

$V_{RM} = 600\text{ V}$, $I_{F(AV)} = 10\text{ A}$, $t_{rr} = 100\text{ ns}$
Fast Recovery Diode
SPNS-1106S

Description

The SPNS-1106S is a fast recovery diode of 600 V / 10 A. Well-balanced characteristics between lower V_F and fast recovery are ensured, achieving loss reduction. The maximum t_{rr} of 100 ns is realized by optimizing a life-time control. The low thermal resistance package achieves high performance in terms of heat dissipation.

Features

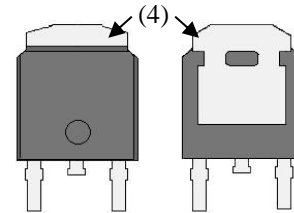
- V_{RM} ----- 600 V
- $I_{F(AV)}$ ----- 10 A
- V_F ----- 1.3 V
- t_{rr} ----- 100 ns
- Bare Leads: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0
- Flow Soldering Available (MSL 1)

Applications

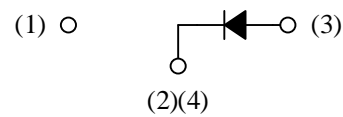
- PFC Circuit
- Freewheeling Diode
(Offline Buck Converter, Offline Buck-boost Converter, etc.)

Package

TO252-2L



(1) (2) (3)



- (1) NC
- (2) Cathode
- (3) Anode
- (4) Cathode

Not to scale

Absolute Maximum Ratings

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

Parameter	Symbol	Conditions	Rating	Unit
Nonrepetitive Peak Reverse Voltage	V_{RSM}		600	V
Repetitive Peak Reverse Voltage	V_{RM}		600	V
Average Forward Current	$I_{F(AV)}$	See Figure 3 and Figure 4	10	A
Surge Forward Current	I_{FSM}	Half cycle sine wave, positive side, 10 ms, 1 shot	100	A
I^2t Limiting Value	I^2t	$1\text{ ms} \leq t \leq 10\text{ ms}$	50	A^2s
Junction Temperature	T_J		-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}		-55 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	V_F	$T_J = 25\text{ }^\circ\text{C}$, $I_F = 10\text{ A}$	—	—	1.3	V
		$T_J = 100\text{ }^\circ\text{C}$, $I_F = 10\text{ A}$	—	1.0	—	V
Reverse Leakage Current	I_R	$V_R = V_{RM}$	—	—	100	μA
Reverse Leakage Current under High Temperature	$H \cdot I_R$	$V_R = V_{RM}$, $T_J = 150\text{ }^\circ\text{C}$	—	—	10	mA
Reverse Recovery Time	t_{rr}	$I_F = I_{RP} = 100\text{ mA}$, 90% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	100	ns
			—	—	—	ns
Thermal Resistance ⁽¹⁾	$R_{th(J-C)}$	⁽²⁾	—	—	5.0	$^\circ\text{C/W}$

Mechanical Characteristics

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

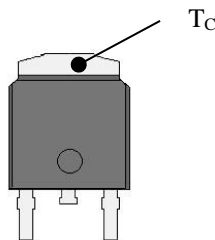


Figure 1. Case Temperature Measurement

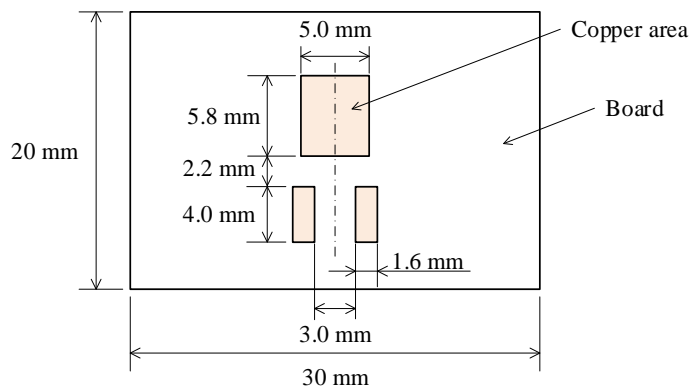


Figure 2. Glass-epoxy Board

⁽¹⁾ Refers to thermal resistance between junction and the case.

