



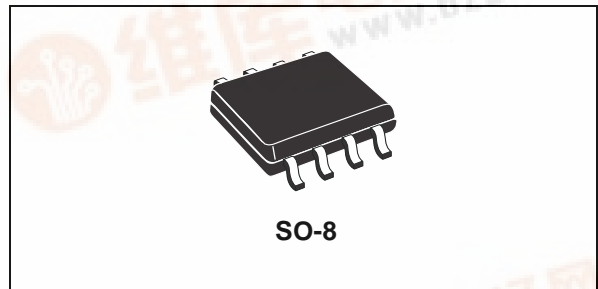
# STS3DPFS45

## P-CHANNEL 45V - 0.080 Ω - 3A SO-8 STripFET™ MOSFET PLUS SCHOTTKY RECTIFIER

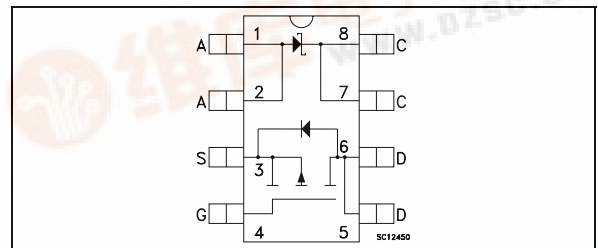
MAIN PRODUCT CHARACTERISTICS			
<b>MOSFET</b>	<b>V<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub></b>	<b>I<sub>D</sub></b>
	45 V	< 0.11 Ω	3 A
<b>SCHOTTKY</b>	<b>I<sub>F(AV)</sub></b>	<b>V<sub>RRM</sub></b>	<b>V<sub>F(MAX)</sub></b>
	3 A	45 V	0.51 V

### DESCRIPTION

This product associates the latest low voltage StripFETœ 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 <sub>DS</sub>	Dain-source Voltage (V <sub>GS</sub> = 0)	45	V
V <sub>DGR</sub>	Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)	45	V
V <sub>GS</sub>	Gate- source Voltage	± 16	V
I <sub>D</sub>	Drain Current (continuos) at T <sub>C</sub> = 25°C	3	A
I <sub>D</sub>	Drain Current (continuos) 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	45	V
I <sub>F(RMS)</sub>	RMS Forward Curren	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

## STS3DPFS45

### TERMAL DATA

Rthj-amb	Thermal Resistance Junction-ambient MOSFET	62.5	°C/W
Rthj-amb	Thermal Resistance Junction-ambient SCHOTTKY	100	°C/W
T <sub>stg</sub>	Storage Temperature Range	-65 to 150	°C
T <sub>j</sub>	Maximum Lead Temperature For Soldering Purpose	150	°C

(\*) Mounted on Fr-4 board (Steady State)

### ELECTRICAL CHARACTERISTICS (T<sub>case</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	45			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> = 250 μA	2	3	4	V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10 V I <sub>D</sub> = 1.5 A		0.080	0.11	Ω
I <sub>D(on)</sub>	On State Drain Current	V <sub>GS</sub> = 10 V	3			A

### SCHOTTKY STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>R</sub> (*)	Reversed Leakage Current	T <sub>J</sub> = 25 °C V <sub>R</sub> = 45 V T <sub>J</sub> = 125 °C V <sub>R</sub> = 45 V		0.03	0.2 100	mA mA
V <sub>F</sub> (*)	Forward Voltage drop	T <sub>J</sub> = 25 °C I <sub>F</sub> = 3 A T <sub>J</sub> = 125 °C I <sub>F</sub> = 3 A		0.42	0.51 0.46	mA mA

### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (*)	Forward Transconductance	V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)</sub> max I <sub>D</sub> = 1.5A		4		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
$t_{d(on)}$ $t_r$	Turn-on Delay Time Rise Time	$V_{DD} = 20\text{ V}$ $I_D = 1.5\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		20 25		ns ns
$Q_g$ $Q_{gs}$ $Q_{gd}$	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 20\text{ V}$ $I_D = 3\text{ A}$ $V_{GS} = 10\text{ V}$		24.5 4 5.5	33	nC nC nC

