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STT5PF20V

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

TYPE	V _{DSS}	R _{DS(on)}	I _D
STT5PF20V	20 V	< 0.080 Ω (@4.5V) < 0.10 Ω (@2.5V)	5 A

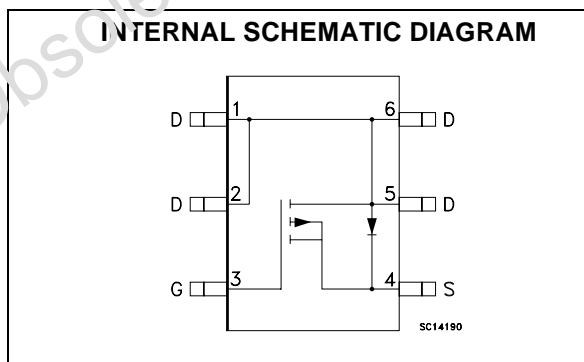
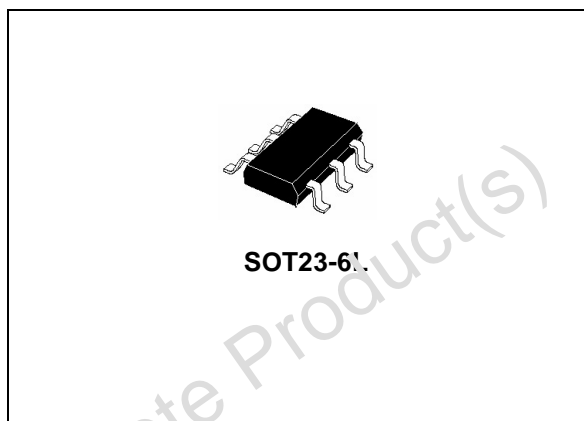
- TYPICAL R_{DS(on)} = 0.065Ω (@4.5V)
- TYPICAL R_{DS(on)} = 0.085Ω (@2.5V)
- ULTRA LOW THRESHOLD GATE DRIVE (2.5V)
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY

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



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	± 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

Rthj-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	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 8\text{V}$			± 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
$R_{D(on)}$	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	Ω Ω

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

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ELECTRICAL CHARACTERISTICS (CONTINUED)
SWITCHING ON

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

SWITCHING OFF

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

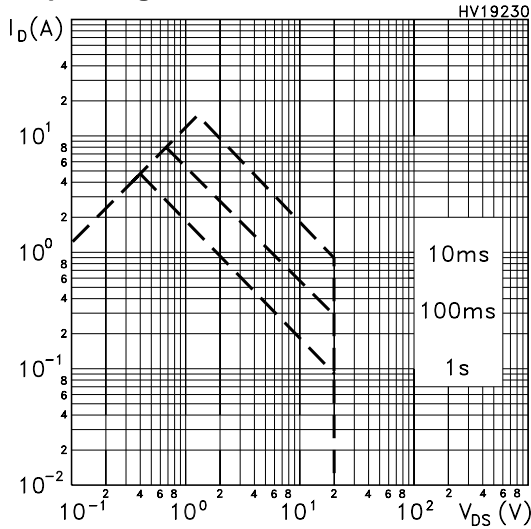
SOURCE DRAIN DIODE

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} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 5\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_{DD} = 16\text{ V}$, $T_J = 150^\circ\text{C}$ (see test circuit, Figure 3)		32 12.8 0.8		ns nC A

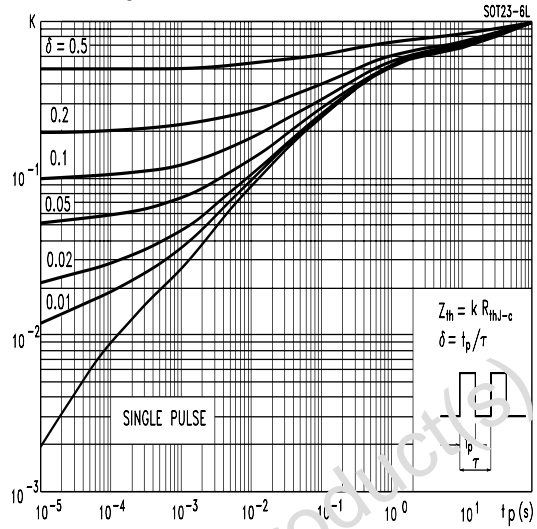
 Note: 1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

