



# STS10PF30L

## P-CHANNEL 30V - 0.012 $\Omega$ - 10A SO-8 STripFET™ II POWER MOSFET

**Table 1: General Features**

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STS10PF30L	30V	<0.014 $\Omega$	10 A

- TYPICAL R<sub>DS(on)</sub> = 0.012  $\Omega$
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE

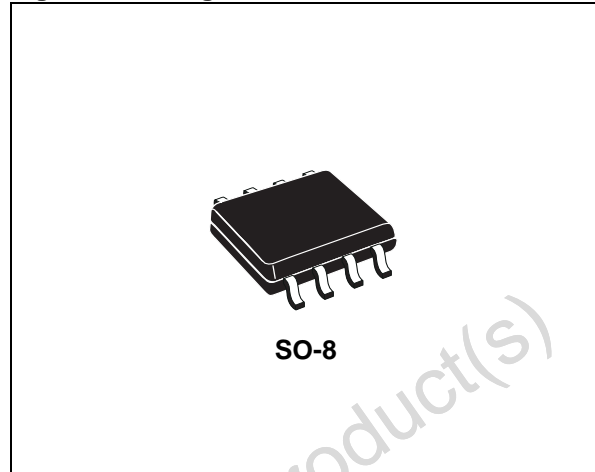
### DESCRIPTION

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.

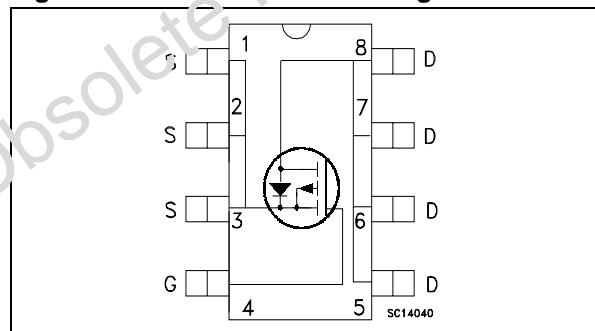
### APPLICATIONS

- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- LOAD SWITCH

**Figure 1: Package**



**Figure 2: Internal Schematic Diagram**



**Table 2: Order Codes**

SALES TYPE	MARKING	PACKAGE	PACKAGING
STS10PF30L	S10PF30L	SO-8	TAPE & REEL

**Table 3: ABSOLUTE MAXIMUM RATING**

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 k $\Omega$ )	30	V
V <sub>GS</sub>	Gate- source Voltage	$\pm 16$	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C	10	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	6	A
I <sub>DM</sub> (•)	Drain Current (pulsed)	40	A
P <sub>tot</sub>	Total Dissipation at T <sub>C</sub> = 25°C	2.5	W

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

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**Table 4: THERMAL DATA**

Rthj-amb	(*) Thermal Resistance Junction-ambient	Max	47	°C/W
Rthj-lead	Thermal Resistance Junction-leads	Max	16	°C/W
T <sub>l</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> FR-4 board, 2 oz of Cu and t ≤ 10 sec.

## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

**Table 5: 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> = ± 16 V			±100	nA

**Table 6: ON (\*)**

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> = 250 μA	1			V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10 V I <sub>D</sub> = 5 A V <sub>GS</sub> = 4.5 V I <sub>D</sub> = 5 A		0.012 0.015	0.014 0.018	Ω Ω

**Table 7: DYNAMIC**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = 10 V I <sub>D</sub> = 5 A		31		S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25V, f = 1 MHz, V <sub>GS</sub> = 0		2300		pF
C <sub>oss</sub>	Output Capacitance			750		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			115		pF

**ELECTRICAL CHARACTERISTICS** (continued)

**Table 8: SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ $t_r$	Turn-on Delay Time Rise Time	$V_{DD} = 15\text{ V}$ $I_D = 5\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 15)		72 87		ns ns
$Q_g$ $Q_{gs}$ $Q_{gd}$	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 15\text{ V}$ $I_D = 10\text{ A}$ $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 16)		29 6.8 7.6	39	nC nC nC

