V_{RM} = 1500 V, $I_{F(AV)}$ = 0.5 A, t_{rr} = 1.5 µs
Fast Recovery Diode

ES1F

Data Sheet

Description

The ES1F is a high voltage fast recovery diode of 1500 V / 0.5 A.

Features

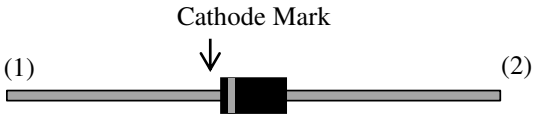
- V_{RM} ---------- 1500 V
- $I_{F(AV)}$ ---------- 0.5 A
- V_F ---------- 2.0 V
- t_{rr1} ---------- 1.5 µs
- Bare Leads: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0

Applications

- High Voltage Rectification Circuit
  (Bridge Circuit, etc.)

Package

Axial (φ2.7 × 5.0L / φ0.78)



(1) Cathode
(2) Anode

Not to scale

Absolute Maximum Ratings

Unless otherwise specified, T_A = 25 °C.

Parameter	Symbol	Conditions	Rating	Unit
Nonrepetitive Peak Reverse Voltage	V_{RSM}		1500	V
Repetitive Peak Reverse Voltage	V_{RM}		1500	V
Average Forward Current	$I_{F(AV)}$	See Figure 2 and Figure 3	0.5	A
Surge Forward Current	I_{FSM}	Half cycle sine wave, positive side, 10 ms, 1 shot	20	A
I^2t Limiting Value	I^2t	1 ms ≤ t ≤ 10 ms	2.0	A^2s
Junction Temperature	T_J		−40 to 150	°C
Storage Temperature	T_{STG}		−40 to 150	°C

Electrical Characteristics

Unless otherwise specified, T_A = 25 °C.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	V_F	T_J = 25 °C, I_F = 0.5 A	—	—	2.0	V
		T_J = 100 °C, I_F = 0.5 A	—	1.0	—	V
Reverse Leakage Current	I_R	$V_R = V_{RM}$	—	—	10	µA
Reverse Leakage Current under High Temperature	$H \cdot I_R$	$V_R = V_{RM}$, T_J = 100 °C	—	—	200	µA
Reverse Recovery Time	t_{rr1}	$I_F = I_{RP}$ = 10 mA, 90% recovery point, T_J = 25 °C	—	—	1.5	µs
	t_{rr2}	I_F = 10 mA, I_{RP} = 20 mA, 75% recovery point, T_J = 25 °C	—	—	0.6	µs
Thermal Resistance [1]	$R_{th(J-L)}$	See Figure 1.	—	—	17	°C/W

Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Package Weight		—	0.3	—	g

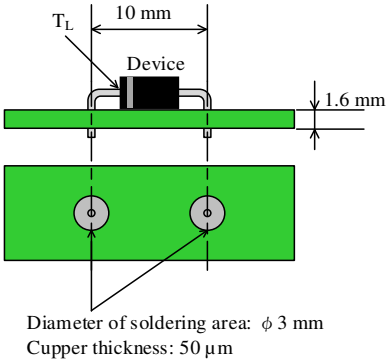


Figure 1. Lead Temperature Measurement Conditions

[1] $R_{th(J-L)}$ is thermal resistance between junction and lead. Lead temperature (T_L) is measured near the root of pin (see Figure 1).

