ZK30P12S

P-channel Enhancement Mode Power MOSFET

Features

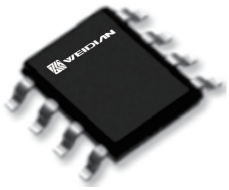
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- 100% UIS TESTED!
- 100% ΔVds TESTED!

Product Summary

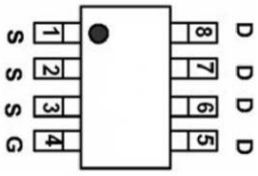
Parameters	Value	Unit
V_{DSS}	-30	V
$V_{GS(th)\_Typ}$	-1.7	V
I_D(@V_{GS}=-10V)	-12	A
$R_{DS(ON)\_Typ}$ @V_{GS}=-10V	10	mΩ
$R_{DS(ON)\_Typ}$ @V_{GS}=-4.5V	13	mΩ

Applications

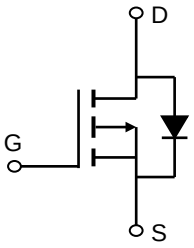
- Load Switch
- PWM Application
- Power Management



SOP8 Top View



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK30P12S	30P12	SOP8	Reel	N/A	N/A	4000

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25°C	I_D	-12	A
	T_C = 100°C		-8	
Pulsed Drain Current		I_{DM}	-48	A
Single Pulsed Avalanche Energy		E_{AS}	64	mJ
Power Dissipation		P_D	1.5	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	82	℃/W
Operating Junction and Storage Temperature Range		T_J ,T_{stg}	-55 to 150	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D = -250uA	-30			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -30V, V_{GS} =0V			1.0	μA
Gate-body leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} =±20V			±100	nA
On characteristics ④						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250uA	-1.0	-1.7	-2.5	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =-10V, I_D =-12A		7.6	10	mΩ
		V_{GS} =-4.5V, I_D =-8A		10.1	13	mΩ
Dynamic characteristics ④⑤						
Input capacitance	C_{iss}	V_{DS} =-15V,V_{GS} =0V f =1MHz		2252		pF
Output capacitance	C_{oss}			306		
Reverse transfer capacitance	C_{rss}			222		
Switching characteristics ④⑤						
Total gate charge	Q_g	V_{GS}=0 to -10V V_{DS}=-15V, I_D=-10A		41		nC
Gate-source charge	Q_{gs}			7		
Gate-drain charge	Q_{gd}			10		
Turn-on delay time	$t_{d(on)}$	V_{DD}=-15V,I_D=-10A V_{GS}=-10V,R_{GEN}=3Ω		6		ns
Turn-on rise time	t_r			2		
Turn-off delay time	$t_{d(off)}$			90		
Turn-off fall time	t_f			52		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=-30A			-1.2	V
Continuous drain-source diode forward current	I_S ①				-12	A
Pulsed drain-source diode forward current	I_{SM} ②				-48	A
Reverse recovery time	trr	di/dt = 100A/μs, I_F = -10A		23		ns
Reverse recovery charge	Qrr			14		nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition: Starting TJ=25C, VDD=-15V, VG=-10V, RG=25ohm, L=0.5mH, IAS=-16A
3. RθJA is measured with the device mounted on a 1inch2 pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