**Table 9: SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ $t_f$	Turn-off Delay Time Fall Time	$V_{DD} = 15\text{ V}$ $I_D = 5\text{ A}$ $R_G = 4.7\ \Omega$ , $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 15)		89 27		ns ns

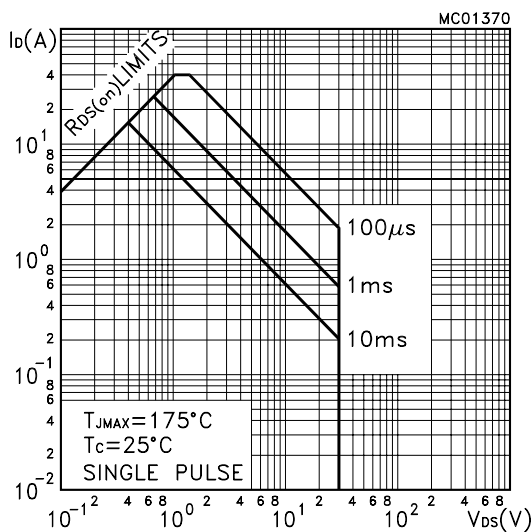
**Table 10: SOURCE DRAIN DIODE**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$ $I_{SDM}$	Source-drain Current Source-drain Current (pulsed)				10 40	A A
$V_{SD}^{(*)}$	Forward On Voltage	$I_{SD} = 10\text{ A}$ $V_{GS} = 0$			1.2	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 10\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 15\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 17)		48.5 68 2.8		ns nC A

(\*) Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle 1.5 %.

