



STS3DNE60L

DUAL N-CHANNEL 60V - 0.065Ω - 3A SO-8 STripFET™ POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STS3DNE60L	60 V	< 0.08 Ω	3 A

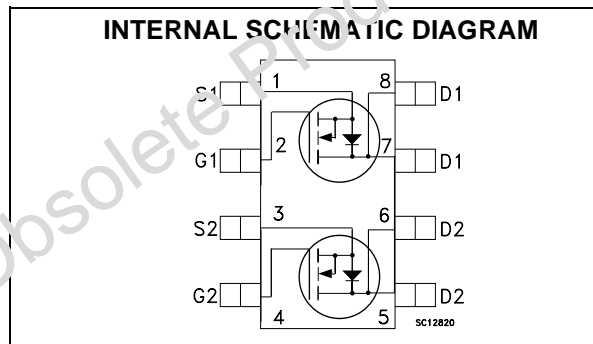
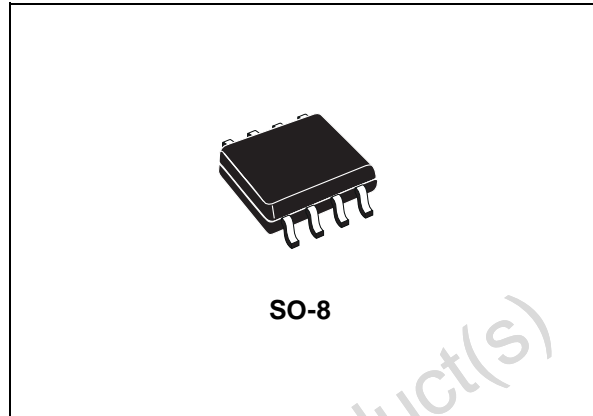
- TYPICAL R_{DS(on)} = 0.065Ω
- LOW THRESHOLD GATE DRIVE
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY

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, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

APPLICATIONS

- DC MOTOR DRIVE
- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN PORTABLE/ DESKTOP PCs



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	60	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	60	V
V _{GS}	Gate- source Voltage	± 20	V
I _D	Drain Current (continuous) at T _C = 25°C Single Operation	3	A
	Drain Current (continuous) at T _C = 100°C Single Operation	1.9	A
I _{DM} (•)	Drain Current (pulsed)	12	A
P _{TOT}	Total Dissipation at T _C = 25°C Dual Operation	1.6	W
	Total Dissipation at T _C = 25°C Single Operation	2.0	W

(•)Pulse width limited by safe operating area

STS3DNE60L

THERMAL DATA

Rthj-amb	(*)Thermal Resistance Junction-amb Max Single Operation (*)Thermal Resistance Junction-amb Max Dual Operation	62.5 78	°C/W °C/W
T _j	Max. Operating Junction Temperature	150	°C
T _{stg}	Storage Temperature	- 55 to 150	°C

(*) Mounted on FR-4 Board (t ≤ 10 sec)

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	60			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} = ± 20V			±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} = 10 V, I _D = 1.5 A V _{GS} = 4.5 V, I _D = 1.5 A		0.065 0.08	0.08 0.1	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} = 15V, I _D = 1.5 A		5		S
C _{iss}	Input Capacitance	V _{DS} = 25 V, f = 1 MHz, V _{GS} = 0		815		pF
C _{oss}	Output Capacitance			125		pF
C _{rss}	Reverse Transfer Capacitance			40		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 30\text{ V}$, $I_D = 3\text{ A}$ $R_G = 4.7\Omega$, $V_{GS} = 5\text{ V}$ (see test circuit, Figure 3)		20		ns
t_r	Rise Time			30		ns
Q_g	Total Gate Charge	$V_{DD} = 24\text{ V}$, $I_D = 3\text{ A}$, $V_{GS} = 4.5\text{ V}$		13.5		nC
Q_{gs}	Gate-Source Charge			6		nC
Q_{gd}	Gate-Drain Charge			3.5		nC

