



STSJ25NF3LL

N-CHANNEL 30V - 0.0085 Ω - 25A PowerSO-8™ LOW GATE CHARGE STripFET™ II POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STSJ25NF3LL	30 V	<0.0105 Ω	25 A

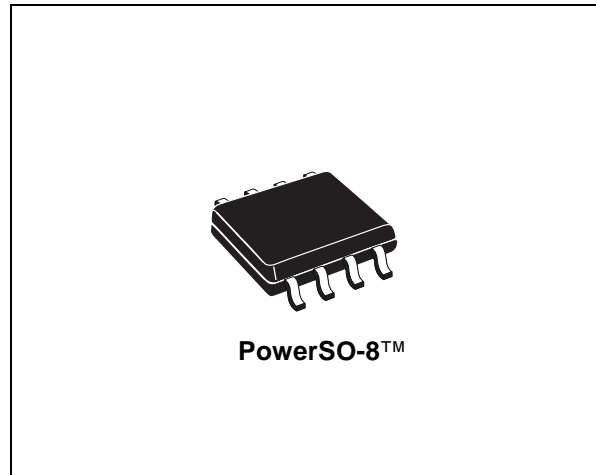
- TYPICAL R_{DS(on)} = 0.0085 Ω @ 10V
- TYPICAL Q_g = 24 nC @ 4.5 V
- CONDUCTION LOSSES REDUCED
- SWITCHING LOSSES REDUCED
- IMPROVED JUNCTION-CASE THERMAL RESISTANCE

DESCRIPTION

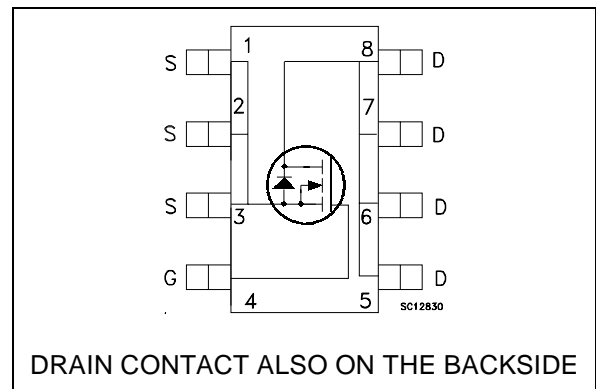
This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. This silicon, housed in thermally improved SO-8™ package, exhibits optimal on-resistance versus gate charge trade-off plus lower R_{thj-c}.

APPLICATIONS

- SPECIFICALLY DESIGNED AND OPTIMISED FOR HIGH EFFICIENCY CPU CORE DC/DC CONVERTERS FOR MOBILE PCs



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	30	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	30	V
V _{GS}	Gate- source Voltage	± 16	V
I _D	Drain Current (continuous) at T _C = 25°C (*)	25	A
I _D	Drain Current (continuous) at T _C = 25°C (#)	12	A
I _D	Drain Current (continuous) at T _C = 100°C	16	A
I _{DM} (●)	Drain Current (pulsed)	100	A
P _{tot}	Total Dissipation at T _C = 25°C	70	W
	Total Dissipation at T _C = 25°C (#)	3	W

(●) Pulse width limited by safe operating area.

(*) Value limited by wires bonding

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THERMAL DATA

Rthj-c	Thermal Resistance Junction-case	Max	1.8	°C/W
Rthj-amb	(*)Thermal Resistance Junction-ambient	Max	42	°C/W
T _j	Maximum Operating Junction Temperature		150	°C
T _{stg}	Storage Temperature		-55 to 150	°C

(*) When mounted on FR-4 board with 0.5 in² pad of Cu.

