STS5PF20V

P-CHANNEL 20V - 0.065Ω - 5A SO-8
2.5V-DRIVE STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STS5PF20V	20 V	< 0.080 Ω (@4.5V) < 0.10 Ω (@2.5V)	5 A

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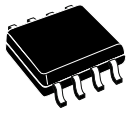
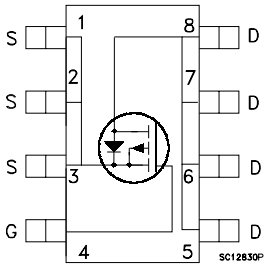
- TYPICAL $R_{DS}(on)$ = 0.065Ω (@4.5V)
- TYPICAL $R_{DS}(on)$ = 0.085Ω (@2.5V)
- ULTRA LOW THRESHOLD GATE DRIVE (2.5V)
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY



SO-8

INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely extremely low on-resistance when driven at 2.5V.

APPLICATIONS

- POWER MANAGEMENT IN CELLULAR PHONES
- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT

ORDER CODES

PART NUMBER	MARKING	PACKAGE	PACKAGING
STS5PF20V	S5PF20V	SO-8	TAPE & REEL

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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 kΩ)	20	V
V_{GS}	Gate- source Voltage	± 8	V
I_D	Drain Current (continuous) at T_C = 25°C	5	A
I_D	Drain Current (continuous) at T_C = 100°C	3.1	A
I_{DM} (•)	Drain Current (pulsed)	20	A
P_{TOT}	Total Dissipation at T_C = 25°C	2.5	W

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(•) 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	50	°C/W
T_j	Max. Operating Junction Temperature	–55 to 150	°C
T_{stg}	Storage Temperature	–55 to 150	°C

ELECTRICAL CHARACTERISTICS (T_J = 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	20			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} = ± 8V			±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	0.45			V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 4.5V, I_D = 2.5 A		0.065	0.080	Ω
		V_{GS} = 2.5V, I_D = 2.5 A		0.085	0.10	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} = 15 V , I_D = 2.5 A		6.6		S
C_{iss}	Input Capacitance	V_{DS} = 15 V, f = 1 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 V, I_D = 2.5 A		11		ns
t_r	Rise Time	R_G = 4.7Ω V_{GS} = 2.5 V (see test circuit, Figure 1)		47		ns
Q_g	Total Gate Charge	V_{DD} = 10 V, I_D = 5 A,		4.5	6	nC
Q_{gs}	Gate-Source Charge	V_{GS} = 2.5V		0.73		nC
Q_{gd}	Gate-Drain Charge	(see test circuit, Figure 2)		1.75		nC

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SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD} = 10 V, I_D = 2.5 A,		39		ns
t_f	Fall Time	R_G = 4.7Ω, V_{GS} = 2.5 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 A, V_{GS} = 0			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 5 A, di/dt = 100A/µs,		32		ns
Q_{rr}	Reverse Recovery Charge	V_{DD} = 16 V, T_j = 150°C		12.8		nC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 3)		0.8		A

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

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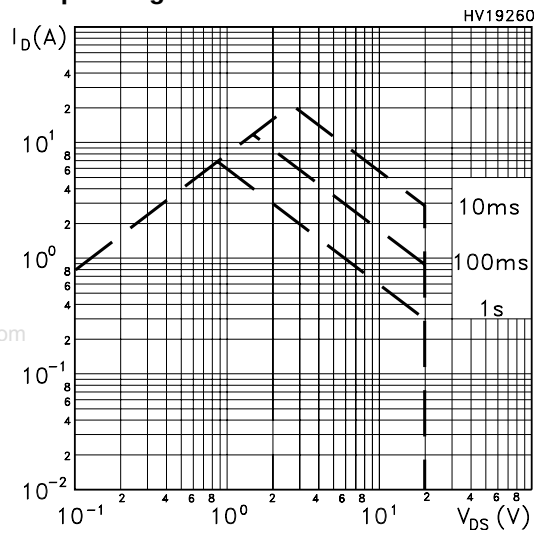
Safe Operating Area