**SWITCHING OFF**

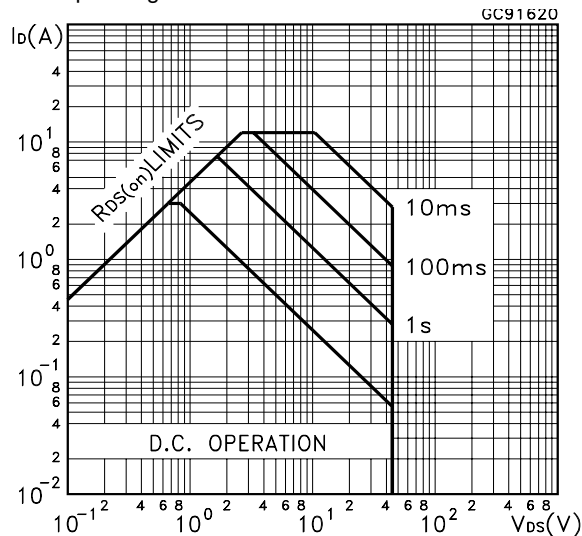
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ $t_f$	Turn-off Delay Time Fall Time	$V_{DD} = 20\text{ V}$ $I_D = 1.5\text{ A}$ $R_G = 4.7\ \Omega$ , $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		100 22		ns ns
$t_{d(off)}$ $t_f$ $t_c$	Turn-off Delay Time Fall Time Cross-over Time	$V_{clamp} = 32\text{ V}$ $I_D = 3\text{ A}$ $R_G = 4.7\ \Omega$ , $V_{GS} = 10\text{ V}$		95 11 35		ns ns ns

**SOURCE DRAIN DIODE**

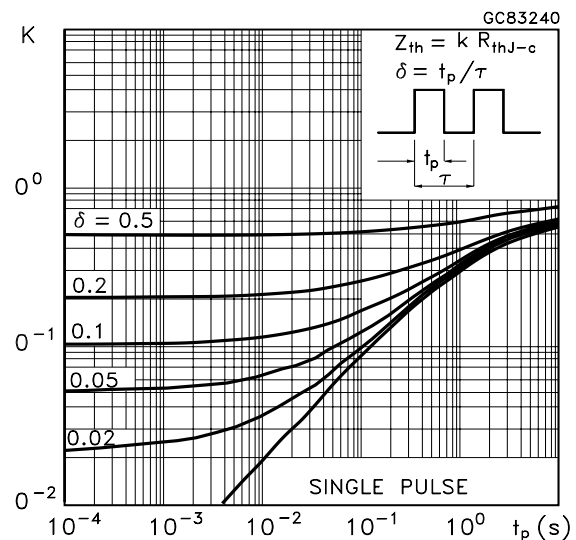
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$ $I_{SDM} (\bullet)$	Source-drain Current Source-drain Current (pulsed)				3 12	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 3\text{ A}$ $V_{GS} = 0$			2	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 3\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 15\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		40 85 3.8		ns nC A

(\*) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.  
 (•) Pulse width limited by safe operating area.

