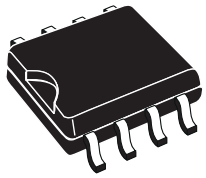
STS4DPFS2LS

P-CHANNEL 20V - 0.06Ω - 4A SO-8
STripFET™ MOSFET PLUS SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS			
MOSFET	V_{DSS}	$R_{DS(on)}$	I_D
	20 V	< 0.07 Ω	4 A
SCHOTTKY	$I_{F(AV)}$	V_{RRM}	$V_{F(MAX)}$
	3 A	40 V	0.44 V

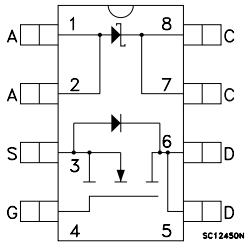


SO-8

DESCRIPTION

This product associates the latest low voltage STripFET™ 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_{DS}	Drain-source Voltage (V_{GS} = 0)	20	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	20	V
V_{GS}	Gate- source Voltage	± 20	V
I_D	Drain Current (continuos) at T_C = 25°C	4	A
I_D	Drain Current (continuos) at T_C = 100°C	3.4	A
I_{DM} (●)	Drain Current (pulsed)	16	A
P_{TOT}	Total Dissipation at T_C = 25°C	2	W
E_{AS} (1)	Single Pulse Avalanche Energy	20	mJ

SCHOTTKY ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		40	V
$I_{F(RMS)}$	RMS Forward Current		10	A
$I_{F(AV)}$	Average Forward Current	TL = 120°C δ = 0.5	3	A
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal	75	A
I_{RRM}	Repetitive Peak Reverse Current	tp = 2 µs F = 1 kHz	1	A
dv/dt	Critical Rate Of Rise Of Reverse Voltage		10000	V/µs

(•)Pulse width limited by safe operating area

(1) Starting T_j = 25°C, I_D = 2.5 A, V_{DD} = 20 V

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

THERMAL DATA

Rthj-amb	(*)Thermal Resistance Junction-ambient MOSFET	62.5	°C/W
Rthj-amb	(*)Thermal Resistance Junction-ambient SCHOTTKY	100	°C/W
T_{stg}	Storage Temperature Range	-55 to 150	°C
T_l	Junction Temperature	150	°C
	(*) Mounted on FR-4 board (Steady State)		

MOSFET 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	20			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating			1	µA
		V_{DS} = Max Rating, T_C = 125 °C			10	µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20 V			±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	1.6	2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V, I_D = 2.5 A		0.06	0.07	Ω
		V_{GS} = 4.5V, I_D = 2.5 A		0.07	0.085	
$I_{D(on)}$	On State Drain Current	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$, V_{GS} = 10V	16			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$, I_D = 2 A		5		S
C_{iss}	Input Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		1350		pF
C_{oss}	Output Capacitance			490		pF
C_{rss}	Reverse Transfer Capacitance			130		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = 15V, I_D = 3A R_G = 4.7Ω		25		ns
t_r	Rise Time	V_{GS} = 10V (see test circuit, Figure 3)		35		ns
Q_g	Total Gate Charge	V_{DD} = 24V, I_D = 6A,		12.5	16	nC
Q_{gs}	Gate-Source Charge	V_{GS} = 4.5 V		5		nC
Q_{gd}	Gate-Drain Charge			3		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off Delay Time	V_{DD} = 15 V, I_D = 2A,		125		ns
t_f	Fall Time	R_G = 4.7Ω, V_{GS} = 4.5 V (see test circuit, Figure 3)		30		ns
$t_{r(Voff)}$	Off-voltage Rise Time	V_{clamp} = 24 V, I_D = 6 A,		83		ns
t_f	Fall Time	R_G = 4.7Ω, V_{GS} = 4.5 V		40		ns
t_c	Cross-over Time	(see test circuit, Figure 5)		75		ns