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	30			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 = 12.5 A V _{GS} = 4.5 V I _D = 12.5 A		0.0085 0.011	0.0105 0.013	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} =15 V I _D = 12.5 A		20		S
C _{iss}	Input Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		1650		pF
C _{oss}	Output Capacitance			540		pF
C _{rss}	Reverse Transfer Capacitance			130		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	$V_{DD} = 15\text{ V}$ $I_D = 12.5\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 1)		23 156		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD}=15\text{V}$ $I_D=25\text{A}$ $V_{GS}=4.5\text{V}$ (see test circuit, Figure 2)		24 8.5 12	33	nC nC nC

SWITCHING OFF

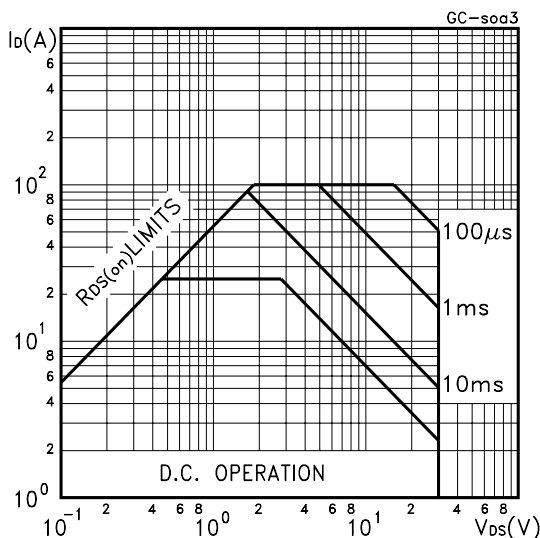
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 15\text{ V}$ $I_D = 12.5\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 3)		27 28		ns ns

SOURCE DRAIN DIODE

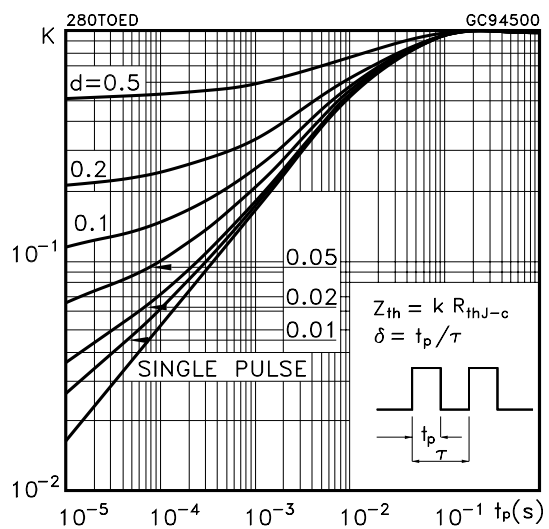
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (●)	Source-drain Current Source-drain Current (pulsed)				25 100	A A
V_{SD} (*)	Forward On Voltage	$I_{SD} = 25\text{ A}$ $V_{GS} = 0$			1.2	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 25\text{ A}$ $di/dt = 100\text{A}/\mu\text{s}$ $V_{DD} = 25\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 3)		40 50 2.5		ns nC A

(*)Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
(●)Pulse width limited by safe operating area.