Derating Curves

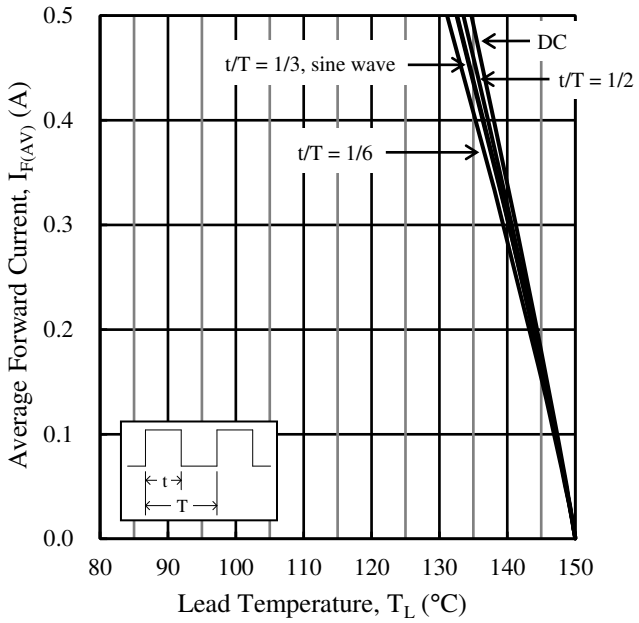


Figure 2. $I_{F(AV)}$ vs. T_L [2] (T_J = 150 °C, V_R = 0 V)

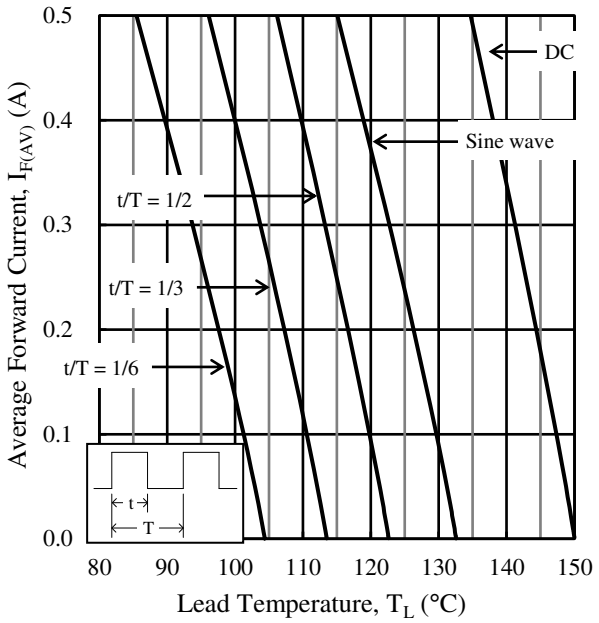


Figure 3. $I_{F(AV)}$ vs. T_L[2] (T_J = 150 °C, V_R = 1500 V)

[2] See Figure 1 for the lead temperature measurement conditions.

Characteristic Curves

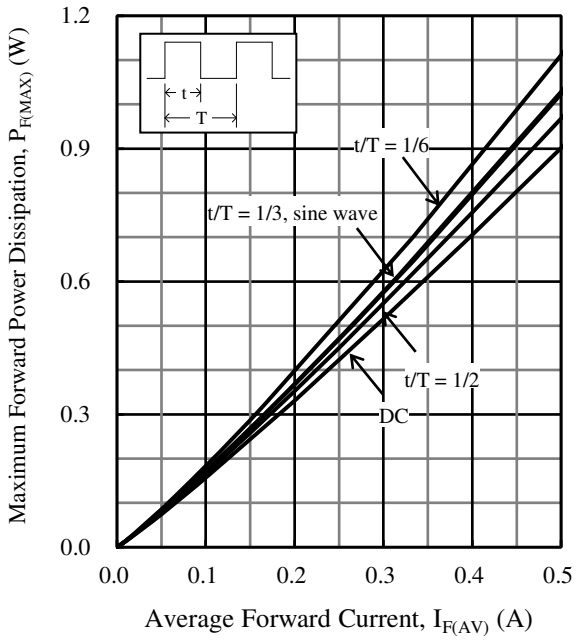


Figure 4. $P_{F(MAX)}$ vs. $I_{F(AV)}$ (T_J = 150 °C)

