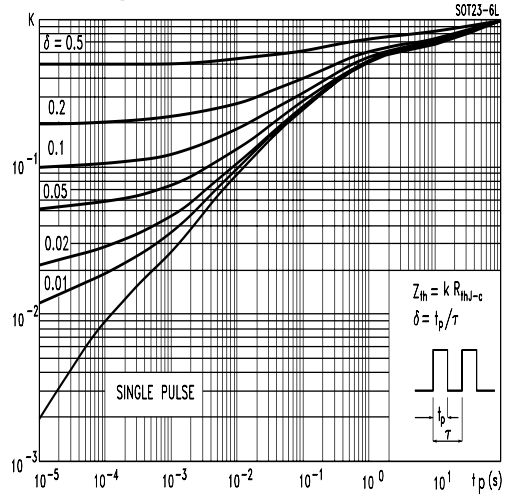
Note: 1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.

# STT5PF20V

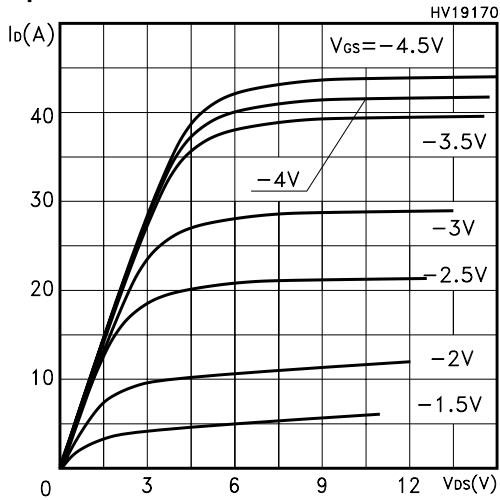
## Safe Operating Area



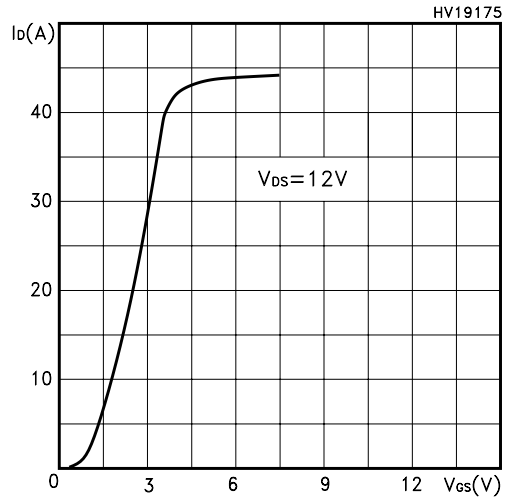
## Thermal Impedance Junction-PCB



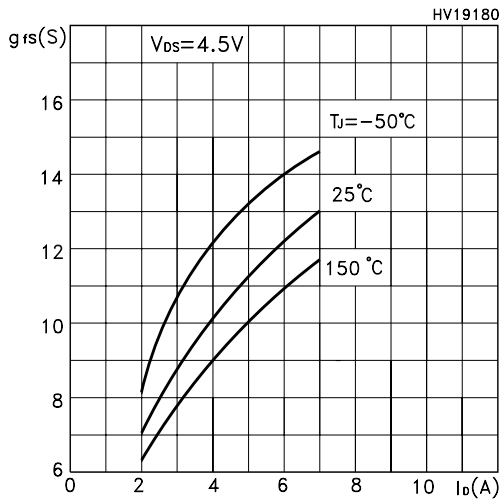
## Output Characteristics



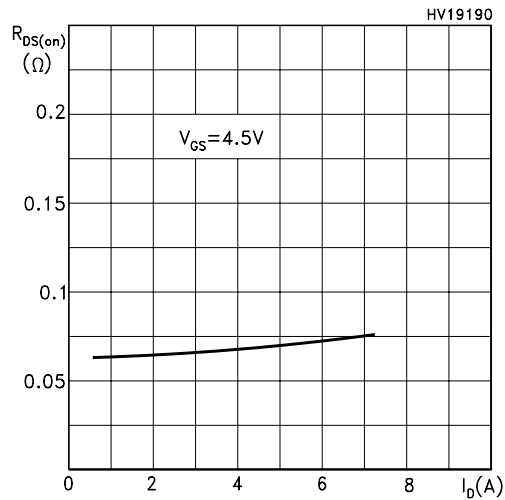