⁽²⁾ 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

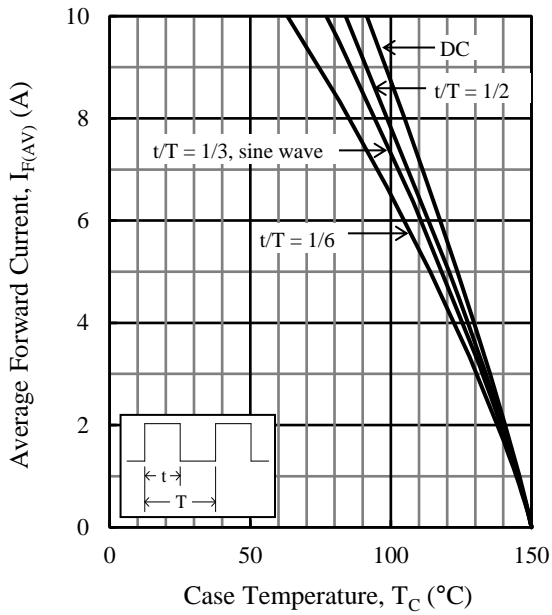


Figure 3. $I_{F(AV)}$ vs. T_C ($T_J = 150\text{ }^\circ\text{C}$, $V_R = 0\text{ V}$)

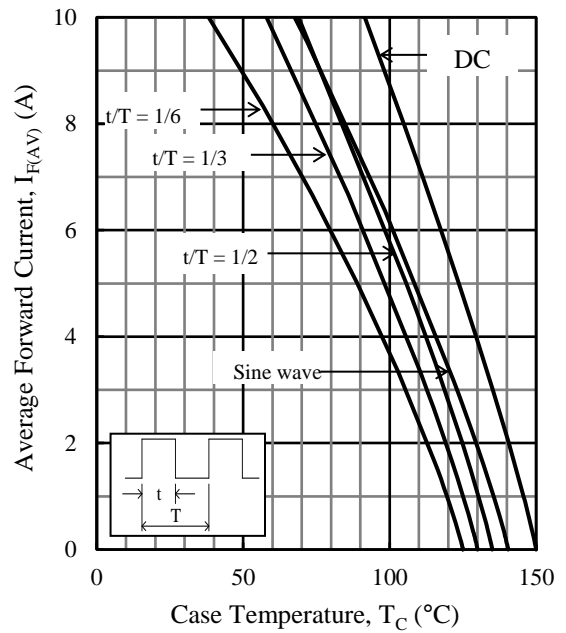


Figure 4. $I_{F(AV)}$ vs. T_C ($T_J = 150\text{ }^\circ\text{C}$, $V_R = 600\text{ V}$)

Characteristic Curves

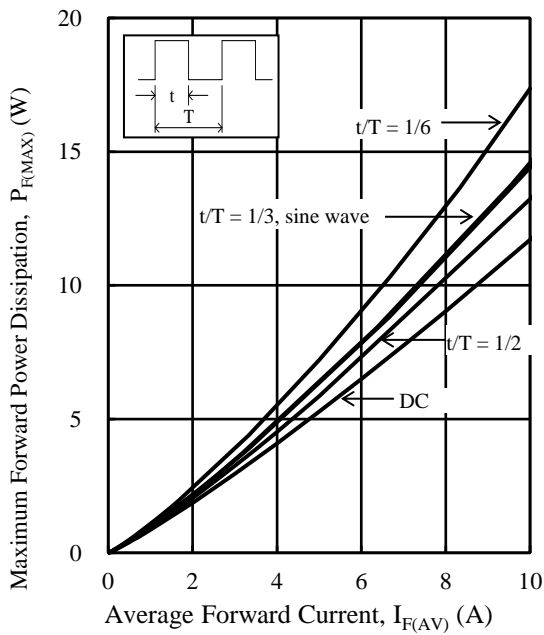


Figure 5. $P_{F(MAX)}$ vs. $I_{F(AV)}$ ($T_J = 150\text{ }^\circ\text{C}$)