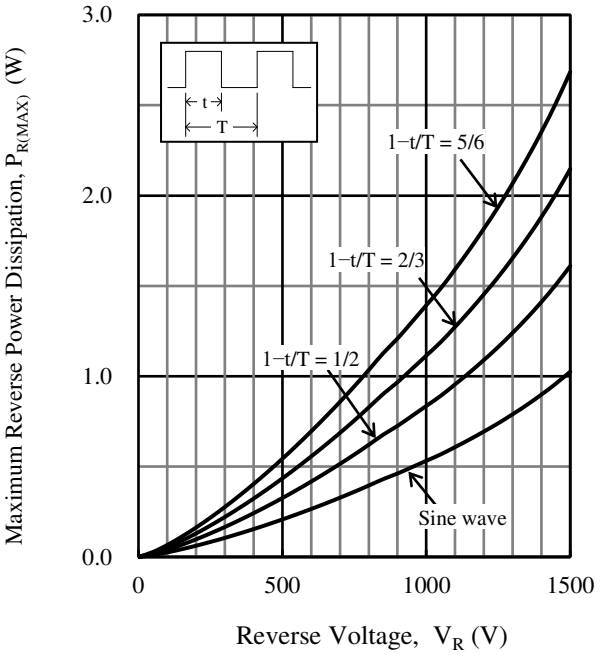


Figure 5. $P_{R(MAX)}$ vs. V_R (T_J = 150 °C)

