

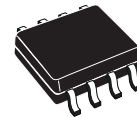


STS4DPFS20L

P-CHANNEL 20V - 0.07Ω - 4A SO-8 STripFET™ MOSFET PLUS SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

MOSFET	V _{DSS}	R _{DS(on)}	I _D
	20 V	< 0.08 Ω	4 A
SCHOTTKY	I _{F(AV)}	V _{RRM}	V _{F(MAX)}
	3 A	30 V	0.51 V

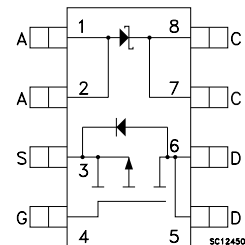


SO-8

DESCRIPTION

This product associates the latest low voltage STripFET™ in p-channel version to a low drop Schottky diode. Such configuration is extremely versatile in implementing, a large variety of DC-DC converters for printers, portable equipment, and cellular phones.

INTERNAL SCHEMATIC DIAGRAM



MOSFET 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	± 16	V
I _D	Drain Current (continuous) at T _C = 25°C	4	A
I _D	Drain Current (continuous) at T _C = 100°C	3.4	A
I _{DM} (●)	Drain Current (pulsed)	16	A
P _{TOT}	Total Dissipation at T _C = 25°C	2	W

SCHOTTKY ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage		30	V
I _{F(RMS)}	RMS Forward Current		20	A
I _{F(AV)}	Average Forward Current	TL = 125°C δ = 0.5	3	A
I _{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal	75	A
I _{RRM}	Repetitive Peak Reverse Current	tp = 2 μs F = 1 kHz	1	A
I _{RSM}	Non Repetitive Peak Reverse Current	tp = 100 μs	1	A
dv/dt	Critical Rate Of Rise Of Reverse Voltage		10000	V/μs

(*)Pulse width limited by safe operating area

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

STS4DPFS20L

THERMAL DATA

Rthj-amb	(*)Thermal Resistance Junction-ambient MOSFET	62.5	°C/W
Rthj-amb	(*)Thermal Resistance Junction-ambient SCHOTTKY	100	°C/W
T _{stg}	Storage Temperature Range	-55 to 150	°C
T _J	Junction Temperature	150	°C
(*) Mounted on FR-4 board (Steady State)			

MOSFET 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	20			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating, T _C = 125 °C			1 10	µA µA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 16 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 = 250µA	1			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V, I _D = 2 A V _{GS} = 4.5V, I _D = 2 A		0.07 0.085	0.08 0.10	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} = 15V, I _D = 2 A		10		S
C _{iss}	Input Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		1350		pF
C _{oss}	Output Capacitance			490		pF
C _{rss}	Reverse Transfer Capacitance			130		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15V$, $I_D = 2A$ $R_G = 4.7\Omega$		25		ns
t_r	Rise Time	$V_{GS} = 10V$ (see test circuit, Figure 3)		35		ns
Q_g	Total Gate Charge	$V_{DD} = 24V$, $I_D = 4A$, $V_{GS} = 4.5 V$		12.5	16	nC
Q_{gs}	Gate-Source Charge			5		nC
Q_{gd}	Gate-Drain Charge			3		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off Delay Time	$V_{DD} = 15 V$, $I_D = 2A$, $R_G = 4.7\Omega$, $V_{GS} = 4.5 V$		125		ns
t_f	Fall Time	(see test circuit, Figure 3)		30		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				4	A
$I_{SDM} (2)$	Source-drain Current (pulsed)				16	A
$V_{SD} (1)$	Forward On Voltage	$I_{SD} = 4 A$, $V_{GS} = 0$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 4 A$, $di/dt = 100A/\mu s$, $V_{DD} = 15 V$, $T_J = 150^\circ C$		45		ns
Q_{rr}	Reverse Recovery Charge	(see test circuit, Figure 5)		36		nC
I_{RRM}	Reverse Recovery Current			1.6		A

