

SDM023P03Q

-30V P-Channel MOSFETs

Rev A.0

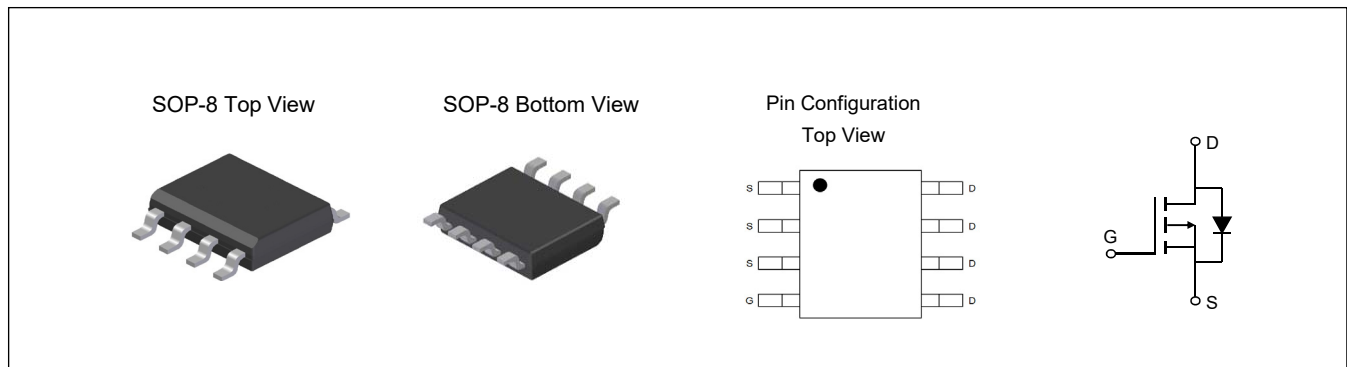
Feature

- ✧ Low $R_{DS(ON)}$
- ✧ Low Gate Charge
- ✧ High current Capability
- ✧ Green product (RoHS compliant), lead free
- ✧ 100% UIS Tested
- ✧ AEC-Q101 qualified

Product Summary

V_{DS}	-30	V
$V_{GS(th_Typ)}$	-1.6	V
$R_{DS(ON)_Typ}$ (at $V_{GS} = -10V$)	12.8	m Ω
I_D (at $V_{GS} = -10V$) ⁽¹⁾	-10	A

Type	Package	Marking	Outline	Media	Quantity (pcs)
SDM023P03Q	SOP-8	4435	Tape	13" Reel	4000



Absolute Maximum Ratings (Rating at $T_J=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_A=25^\circ C$	-10
		$T_A=100^\circ C$	-6.3
Pulsed Drain Current ⁽²⁾	I_{DM}	-40	A
Maximum Body-Diode Continuous Current	I_S	-10	A
Avalanche Energy ⁽³⁾	E_{AS}	7.8	mJ
Power Dissipation ⁽⁴⁾	P_D	1.9	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

Electrical Characteristics (Rating at $T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$	-	-	-1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1.0	-1.6	-2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$, $I_D=-10\text{A}$	-	12.8	16.6	m Ω
		$V_{GS}=-4.5\text{V}$, $I_D=-5\text{A}$	-	18.1	23.5	
V_{SD}	Diode Forward Voltage	$I_S=-10\text{A}$, $V_{GS}=0\text{V}$	-	-	-1.2	V
DYNAMIC PARAMETERS ⁽⁵⁾						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$	-	1269	-	pF
C_{oss}	Output Capacitance		-	167	-	pF
C_{rss}	Reverse Transfer Capacitance		-	127	-	pF
SWITCHING PARAMETERS ⁽⁵⁾						
Q_g	Total Gate Charge	$V_{GS}=0$ to -10V , $V_{DD}=-15\text{V}$, $I_D=-5\text{A}$	-	23.1	-	nC
Q_{gs}	Gate Source Charge		-	4.1	-	nC
Q_{gd}	Gate Drain Charge		-	5.1	-	nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=-10\text{V}$, $V_{DD}=-15\text{V}$, $I_D=-5\text{A}$, $R_{GEN}=3\Omega$	-	4.1	-	ns
t_r	Turn-On Rise Time		-	3.1	-	ns
$t_{D(off)}$	Turn-Off Delay Time		-	61	-	ns
t_f	Turn-Off Fall Time		-	51	-	ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-5\text{A}$, $di/dt=100\text{A}/\mu\text{s}$	-	13	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-5\text{A}$, $di/dt=100\text{A}/\mu\text{s}$	-	4.1	-	nC

