

$V_{RM} = 1500\text{ V}$ ,  $I_{F(AV)} = 0.5\text{ A}$ ,  $t_{rr} = 1.5\text{ }\mu\text{s}$   
**Fast Recovery Diode**  
**ES1F**

**Description**

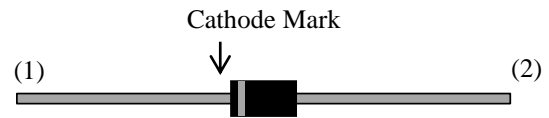
The ES1F is a high voltage fast recovery diode of 1500 V / 0.5 A.

**Package**

Axial ( $\phi 2.7 \times 5.0\text{L} / \phi 0.78$ )

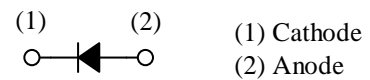
**Features**

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



**Applications**

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



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	$V_{RSM}$		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	$I^2t$	$1\text{ ms} \leq t \leq 10\text{ ms}$	2.0	$\text{A}^2\text{s}$
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	$V_F$	$T_J = 25\text{ }^\circ\text{C}$ , $I_F = 0.5\text{ A}$	—	—	2.0	V
		$T_J = 100\text{ }^\circ\text{C}$ , $I_F = 0.5\text{ A}$	—	1.0	—	V
Reverse Leakage Current	$I_R$	$V_R = V_{RM}$	—	—	10	$\mu\text{A}$
Reverse Leakage Current under High Temperature	$H \cdot I_R$	$V_R = V_{RM}$ , $T_J = 100\text{ }^\circ\text{C}$	—	—	200	$\mu\text{A}$
Reverse Recovery Time	$t_{rr1}$	$I_F = I_{RP} = 10\text{ mA}$ , 90% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	1.5	$\mu\text{s}$
	$t_{rr2}$	$I_F = 10\text{ mA}$ , $I_{RP} = 20\text{ mA}$ , 75% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	0.6	$\mu\text{s}$
Thermal Resistance <sup>(1)</sup>	$R_{th(J-L)}$	See Figure 1.	—	—	17	$^\circ\text{C/W}$

**Mechanical Characteristics**

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

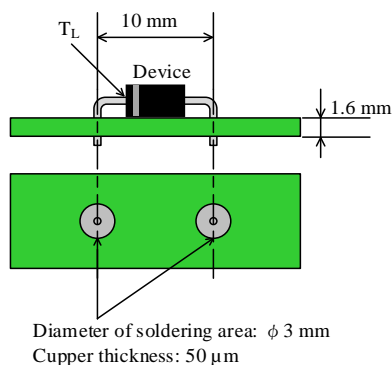


Figure 1. Lead Temperature Measurement Conditions

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

Derating Curves

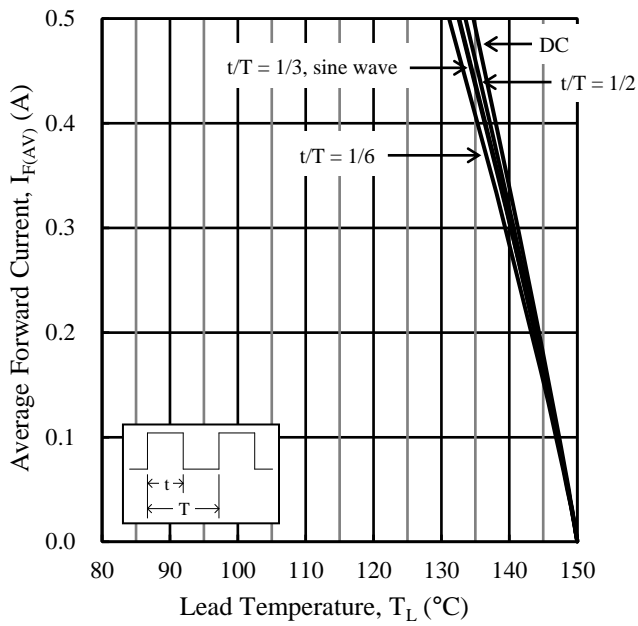


Figure 2.  $I_{F(AV)}$  vs.  $T_L$ <sup>(2)</sup> ( $T_J = 150\text{ °C}$ ,  $V_R = 0\text{ V}$ )