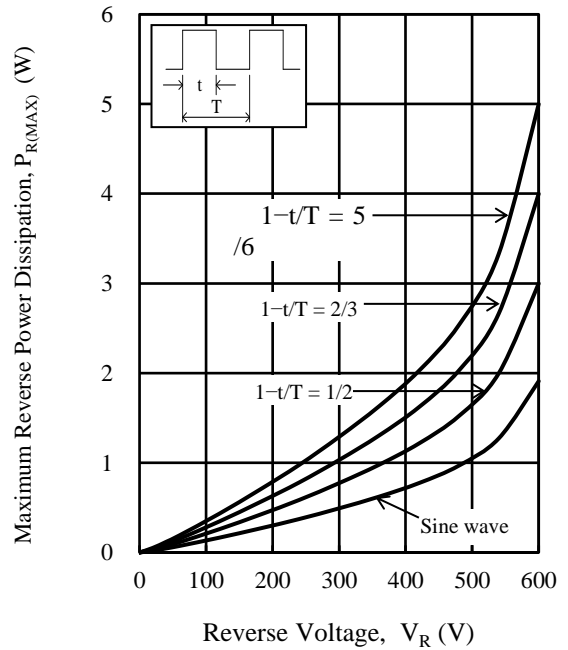


Figure 6. $P_{R(MAX)}$ vs. V_R ($T_J = 150\text{ }^\circ\text{C}$)