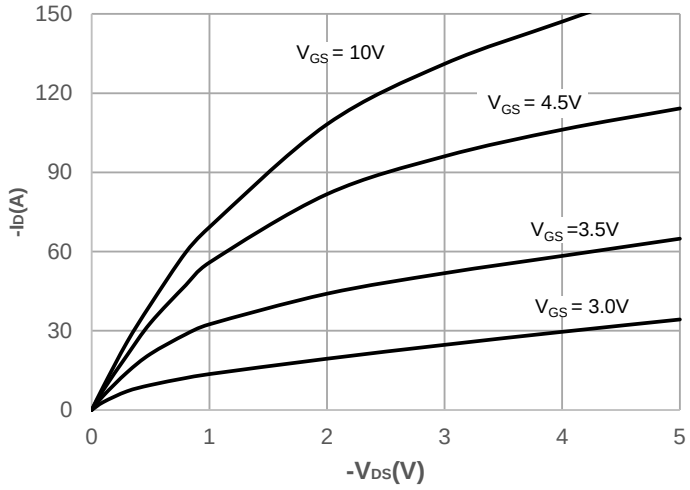


Figure 2: Typical Transfer Characteristics

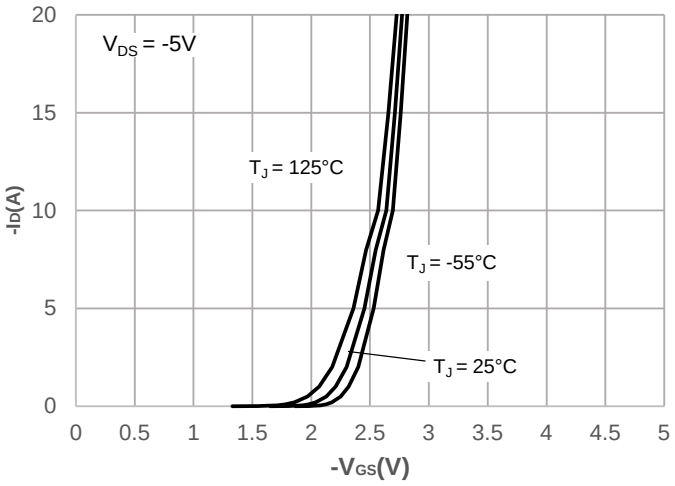


Figure 3: On-resistance vs. Drain Current

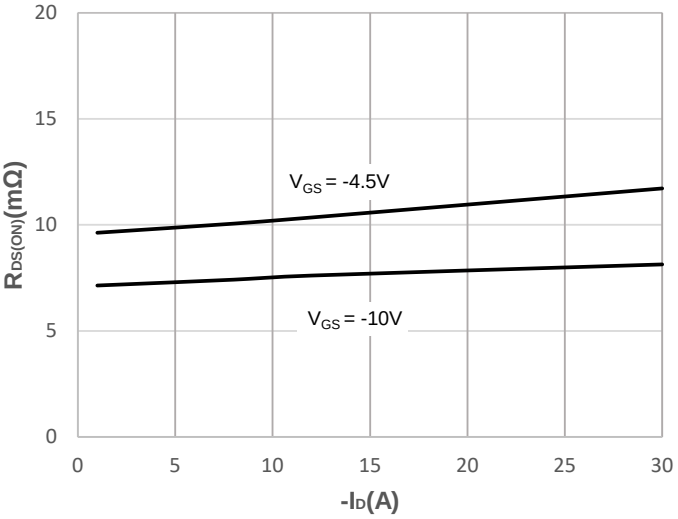