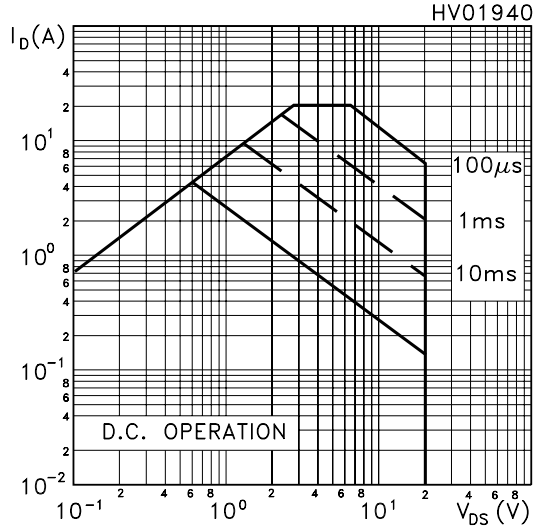
Note: 1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

2. Pulse width limited by safe operating area.

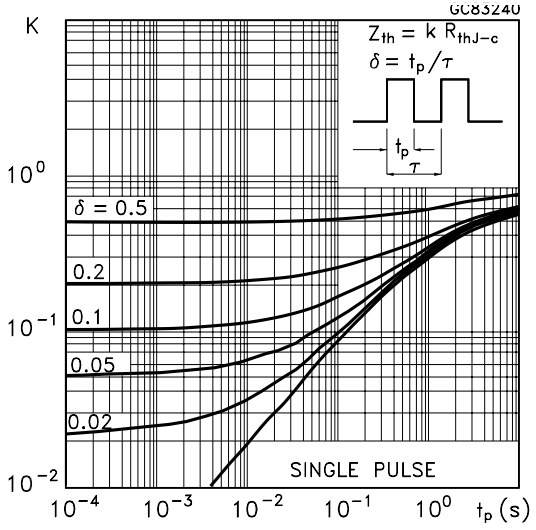
SCHOTTKY STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_R(^*)$	Reversed Leakage Current	$T_J = 25^\circ C$, $V_R = 30 V$ $T_J = 125^\circ C$, $V_R = 30 V$		0.03	0.2 100	mA mA
$V_F(^*)$	Forward Voltage Drop	$T_J = 25^\circ C$, $I_F = 3 A$ $T_J = 125^\circ C$, $I_F = 3 A$		0.46	0.51 0.46	V V

