

1. General description

Ultrafast power diode in a SMA package.

2. Features and benefits

- Fast switching
- SMA package
- High voltage capability
- Low forward voltage drop
- Low leakage current
- Low thermal resistance
- Soft recovery characteristic

3. Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- Switching power supplies, inverters and as free wheeling diodes
- High frequency switched-mode power supplies

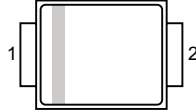

4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Values | Unit |
|--------------------------------|-------------------------------------|--|--------|------|
| Absolute maximum rating | | | | |
| V_{RRM} | repetitive peak reverse voltage | | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_{lead} \leq 140 \text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3 | 1 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25 \text{ } \mu\text{s}$; $T_{lead} \leq 140 \text{ }^\circ\text{C}$; square-wave pulse | 2 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10 \text{ ms}$; $T_{J(init)} = 25 \text{ }^\circ\text{C}$; sine-wave pulse; Fig. 4 | 39 | A |
| | | $t_p = 8.3 \text{ ms}$; $T_{J(init)} = 25 \text{ }^\circ\text{C}$; sine-wave pulse | 43 | A |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--|---|
| 1 | K | cathode |  |  |
| 2 | A | anode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package Name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|-------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| MURS160 | SMA | MURS160J | Reel | 7500 | SMAE | 03-Mar-2020 |

7. Marking

Table 4. Marking codes

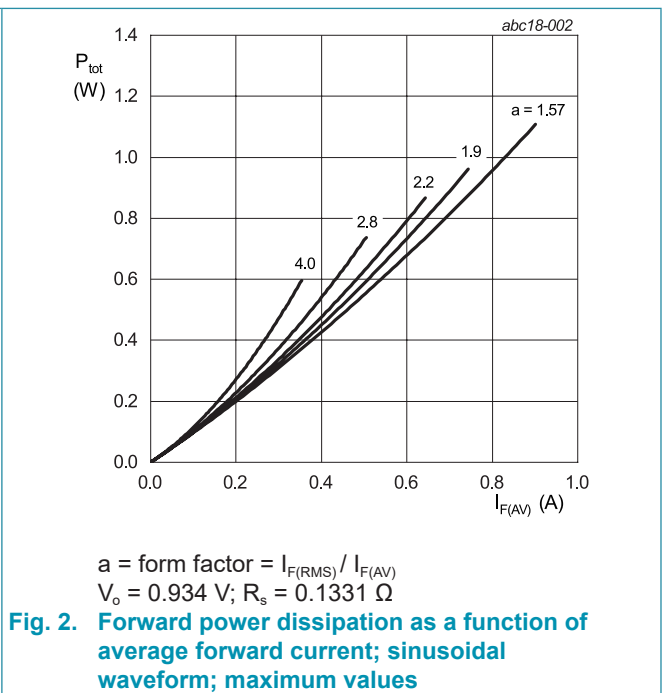
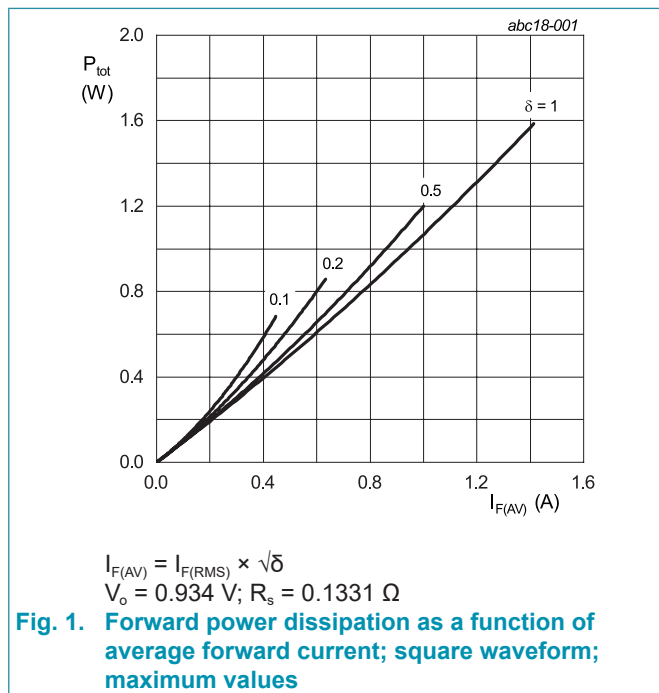
| Type number | Marking codes |
|-------------|---------------|
| MURS160 | S160 |