(\*) Pulse width limited by  $T_{JMAX}$

**Figure 3: Safe Operating Area**



**Figure 4: Thermal Impedance**

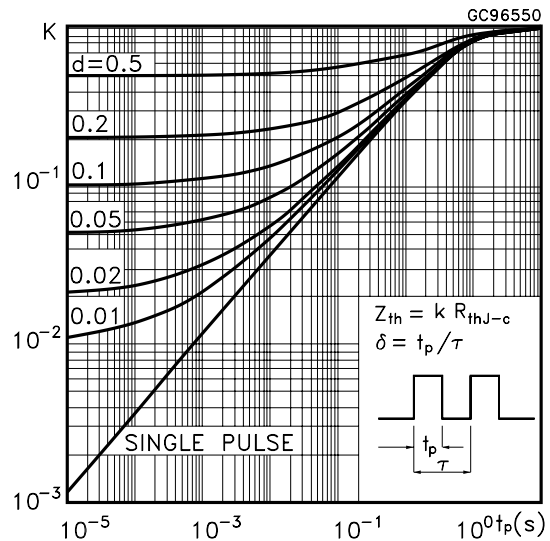


Figure 5: Output Characteristics

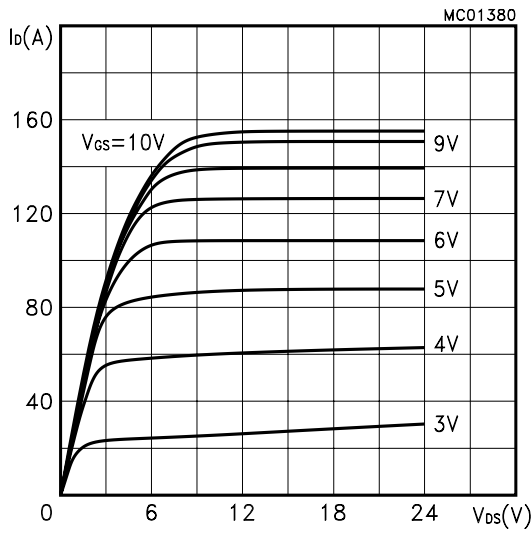


Figure 6: Transfer Characteristics

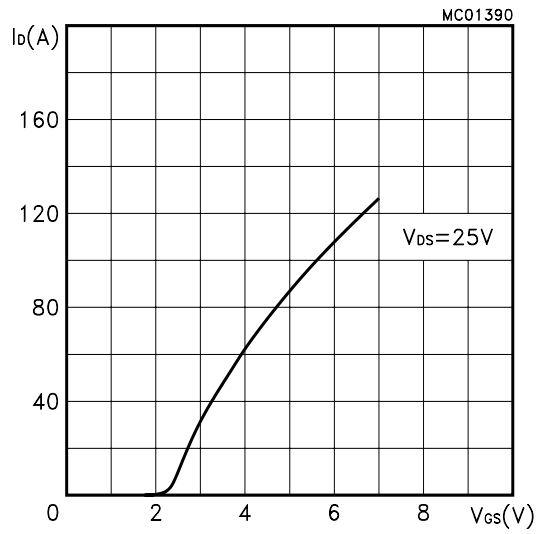


Figure 7: Transconductance

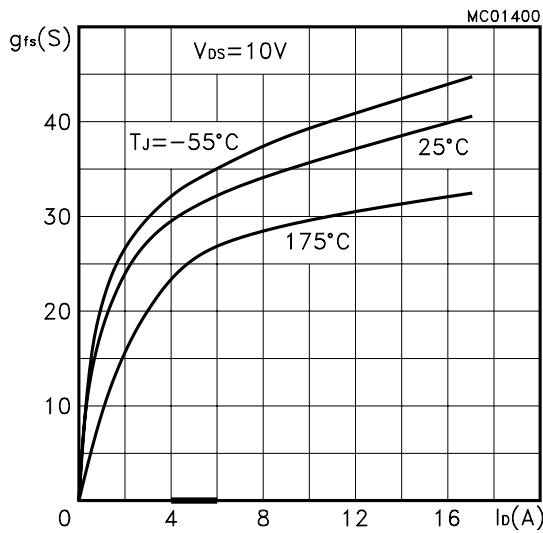


