



# STS6PF30L

## P-CHANNEL 30V - 0.025Ω - 6A SO-8 STripFET™ II POWER MOSFET

PRELIMINARY DATA

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STS6PF30L	30 V	< 0.030 Ω	6 A

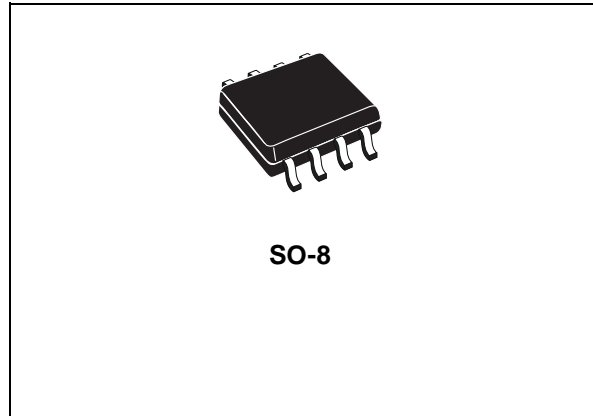
- TYPICAL R<sub>DS(on)</sub> = 0.025Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE

### DESCRIPTION

This Power Mosfet is the latest development of ST-Microelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

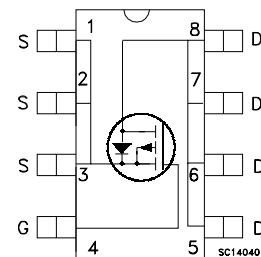
### APPLICATIONS

- MOBILE PHONE APPLICATIONS
- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT



SO-8

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	30	V
V <sub>DGR</sub>	Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)	30	V
V <sub>GS</sub>	Gate- source Voltage	±20	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C	6	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	4	A
I <sub>DM</sub> (●)	Drain Current (pulsed)	24	A
P <sub>TOT</sub>	Total Dissipation at T <sub>C</sub> = 25°C	2.5	W

(●) Pulse width limited by safe operating area

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

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## THERMAL DATA

Rthj-amb(#)	Thermal Resistance Junction-ambient Max	50	°C/W
T <sub>j</sub>	Maximum Lead Temperature For Soldering Purpose Typ	150	°C
T <sub>stg</sub>	Storage Temperature	-55 to 150	°C

(#) When mounted on 1 inch<sup>2</sup> FR4 Board, 2 oz of Cu and t ≤ 10s

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 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	30			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> = ± 20V			±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	1	1.6	2.5	V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3A		0.025 0.032	0.030 0.040	Ω Ω

## DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (1)	Forward Transconductance	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3A		11		S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25 V, f = 1 MHz, V <sub>GS</sub> = 0		1670		pF
C <sub>oss</sub>	Output Capacitance			345		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			120		pF

**ELECTRICAL CHARACTERISTICS (CONTINUED)**

**SWITCHING ON(2)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 24V, I_D = 6A$ $R_G = 4.7\Omega, V_{GS} = 4.5V$ (Resistive Load, Figure 3)		62		ns
$t_r$	Rise Time			48		ns
$Q_g$ $Q_{gs}$ $Q_{gd}$	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 15V, I_D = 6A,$ $V_{GS} = 4.5V$		18.5 3.9 8.6	25	nC nC nC

**SWITCHING OFF(2)**

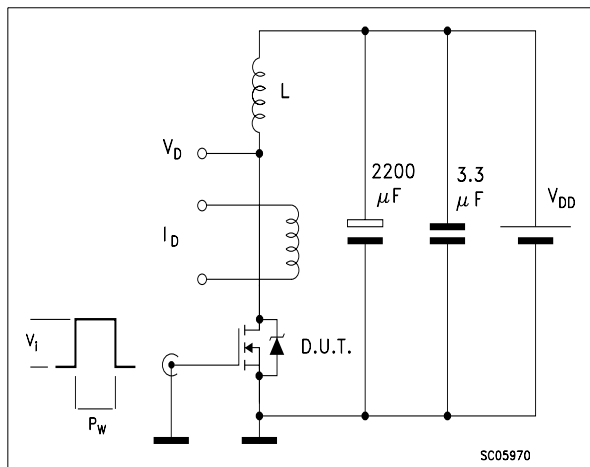
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 24V, I_D = 6A,$ $R_G = 4.7\Omega, V_{GS} = 4.5V$ (Resistive Load, Figure 3)		57		ns
$t_f$	Fall Time			19		ns

**SOURCE DRAIN DIODE (2)**

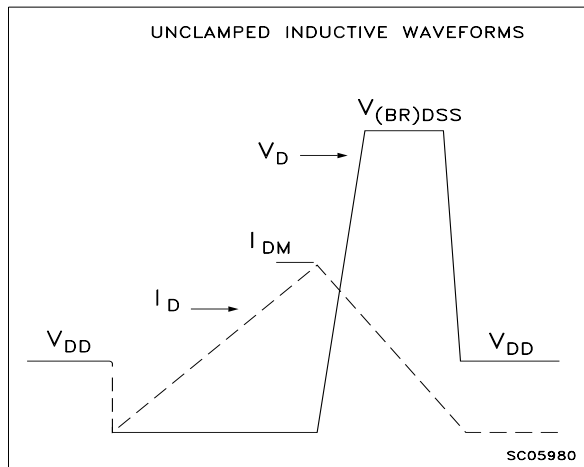
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				6	A
$I_{SDM} (1)$	Source-drain Current (pulsed)				24	A
$V_{SD} (2)$	Forward On Voltage	$I_{SD} = 6A, V_{GS} = 0$			1.2	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 6A, di/dt = 100A/\mu s,$ $V_{DD} = 24V, T_j = 150^\circ C$ (see test circuit, Figure 5)		37 46 2.5		ns nC A

