



# STS8DNH3LL

## DUAL N-CHANNEL 30V - 0.018 Ω - 8A SO-8 LOW GATE CHARGE STripFET™ III POWER MOSFET

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STS8DNH3LL	30 V	<0.022 Ω	8 A

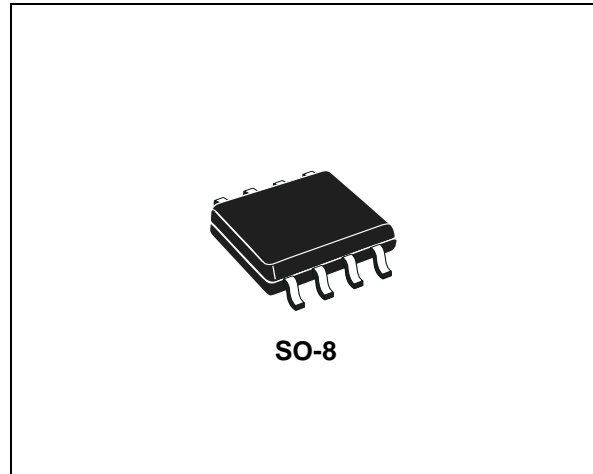
- TYPICAL R<sub>DS(on)</sub> = 0.018Ω
- OPTIMAL R<sub>DS(on)</sub> x Q<sub>g</sub> TRADE-OFF @ 4.5V
- CONDUCTION LOSSES REDUCED
- SWITCHING LOSSES REDUCED

### DESCRIPTION

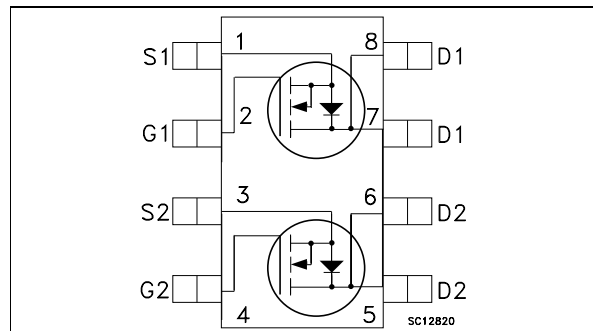
This application specific MOSFET is the Third generation of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows the best trade-off between on-resistance and gate charge. When used as high and low side in buck regulators, it gives the best performance in terms of both conduction and switching losses. This is extremely important for motherboards where fast switching and high efficiency are of paramount importance.

### APPLICATIONS

- SPECIFICALLY DESIGNED AND OPTIMISED FOR HIGH EFFICIENCY CPU CORE DC/DC CONVERTERS FOR MOBILE PC<sub>S</sub>



### INTERNAL SCHEMATIC DIAGRAM



### Ordering Information

SALES TYPE	MARKING	PACKAGE	PACKAGING
STS8DNH3LL	S8DNH3LL	SO-8	TAPE & REEL

### ABSOLUTE MAXIMUM RATINGS

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 kΩ)	30	V
V <sub>GS</sub>	Gate- source Voltage	± 16	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C	8	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	5	A
I <sub>DM</sub> (●)	Drain Current (pulsed)	32	A
P <sub>tot</sub>	Total Dissipation at T <sub>C</sub> = 25°C	2	W

(●) Pulse width limited by safe operating area.

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**TAB.1 THERMAL DATA**

Rthj-amb T <sub>j</sub> T <sub>stg</sub>	(*)Thermal Resistance Junction-ambient Maximum Operating Junction Temperature Storage Temperature	Max	62.5 150 -55 to 150	°C/W °C °C
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(\*) When mounted on 1 inch<sup>2</sup> FR-4 board, 2 oz of Cu, t ≤ 10s

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

**TAB.2 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

**TAB.3 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> = 4 A V <sub>GS</sub> = 4.5 V I <sub>D</sub> = 4 A		0.018 0.020	0.022 0.025	Ω Ω