Figure 8: Static Drain-source On Resistance

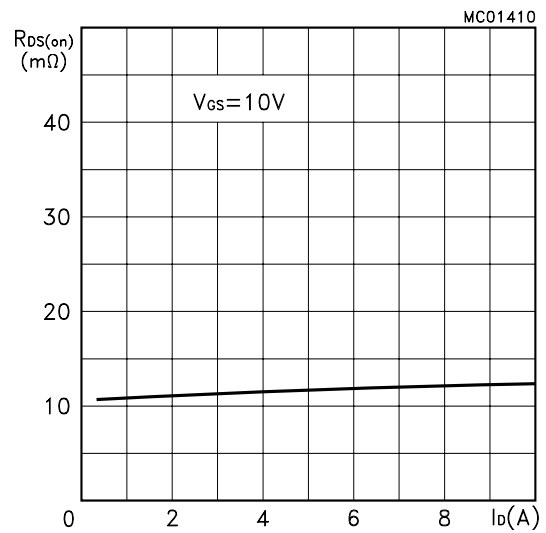


Figure 9: Gate Charge vs Gate-source Voltage

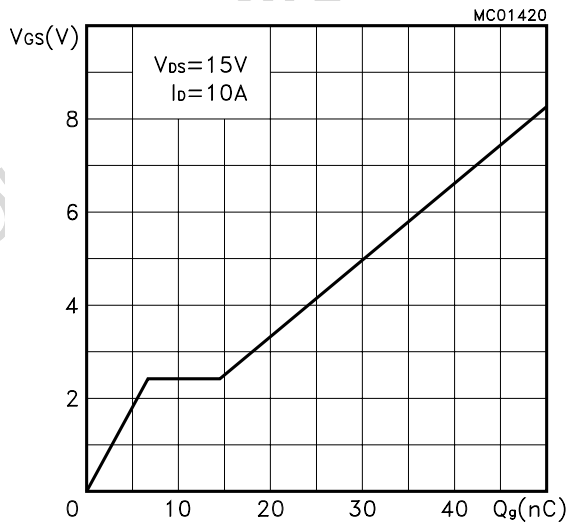


Figure 10: Capacitance Variations

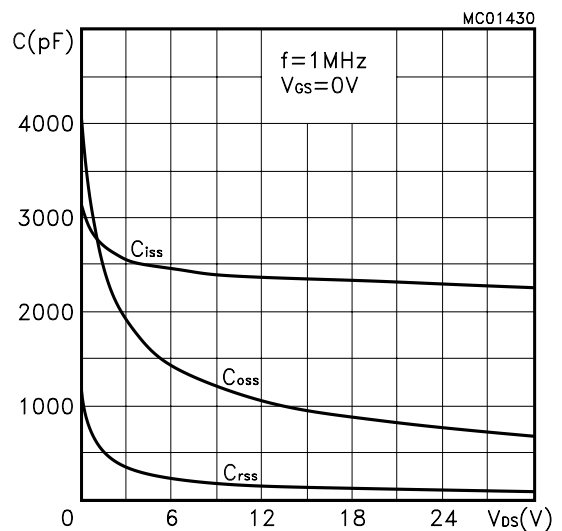


Figure 11: Normalized Gate Threshold Voltage vs Temperature

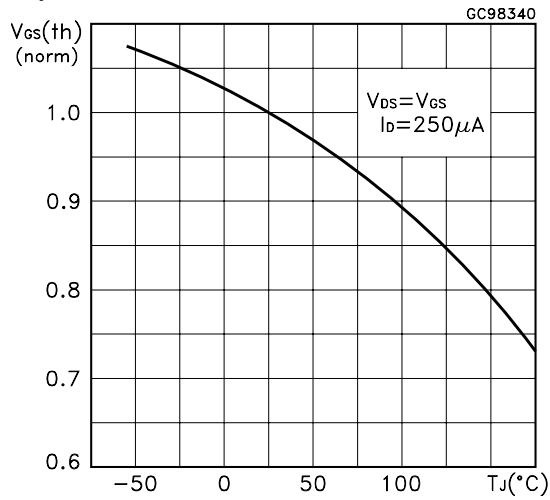