SOURCE DRAIN DIODE

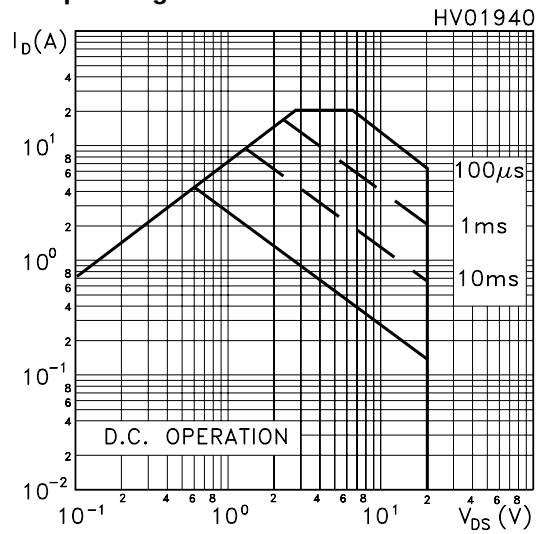
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				4	A
I_{SDM} (2)	Source-drain Current (pulsed)				16	A
V_{SD} (1)	Forward On Voltage	I_{SD} = 4 A, V_{GS} = 0			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 4 A, di/dt = 100A/µs,		45		ns
Q_{rr}	Reverse Recovery Charge	V_{DD} = 15 V, T_j = 150°C (see test circuit, Figure 5)		36		nC
I_{RRM}	Reverse Recovery Current			1.6		A

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

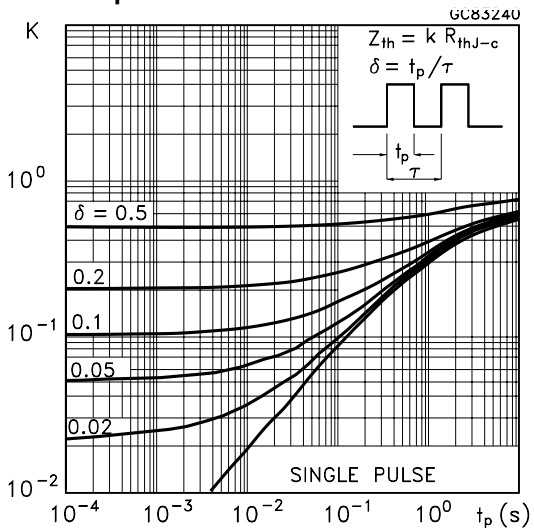
SCHOTTCKY STATIC ELETTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_R(*)	Reversed Leakage Current	T_J = 25 °C , V_R = 30 V		14	50	µA
		T_J = 125 °C , V_R = 30 V		8	18	mA
V_F(*)	Forward Voltage Drop	T_J = 25 °C , I_F = 1 A		0.37	0.42	V
		T_J = 125 °C , I_F = 1 A		0.28	0.32	V
		T_J = 25 °C , I_F = 2 A		0.41	0.46	V
		T_J = 125 °C , I_F = 2 A		0.34	0.39	V
		T_J = 25 °C , I_F = 3 A			0.5	V
		T_J = 125 °C , I_F = 3 A		0.4	0.44	V