Figure 4: Body Diode Characteristics

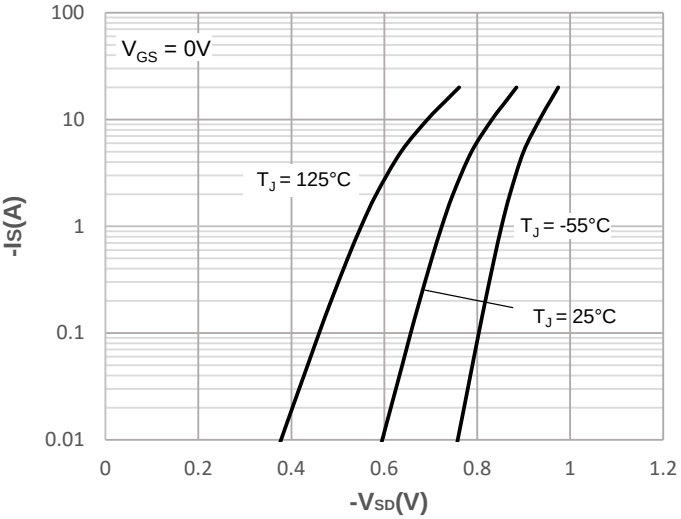


Figure 5: Gate Charge Characteristics

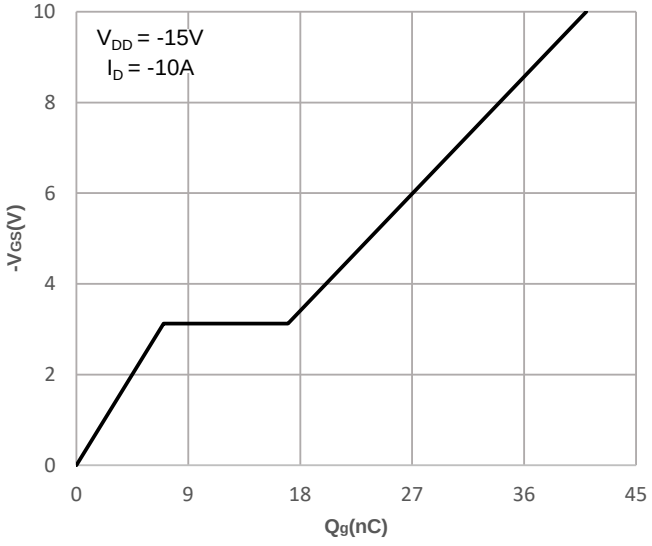
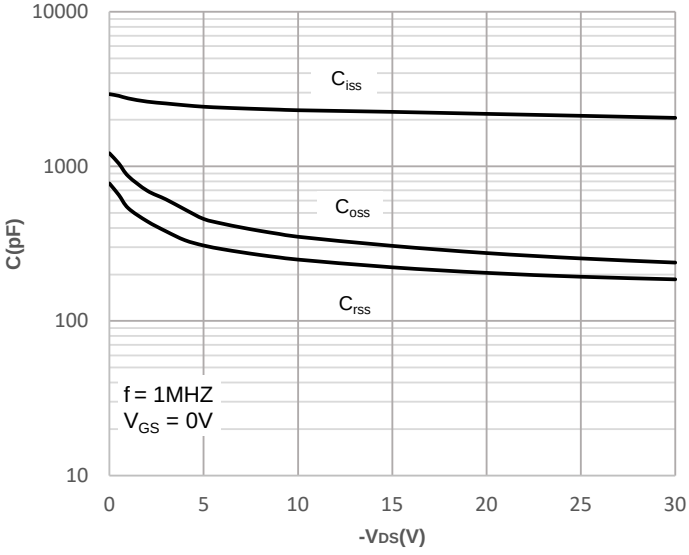