Figure 12: Normalized on Resistance vs Temperature

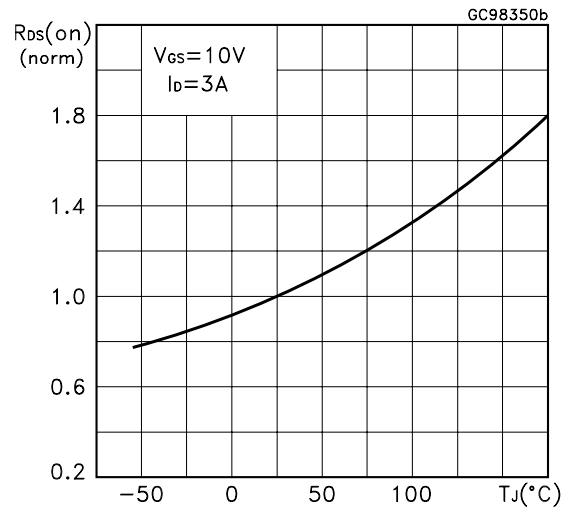


Figure 13: Source-drain Diode Forward Characteristics

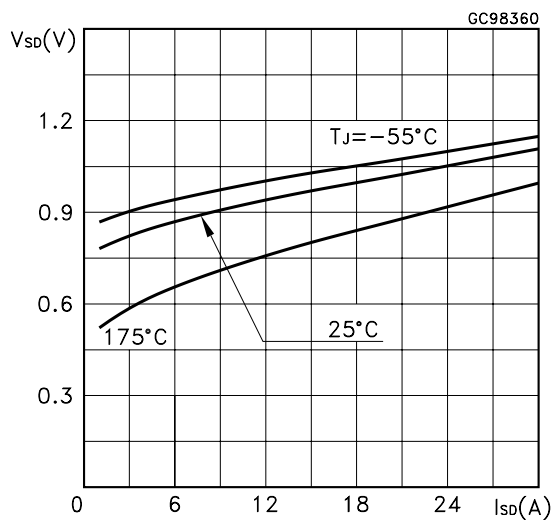
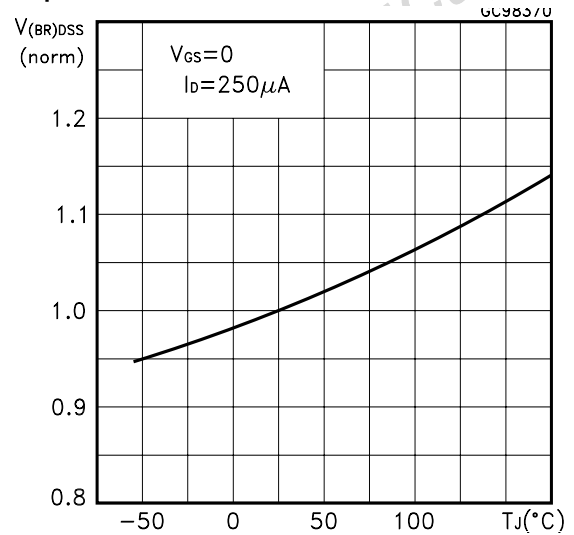
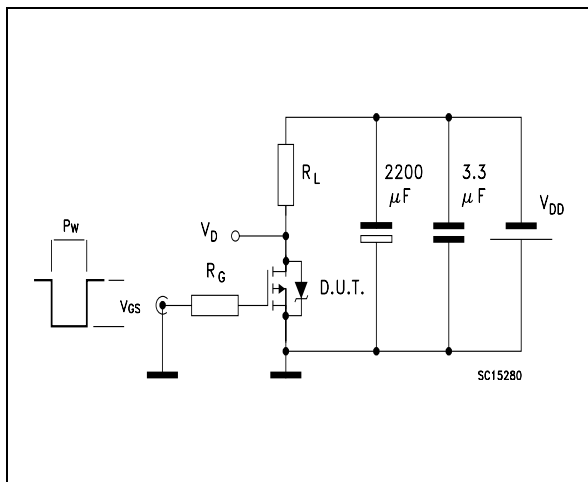


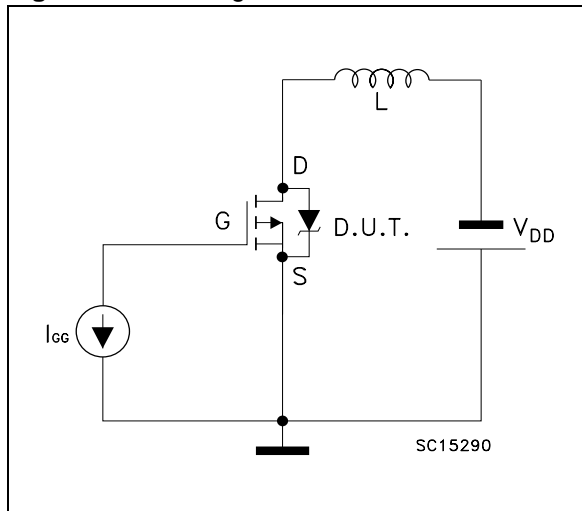
Figure 14: Normalized Breakdown Voltage vs Temperature.