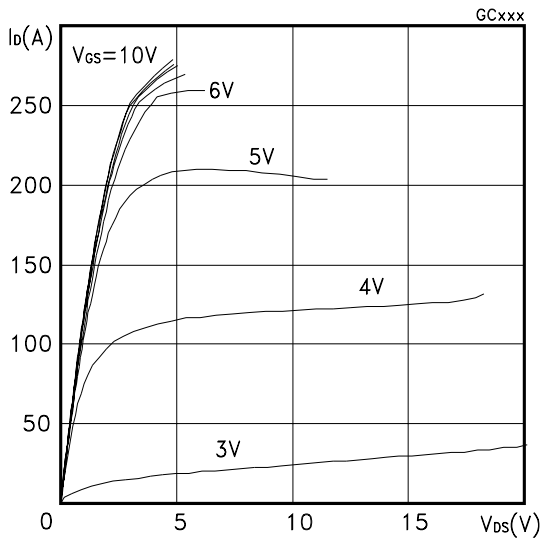
Safe Operating Area



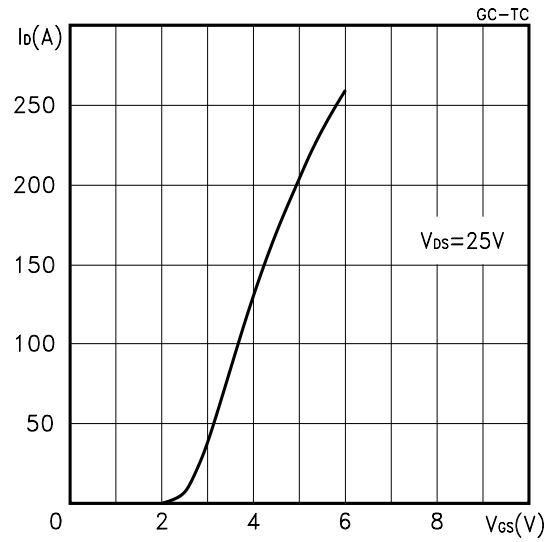
Thermal Impedance



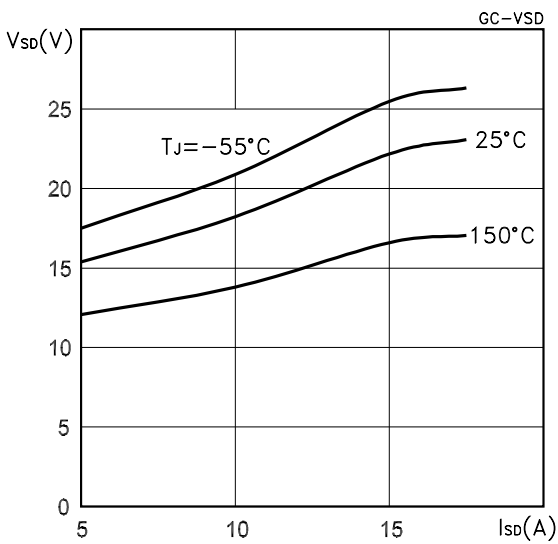
Output Characteristics



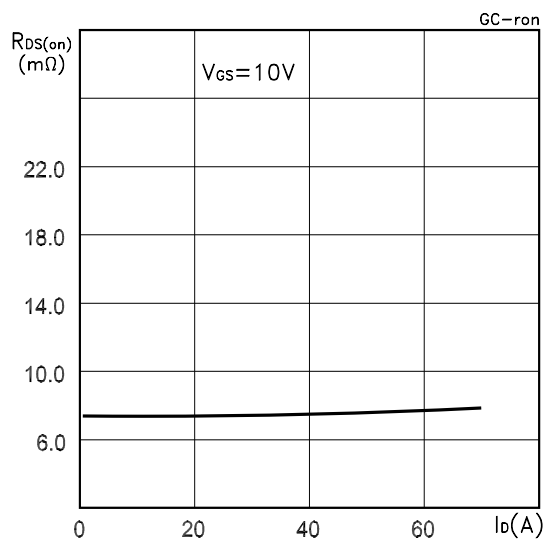
Transfer Characteristics



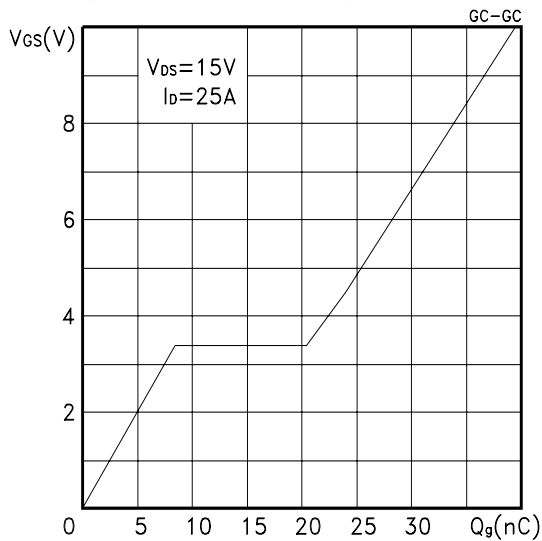
Transconductance