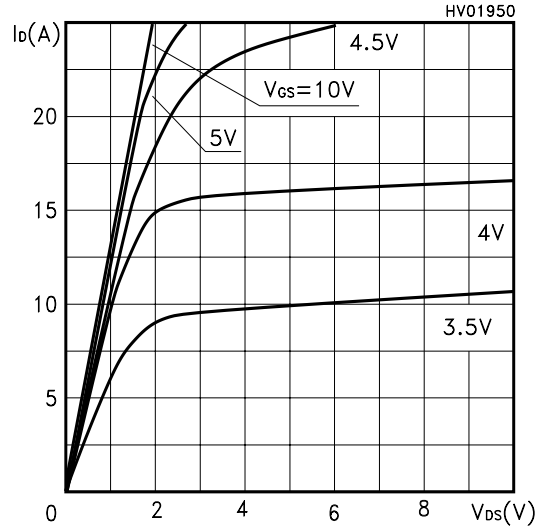
Safe Operating Area



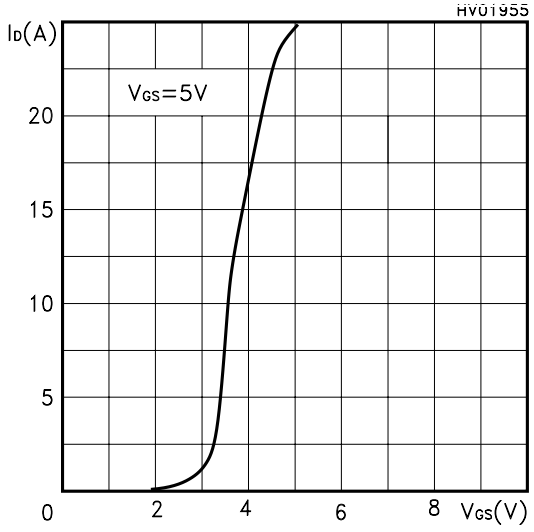
Thermal Impedance



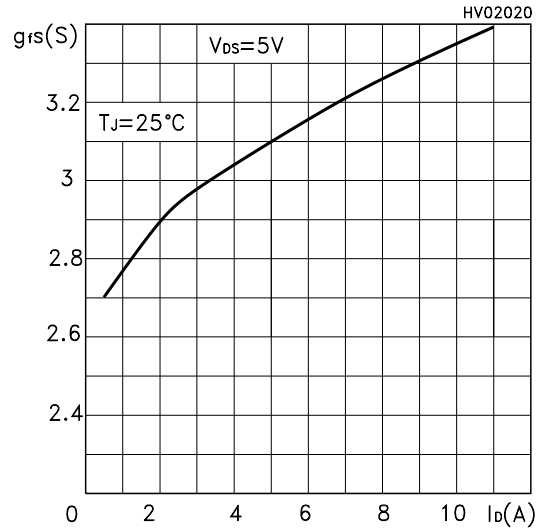
Output Characteristics



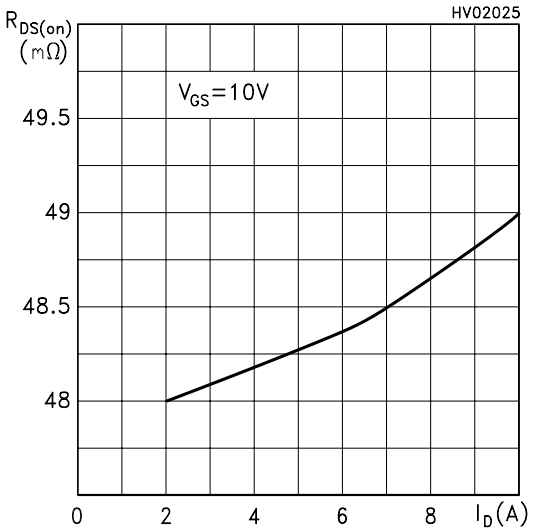
Transfer Characteristics



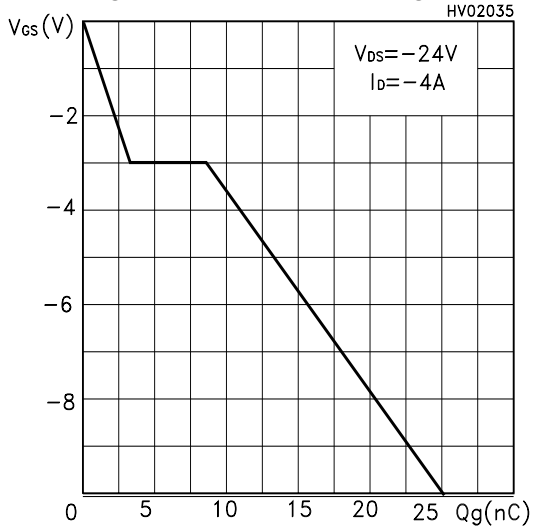
Transconductance



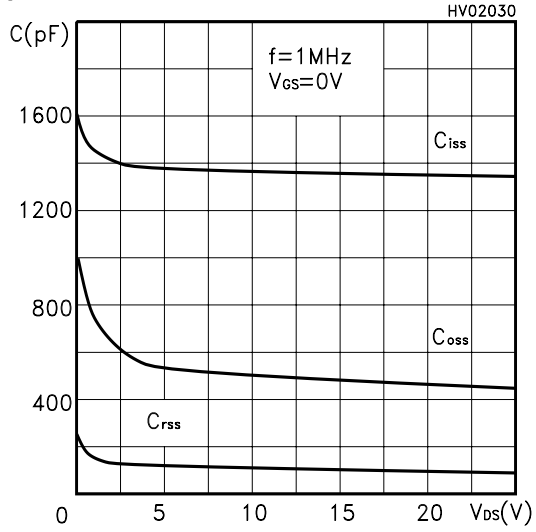
Static Drain-source On Resistance