SWITCHING OFF

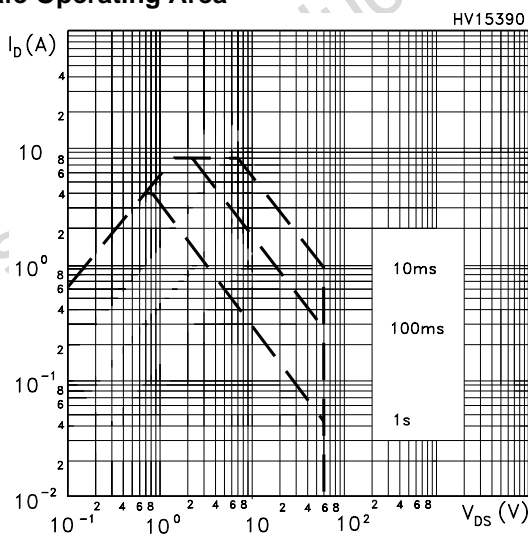
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(off)}$	Off-voltage Rise Time	$V_{DD} = 48\text{ V}$, $I_D = 3\text{ A}$ $R_G = 4.7\Omega$, $V_{GS} = 5\text{ V}$ (see test circuit, Figure 5)		12		ns
t_f	Fall Time			16		ns
t_c	Cross-over Time			32		ns

SOURCE DRAIN DIODE

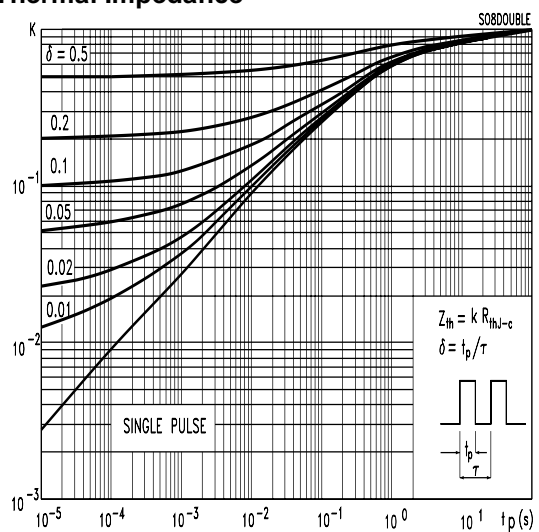
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				3	A
$I_{SDM(1)}$	Source-drain Current (pulsed)				12	A
$V_{SD(2)}$	Forward On Voltage	$I_{SD} = 3\text{ A}$, $V_{GS} = 0$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 3\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_{DD} = 30\text{ V}$, $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		60		ns
Q_{rr}	Reverse Recovery Charge			130		nC
I_{RRM}	Reverse Recovery Current			4		A

