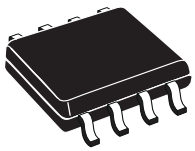
STS7NF60L

N-CHANNEL 60V - 0.017 Ω - 7.5A SO-8
STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STS7NF60L	60 V	< 0.0195 Ω	7.5 A

- TYPICAL $R_{DS}(on)$ = 0.017 Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE



SO-8

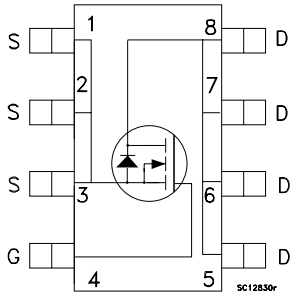
DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronis 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

INTERNAL SCHEMATIC DIAGRAM



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	± 16	V
I_D	Drain Current (continuous) at T_C = 25°C	7.5	A
I_D	Drain Current (continuous) at T_C = 100°C	4.7	A
I_{DM}(•)	Drain Current (pulsed)	30	A
P_{tot}	Total Dissipation at T_C = 25°C	2.5	W
E_{AS} (1)	Single Pulse Avalanche Energy	350	mJ

(•) Pulse width limited by safe operating area.

(1) Starting T_j = 25 °C, I_D = 7.5 A V_{DD} = 30 V

THERMAL DATA

$R_{thj\text{-}amb}$(#)	Thermal Resistance Junction-ambient	Max	50	°C/W
T_j	Maximum Operating Junction Temperature		150	°C
T_{stg}	Storage Temperature		-55 to 150	°C

(#) When Mounted on 1 inch^2 FR-4 board, 2 oz of Cu and t ≤ 10 sec.

ELECTRICAL CHARACTERISTICS (T_{case} = 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} = ± 16 V			±100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250 µA	1			V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 3.5 A V_{GS} = 5 V I_D = 3.5 A		0.017 0.019	0.0195 0.0215	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs}	Forward Transconductance	V_{DS} = 15 V I_D = 3.5 A		13		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		1700 300 100		pF pF 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} = 30 V I_D = 3.5 A R_G = 4.7 Ω V_{GS} = 4.5 V (Resistive Load, Figure 1)		15 27		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 48V I_D 7.5A V_{GS}=4.5V (see test circuit, Figure 2)		25 4.5 7	34	nC nC nC

SWITCHING OFF (*)

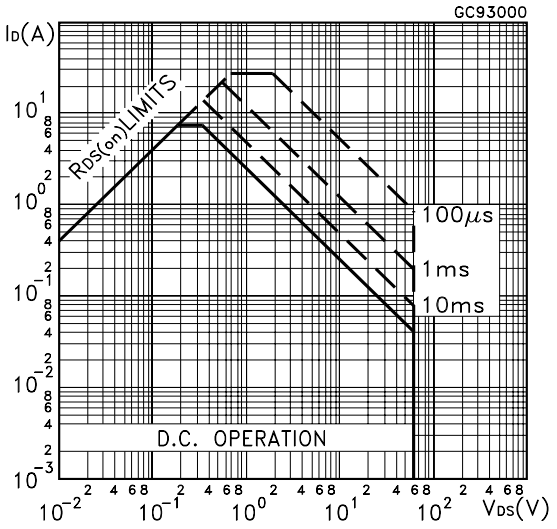
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 30 V I_D = 3.5 A R_G = 4.7Ω, V_{GS} = 4.5 V (Resistive Load, Figure 1)		47 20		ns ns

SOURCE DRAIN DIODE (*)

