

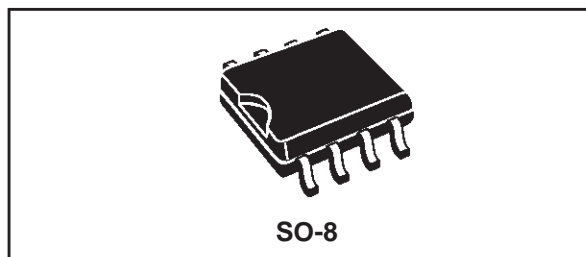


# STS3DPFS40

## P-CHANNEL 40V - 0.070Ω - 3A SO-8 STripFET™ MOSFET PLUS SCHOTTKY RECTIFIER

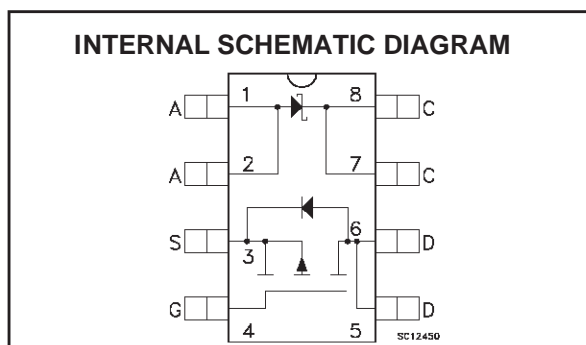
PRELIMINARY DATA

MAIN PRODUCT CHARACTERISTICS			
<b>MOSFET</b>	<b>V<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub></b>	<b>I<sub>D</sub></b>
	40 V	< 0.1 Ω	3 A
<b>SCHOTTKY</b>	<b>I<sub>F(AV)</sub></b>	<b>V<sub>RRM</sub></b>	<b>V<sub>F(MAX)</sub></b>
	3 A	40 V	0.51 V



### 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.



### MOSFET ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	40	V
V <sub>DGR</sub>	Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)	40	V
V <sub>GS</sub>	Gate- source Voltage	± 16	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C	3	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	1.9	A
I <sub>DM</sub> (●)	Drain Current (pulsed)	12	A
P <sub>TOT</sub>	Total Dissipation at T <sub>C</sub> = 25°C	2	W

### SCHOTTKY ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>RRM</sub>	Repetitive Peak Reverse Voltage	40	V
I <sub>F(RMS)</sub>	RMS Forward Current	20	A
I <sub>F(AV)</sub>	Average Forward Current	3	A
I <sub>FSM</sub>	Surge Non Repetitive Forward Current	75	A
I <sub>RRM</sub>	Repetitive Peak Reverse Current	1	A
I <sub>RSM</sub>	Non Repetitive Peak Reverse Current	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

## STS3DPFS40

### THERMAL DATA

Rthj-amb	(*)Thermal Resistance Junction-ambient MOSFET	62.5	°C/W
Rthj-amb	(*)Thermal Resistance Junction-ambient SCHOTTKY Maximum	100	°C/W
T <sub>stg</sub>	Storage Temperature Range	-65 to 150	°C
T <sub>J</sub>	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 <sub>(BR)DSS</sub>	Drain-source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0	40			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> = ± 16 V			±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	2	3	4	V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.5 A		0.070	0.1	Ω
I <sub>D(on)</sub>	On State Drain Current	V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)max</sub> , V <sub>GS</sub> = 10V	3			A

### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (1)	Forward Transconductance	V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)max</sub> , I <sub>D</sub> = 1.5 A		6		S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25V, f = 1 MHz, V <sub>GS</sub> = 0		1190		pF
C <sub>oss</sub>	Output Capacitance			200		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			56		pF

**ELECTRICAL CHARACTERISTICS (CONTINUED)**

**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 20\text{ V}, I_D = 1.5\text{ A}$ $R_G = 4.7\ \Omega, V_{GS} = 10\text{ V}$ (see test circuit, Figure 3)		20		ns
$t_r$	Rise Time			25		ns
$Q_g$	Total Gate Charge	$V_{DD} = 20\text{ V}, I_D = 3\text{ A},$ $V_{GS} = 10\text{ V}$		24.5	33	nC
$Q_{gs}$	Gate-Source Charge			4		nC
$Q_{gd}$	Gate-Drain Charge			5.5		nC