**TAB.4 DYNAMIC**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (*)	Forward Transconductance	V <sub>DS</sub> =15 V I <sub>D</sub> = 4 A		8.5		S
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V <sub>DS</sub> = 25V, f = 1 MHz, V <sub>GS</sub> = 0		857 147 20		pF pF pF

**ELECTRICAL CHARACTERISTICS** (continued)

**TAB.5 SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ $t_r$	Turn-on Delay Time Rise Time	$V_{DD} = 15\text{ V}$ $I_D = 4\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 1)		12 14.5		ns ns
$Q_g$ $Q_{gs}$ $Q_{gd}$	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 15\text{ V}$ $I_D = 8\text{ A}$ $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 2)		7.0 2.5 2.3	10	nC nC nC

**TAB.6 SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ $t_f$	Turn-off Delay Time Fall Time	$V_{DD} = 15\text{ V}$ $I_D = 4\text{ A}$ $R_G = 4.7\ \Omega$ , $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 1)		23 8		ns ns

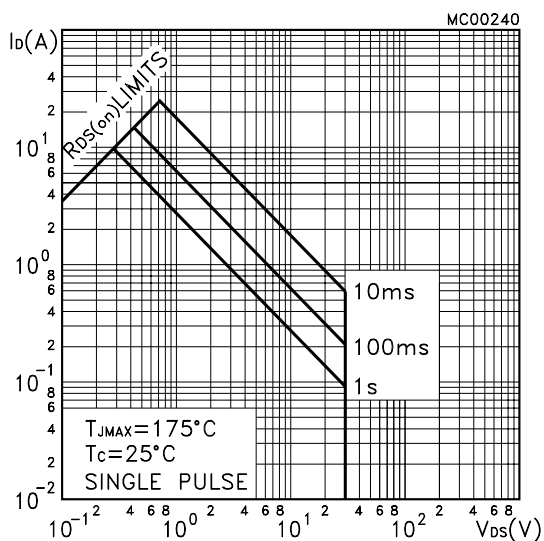
**TAB.7 SOURCE DRAIN DIODE**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$ $I_{SDM} (\bullet)$	Source-drain Current Source-drain Current (pulsed)				8 32	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 4\text{ A}$ $V_{GS} = 0$			1.5	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 8\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 15\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 3)		15 5.7 0.76		ns nC A

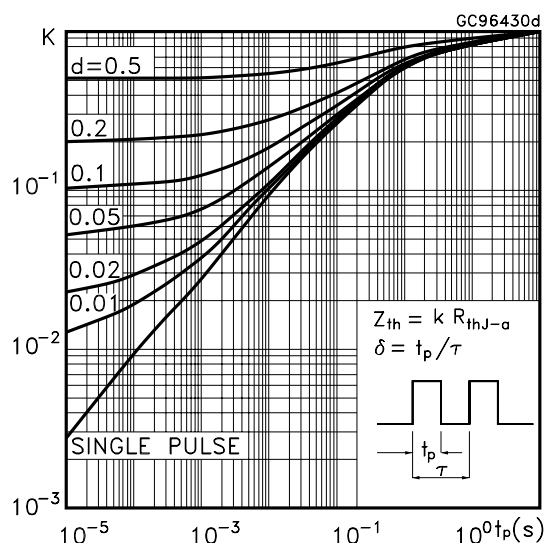
(\*)Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.

( $\bullet$ )Pulse width limited by safe operating area.