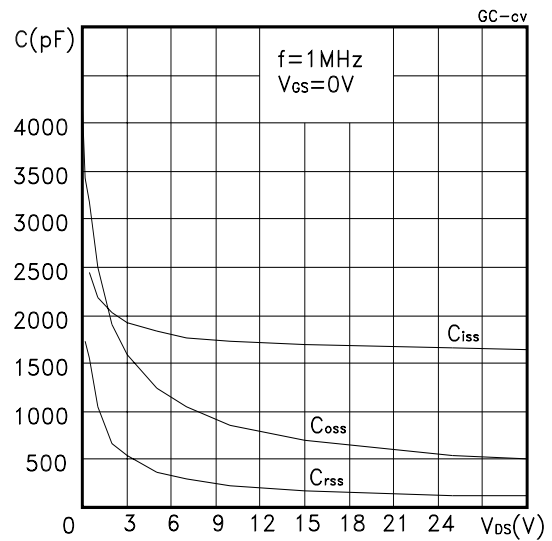
Static Drain-source On Resistance



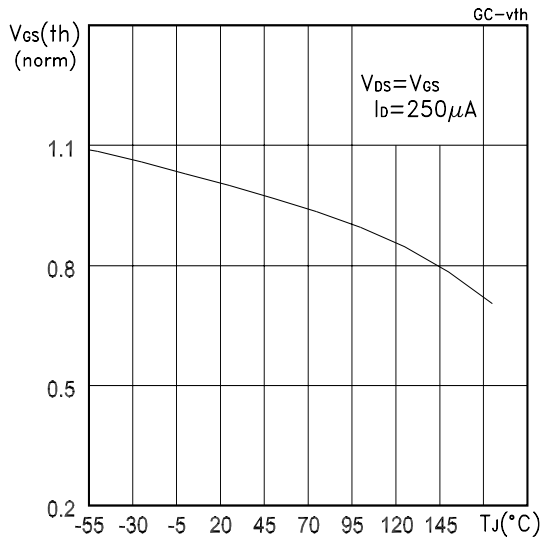
Gate Charge vs Gate-source Voltage



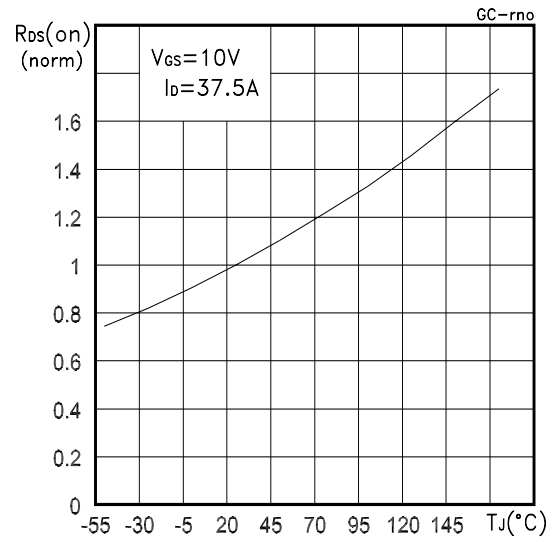
Capacitance Variations



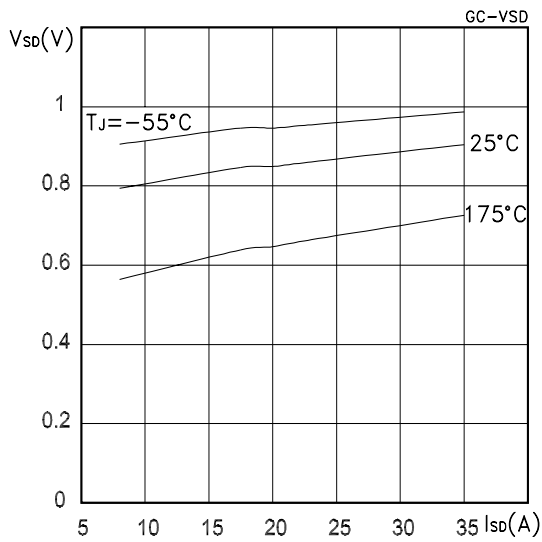
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature.