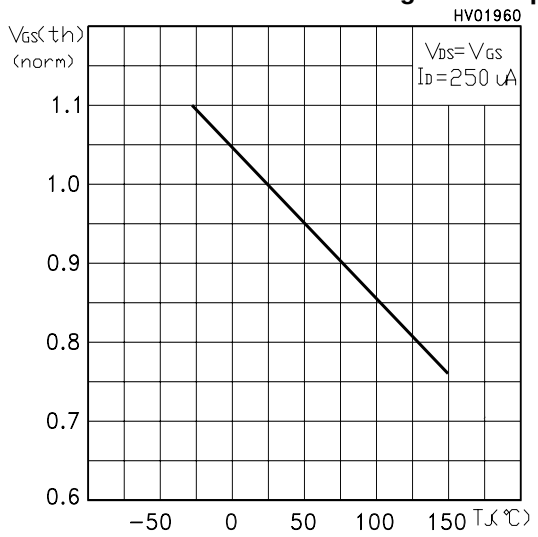
Gate Charge vs Gate-source Voltage



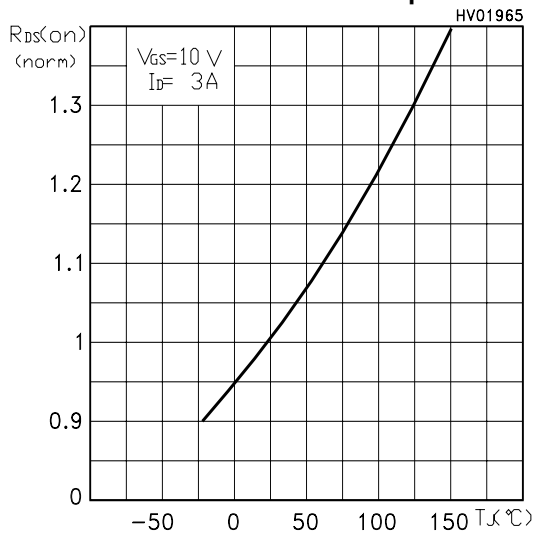
Capacitance Variations



Normalized Gate Threshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

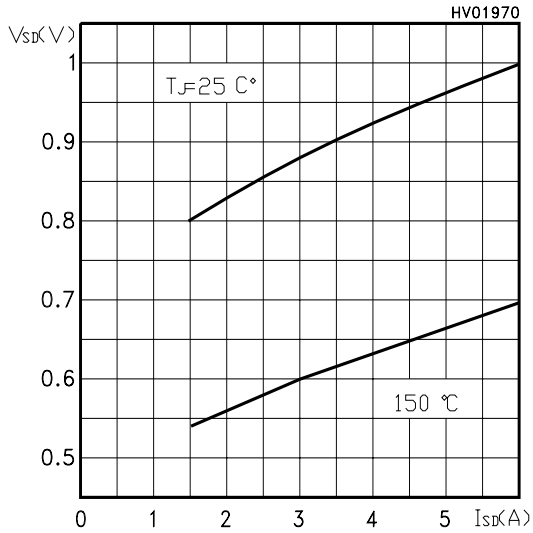


Fig. 1: Unclamped Inductive Load Test Circuit

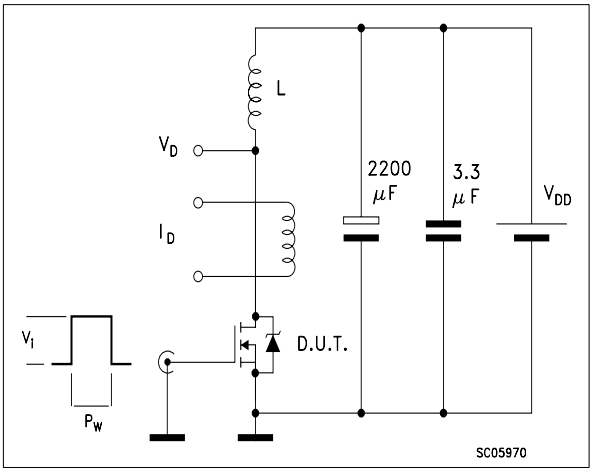


Fig. 2: Unclamped Inductive Waveform

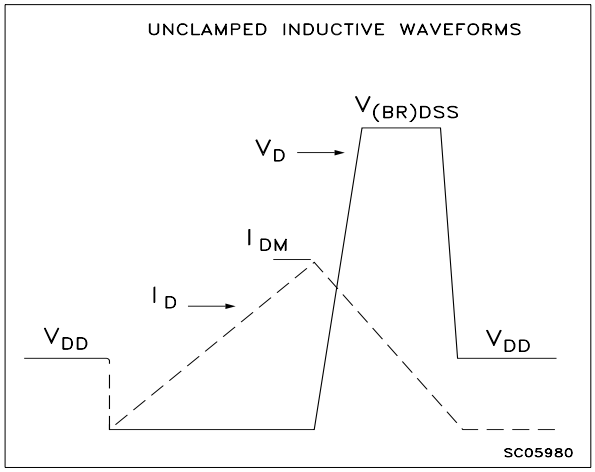