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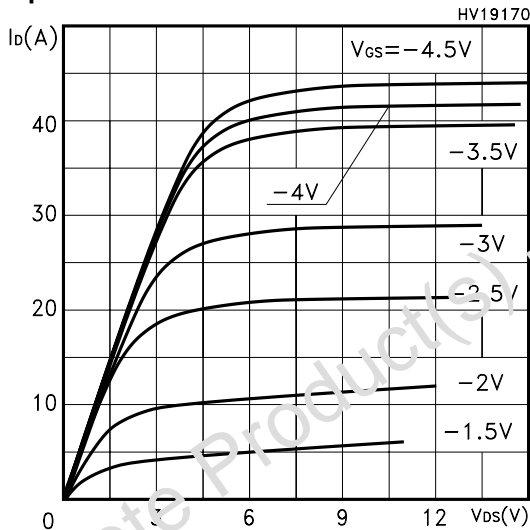
Safe Operating Area



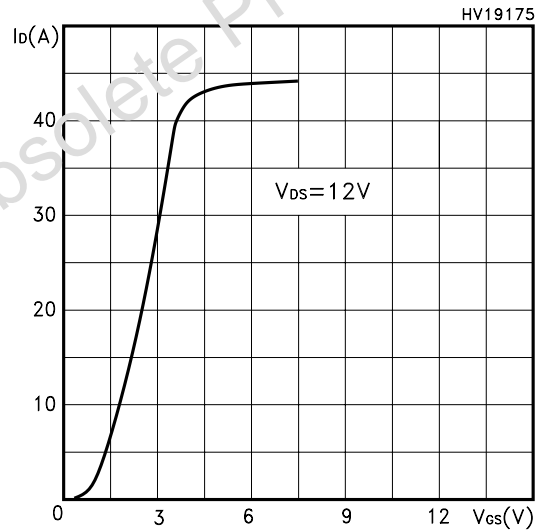
Thermal Impedance Junction-PCB



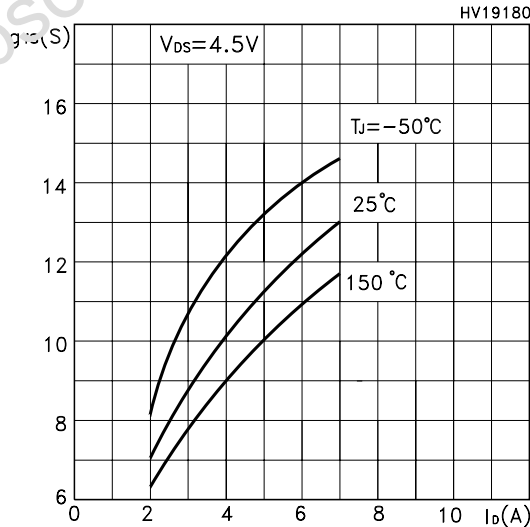
Output Characteristics



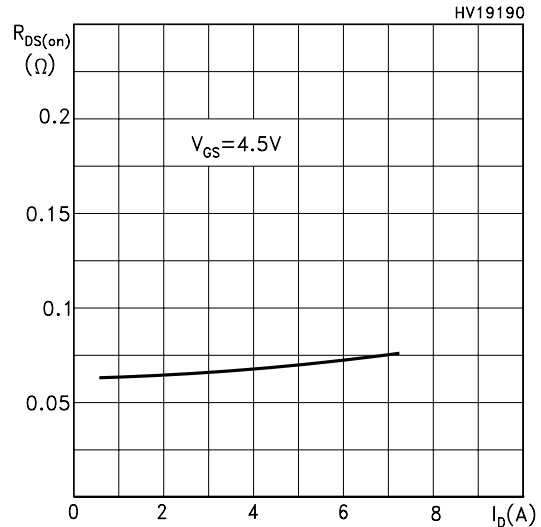
Transfer Characteristics



Transconductance

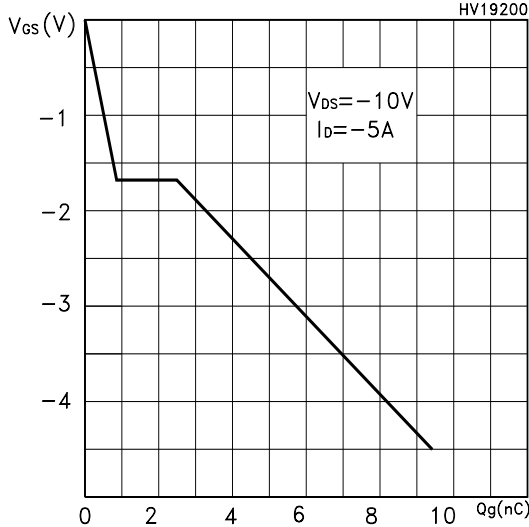


Static Drain-source On Resistance

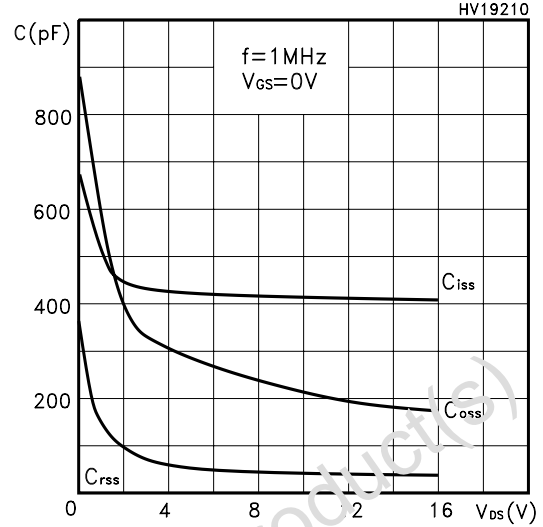


