

General Description

FSMOS[®] MOSFET is based on Oriental Semiconductor's unique device design to achieve low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. The low V_{th} series is specially optimized for synchronous rectification systems with low driving voltage.

Features

- Low $R_{DS(on)}$ & FOM (Figure of Merit)
- Extremely low switching loss
- Excellent reliability and uniformity
- Fast switching and soft recovery



Applications

- PD charger
- Motor driver
- Switching voltage regulator
- DC-DC convertor
- Switched mode power supply

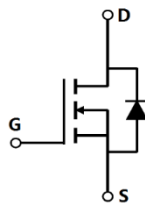
Key Performance Parameters

Parameter	Value	Unit
$V_{DS, min} @ T_{j(max)}$	80	V
$I_{D, pulse}$	48	A
$R_{DS(ON) max} @ V_{GS}=10V$	8	m Ω
Q_g	28.9	nC

Marking Information

Product Name	Package	Marking
SFS08R08BF	SOP8	SFS08R08B

Package & Pin information



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	80	V
Gate source voltage	V_{GS}	± 20	V
Continuous drain current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_D	16	A
Pulsed drain current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{D, pulse}$	48	A
Continuous diode forward current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_S	16	A
Diode pulsed current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{S, Pulse}$	48	A
Power dissipation ³⁾ , $T_C=25^{\circ}\text{C}$	P_D	8	W
Single pulsed avalanche energy ⁵⁾	E_{AS}	25	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 175	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-ambient ⁴⁾	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_j=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	80			V	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.0		2.5	V	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		7.1	8	m Ω	$V_{GS}=10\text{ V}, I_D=12\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		8.2	10	m Ω	$V_{GS}=4.5\text{ V}, I_D=9\text{ A}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=20\text{ V}$
				-100		$V_{GS}=-20\text{ V}$
Drain-source leakage current	I_{DSS}			1	μA	$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}$
Gate resistance	R_G		3.3		Ω	$f=1\text{ MHz}, \text{Open drain}$

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		2028		pF	$V_{GS}=0\text{ V}$, $V_{DS}=25\text{ V}$, $f=100\text{ kHz}$
Output capacitance	C_{oss}		717		pF	
Reverse transfer capacitance	C_{rss}		53.9		pF	
Turn-on delay time	$t_{d(on)}$		22.2		ns	$V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $R_G=2.5\ \Omega$, $I_D=25\text{ A}$
Rise time	t_r		6.3		ns	
Turn-off delay time	$t_{d(off)}$		47.5		ns	
Fall time	t_f		8.8		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		28.9		nC	$V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $I_D=25\text{ A}$
Gate-source charge	Q_{gs}		5.4		nC	
Gate-drain charge	Q_{gd}		4.9		nC	
Gate plateau voltage	$V_{plateau}$		3.5		V	