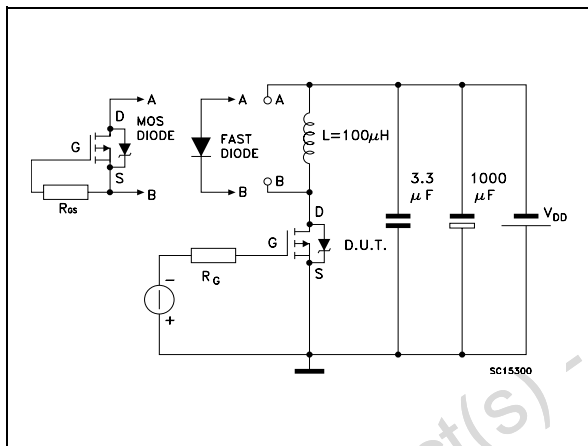
**Fig. 15:** Switching Times Test Circuits For Resistive Load



**Fig. 16:** Gate Charge test Circuit



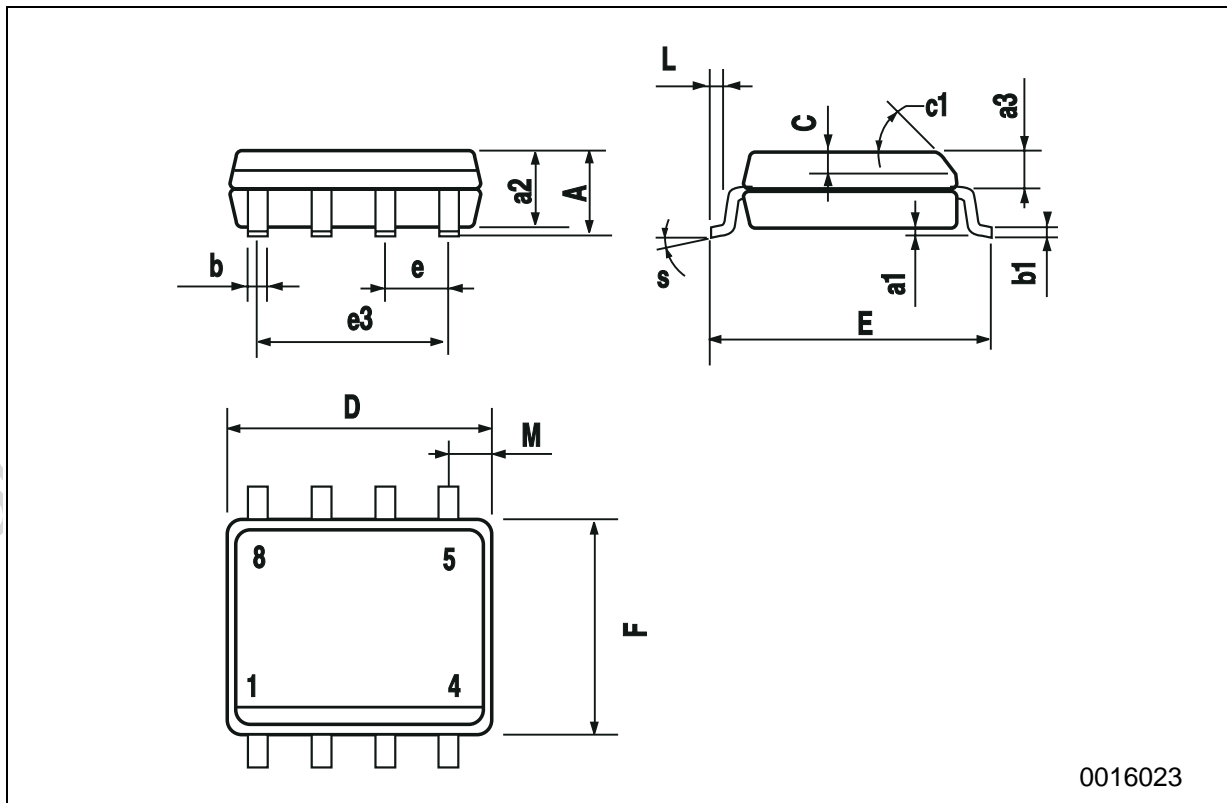
**Fig. 17:** Test Circuit For Diode Recovery Behaviour



Obsolete Product(s) - Obsolete Product(s)

**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.)					



## STS10PF30L

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**Table 11:Revision History**

Date	Revision	Description of Changes
May 2005	2.0	completed whit curves

Obsolete Product(s) - Obsolete Product(s)



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