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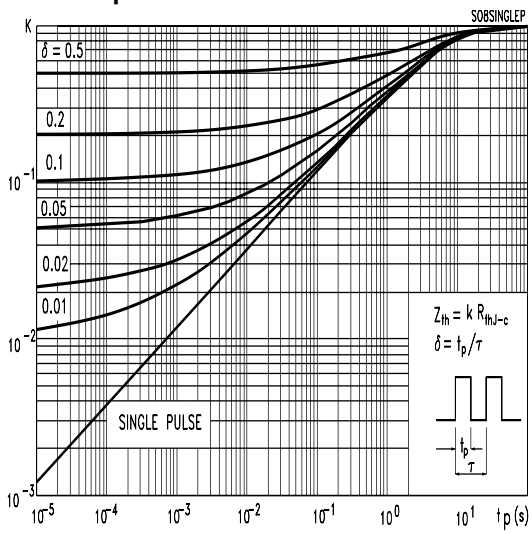
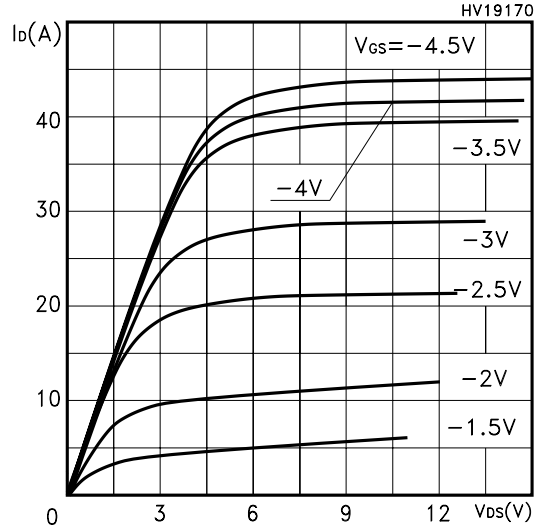
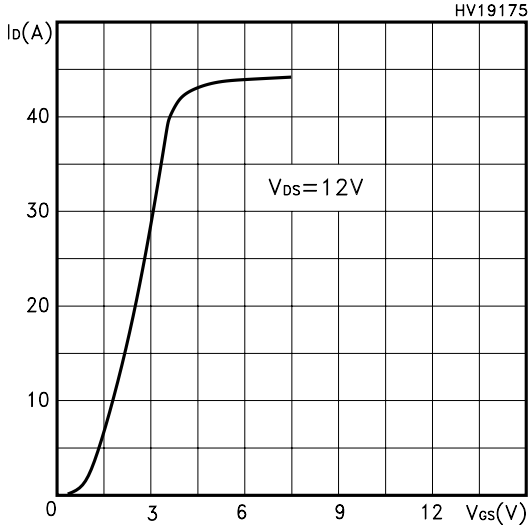
Thermal Impedence



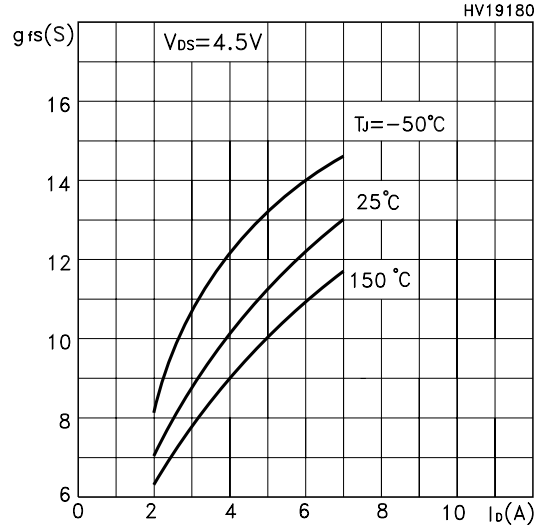
Output Characteristics



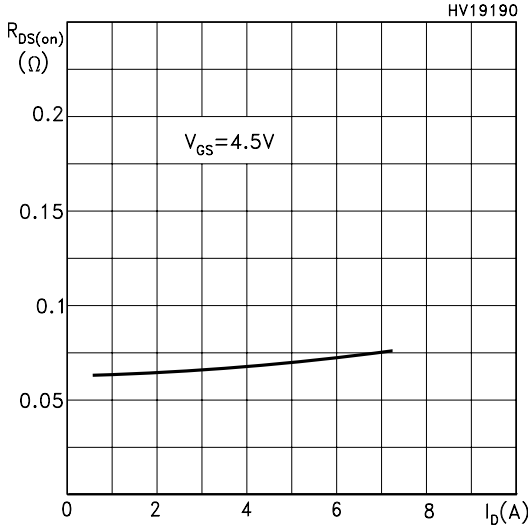
Transfer Characteristics



Transconductance



Static Drain-source On Resistance



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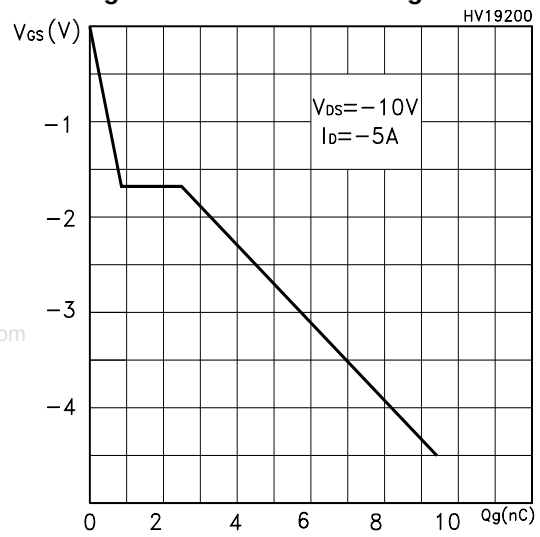
Gate Charge vs Gate-source Voltage