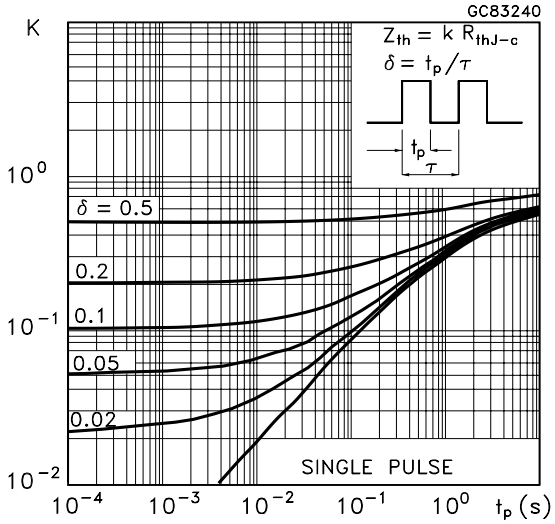
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				7.5 30	A A
V_{SD}	Forward On Voltage	I_{SD} = 7.5 A V_{GS} = 0			1.2	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} =7.5 A di/dt = 100A/µs V_{DD} = 20 V T_j = 150°C (see test circuit, Figure 3)		55 110 3.9		ns nC A

(*) Pulse width ≤ 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

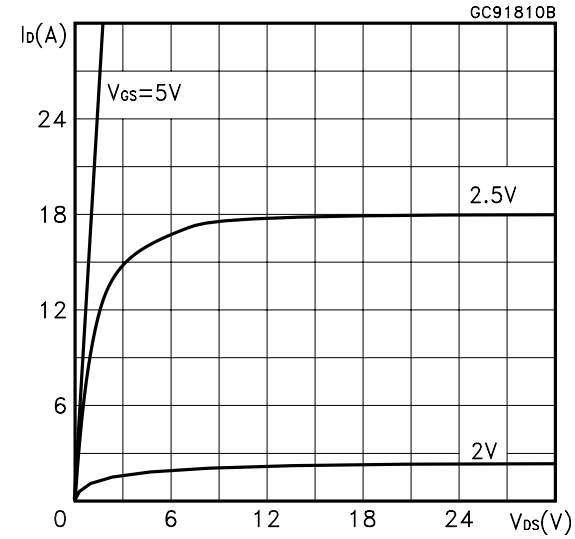
Safe Operating Area



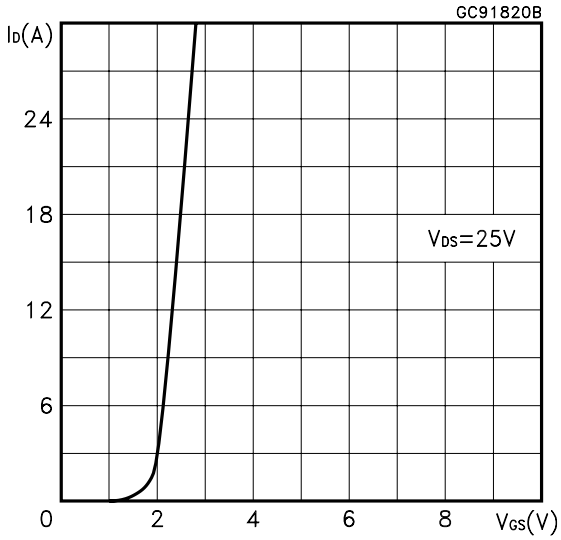
Thermal Impedance



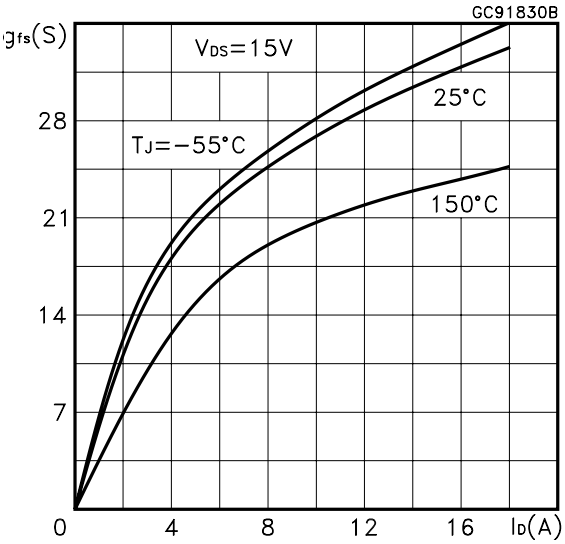
Output Characteristics



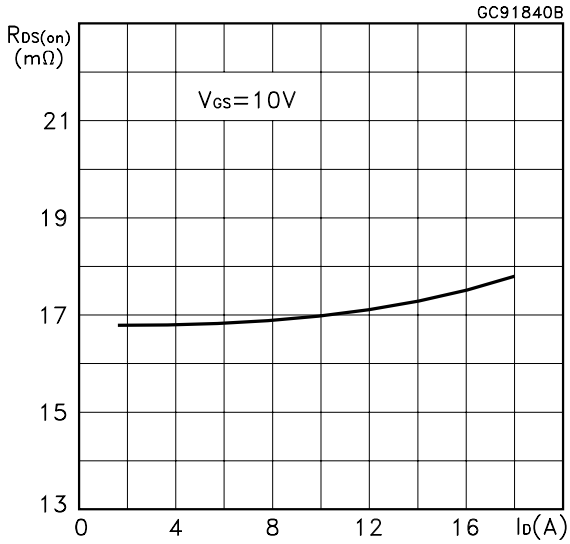
Transfer Characteristics



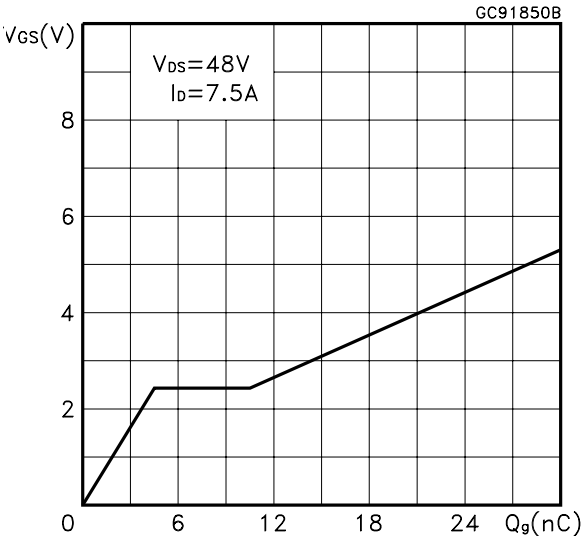