## Transfer Characteristics



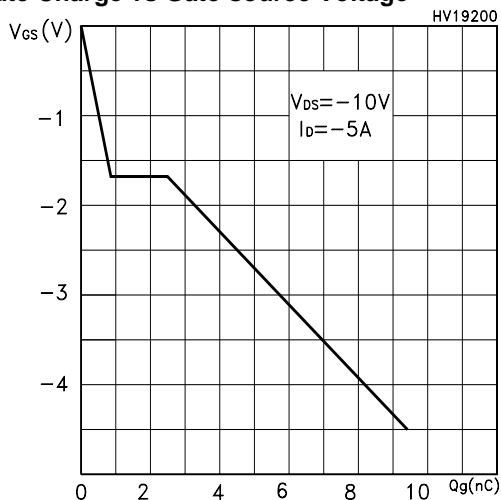
## Transconductance



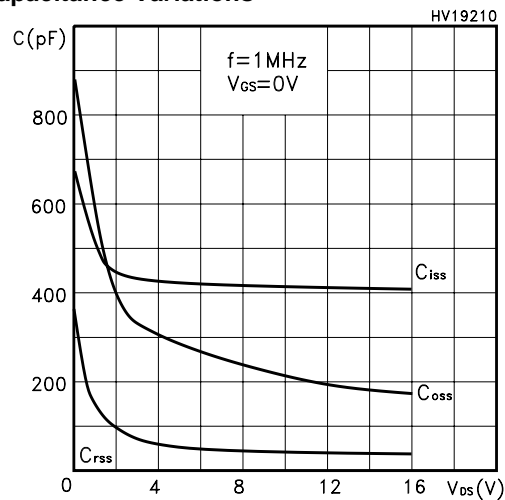
## Static Drain-source On Resistance



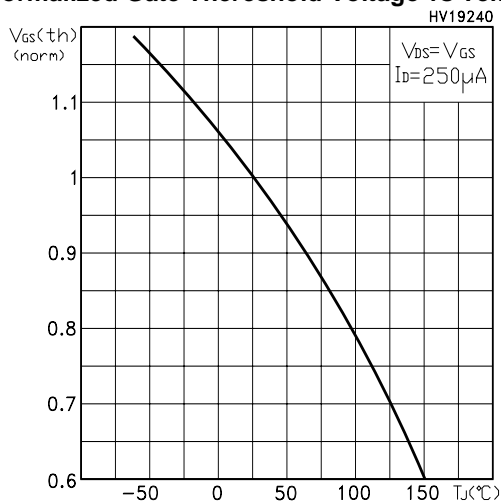
Gate Charge vs Gate-source Voltage



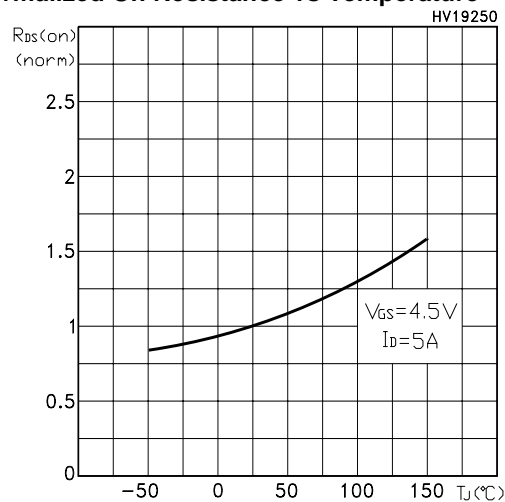
Capacitance Variations



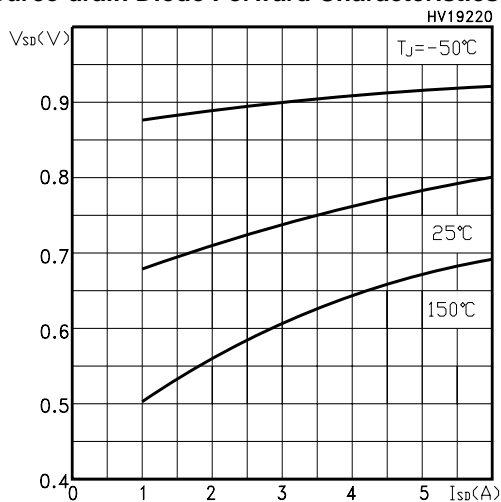
Normalized Gate Threshold Voltage vs Temp.



