

**$V_{RM} = 200\text{ V}$ ,  $I_{F(AV)} = 10\text{ A}$ ,  $t_{rr} = 30\text{ ns}$**   
**Fast Recovery Diode**  
**SPXS-2102S**

**Description**

The SPXS-2102S is a fast recovery diode of 200 V / 10 A. The maximum  $t_{rr}$  of 30 ns is realized by optimizing a life-time control. The low thermal resistance package achieves high performance in terms of heat dissipation.

**Features**

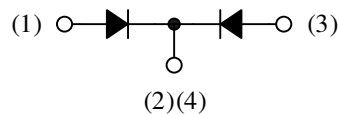
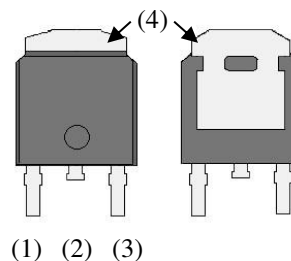
- $V_{RM}$ -----200 V
- $I_{F(AV)}$ -----10 A
- $V_F$ -----1.25 V
- $t_{rr1}$ -----30 ns
- Bare Leads: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0

**Applications**

- Secondary-side Rectifier Diode  
(Flyback Converter, LLC Converter, etc.)
- Freewheel Diode  
(Offline Buck Converter, Offline Buck-boost Converter, etc.)

**Package**

TO252-2L



- (1) Anode
  - (2) Cathode
  - (3) Anode
  - (4) Cathode
- Not to scale

# SPXS-2102S

## Absolute Maximum Ratings

Unless otherwise specified,  $T_A = 25\text{ }^\circ\text{C}$ .

Parameter	Symbol	Conditions	Rating	Unit
Nonrepetitive Peak Reverse Voltage <sup>(1)</sup>	$V_{RSM}$		200	V
Repetitive Peak Reverse Voltage <sup>(1)</sup>	$V_{RM}$		200	V
Average Forward Current	$I_{F(AV)}$	See Figure 3 and Figure 4	10	A
Surge Forward Current <sup>(1)</sup>	$I_{FSM}$	Half cycle sine wave, positive side, 10 ms, 1 shot	65	A
$I^2t$ Limiting Value <sup>(1)</sup>	$I^2t$	$1\text{ ms} \leq t \leq 10\text{ ms}$	21	$\text{A}^2\text{s}$
Junction Temperature	$T_J$		-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$		-40 to 150	$^\circ\text{C}$

## Electrical Characteristics

Unless otherwise specified,  $T_A = 25\text{ }^\circ\text{C}$ .

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop <sup>(1)</sup>	$V_F$	$T_J = 25\text{ }^\circ\text{C}$ , $I_F = 5.0\text{ A}$	—	—	1.25	V
		$T_J = 100\text{ }^\circ\text{C}$ , $I_F = 5.0\text{ A}$	—	0.82	—	V
Reverse Leakage Current <sup>(1)</sup>	$I_R$	$V_R = V_{RM}$	—	—	50	$\mu\text{A}$
Reverse Leakage Current under High Temperature <sup>(1)</sup>	$H \cdot I_R$	$V_R = V_{RM}$ , $T_J = 150\text{ }^\circ\text{C}$	—	—	10	$\text{mA}$
Reverse Recovery Time <sup>(1)</sup>	$t_{rr1}$	$I_F = I_{RP} = 100\text{ mA}$ , 90% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	30	ns
	$t_{rr2}$	$I_F = 100\text{ mA}$ , $I_{RP} = 200\text{ mA}$ , 75% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	25	ns
Thermal Resistance <sup>(2)</sup>	$R_{th(J-C)}$	<sup>(3)</sup>	—	—	5.0	$^\circ\text{C/W}$

## Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Package Weight		—	0.32	—	g

