V_{RM} = 400 V, $I_{F(AV)}$ = 0.7 A, t_{rr} = 1.5 µs
Fast Recovery Diode

ES1

Data Sheet

Description

The ES1 is a fast recovery diode of 400 V / 0.7 A. The maximum t_{rr} of 1.5 µs is realized by optimizing a life-time control.

Features

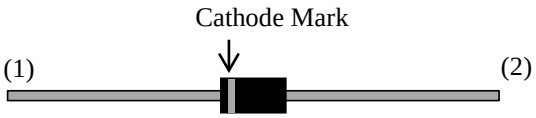
- V_{RM} ---------- 400 V
- $I_{F(AV)}$ ---------- 0.7 A
- V_F ---------- 2.5 V
- t_{rr} ----------1.5 µs
- Bare Leads: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0

Applications

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

Package

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}		450	V
Repetitive Peak Reverse Voltage	V_{RM}		400	V
Average Forward Current	$I_{F(AV)}$	See Figure 2 and Figure 3	0.7	A
Surge Forward Current	I_{FSM}	Half cycle sine wave, positive side, 10 ms, 1 shot	30	A
I^2t Limiting Value	I^2t	1 ms ≤ t ≤ 10 ms	4.5	A^2s
Junction Temperature	T_J		−40 to 140	°C
Storage Temperature	T_{STG}		−40 to 140	°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 = 0.8 A	—	—	2.5	V
		T_J = 100 °C, I_F = 0.8 A	—	0.92	—	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_{rr}	$I_F = I_{RP}$ = 10 mA, 90% recovery point, T_J = 25 °C	—	—	1.5	μs
Thermal Resistance [1]	$R_{th(J-L)}$	See Figure 1	—	—	17	°C/W

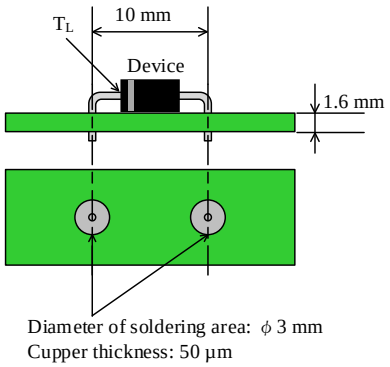


Figure 1. Lead Temperature Measurement Conditions

[1] $R_{th(J-L)}$ is thermal resistance between junction and lead.

Rating and Characteristic Curves

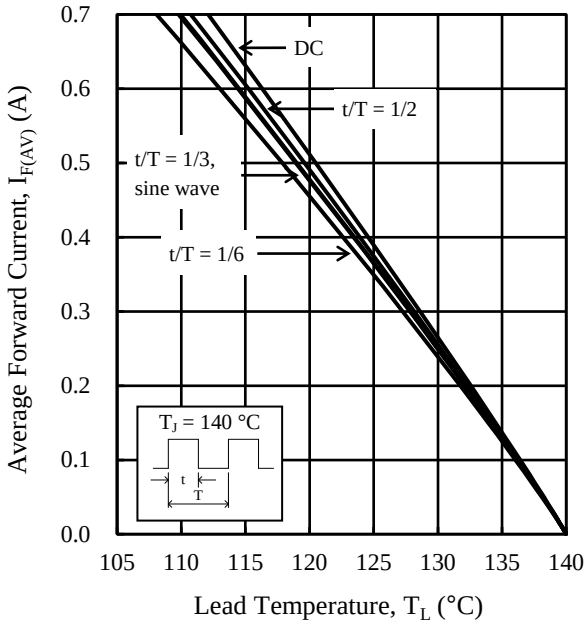


Figure 2. Typical Characteristics: $I_{F(AV)}$ vs. T_L [2] (V_R = 0 V)

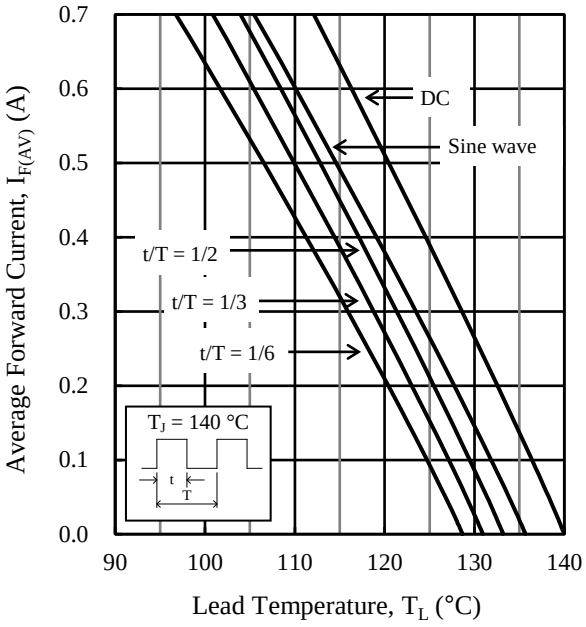


Figure 3. Typical Characteristics: $I_{F(AV)}$ vs. T_L [2] (V_R = 400 V)