**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off Delay Time	$V_{DD} = 20\text{ V}, I_D = 1.5\text{ A},$ $R_G = 4.7\ \Omega, V_{GS} = 10\text{ V}$ (see test circuit, Figure 3)		100		ns
$t_f$	Fall Time			22		ns
$t_{d(off)}$	Off-voltage Rise Time	$V_{clamp} = 32\text{ V}, I_D = 3\text{ A},$ $R_G = 4.7\ \Omega, V_{GS} = 10\text{ V}$		20		
$t_f$	Fall Time			11		
$t_c$	Cross-over Time			35		

**SOURCE DRAIN DIODE**

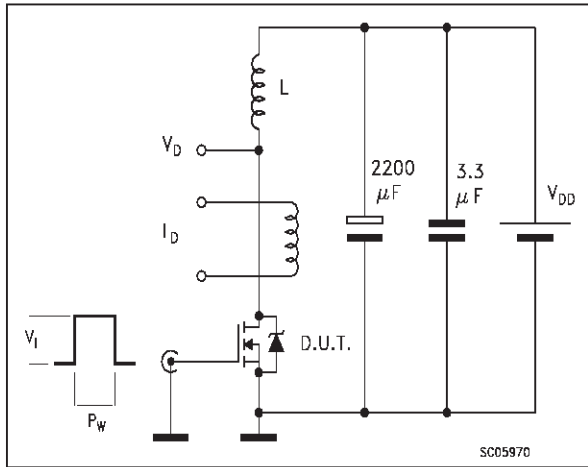
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				3	A
$I_{SDM(2)}$	Source-drain Current (pulsed)				12	A
$V_{SD(1)}$	Forward On Voltage	$I_{SD} = 3\text{ A}, V_{GS} = 0$			2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 3\text{ A}, di/dt = 100\text{A}/\mu\text{s},$ $V_{DD} = 15\text{ V}, T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		34		ns
$Q_{rr}$	Reverse Recovery Charge			45		nC
$I_{RRM}$	Reverse Recovery Current			2.6		A

Note: 1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.  
2. Pulse width limited by safe operating area.

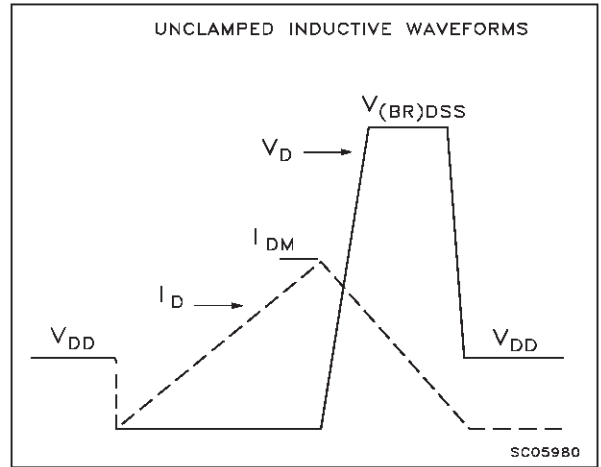
**SCHOTTCKY STATIC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_R(^*)$	Reversed Leakage Current	$T_J = 25\ ^\circ\text{C}, V_R = 30\text{ V}$ $T_J = 125\ ^\circ\text{C}, V_R = 30\text{ V}$		0.03	0.2 100	mA mA
$V_F(^*)$	Forward Voltage Drop	$T_J = 25\ ^\circ\text{C}, I_F = 3\text{ A}$ $T_J = 125\ ^\circ\text{C}, I_F = 3\text{ A}$		0.42	0.51 0.46	V V

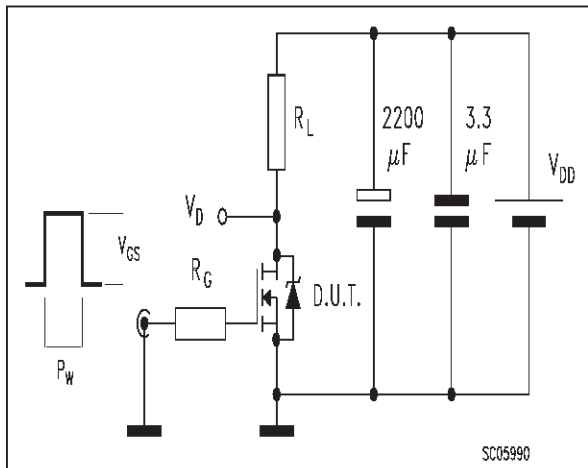
**Fig. 1: Unclamped Inductive Load Test Circuit**