Safe Operating Area

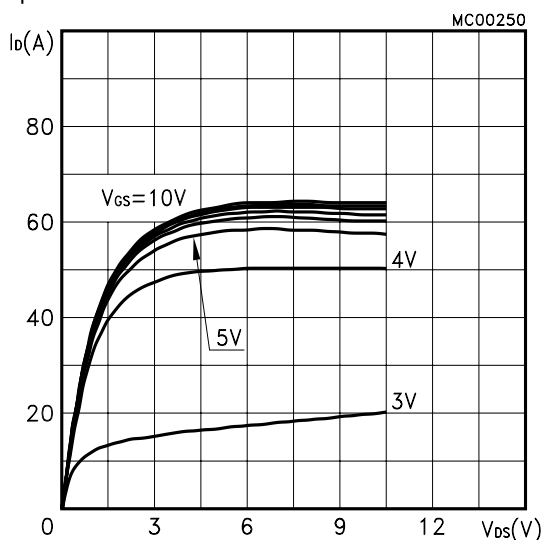


Thermal Impedance

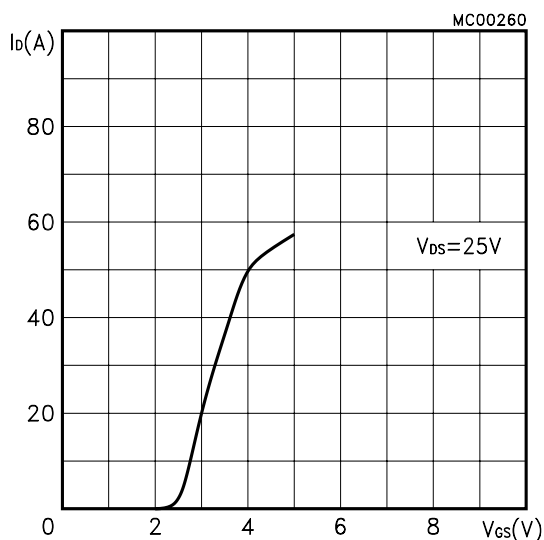


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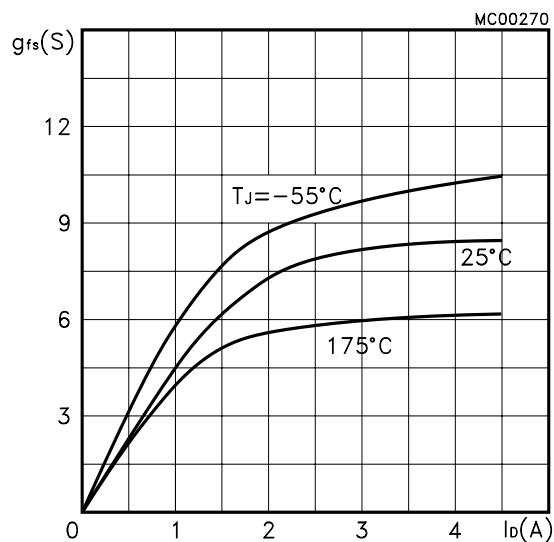
Output Characteristics