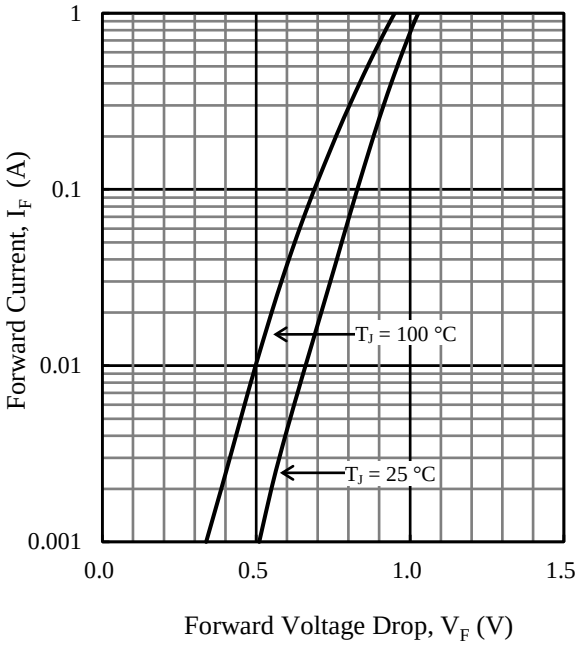


Figure 4. Typical Characteristics: I_F vs. V_F

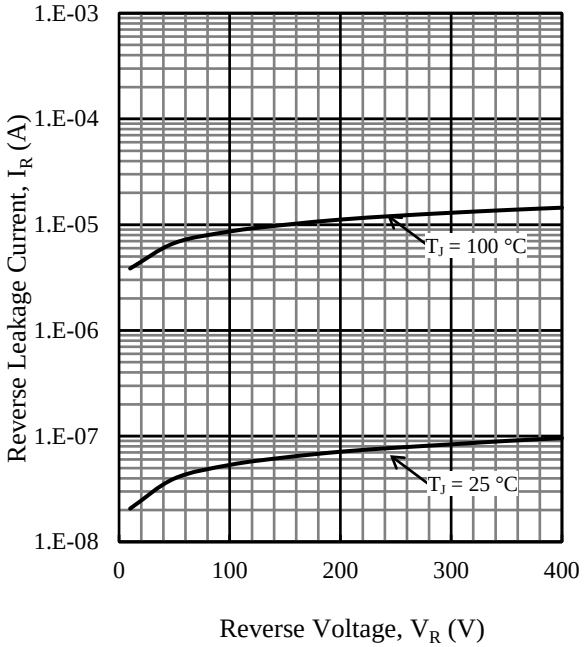
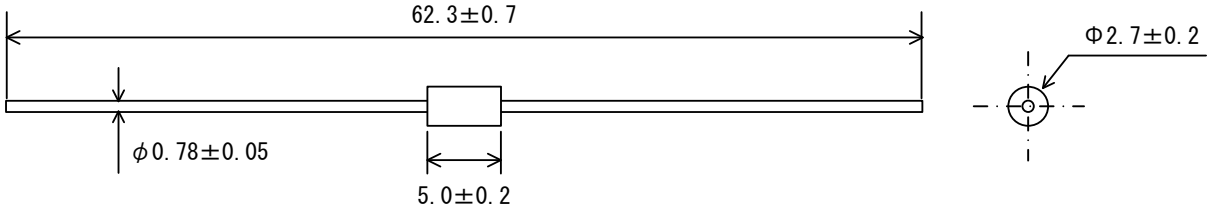


Figure 5. Typical Characteristics: I_R vs. V_R

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

Physical Dimensions

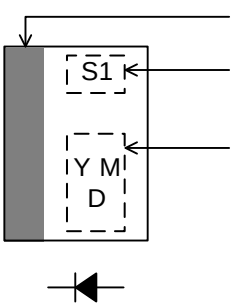
● **Axial (φ2.7 × 5.0L / φ0.78)**



NOTES:

- Dimensions in millimeters
- Bare leads: Pb-free (RoHS compliant)
- When soldering the products, it is required to minimize the working time within the following limits:
  Flow: 260 ± 5 °C / 10 ± 1 s, 2 times
  Soldering Iron: 380 ± 10 °C / 3.5 ± 0.5 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
S1	ES1

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