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

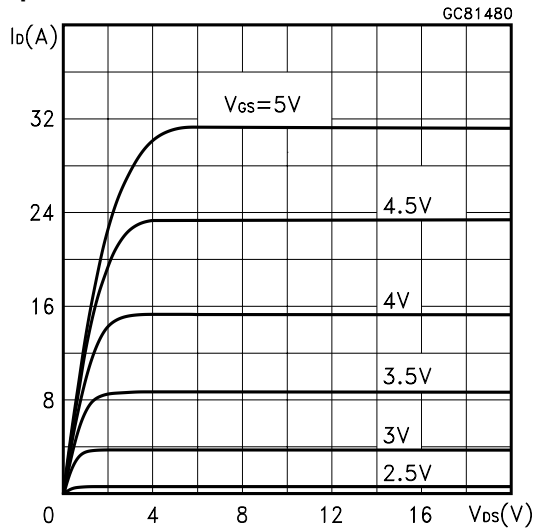
Safe Operating Area



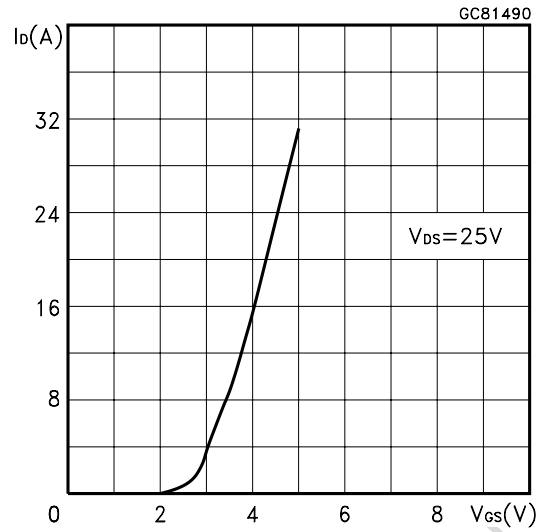
Thermal Impedance



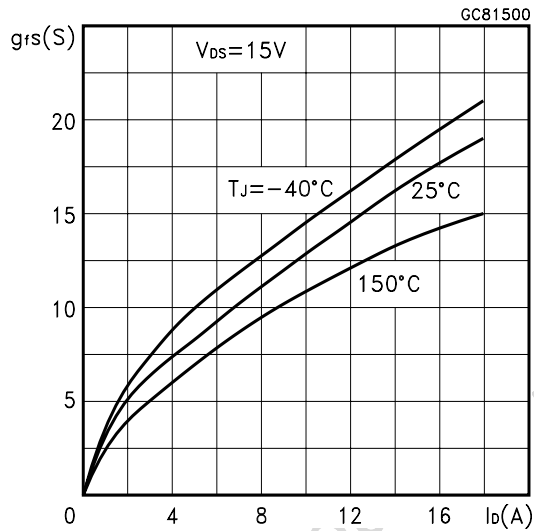
Output Characteristics



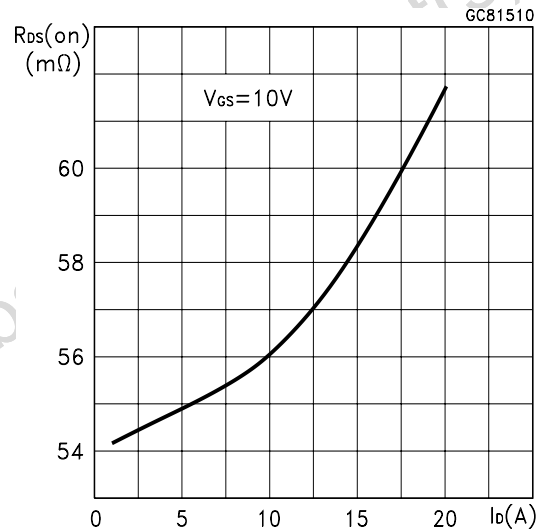
Transfer Characteristics



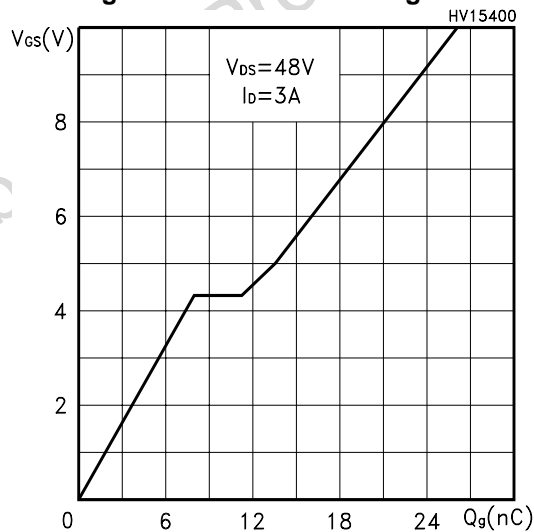