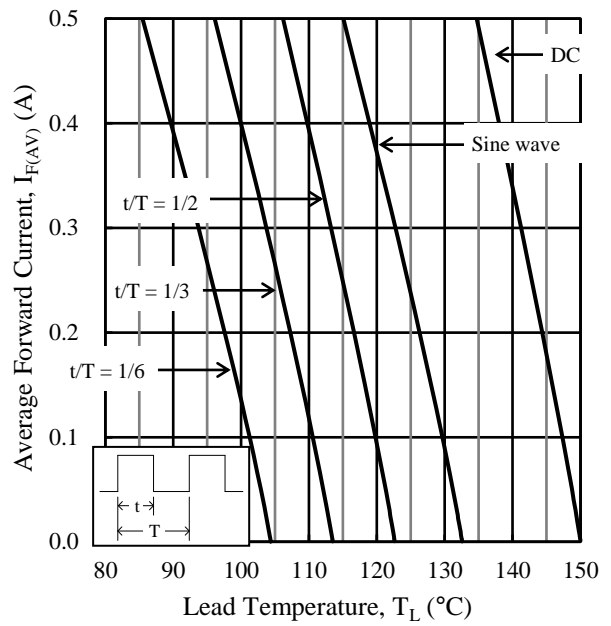


Figure 3.  $I_{F(AV)}$  vs.  $T_L$ <sup>(2)</sup> ( $T_J = 150\text{ °C}$ ,  $V_R = 1500\text{ V}$ )

<sup>(2)</sup> See Figure 1 for the lead temperature measurement conditions.

Characteristic Curves

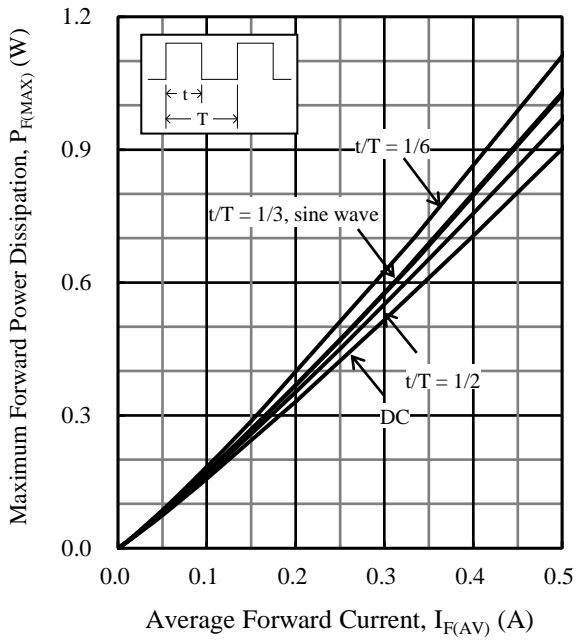


Figure 4.  $P_{F(MAX)}$  vs.  $I_{F(AV)}$  ( $T_J = 150\text{ }^\circ\text{C}$ )

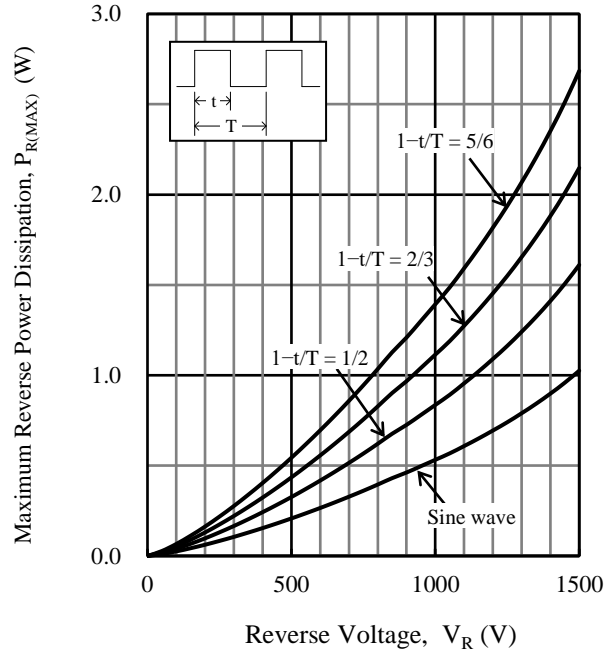


Figure 5.  $P_{R(MAX)}$  vs.  $V_R$  ( $T_J = 150\text{ }^\circ\text{C}$ )