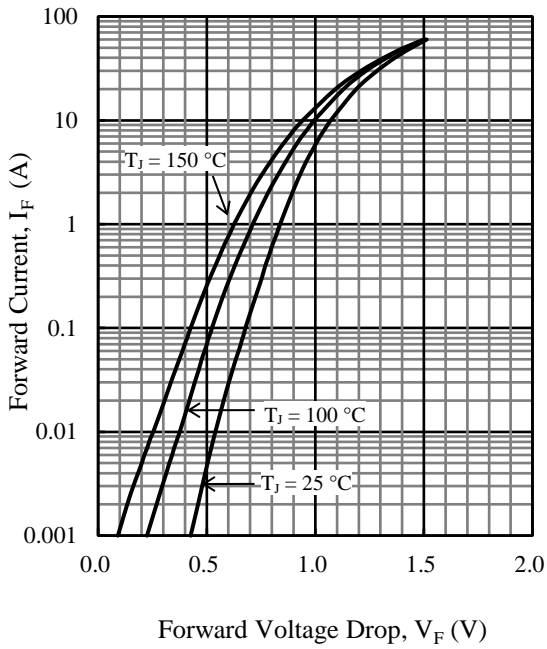


Figure 7. Typical Characteristics: I_F vs. V_F

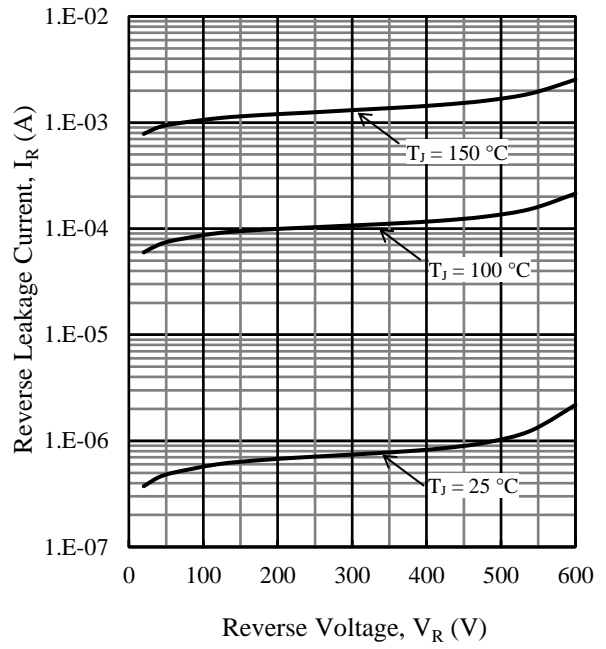


Figure 8. Typical Characteristics: I_R vs. V_R

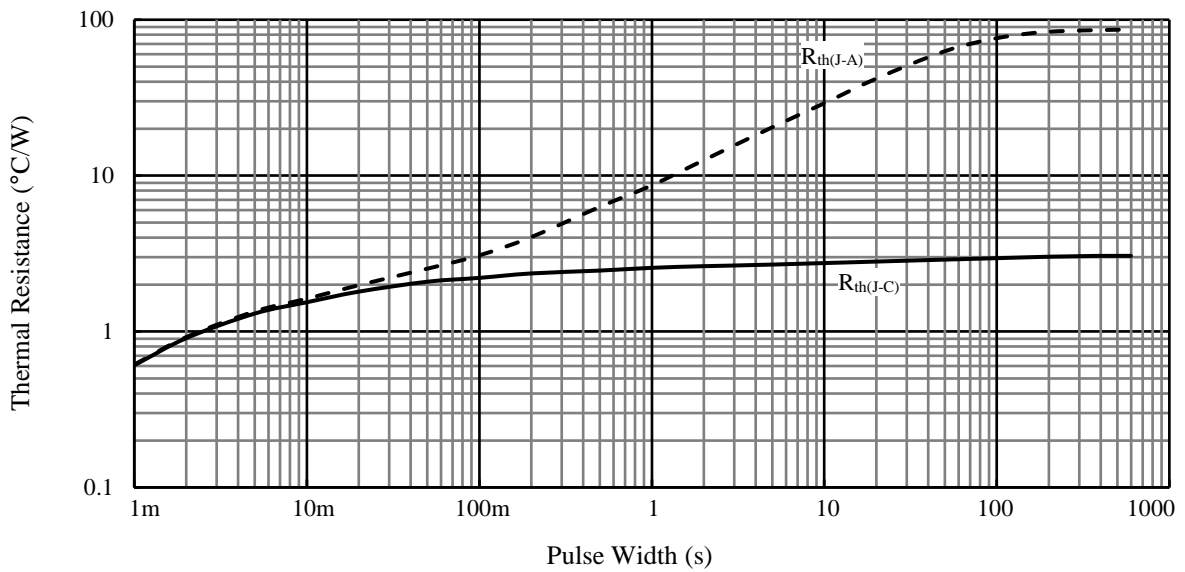
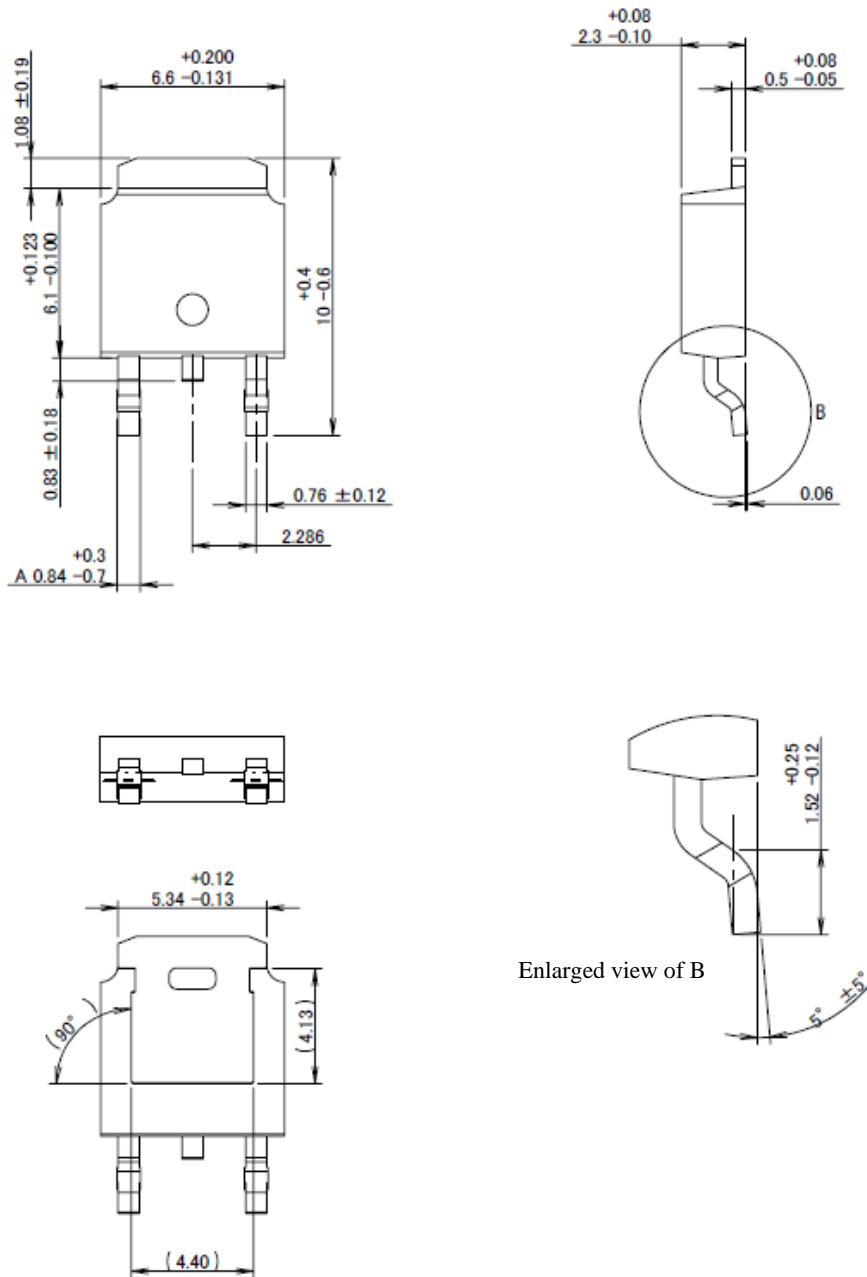