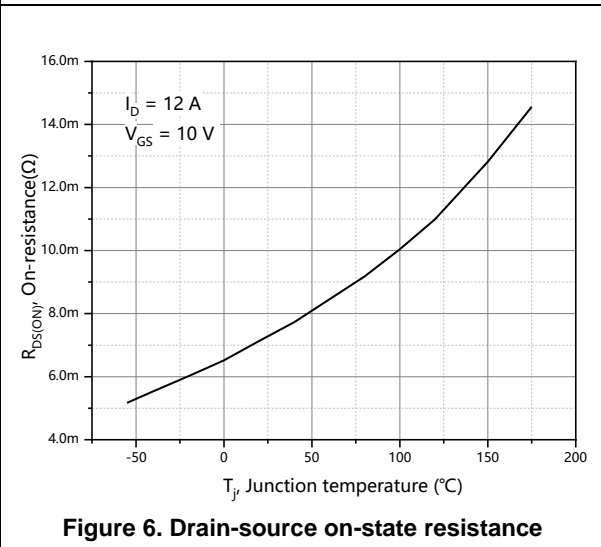
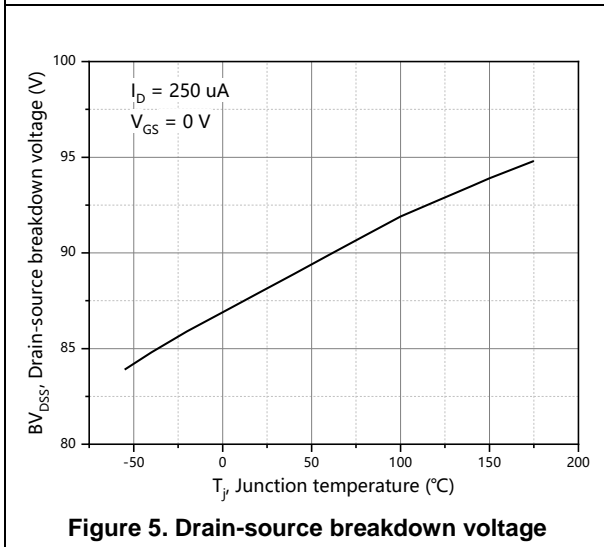
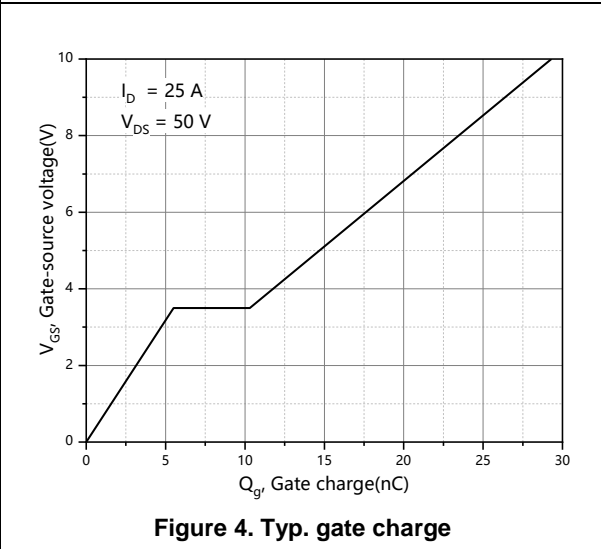
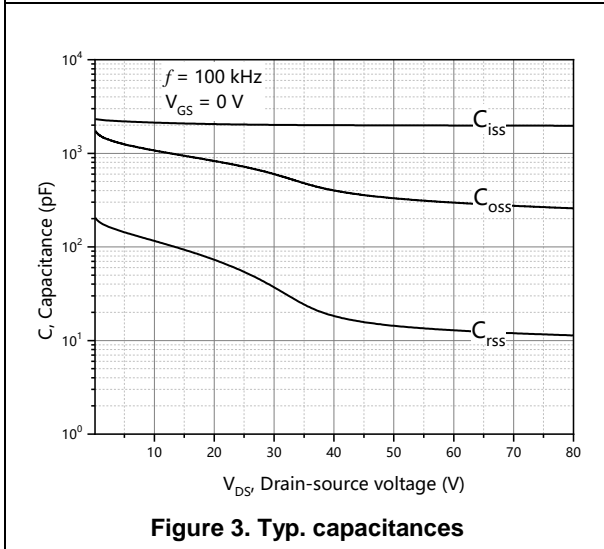
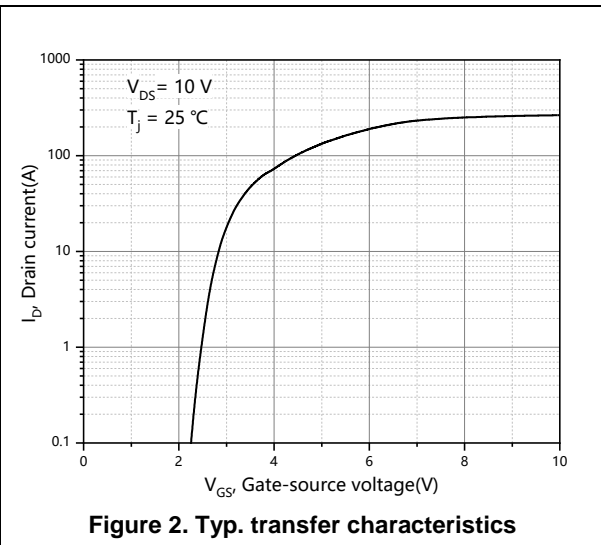
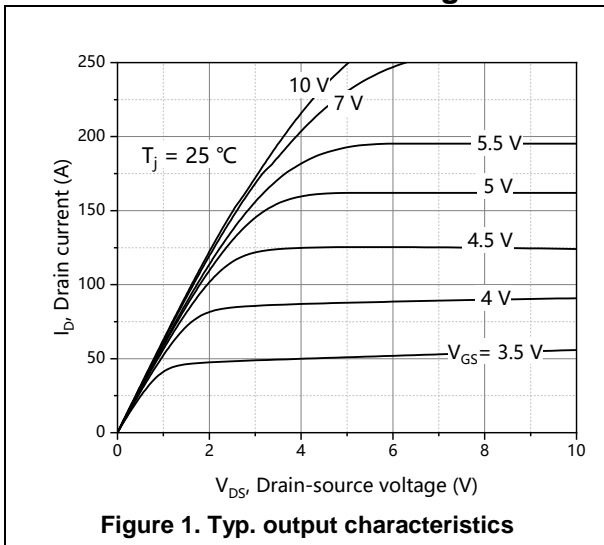
Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	$I_S=12\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		51.3		ns	$V_R=50\text{ V}$, $I_S=25\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		60.6		nC	
Peak reverse recovery current	I_{rrm}		2		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^\circ\text{C}$.
- 5) $V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $L=0.3\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams