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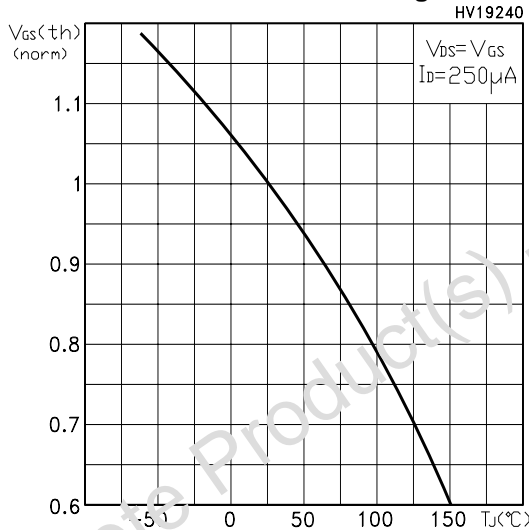
Gate Charge vs Gate-source Voltage



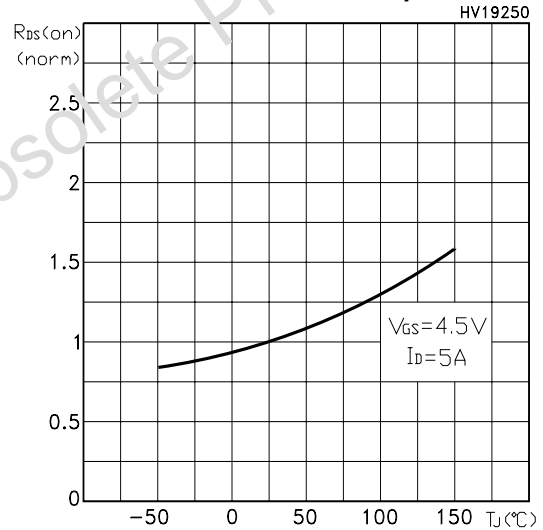
Capacitance Variations



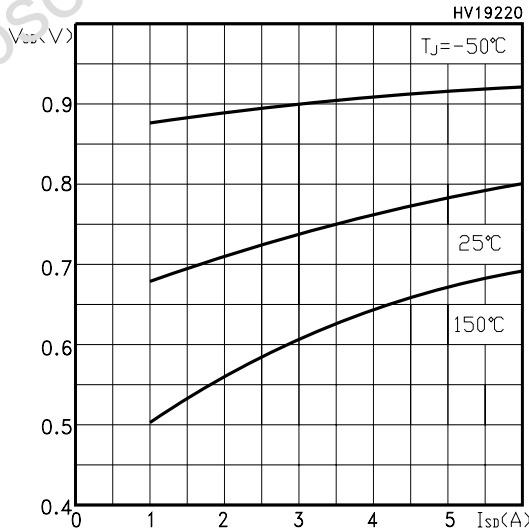
Normalized Gate Threshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-Drain Diode Forward Characteristics



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Fig. 1: Switching Times Test Circuit For Resistive Load