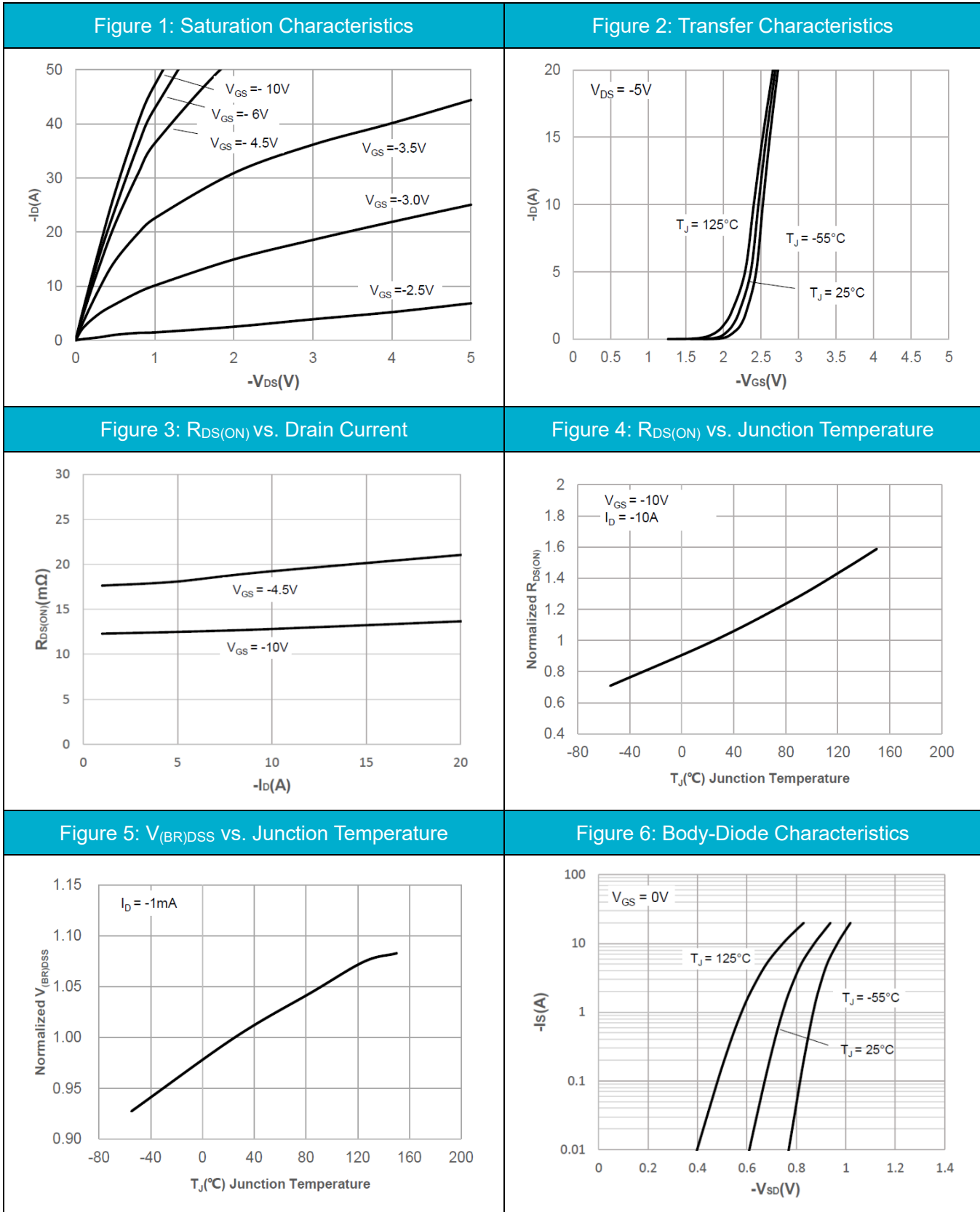
Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal resistance from junction to ambient	-	65	$^{\circ}\text{C} / \text{W}$

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
3. This single-pulse measurement was taken under the following condition [$L=0.5\text{mH}$, $V_{GS}=-10\text{V}$, $V_{DD}=-15\text{V}$, $R_g=25\text{ohm}$, $I_{AS}=8\text{A}$] while its value is limited by $T_{J_Max}=150^{\circ}\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max}=150^{\circ}\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical and Thermal Characteristics