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

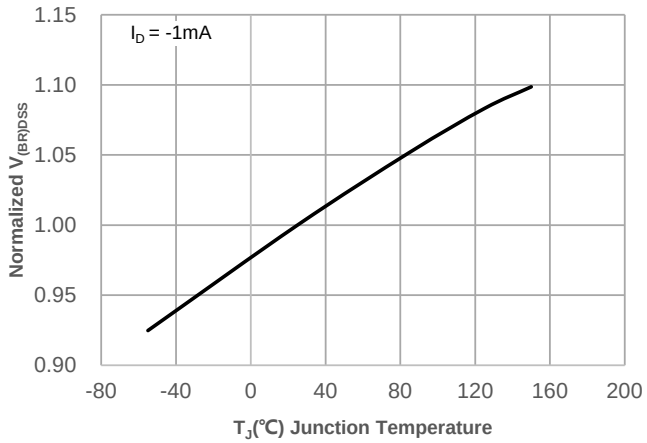


Figure 8: Normalized on Resistance vs. Junction Temperature

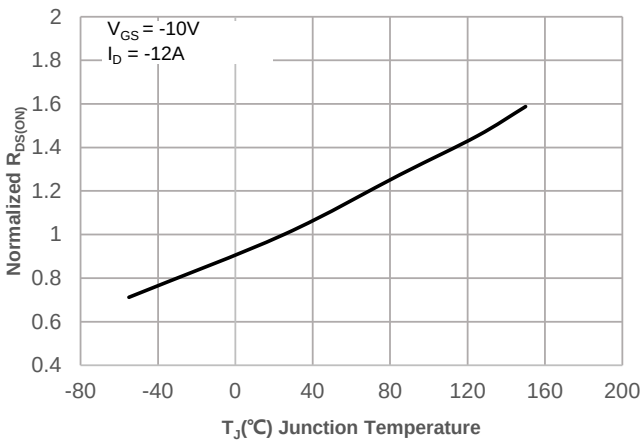


Figure 9: Maximum Safe Operating Area

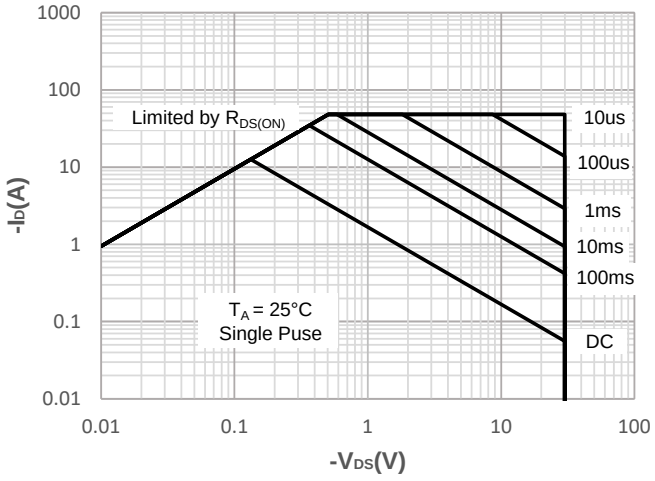


Figure 10: Maximum Continuous Drian Current vs. Ambient Temperature

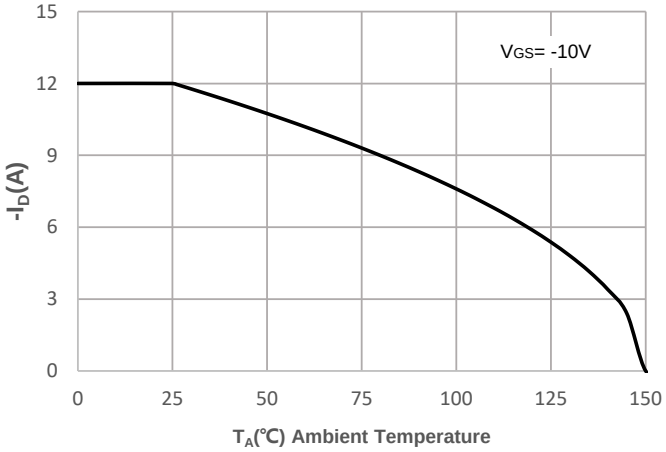


Figure 11: Normalized Maximum Transient Thermal Impedance

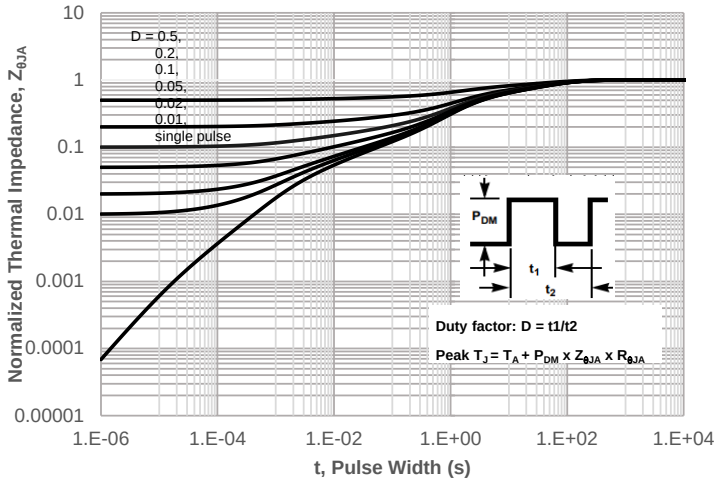
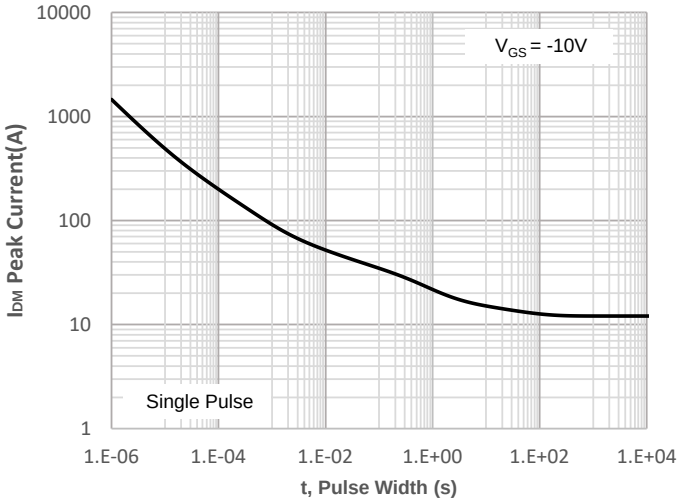