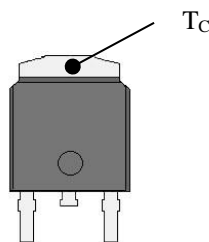


Figure 1. Case Temperature Measurement Point

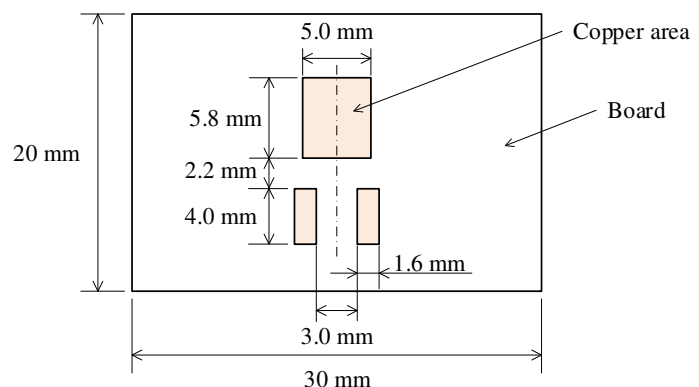


Figure 2. Glass-epoxy Board

<sup>(1)</sup> Specifies a value per chip; the SPXS-2102S consists of two chips.

<sup>(2)</sup> Refers to thermal resistance between junction and the case.

<sup>(3)</sup> The device is mounted on the glass-epoxy board (PCB: 42 mm × 32 mm in size, 1 mm in thickness, copper area: see Figure 2).

Derating Curves

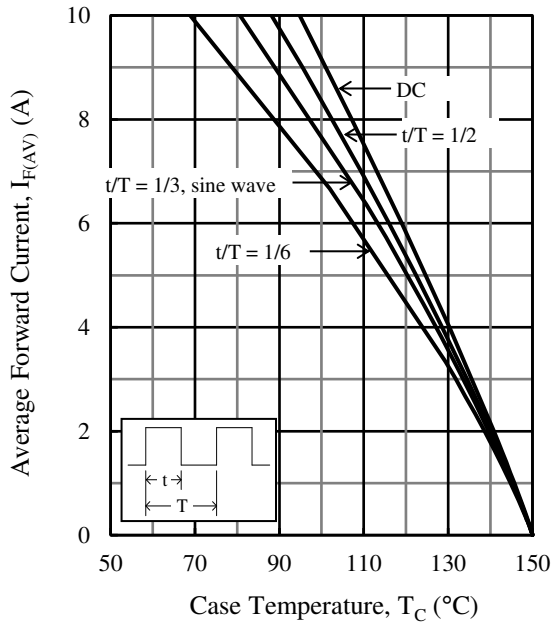


Figure 3.  $I_{F(AV)}$  vs.  $T_C$  ( $T_J = 150\text{ }^\circ\text{C}$ ,  $V_R = 0\text{ V}$ )

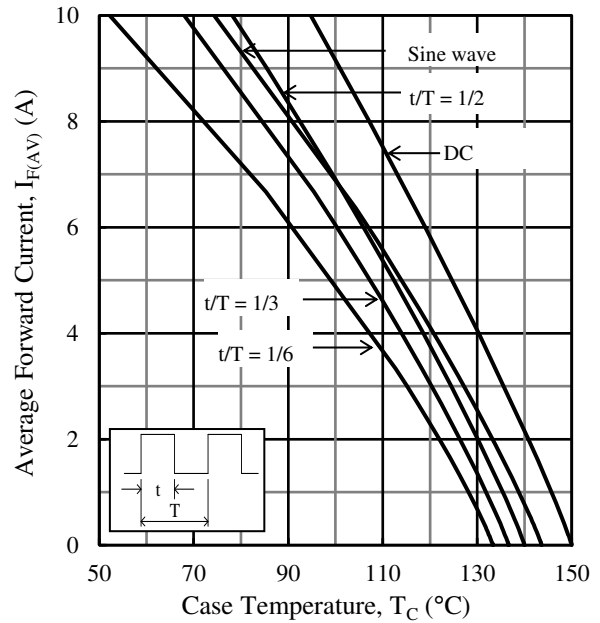


Figure 4.  $I_{F(AV)}$  vs.  $T_C$  ( $T_J = 150\text{ }^\circ\text{C}$ ,  $V_R = 200\text{ V}$ )