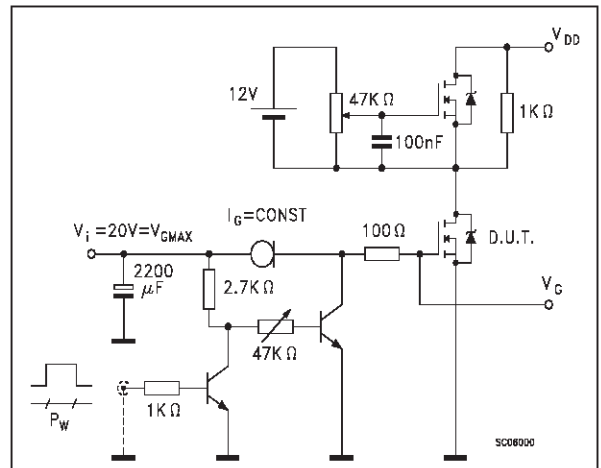
**Fig. 2: Unclamped Inductive Waveform**



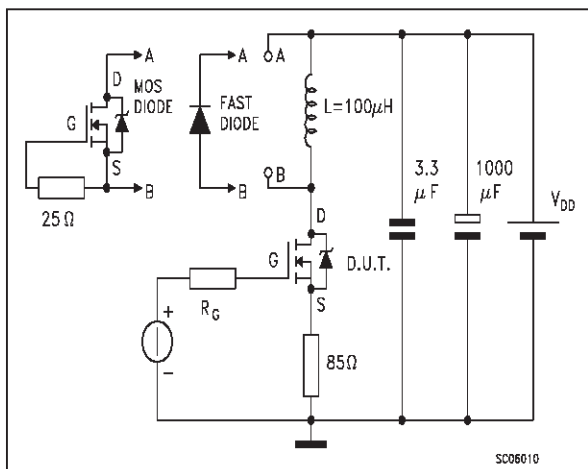
**Fig. 3: Switching Times Test Circuits For Resistive Load**



**Fig. 4: Gate Charge test Circuit**

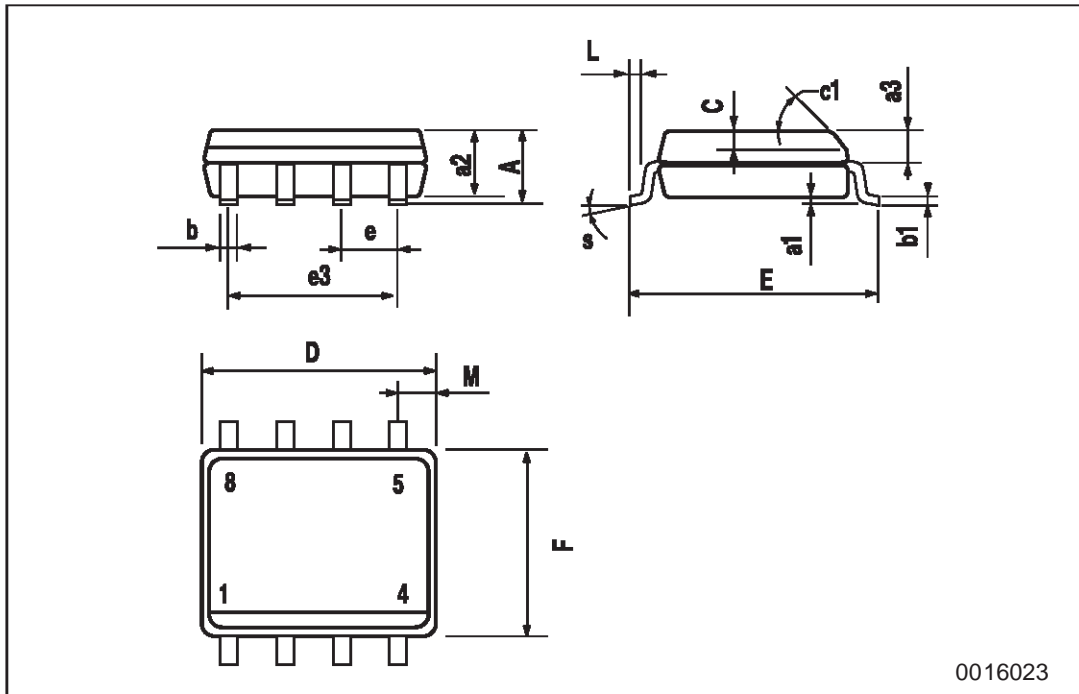


**Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times**



**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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