Figure 12: Peak Current Capacity



Test Circuit

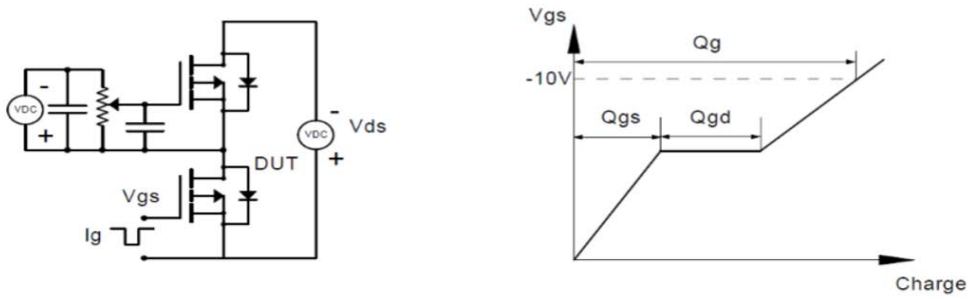


Figure 1: Gate Charge Test Circuit & Waveform

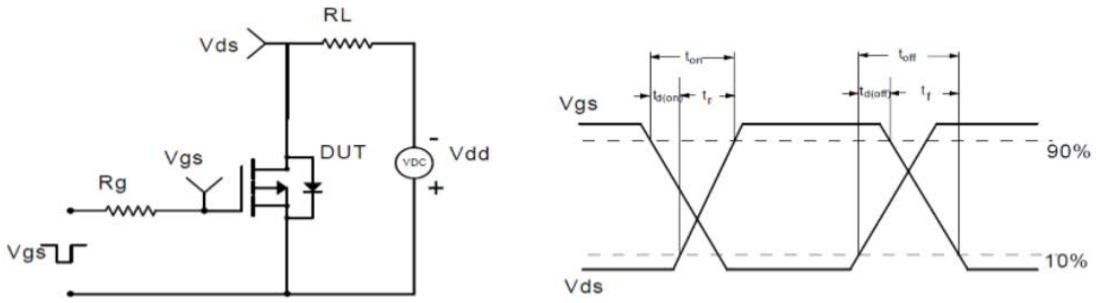


Figure 2: Resistive Switching Test Circuit & Waveform

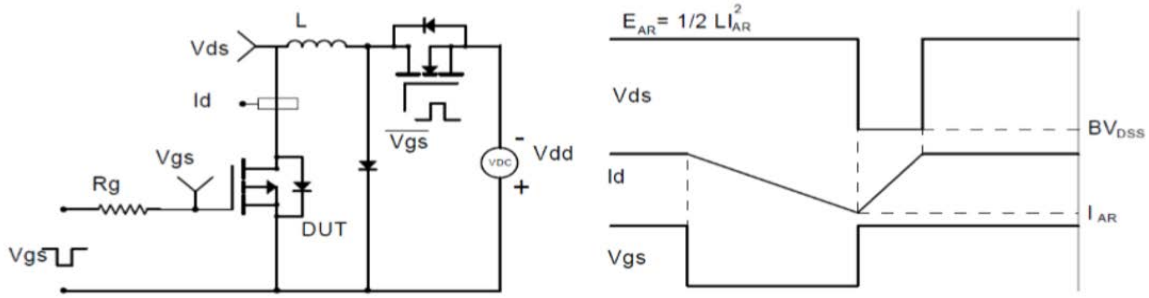