**Safe Operating Area**

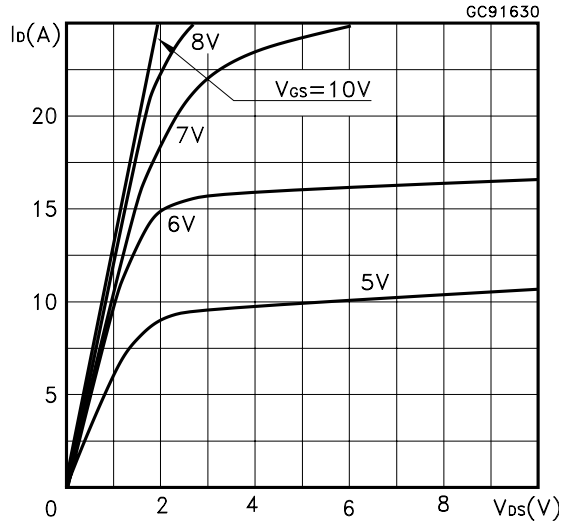


**Thermal Impedance**

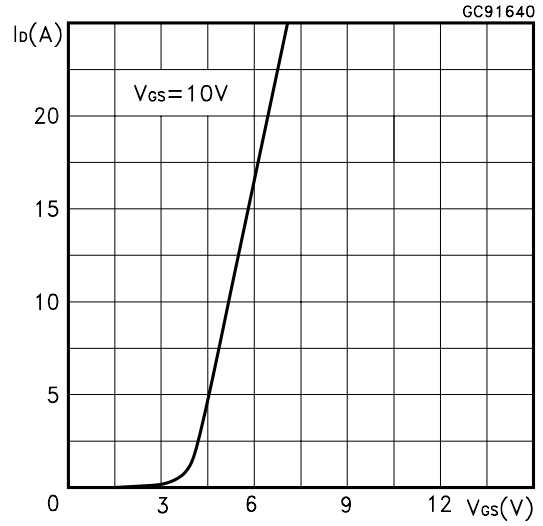


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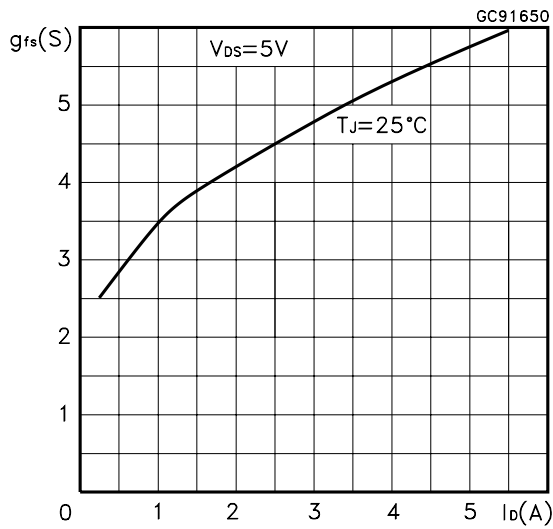
Output Characteristics