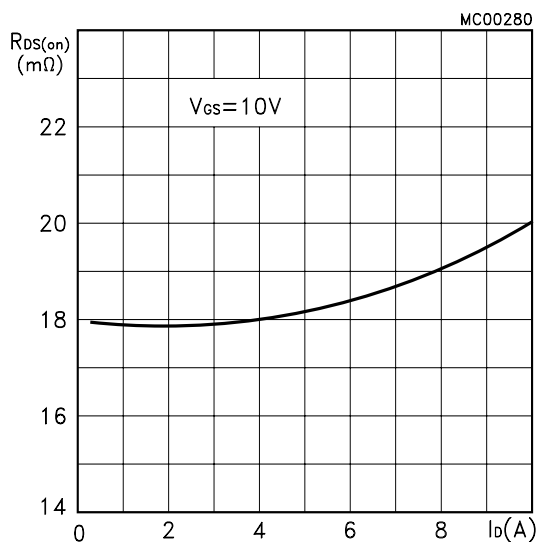
Transfer Characteristics



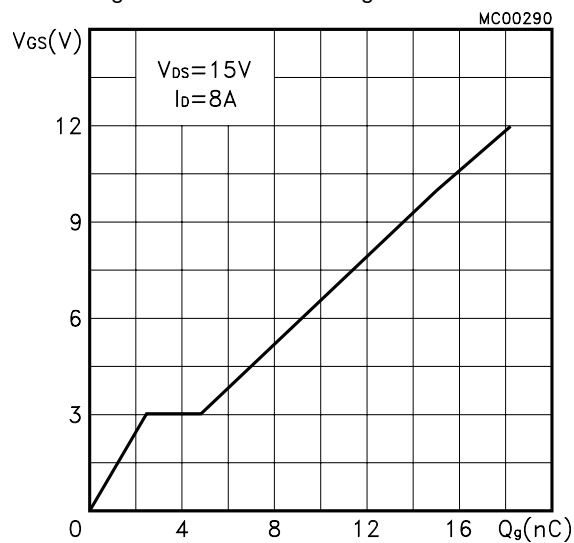
Transconductance



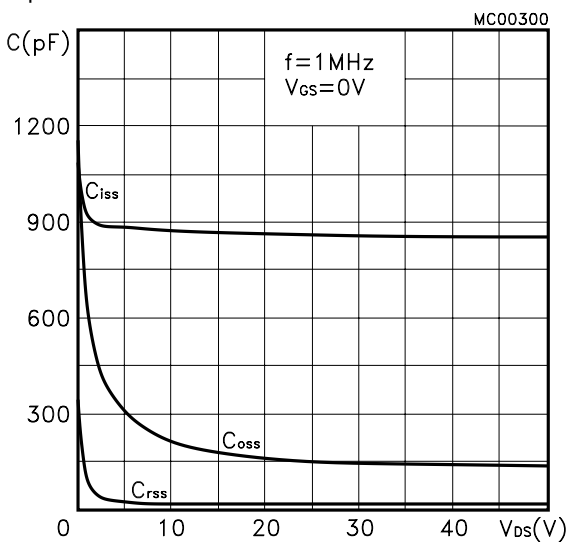
Static Drain-source On Resistance



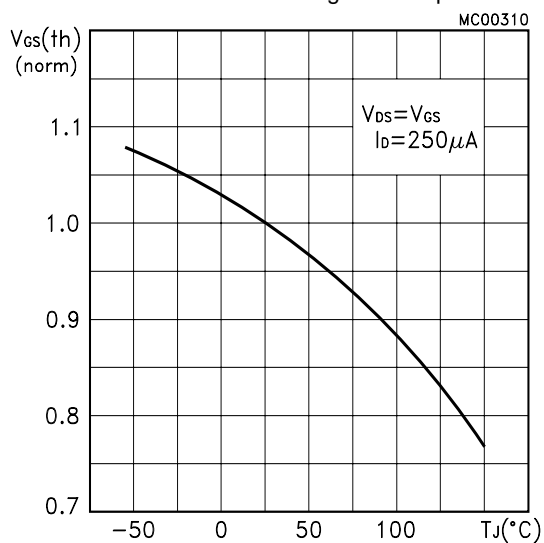
Gate Charge vs Gate-source Voltage



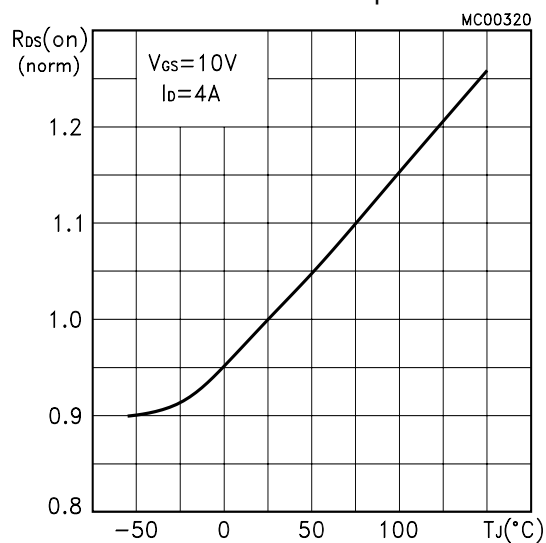
Capacitance Variations



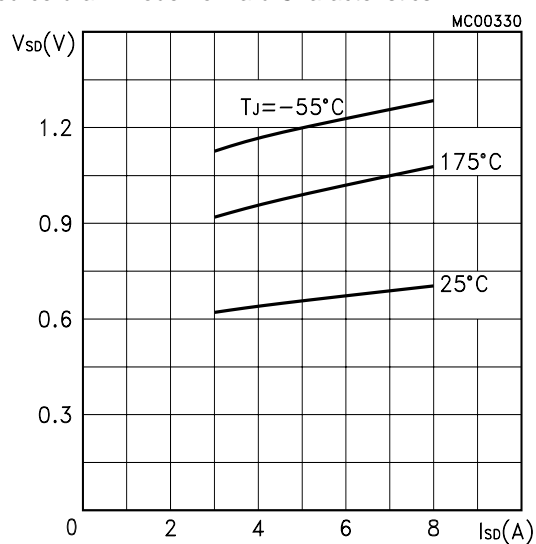
Normalized Gate Threshold Voltage vs Temperature