Characteristic Curves

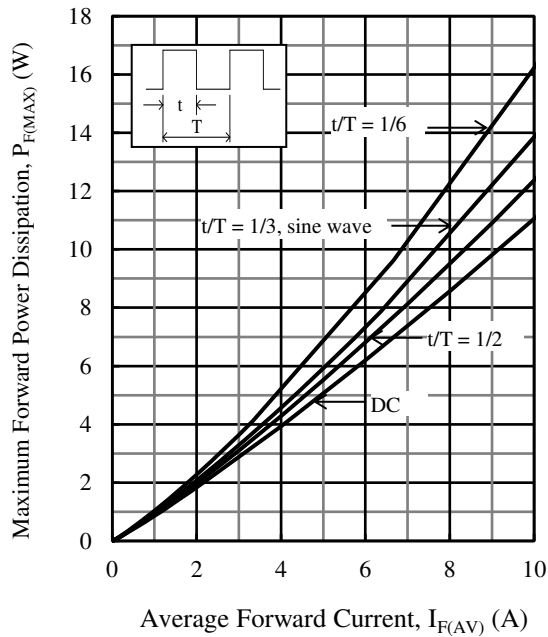


Figure 5.  $P_{F(MAX)}$  vs.  $I_{F(AV)}$  ( $T_J = 150\text{ }^\circ\text{C}$ )

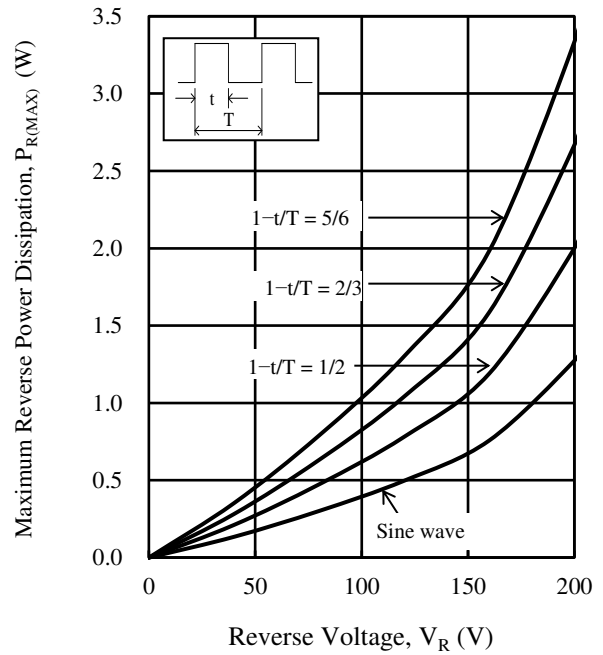


Figure 6.  $P_{R(MAX)}$  vs.  $V_R$  ( $T_J = 150\text{ }^\circ\text{C}$ )