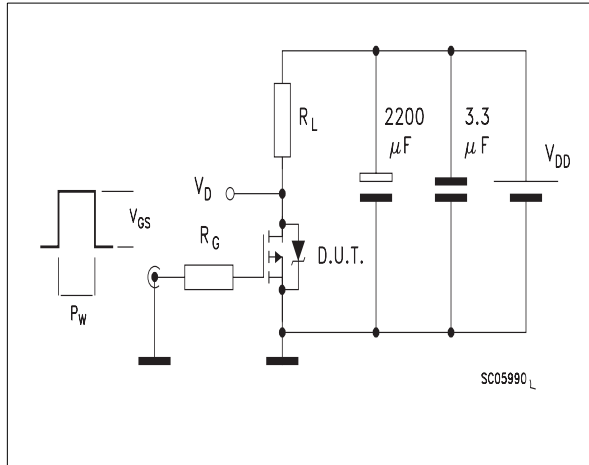


Fig. 2: Gate Charge test Circuit

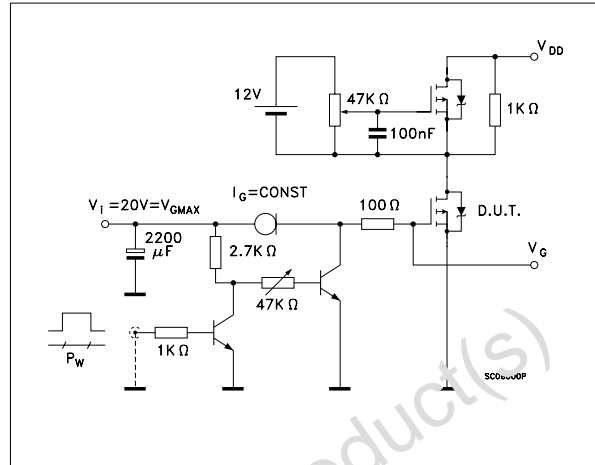
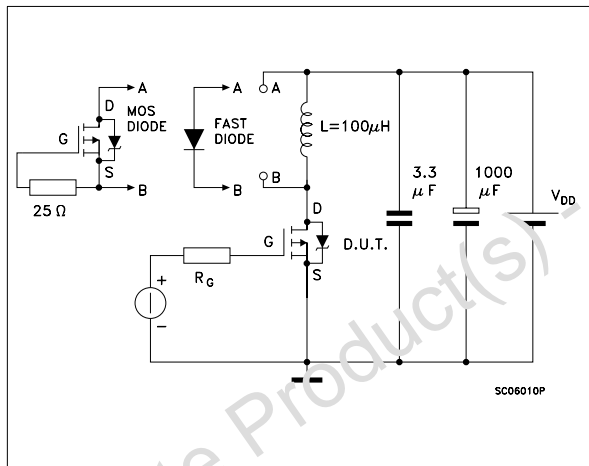


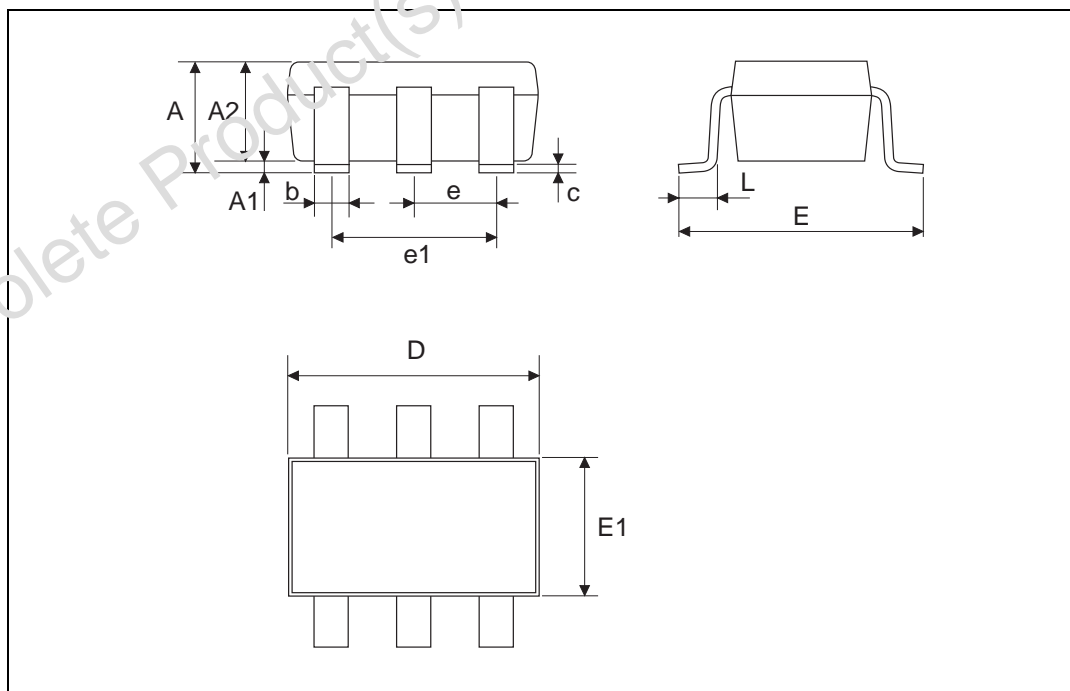
Fig. 3: Test Circuit For Diode Recovery Behaviour



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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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