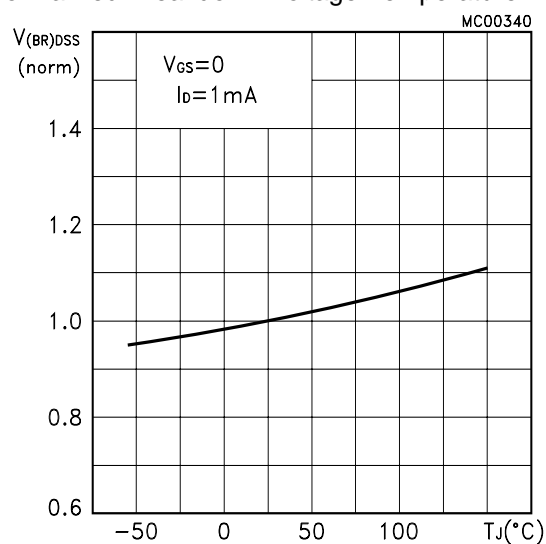
Normalized on Resistance vs Temperature



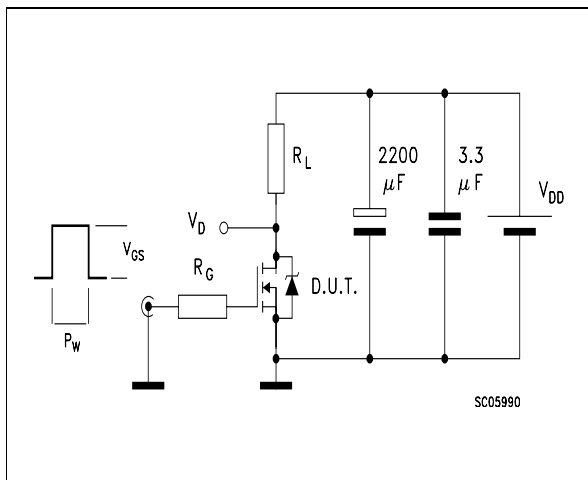
Source-drain Diode Forward Characteristics



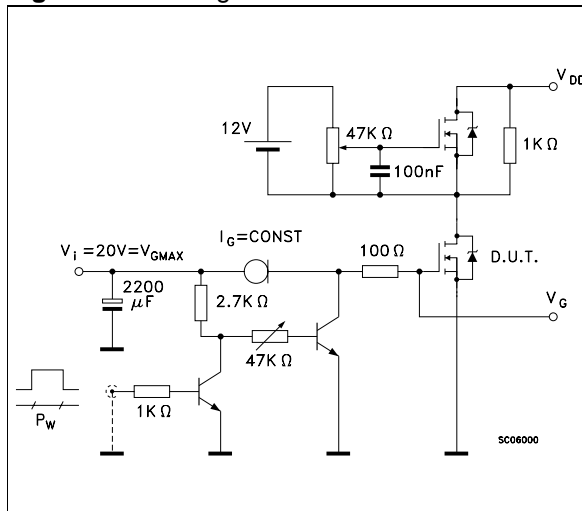
Normalized Breakdown Voltage Temperature.