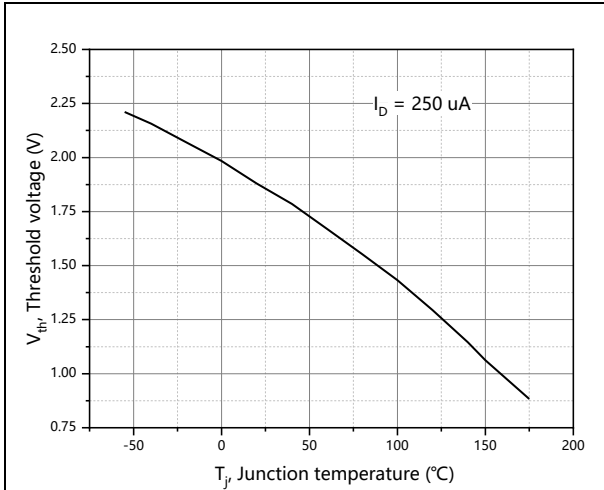


Figure 7. Threshold voltage

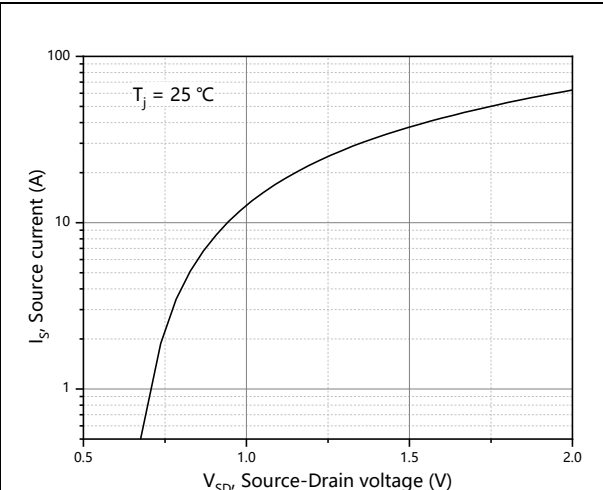


Figure 8. Forward characteristic of body diode

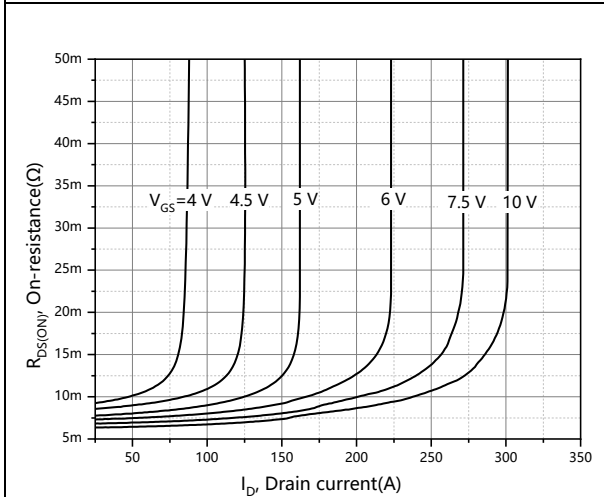


Figure 9. Drain-source on-state resistance

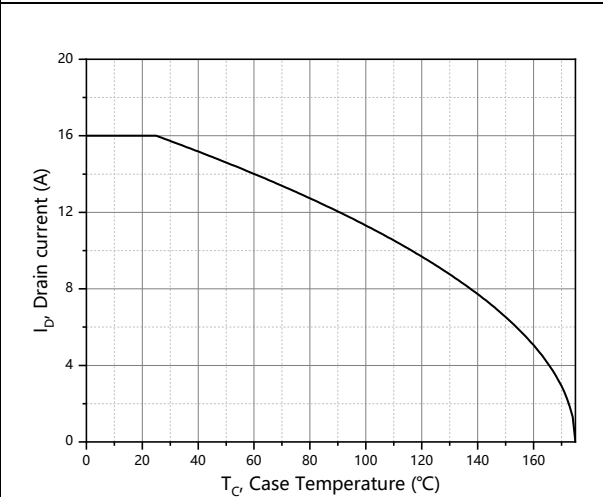


Figure 10. Drain current

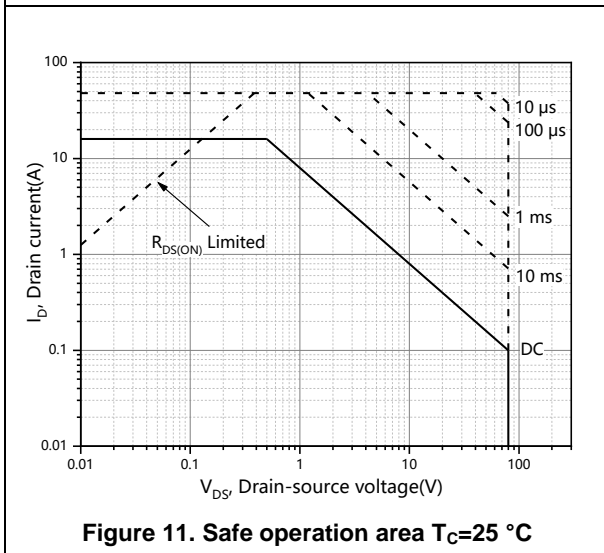


Figure 11. Safe operation area $T_C=25 \text{ °C}$

Test circuits and waveforms

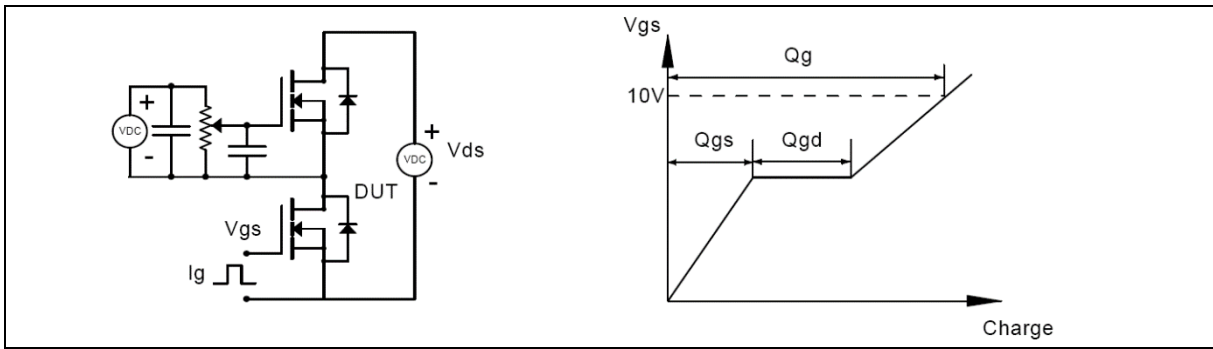


Figure 1. Gate charge test circuit & waveform