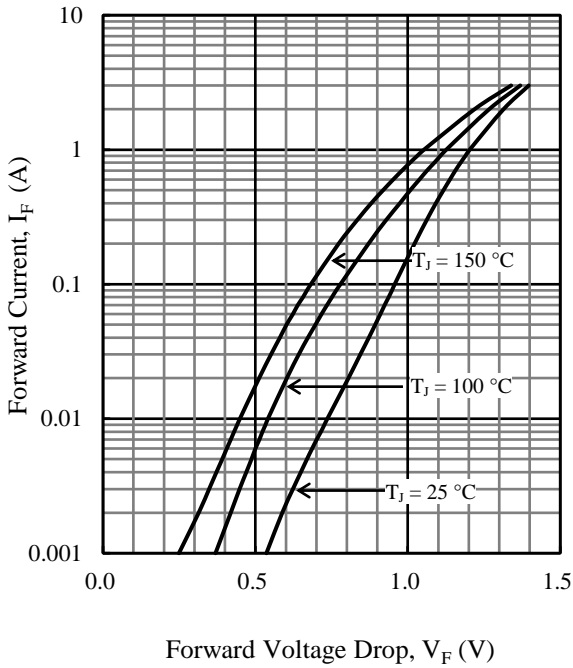


Figure 6. Typical Characteristics:  $I_F$  vs.  $V_F$

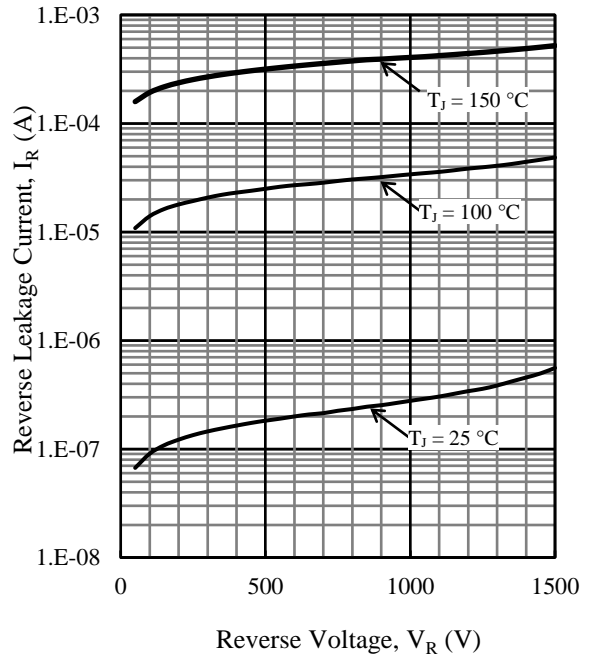


Figure 7. Typical Characteristics:  $I_R$  vs.  $V_R$

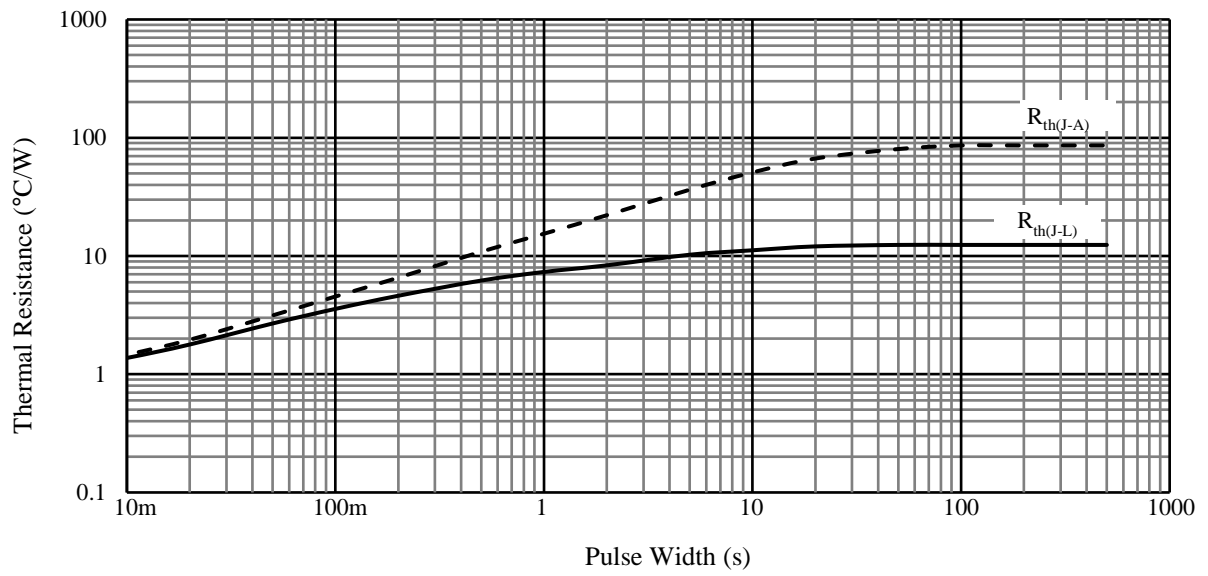
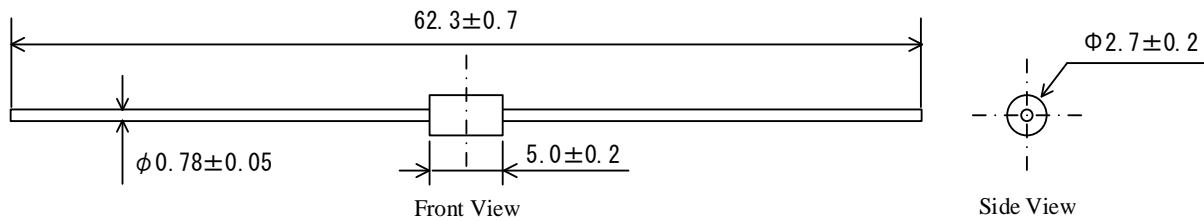


Figure 8. Typical Transient Thermal Resistance Characteristics

# ES1F

## Physical Dimensions

- Axial ( $\phi 2.7 \times 5.0L / \phi 0.78$ )