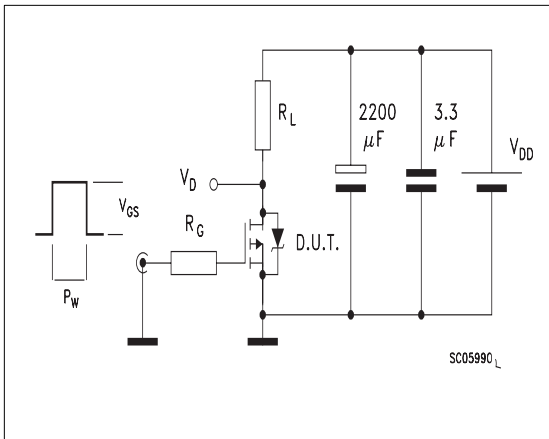
Normalized On Resistance vs Temperature



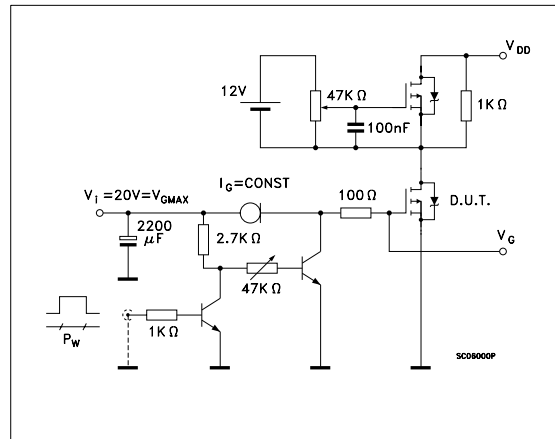
Source-drain Diode Forward Characteristics



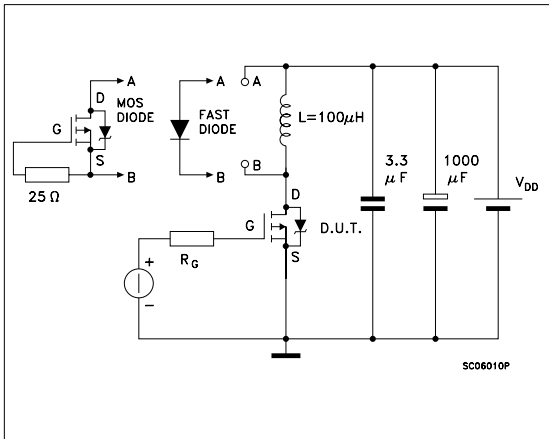
**Fig. 1: Switching Times Test Circuit For Resistive Load**



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

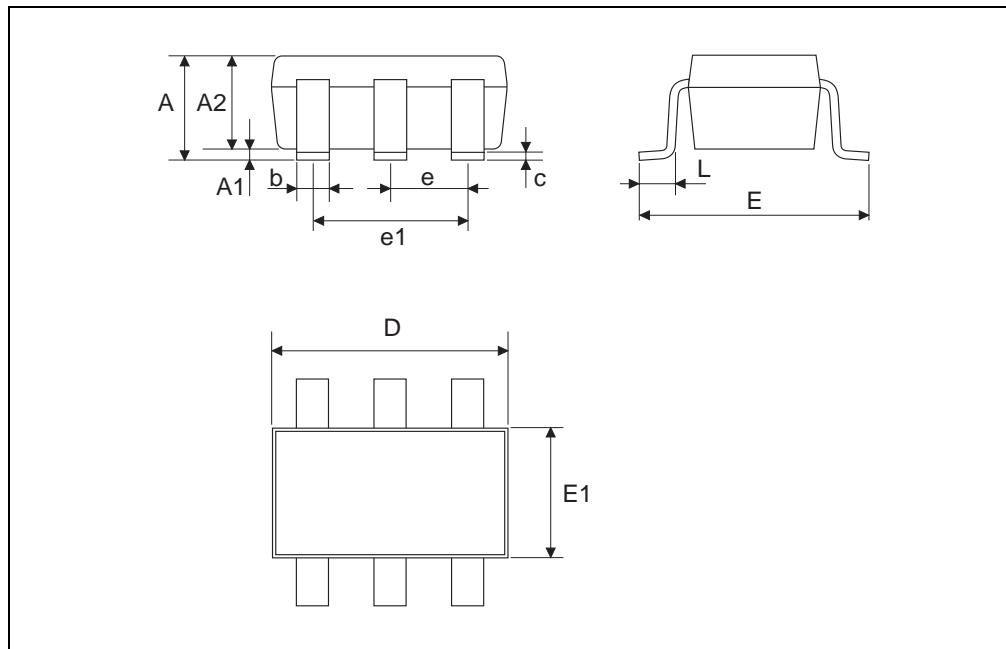


**Fig. 3: Test Circuit For Diode Recovery Behaviour**



## 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	



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