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Figure 7: Gate-Charge characteristics

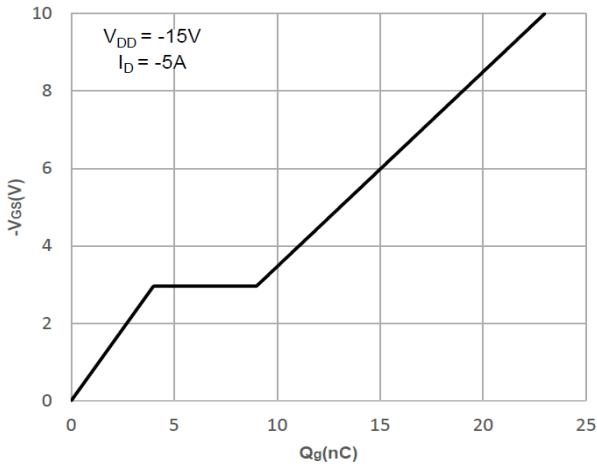


Figure 8: Capacitance characteristics

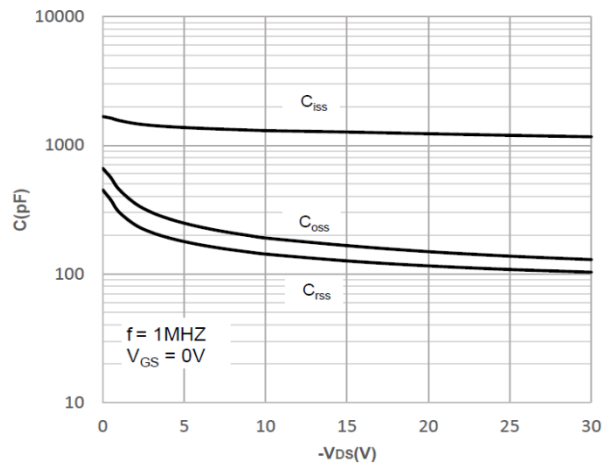


Figure 9: Current De-rating

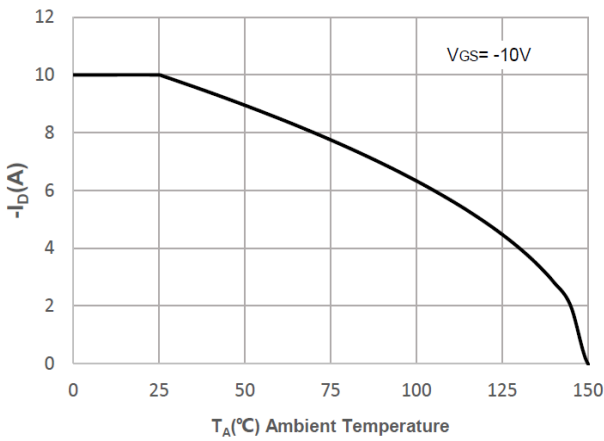


Figure 10: Single Pulse Power Rating, Junction-to-Case

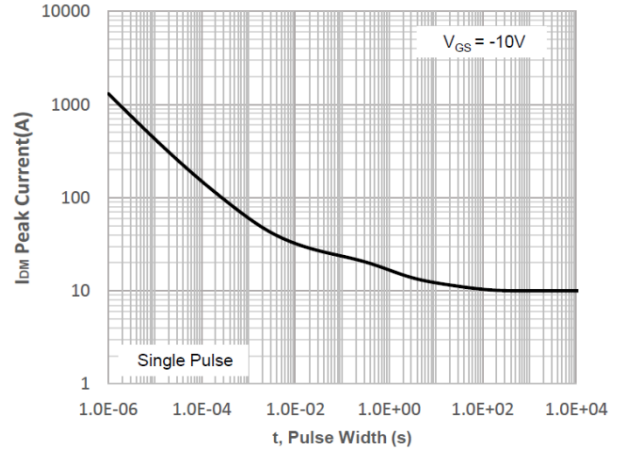


Figure 11: Maximum Safe Operating Area

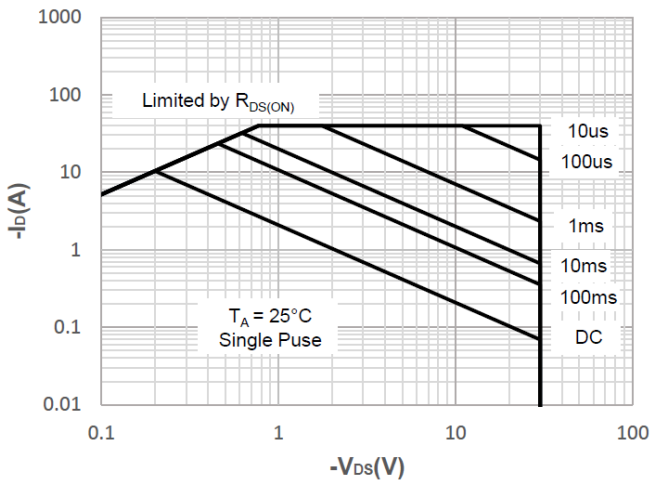
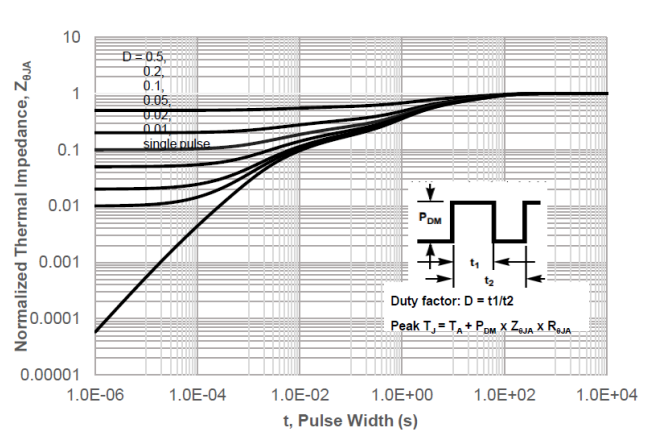