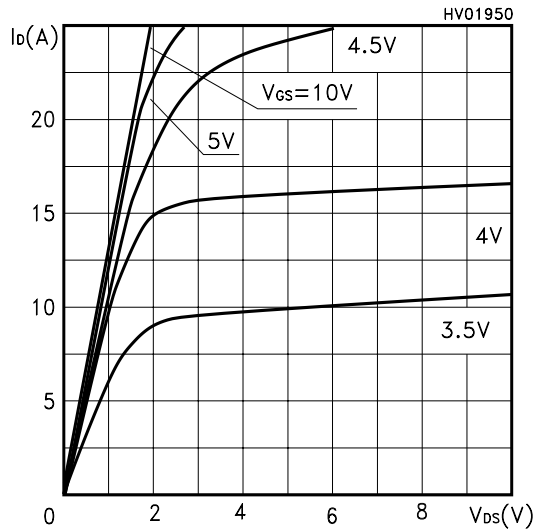
Safe Operating Area



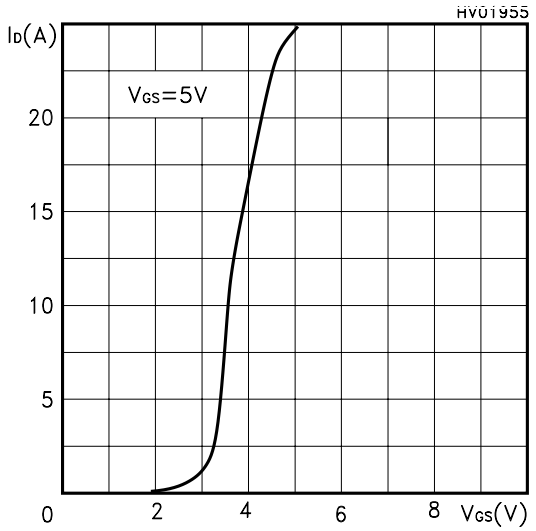
Thermal Impedance



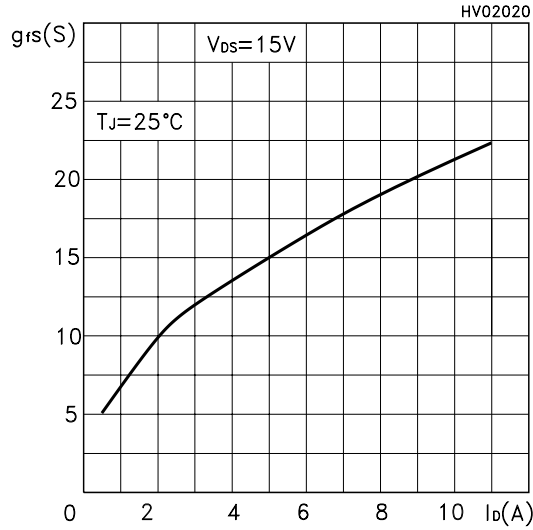
Output Characteristics



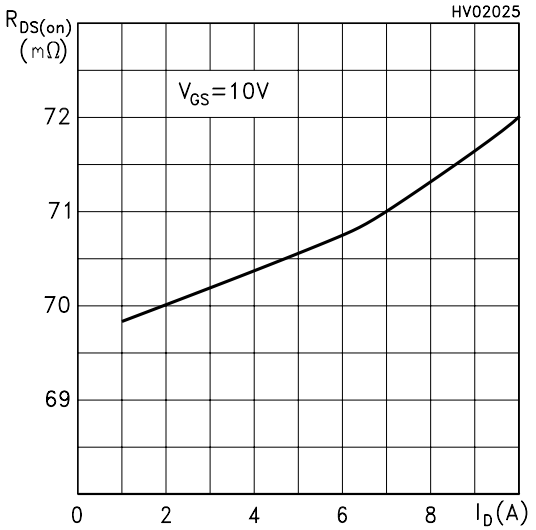
Transfer Characteristics



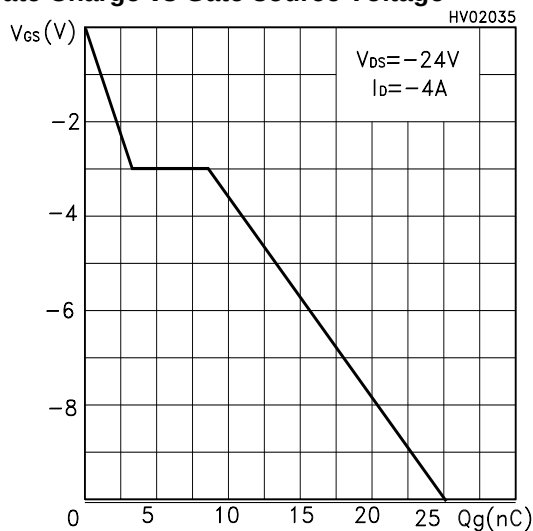
Transconductance



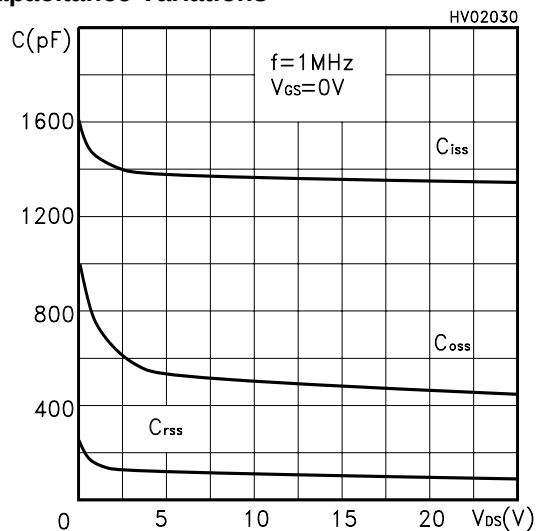
Static Drain-source On Resistance