### 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:  $260\text{ }^\circ\text{C} / 10\text{ s}$ , 1 time  
 Soldering Iron:  $350\text{ }^\circ\text{C} / 3.5\text{ s}$ , 1 time (Soldering should be at a distance of at least 1.5 mm from the body of the product.)

## Marking Diagram

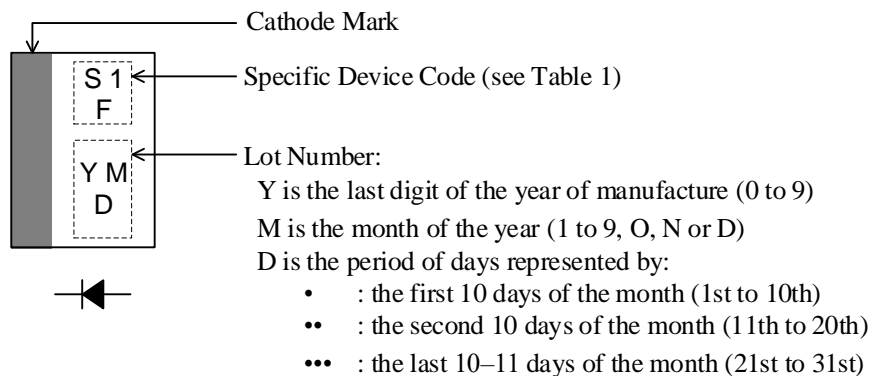


Table 1. Specific Device Code

Specific Device Code	Part Number
S1F	ES1F

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