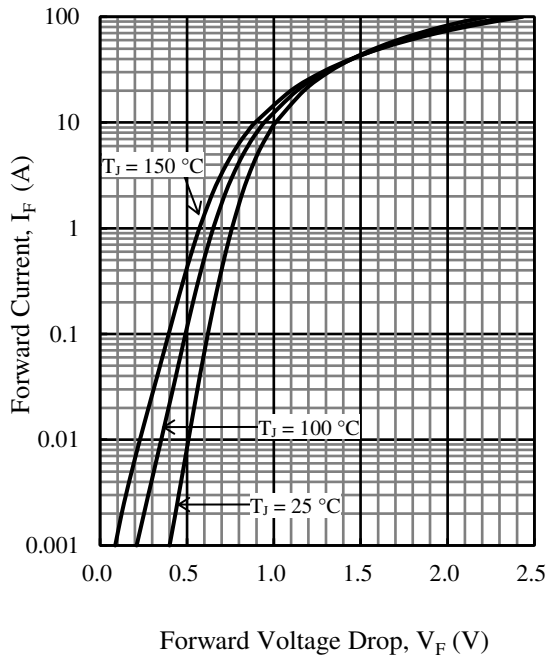


Figure 7. Typical Characteristics:  $I_F$  vs.  $V_F$

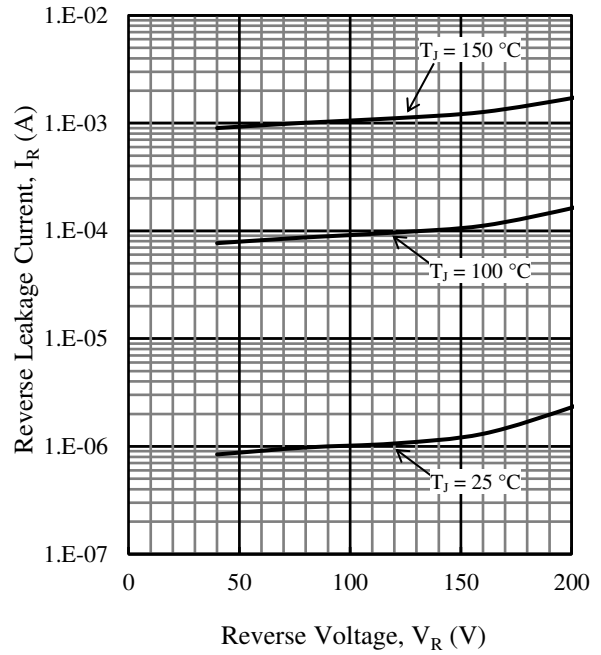


Figure 8. Typical Characteristics:  $I_R$  vs.  $V_R$

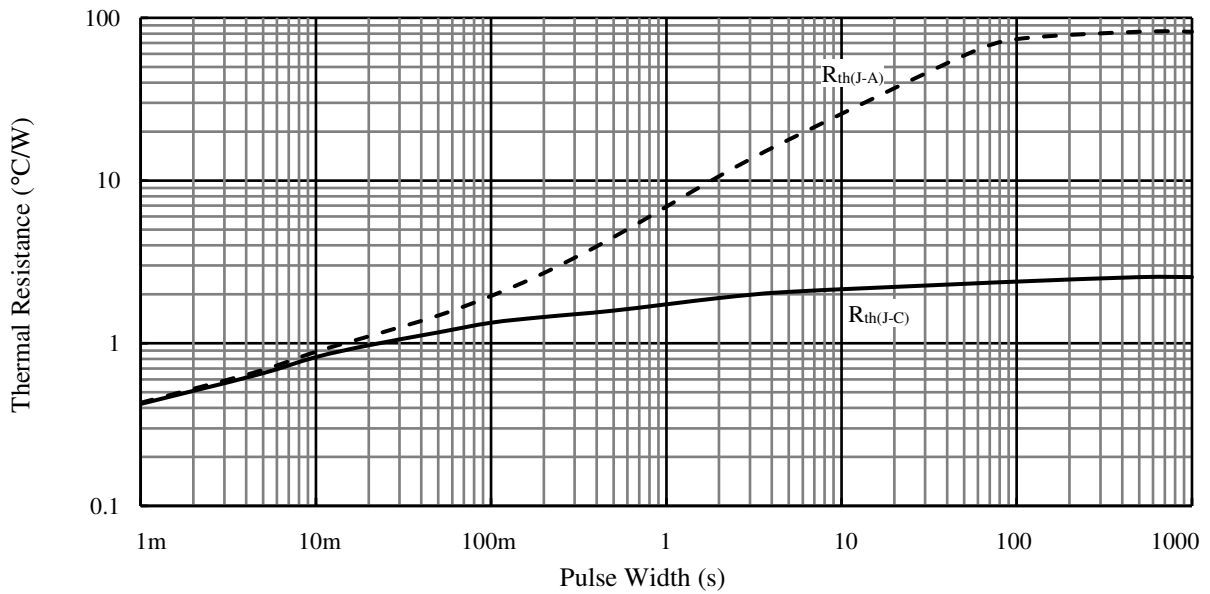
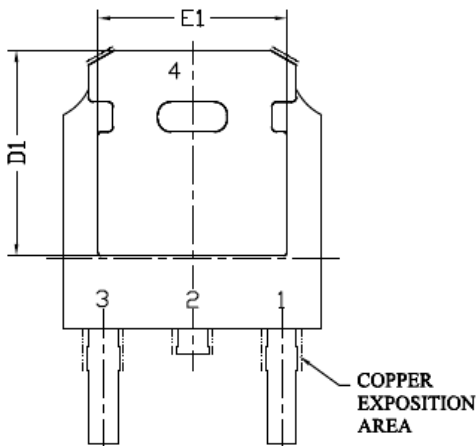
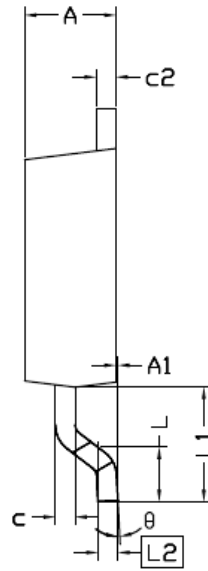
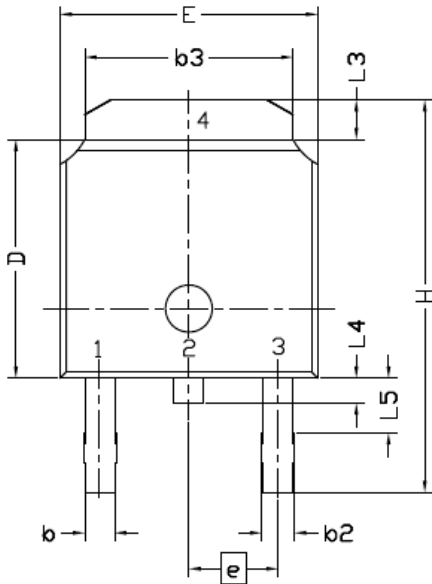