Figure 12: Single Pulse Power Rating, Junction-to-Case



Test Circuit

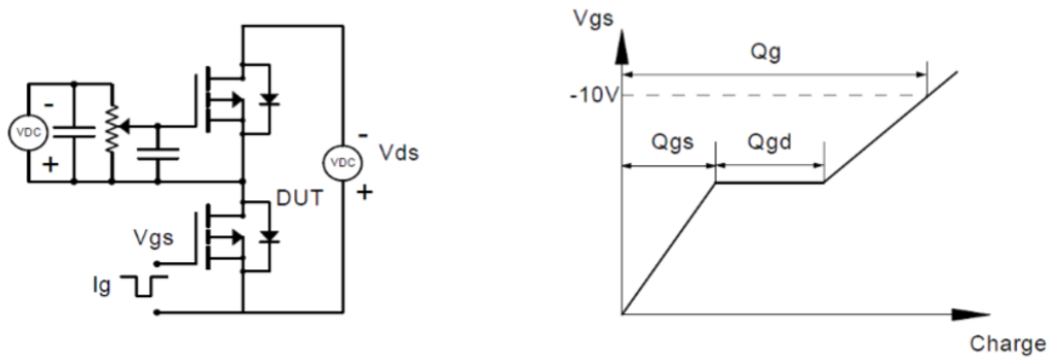


Figure1: Gate Charge Test Circuit & Waveforms

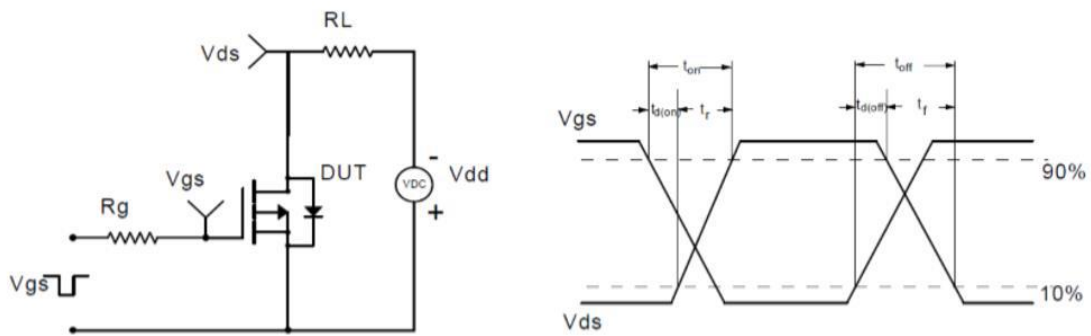


Figure2: Resistive Switching Test Circuit & Waveforms

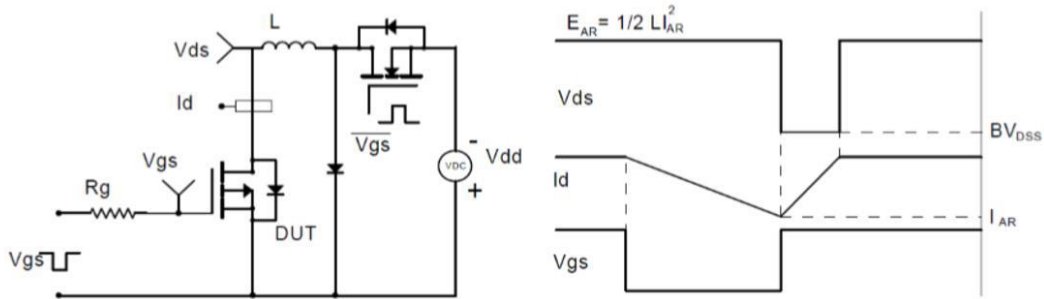


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