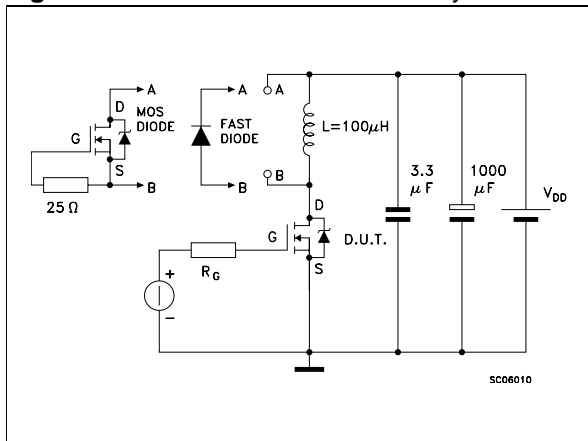
**Fig. 1: Switching Times Test Circuits For Resistive Load**



**Fig. 2: Gate Charge test Circuit**

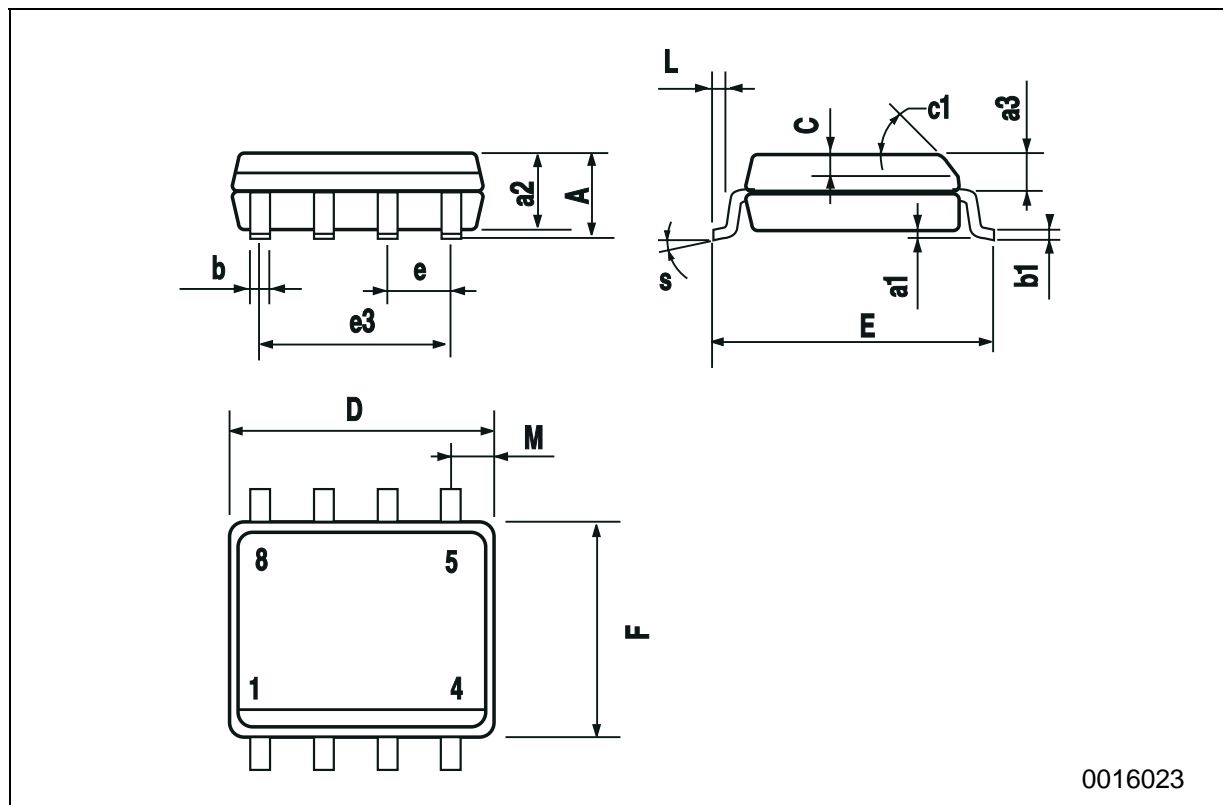


**Fig. 3: Test Circuit For Diode Recovery Behaviour**



**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.)					



**Revision History**

<b>Date</b>	<b>Revision</b>	<b>Description of Changes</b>
Tuesday 15 June 2004	0.2	FIRST ISSUE



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