Transconductance



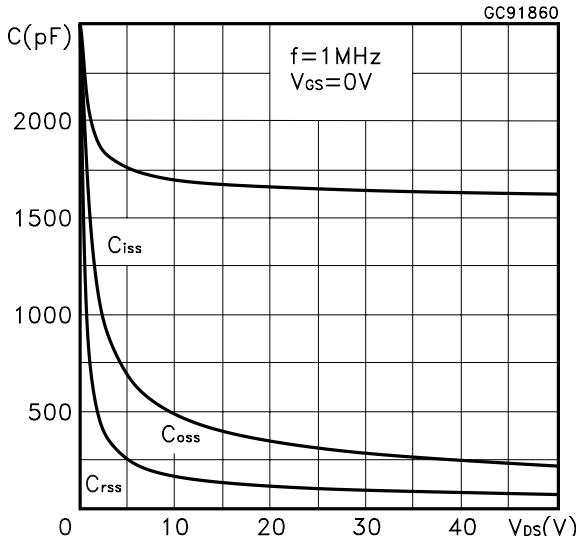
Static Drain-source On Resistance



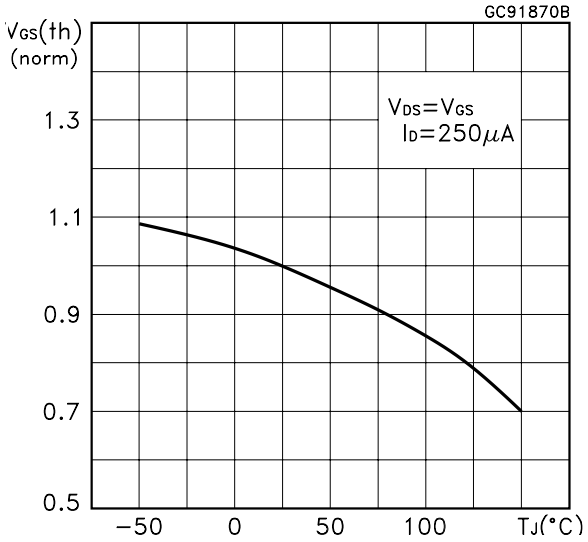
Gate Charge vs Gate-source Voltage



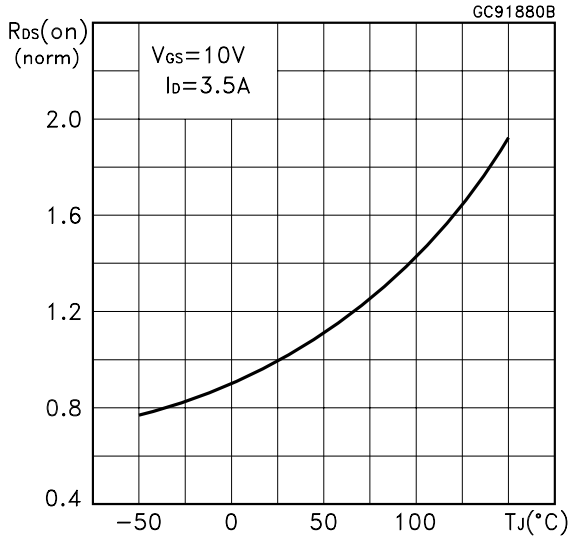
Capacitance Variations



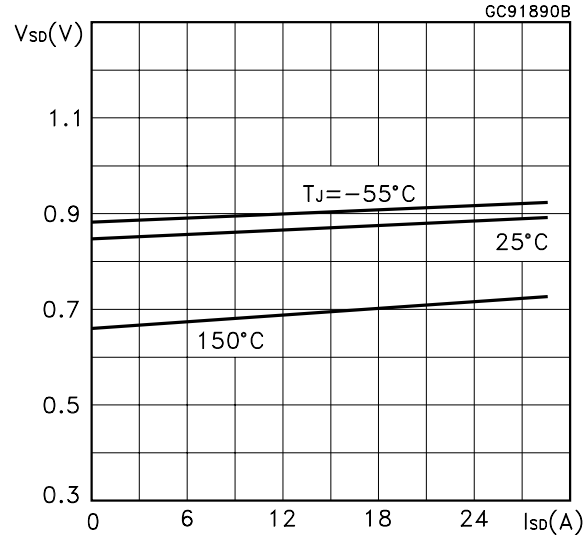
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature

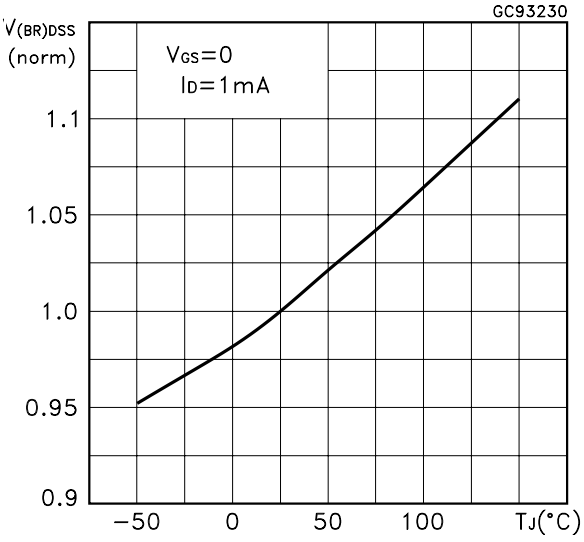


Fig. 1: Unclamped Inductive Load Test Circuit

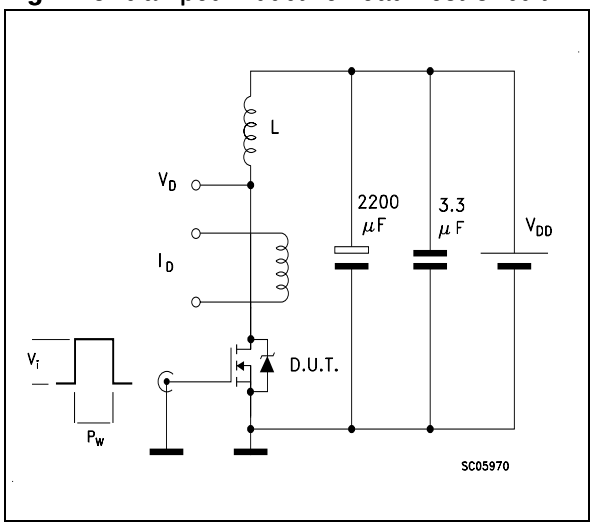


Fig. 2: Unclamped Inductive Waveform

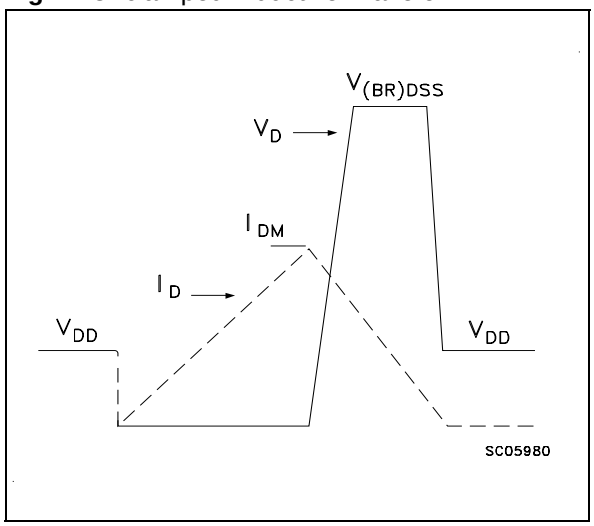


Fig. 3: Switching Times Test Circuits For Resistive Load

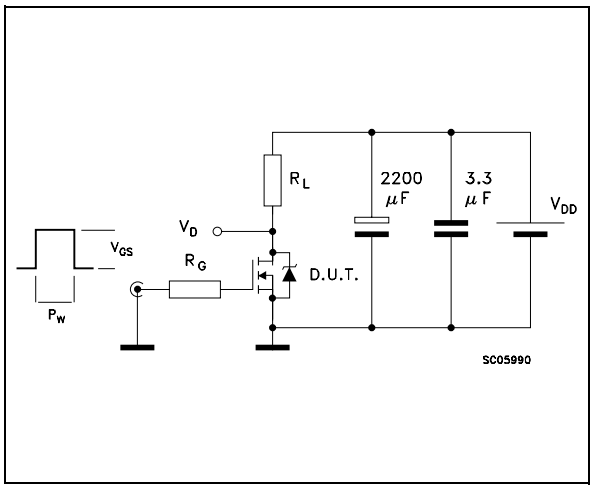