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

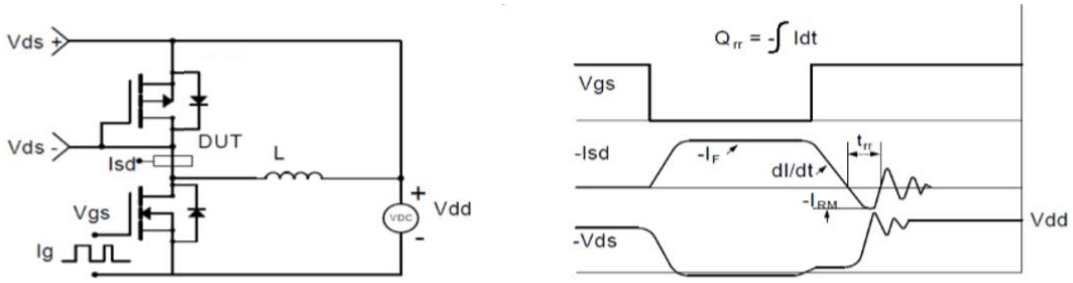
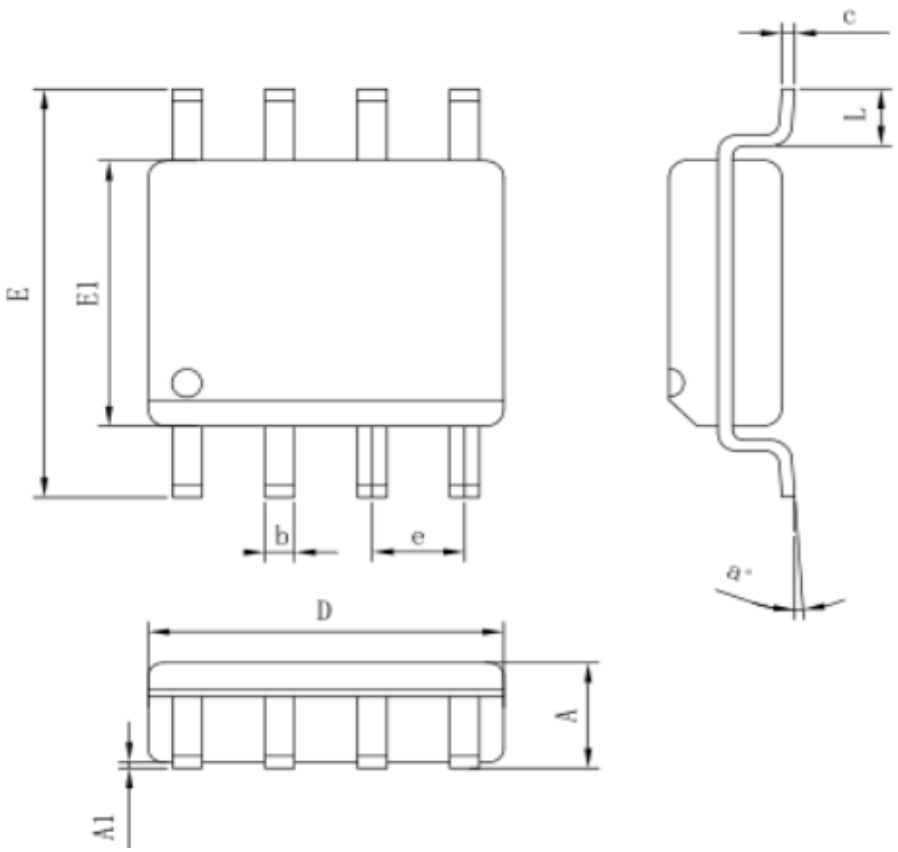


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(SOP-8)



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°