Tranconductance



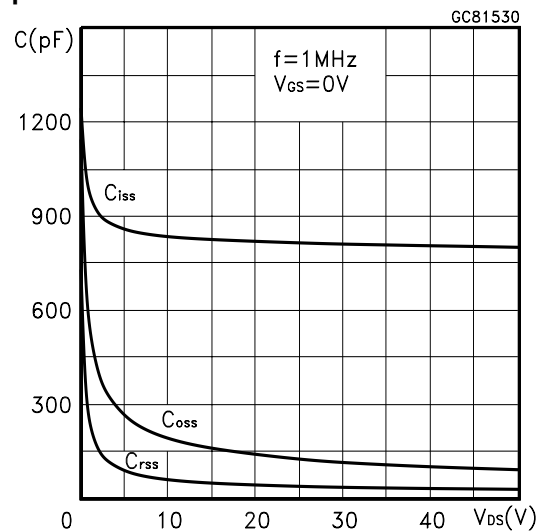
Static Drain-Source On Resistance



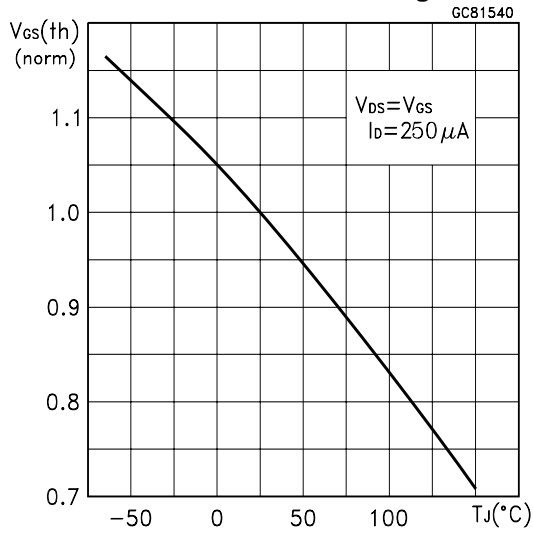
Gate Charge vs Gate-source Voltage



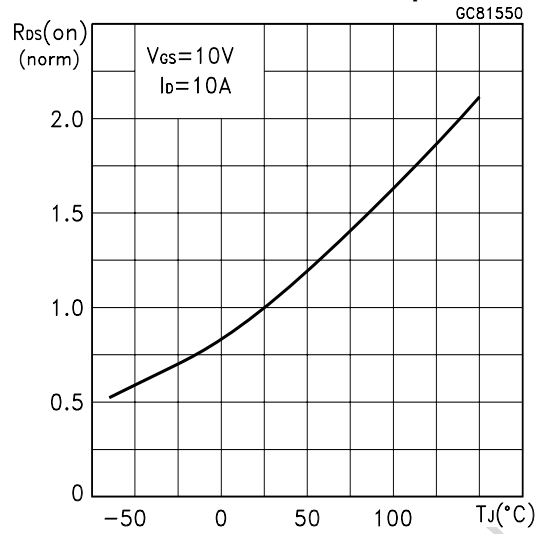
Capacitance Variations



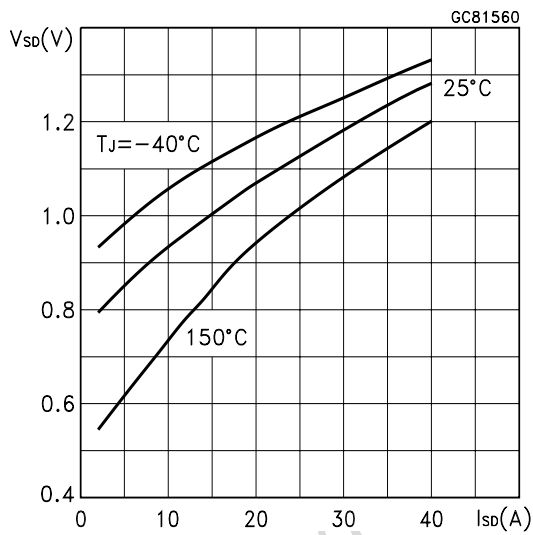
Normalized Gate Threshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics