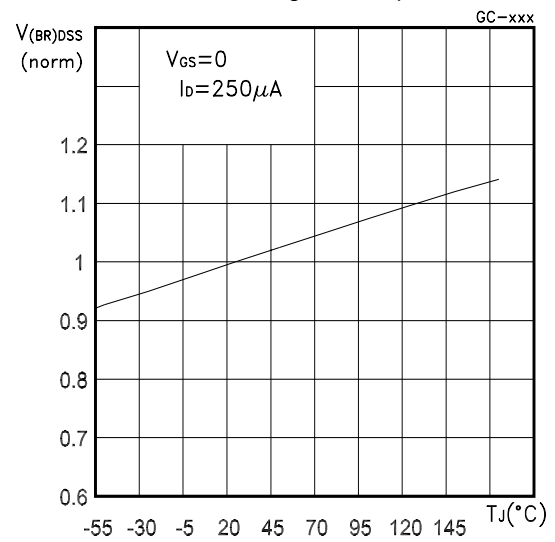


Fig. 1: Switching Times Test Circuits For Resistive Load

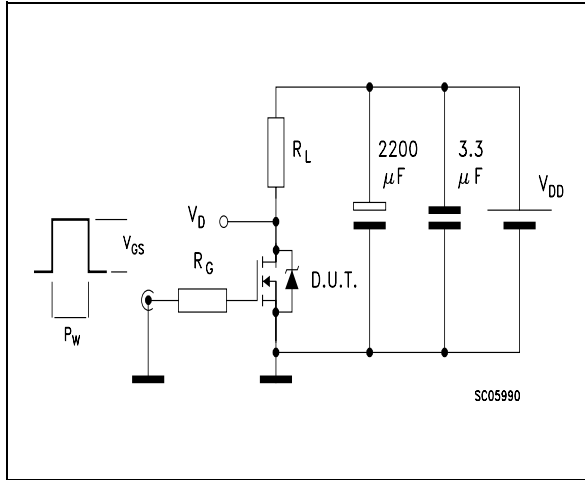


Fig. 2: Gate Charge test Circuit

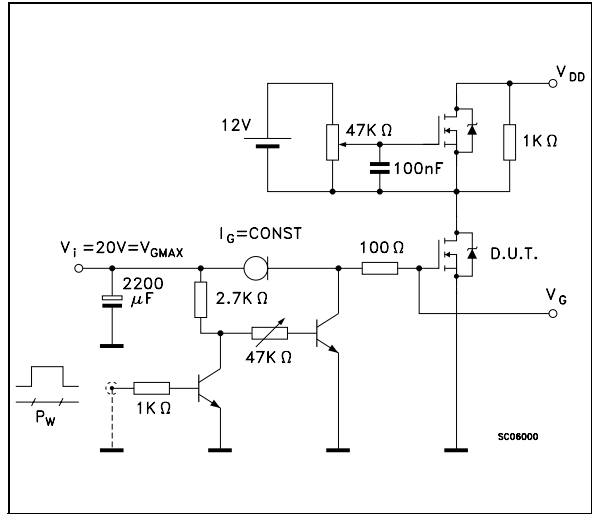
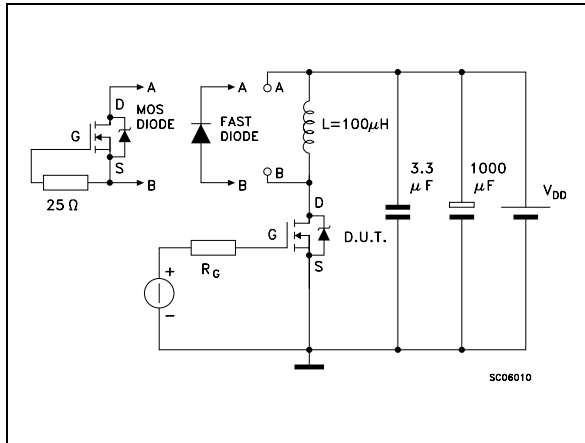