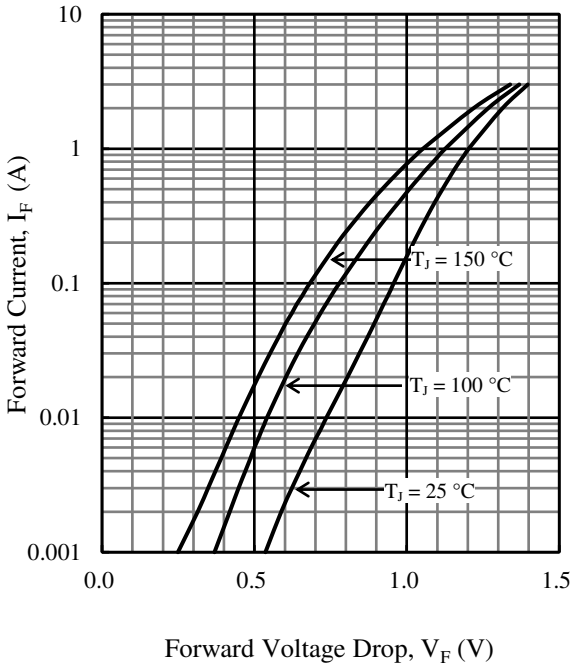


Figure 6. Typical Characteristics: I_F vs. V_F

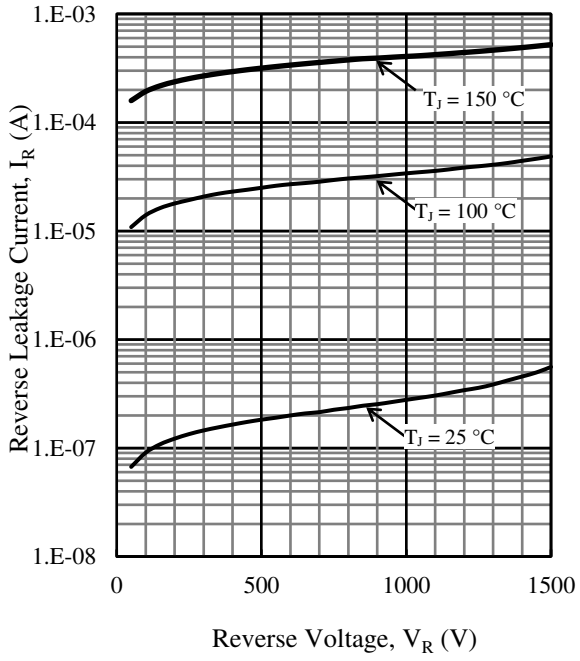


Figure 7. Typical Characteristics: I_R vs. V_R

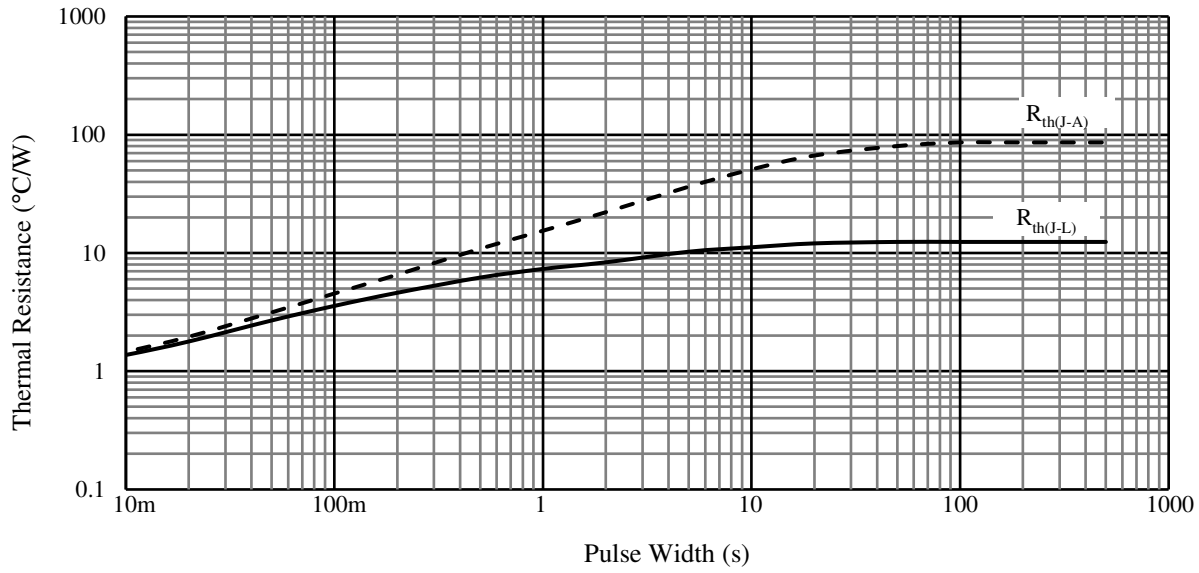
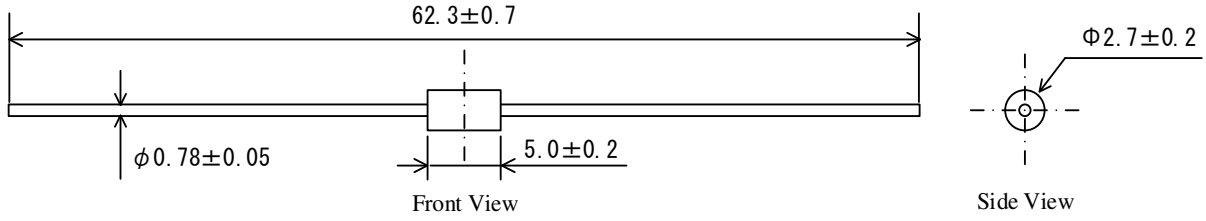


Figure 8. Typical Transient Thermal Resistance Characteristics

Physical Dimensions

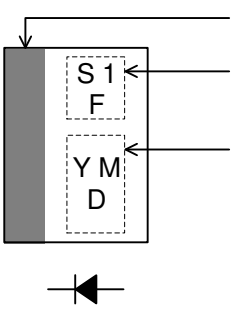
● **Axial (φ2.7 × 5.0L / φ0.78)**



NOTES:

- Dimensions in millimeters
- Bare leads: Pb-free (RoHS compliant)
- The total length of the product is the dimension when delivered separately and depends on the taping and lead forming specifications.
- The allowance position of body against the center of the total length of the product is 0.5 mm (max.); see Front View.
- The allowance position of lead against the center of body is 0.2 mm (max.); see Side View.
- The burr may exist up to 2 mm from the body of lead root.
- When soldering the products, it is required to minimize the working time within the following limits:
  Flow: 260 °C / 10 s, 1 time
  Soldering Iron: 350 °C / 3.5 s, 1 time (Soldering should be at a distance of at least 1.5 mm from the body of the product.)

Marking Diagram



Cathode Mark

Specific Device Code (see Table 1)

Lot Number:
Y is the last digit of the year of manufacture (0 to 9)
M is the month of the year (1 to 9, O, N or D)
D is the period of days represented by:
- • : the first 10 days of the month (1st to 10th)
- •• : the second 10 days of the month (11th to 20th)
- ••• : the last 10–11 days of the month (21st to 31st)

Table 1. Specific Device Code

Specific Device Code	Part Number
S1F	ES1F

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- No anti-radioactive ray design has been adopted for the Sanken Products.
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