Figure 9. Typical Transient Thermal Resistance Characteristics

SPNS-1106S

Physical Dimensions

• TO252-2L Package

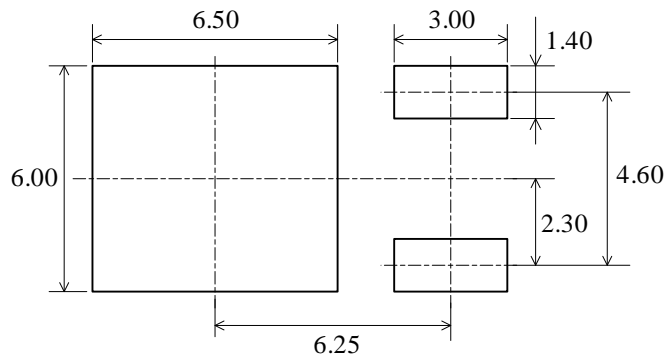


NOTES:

- Dimensions in millimeters
- All the dimensions exclude mold flashes, protrusions, and gate burrs.
- 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: $260^\circ\text{C} / 10\text{ s}$, 1 time
Reflow:
 Preheat: 150°C to $200^\circ\text{C} / 60\text{ s}$ to 120 s
 Solder heating: $255^\circ\text{C} / 30\text{ s}$, 2 times (260°C peak)
 Soldering Iron: $350^\circ\text{C} / 3.5\text{ s}$, 1 time

SPNS-1106S

• T0252-2L Land Pattern Example



Dimensions in millimeters

Marking Diagram

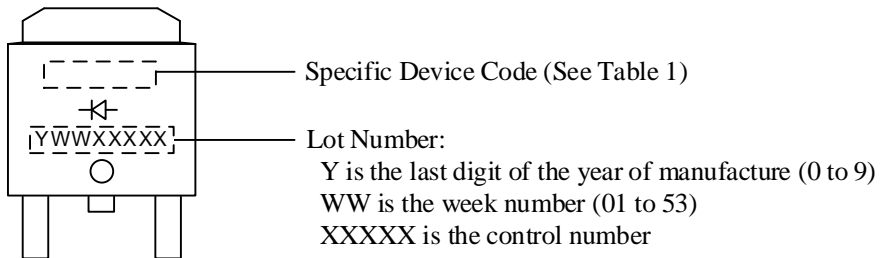


Table 1. Specific Device Code

Specific Device Code	Part Number
NS1106	SPNS-1106S

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