- Obsolete Product(s)

Fig. 1: Unclamped Inductive Load Test Circuit

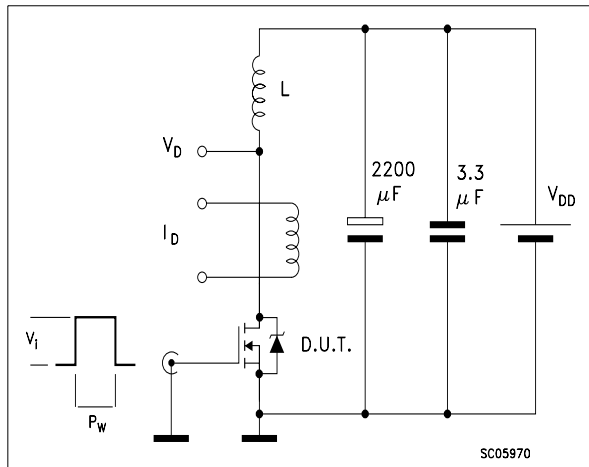


Fig. 2: Unclamped Inductive Waveform

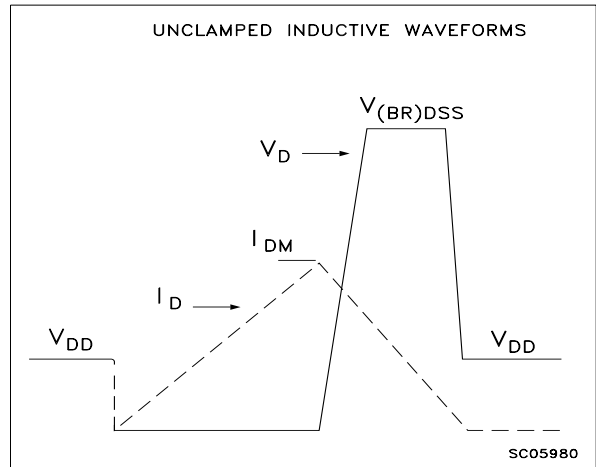


Fig. 3: Switching Times Test Circuit For Resistive Load

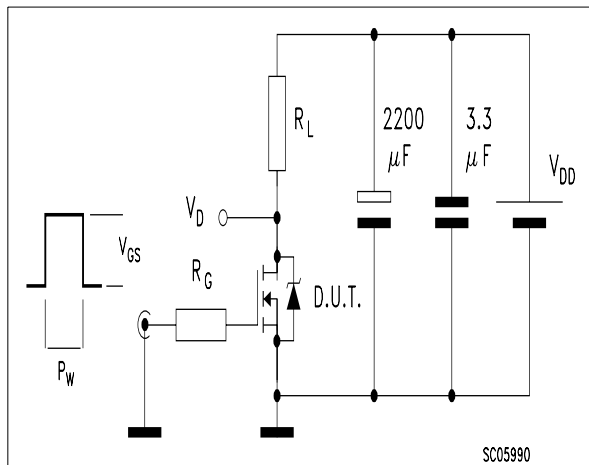


Fig. 4: Gate Charge test Circuit

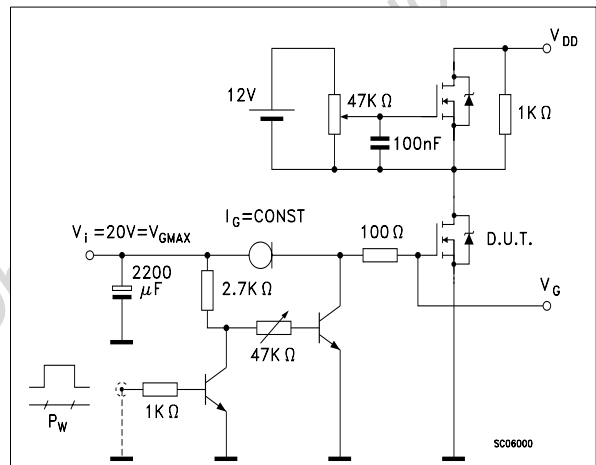