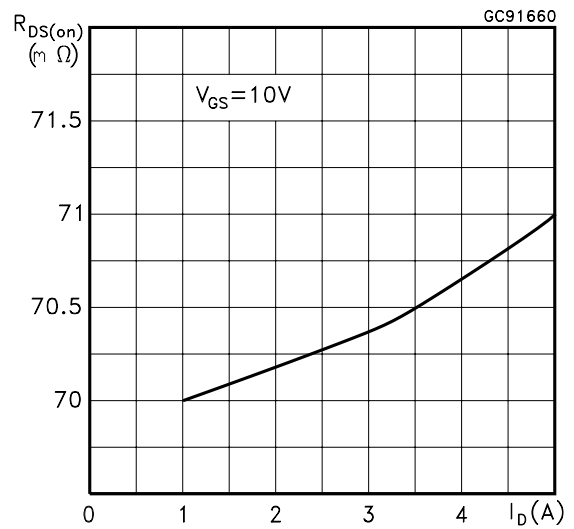
Transfer Characteristics



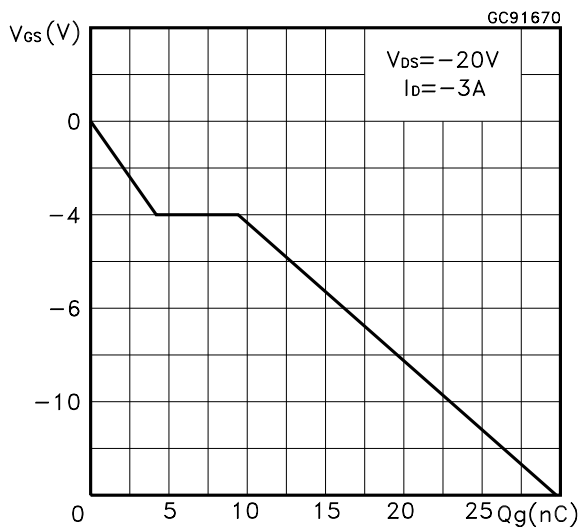
Transconductance



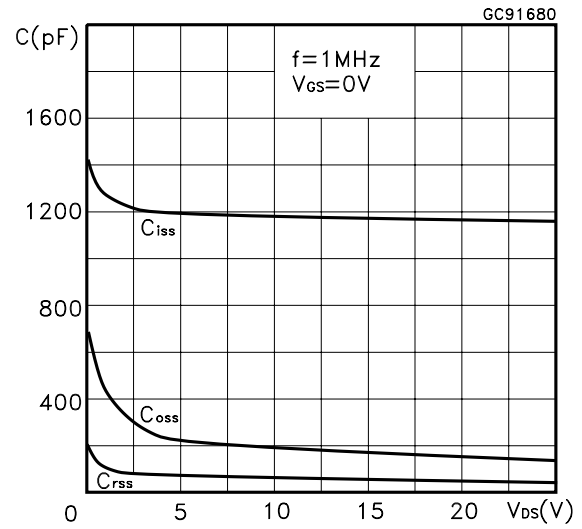
Static Drain-source On Resistance



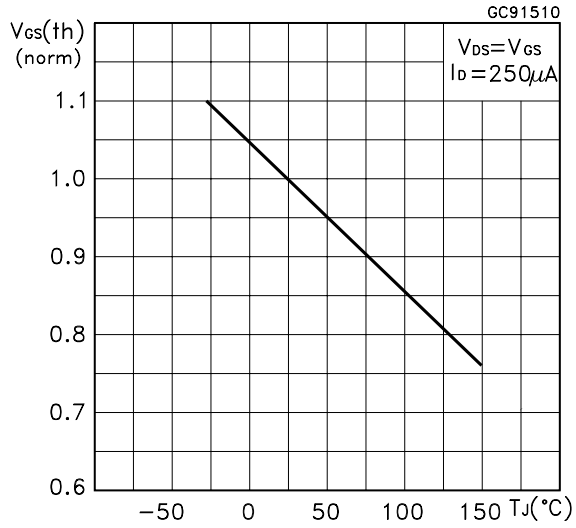
Gate Charge vs Gate-source Voltage



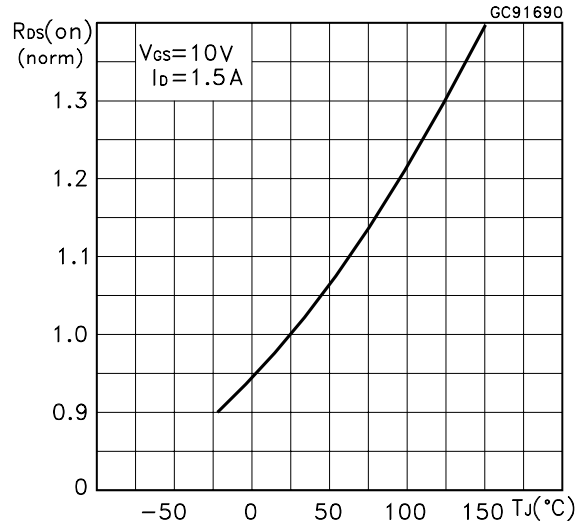
Capacitance Variations



Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics

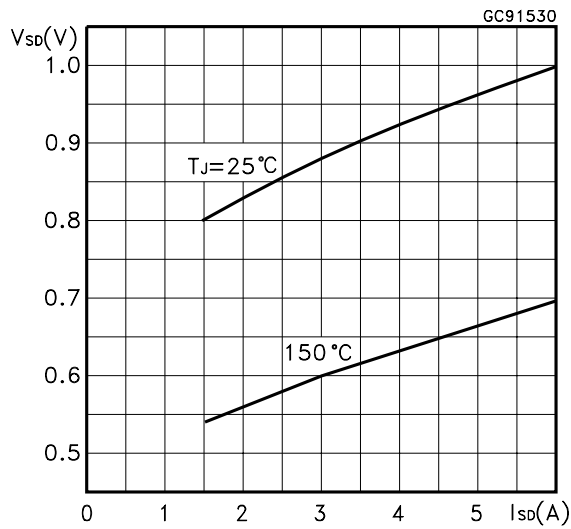


Fig. 1: Unclamped Inductive Load Test Circuit

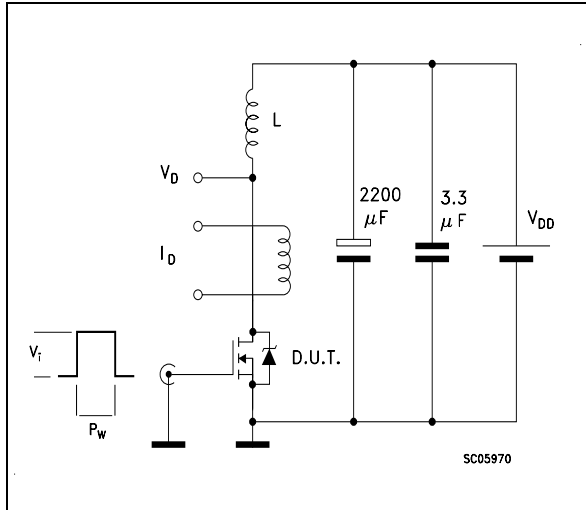


Fig. 2: Unclamped Inductive Waveform

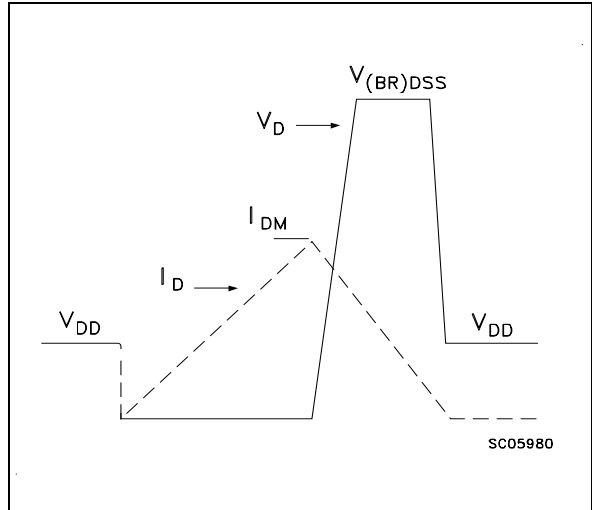


Fig. 3: Switching Times Test Circuits For Resistive Load