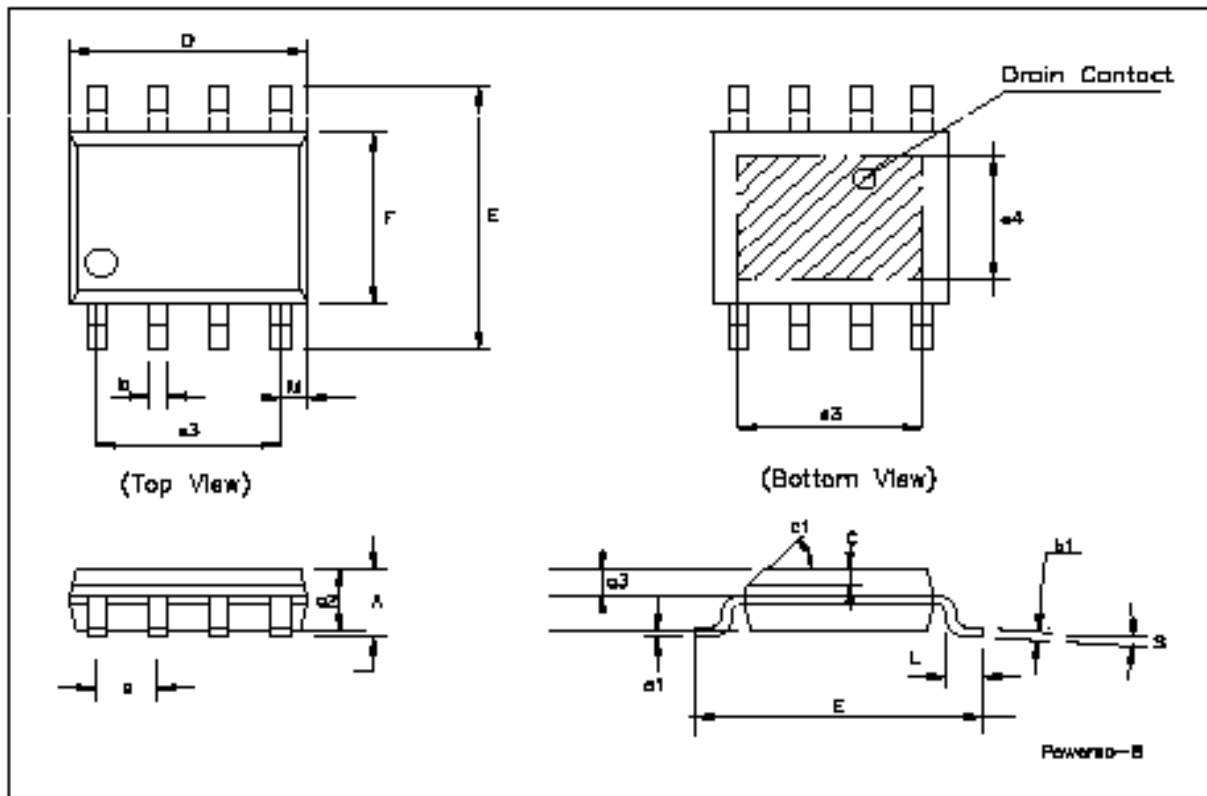


Fig. 3: Test Circuit For Diode Recovery Behaviour



PowerSO-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	
e4		2.79			0.110	
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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