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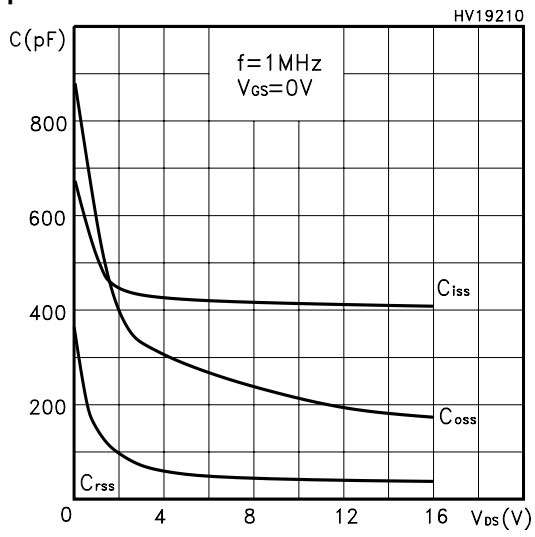
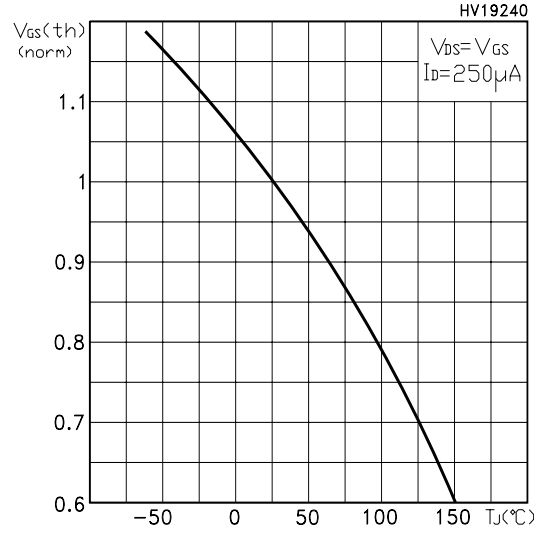
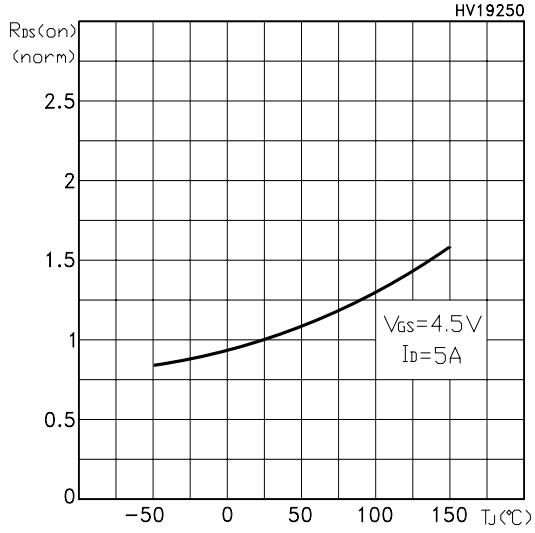
Capacitance Variations



Normalized Gate Thereshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

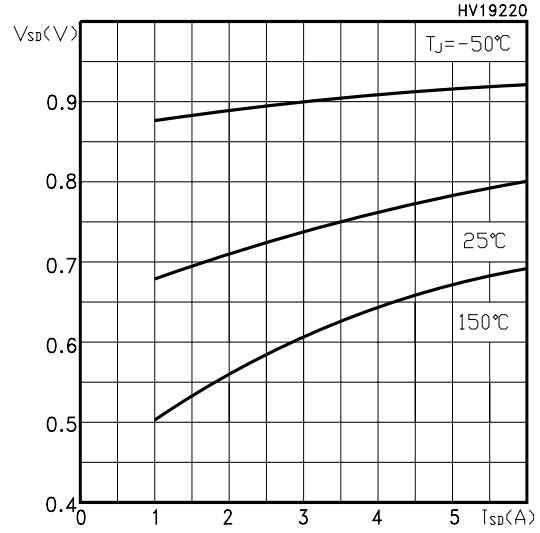


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Fig. 1: Switching Times Test Circuit For Resistive Load