Figure 9. Typical Transient Thermal Resistance Characteristics

# SPXS-2102S

## Physical Dimensions

### • TO252-2L Package



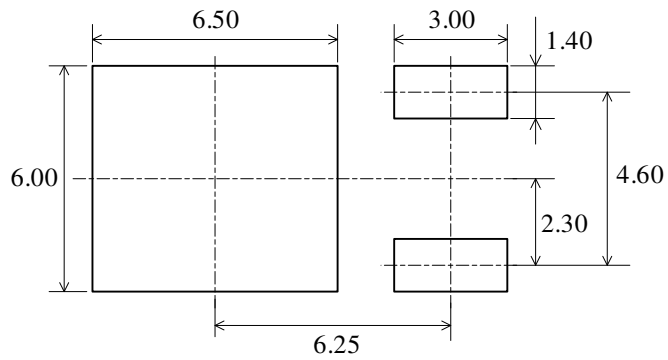
Symbol	Dimensions		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	1.40	1.52	1.77
L1	2.743 (REF)		
L2	0.508 (BSC)		
L3	0.89	—	1.27
L4	0.64	—	1.01
L5	—	—	—
D	6.00	6.10	6.223
H	9.40	10.00	10.40
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e	2.286 (BSC)		
A	2.20	2.30	2.38
A1	0	—	0.127
c	0.46	0.50	0.60
c2	0.46	0.50	0.58
D1	5.21	—	—
E1	4.40	—	—
θ	0°	—	10°

### NOTES:

- Dimensions in millimeters
- All the dimensions exclude mold flashes.
- Bare lead frame: Pb-free (RoHS compliant)
- Moisture Sensitivity Level 1 (MSL 1)
- When soldering the products, it is required to minimize the working time within the following limits:  
 Flow: 260 °C / 10 s, 1 time  
 Reflow:  
   Preheat: 150 °C to 200 °C / 60 s to 120 s  
   Solder heating: 255 °C / 30s, 2 times (260 °C peak)  
   Soldering Iron: 350 °C / 3.5 s, 1 time

# SPXS-2102S

## • T0252-2L Land Pattern Example



Dimensions in millimeters

## Marking Diagram

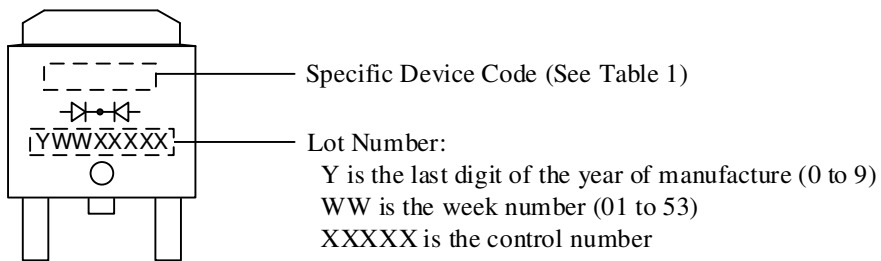


Table 1. Specific Device Code

Specific Device Code	Part Number
XS2102	SPXS-2102S

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