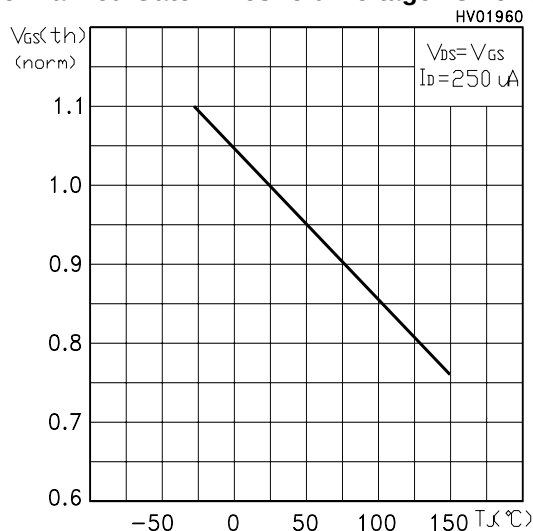
Gate Charge vs Gate-source Voltage



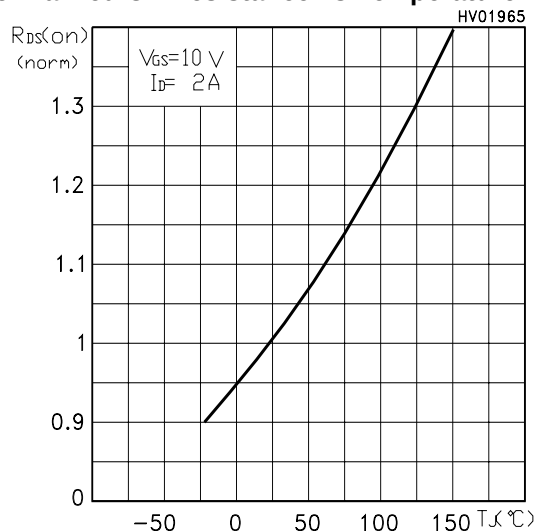
Capacitance Variations



Normalized Gate Threshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

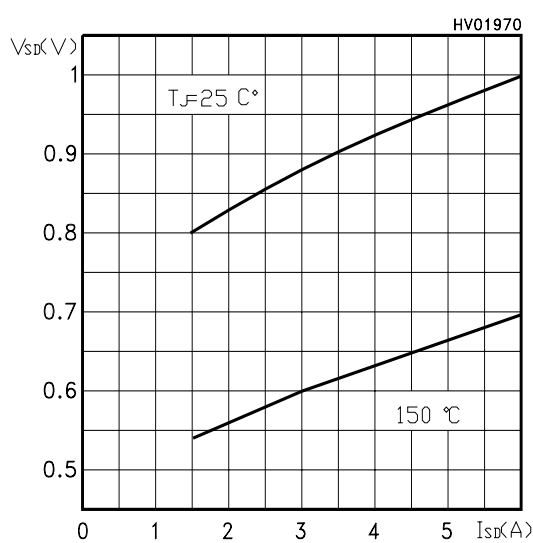


Fig. 1: Unclamped Inductive Load Test Circuit

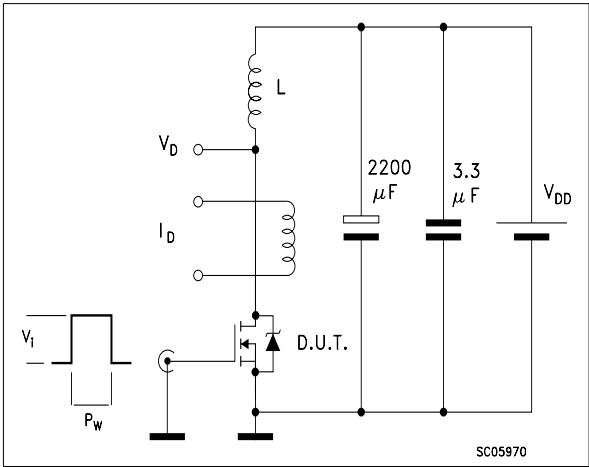


Fig. 2: Unclamped Inductive Waveform

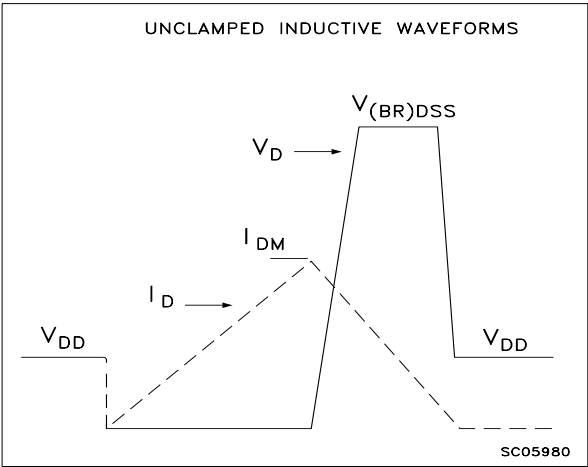