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

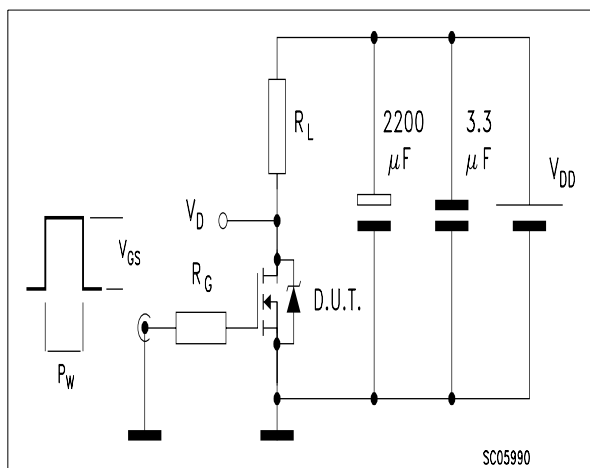
**Fig. 1: Unclamped Inductive Load Test Circuit**



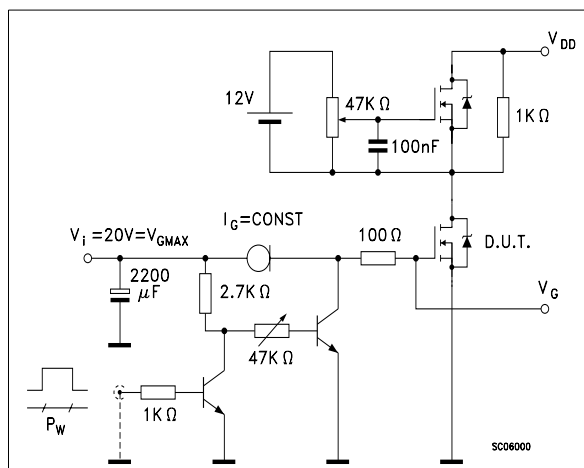
**Fig. 2: Unclamped Inductive Waveform**



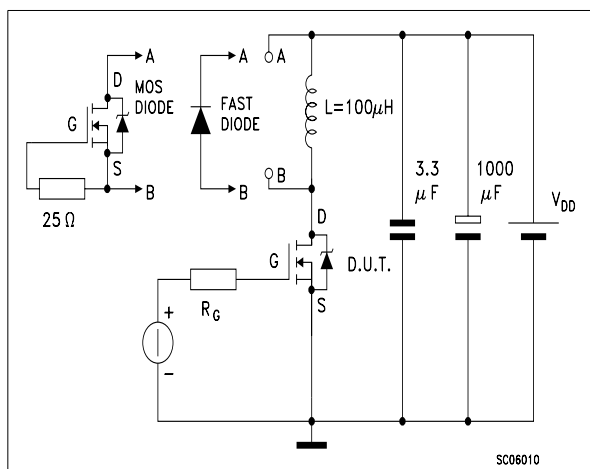
**Fig. 3: Switching Times Test Circuit For Resistive Load**



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

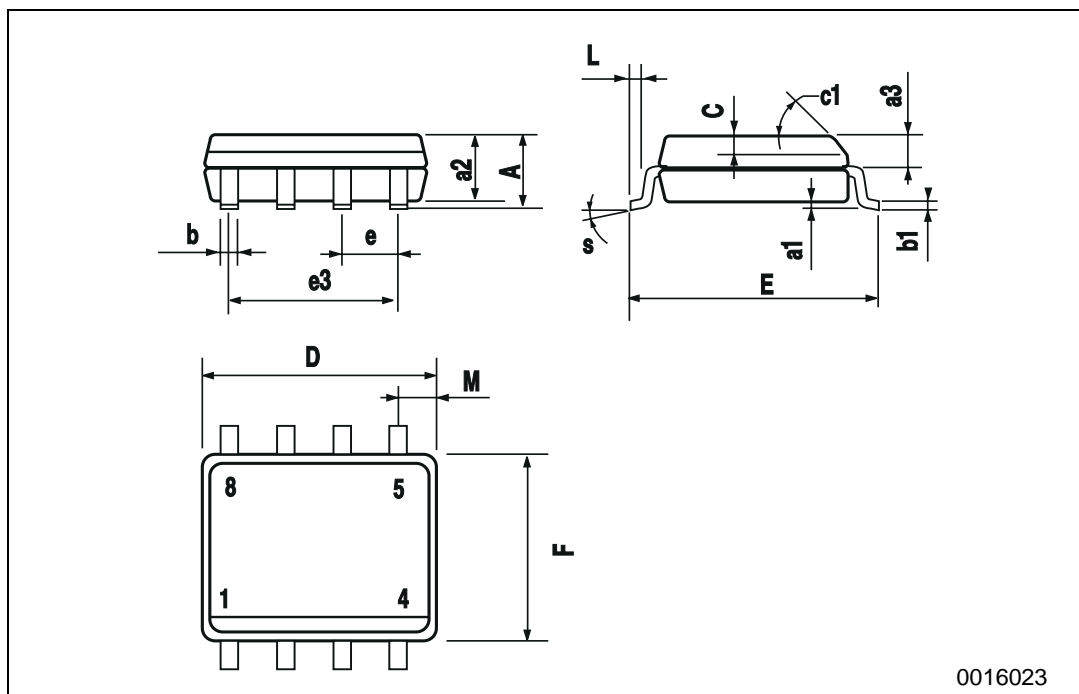


**Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times**



**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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