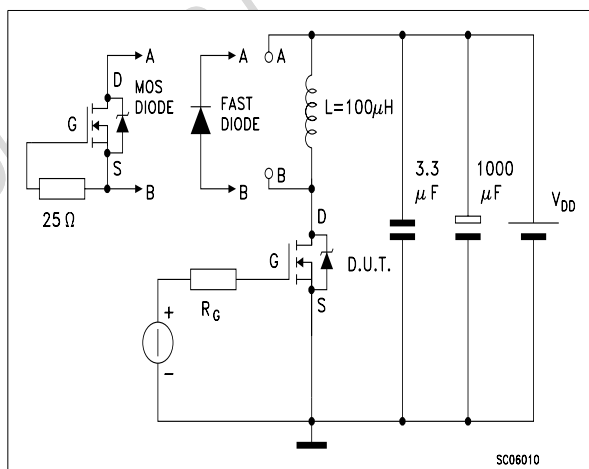
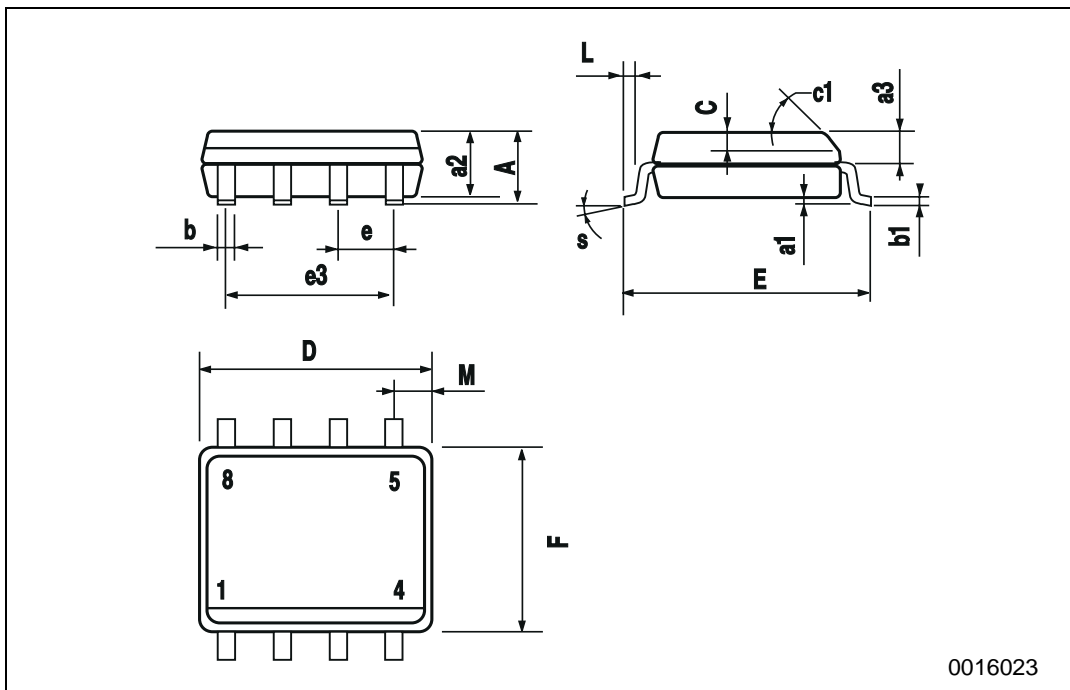


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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.)					



0016023

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - Printed in Italy - All Rights Reserved
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

© <http://www.st.com>