Fig. 4: Gate Charge test Circuit

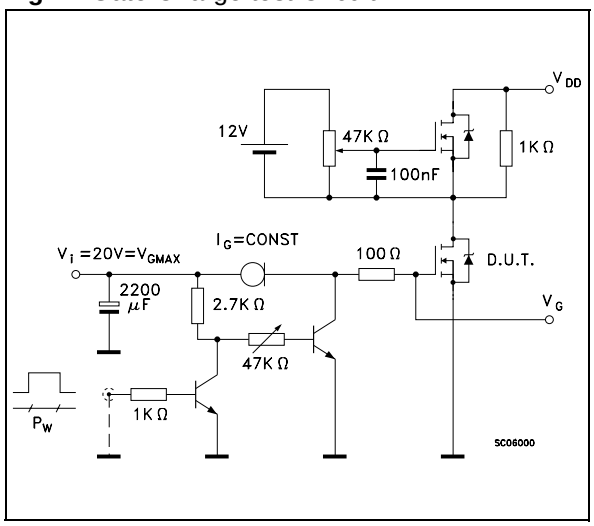
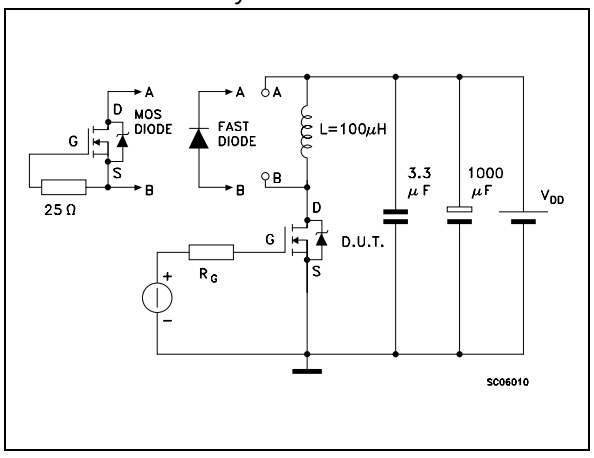
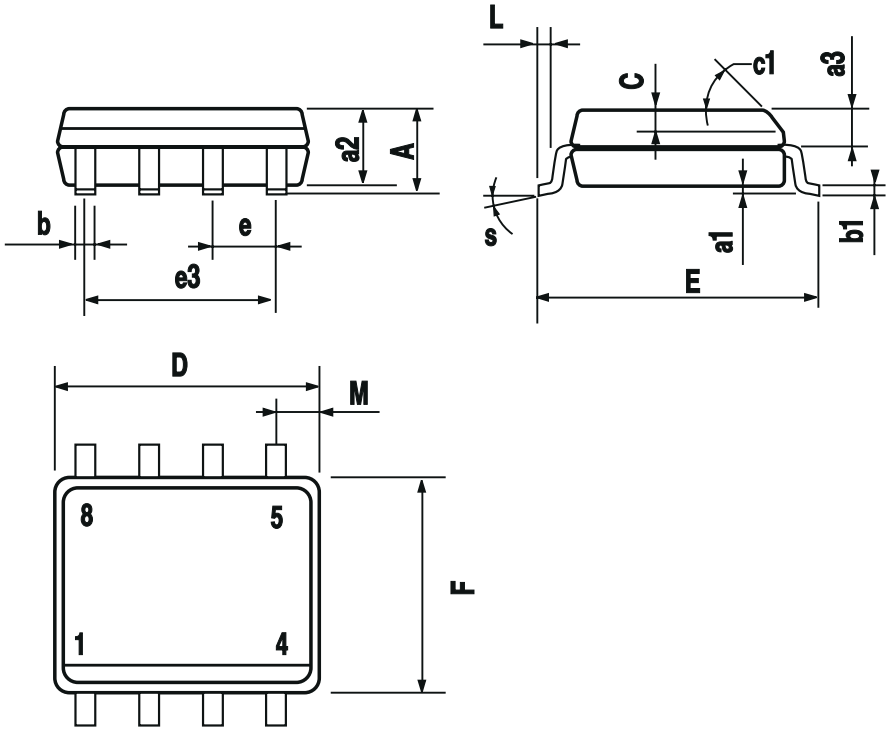


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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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