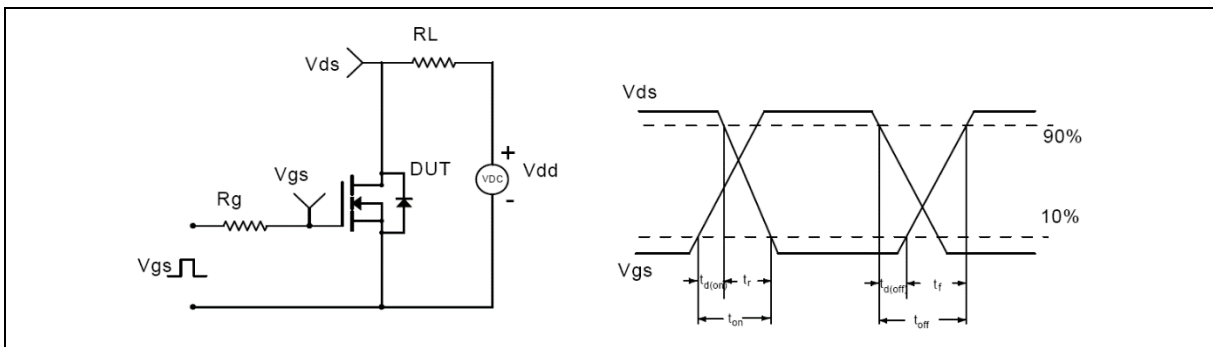


Figure 2. Switching time test circuit & waveforms

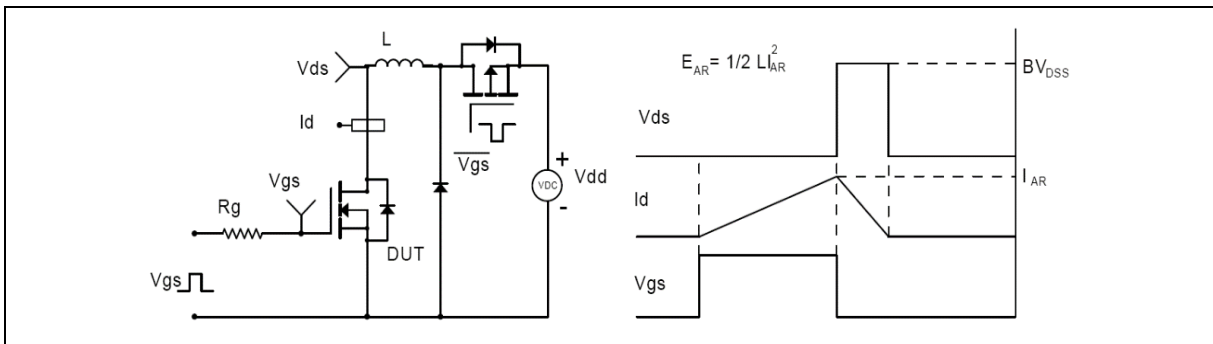


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

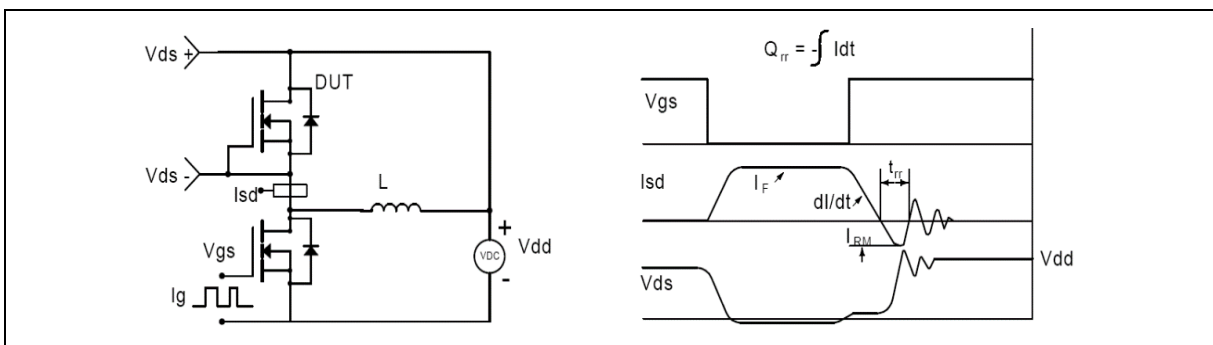
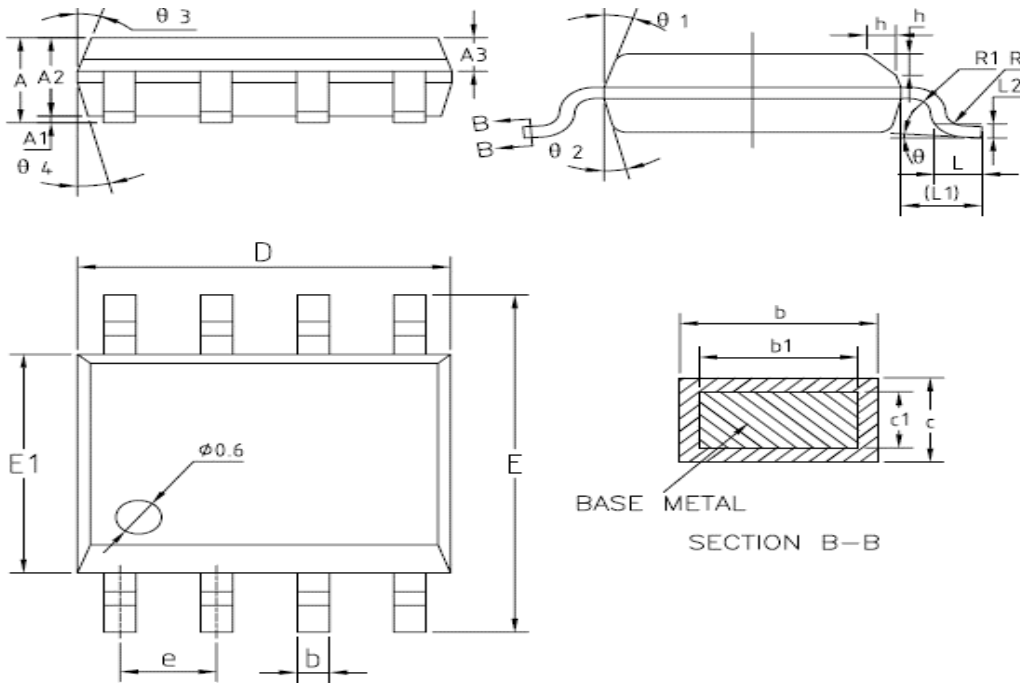


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	1.35	1.55	1.75
A1	0.10	0.15	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	-	0.51
L1	1.04 REF		
L2	0.25 BSC		
b1	0.37	0.42	0.47
c	0.18	-	0.25
c1	0.17	0.20	0.23
D	4.80	4.90	5
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.17	1.27	1.37
L	0.45	0.60	0.80
R	0.07	-	-
R1	0.07	-	-
h	0.30	0.40	0.50
θ	0°	-	8°
$\theta 1$	15°	17°	19°
$\theta 2$	11°	13°	15°
$\theta 3$	15°	17°	19°
$\theta 4$	11°	13°	15°

Version 1: SOP8-K package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels / Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOP8-K	2500	2	5000	6	30000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
SFS08R08BF	SOP8	yes	yes	yes

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