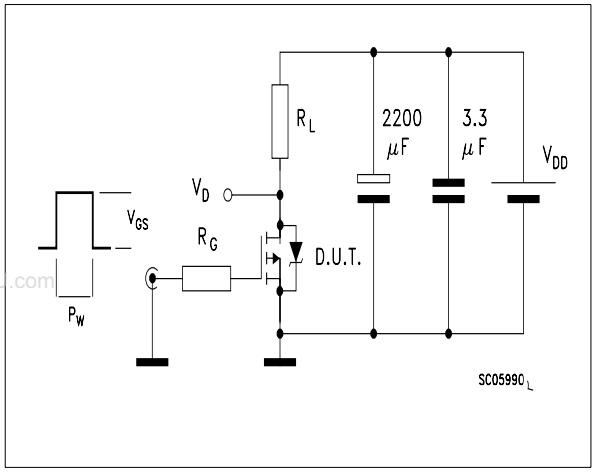

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Fig. 2: Gate Charge test Circuit

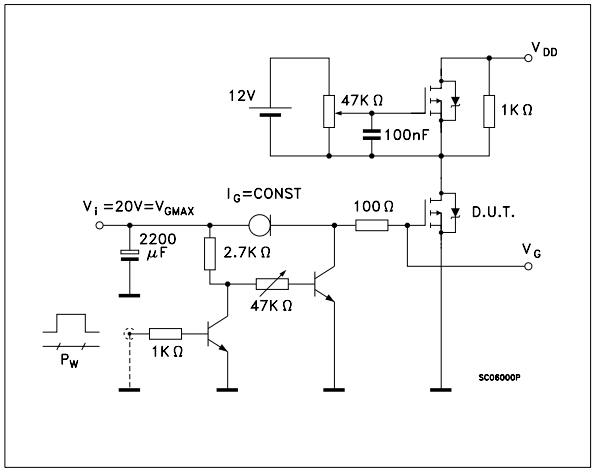
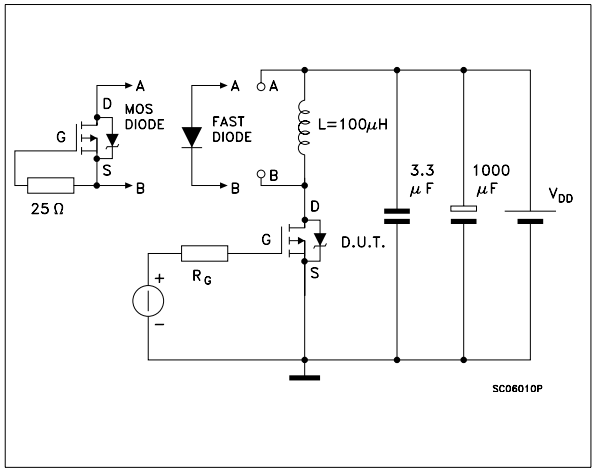


Fig. 3: Test Circuit For Diode Recovery Behaviour



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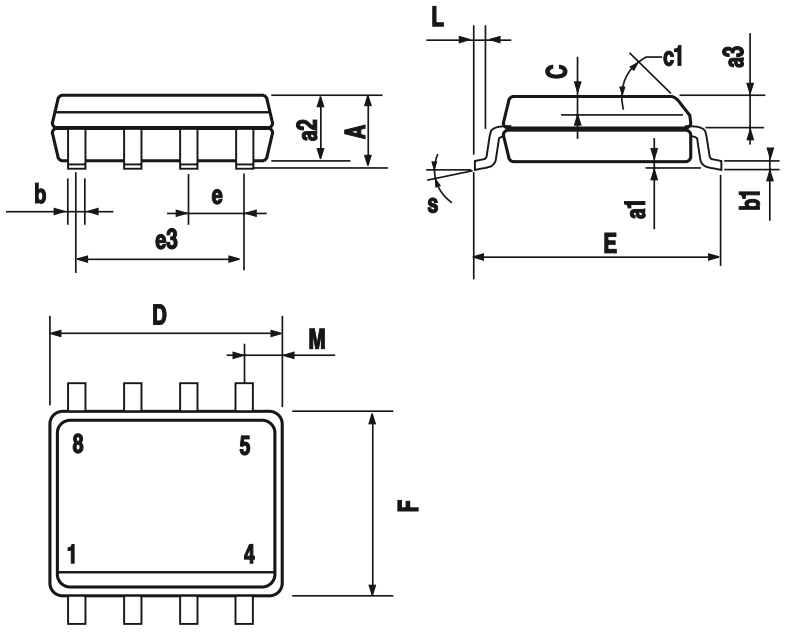
SO-8 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45 (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8 (max.)					



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