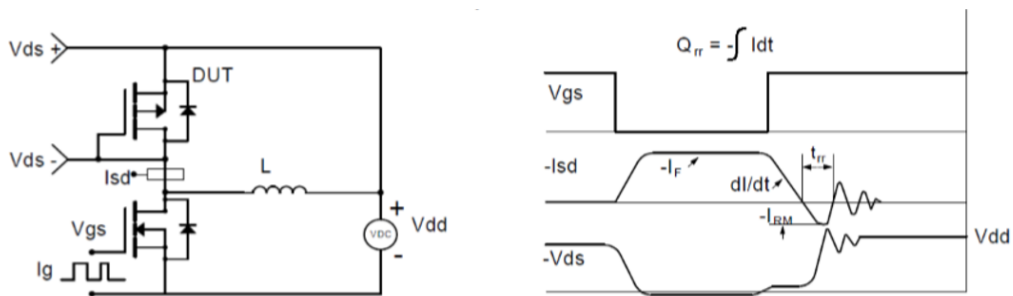
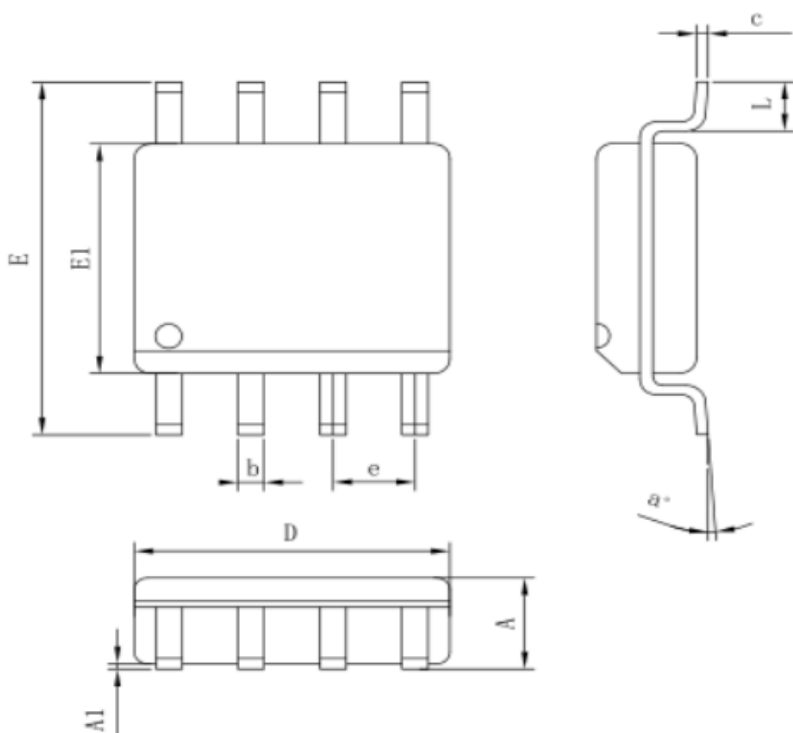


Figure4: Diode Recovery Test Circuit & Waveforms

SOP-8 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	--	--	1.75
A1	0.10	--	0.23
b	0.35	--	0.48
c	0.19	--	0.25
D	4.70	4.90	5.00
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
L	0.50	--	0.80
a*	0°	--	8°