Fig. 3: Switching Times Test Circuits For Resistive Load

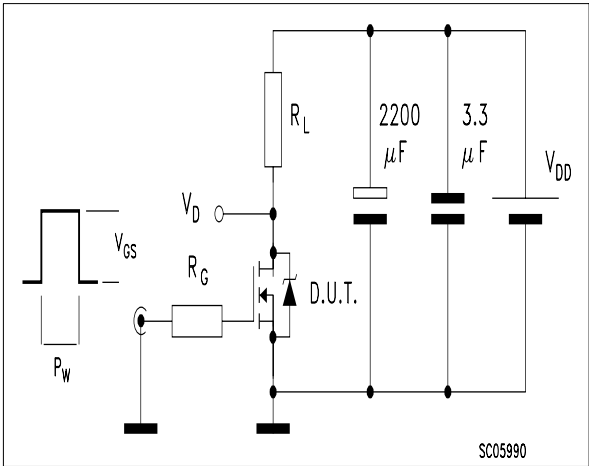


Fig. 4: Gate Charge test Circuit

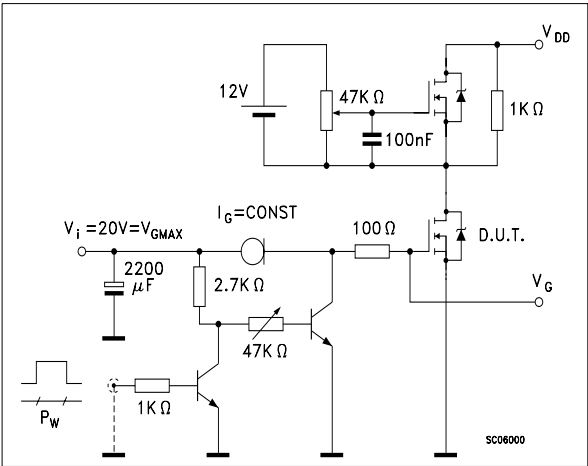
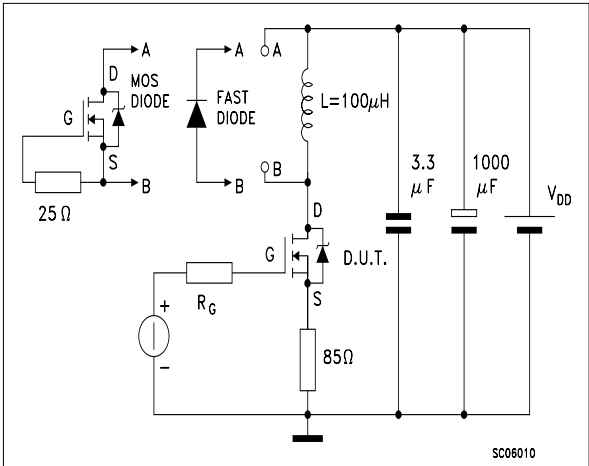
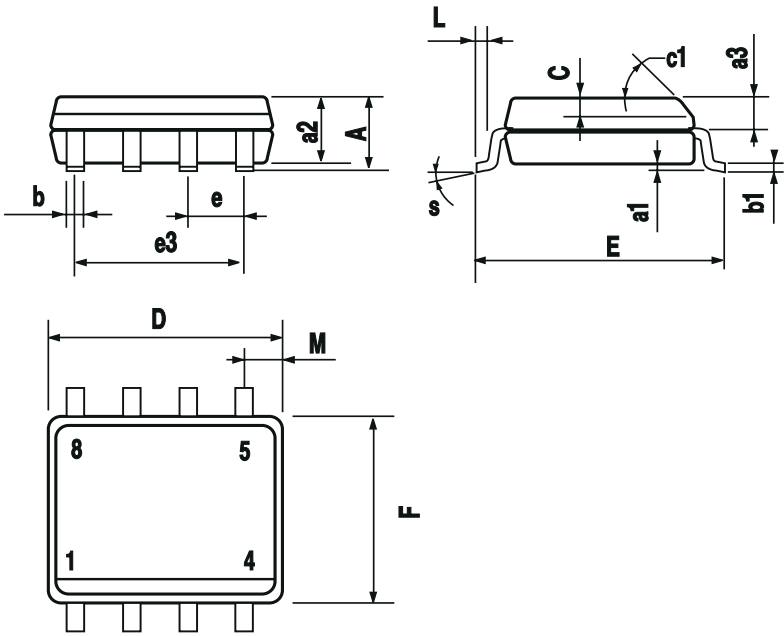


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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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