Fig. 3: Switching Times Test Circuits For Resistive Load

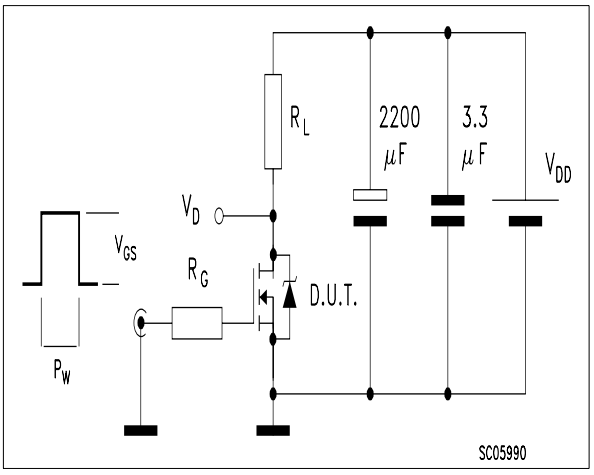


Fig. 4: Gate Charge test Circuit

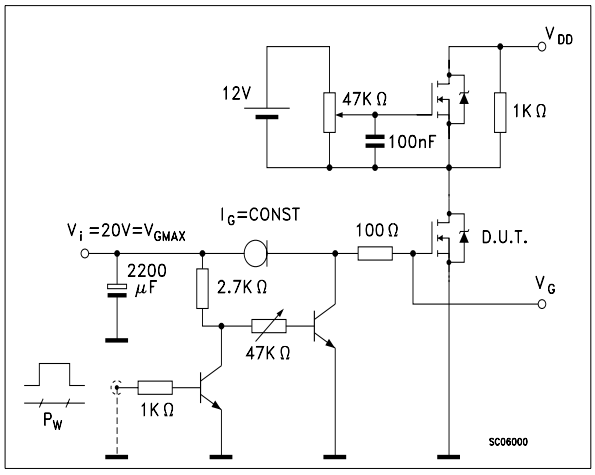
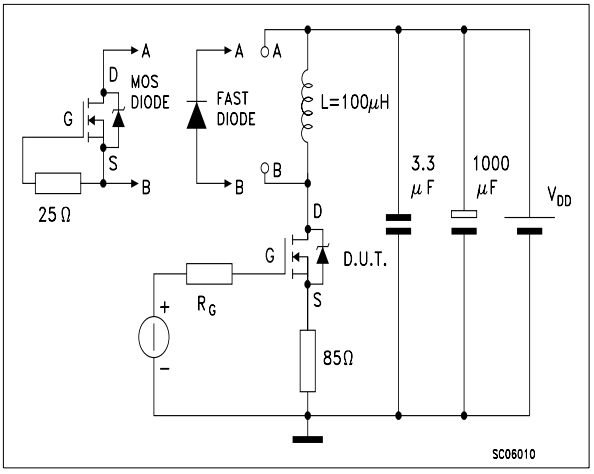
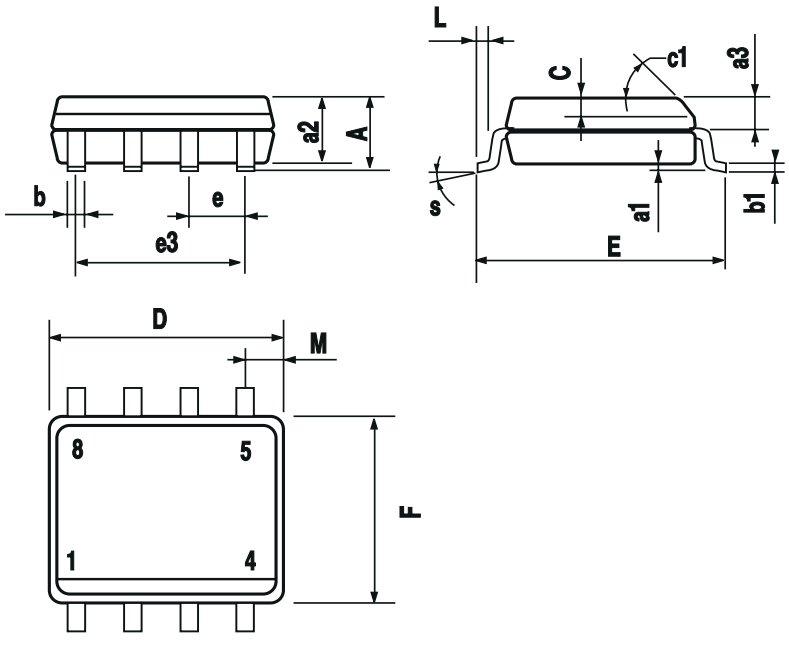


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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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