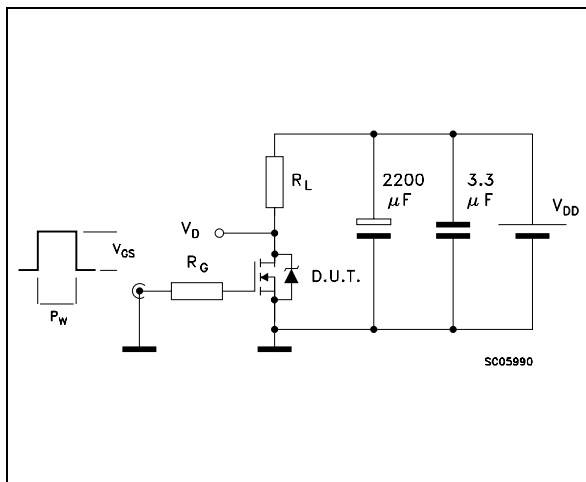


Fig. 4: Gate Charge test Circuit

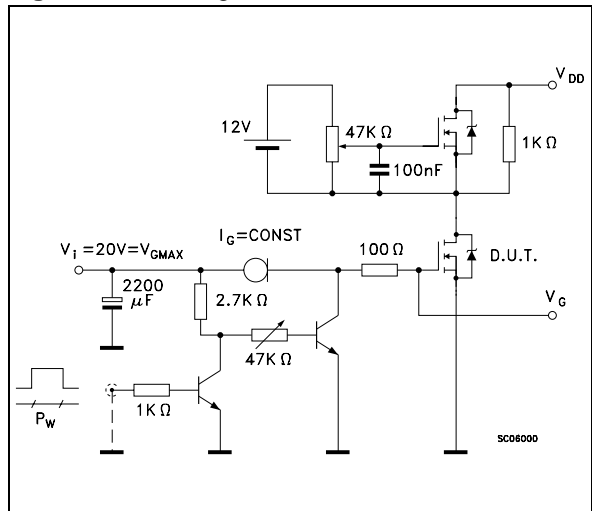
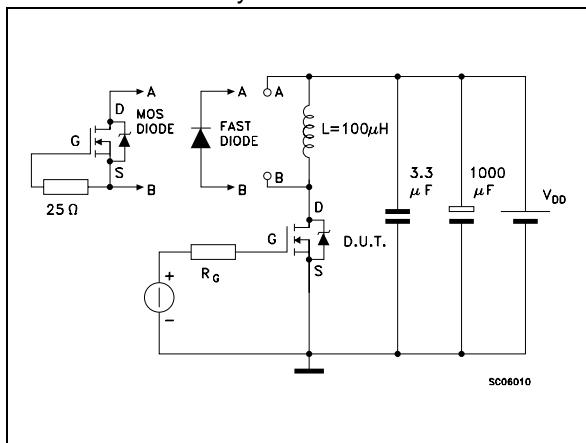
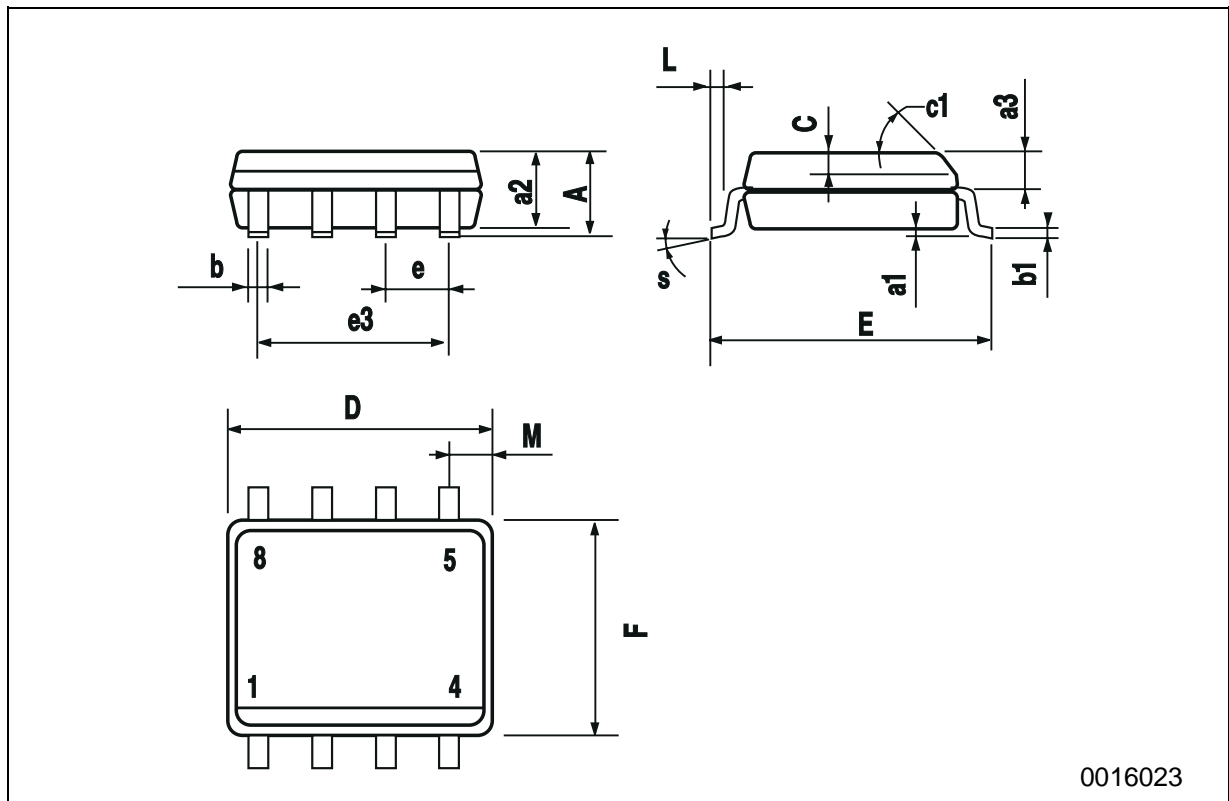


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



**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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