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Values | Unit |
|-------------|-------------------------------------|--|------------|------------------|
| V_{RRM} | repetitive peak reverse voltage | | 600 | V |
| V_{RWM} | crest working reverse voltage | | 600 | V |
| V_R | reverse voltage | DC | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_{lead} \leq 140\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3 | 1 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{lead} \leq 140\text{ }^\circ\text{C}$; square-wave pulse | 2 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; $T_{j(init)} = 25\text{ }^\circ\text{C}$; sine-wave pulse; Fig. 4 | 39 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(init)} = 25\text{ }^\circ\text{C}$; sine-wave pulse | 43 | A |
| T_{stg} | storage temperature | | -65 to 175 | $^\circ\text{C}$ |
| T_j | junction temperature | | 175 | $^\circ\text{C}$ |



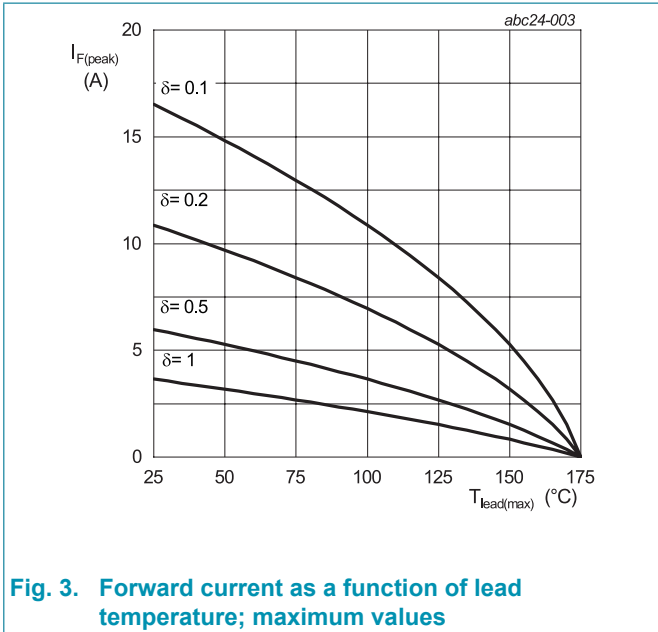


Fig. 3. Forward current as a function of lead temperature; maximum values

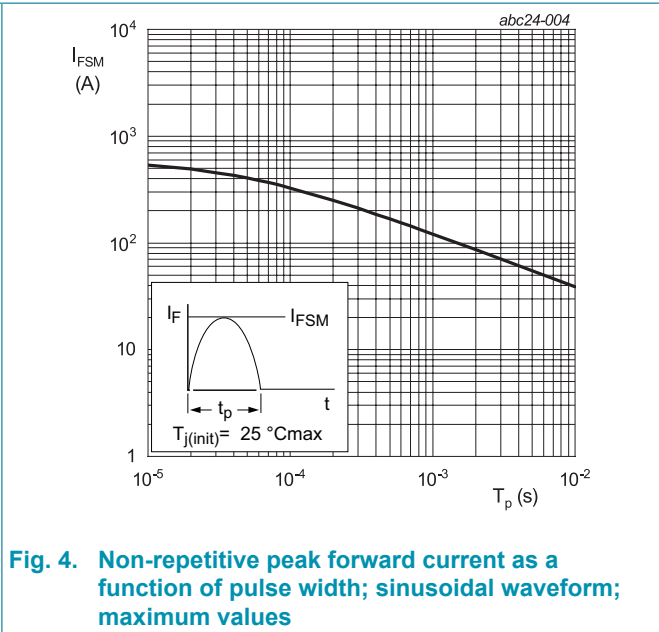


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--|------------------------|-----|-----|-----|------|
| $R_{th(j-lead)}$ | thermal resistance from junction to lead | Fig. 5 | - | - | 29 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | in free air | - | - | 216 | K/W |

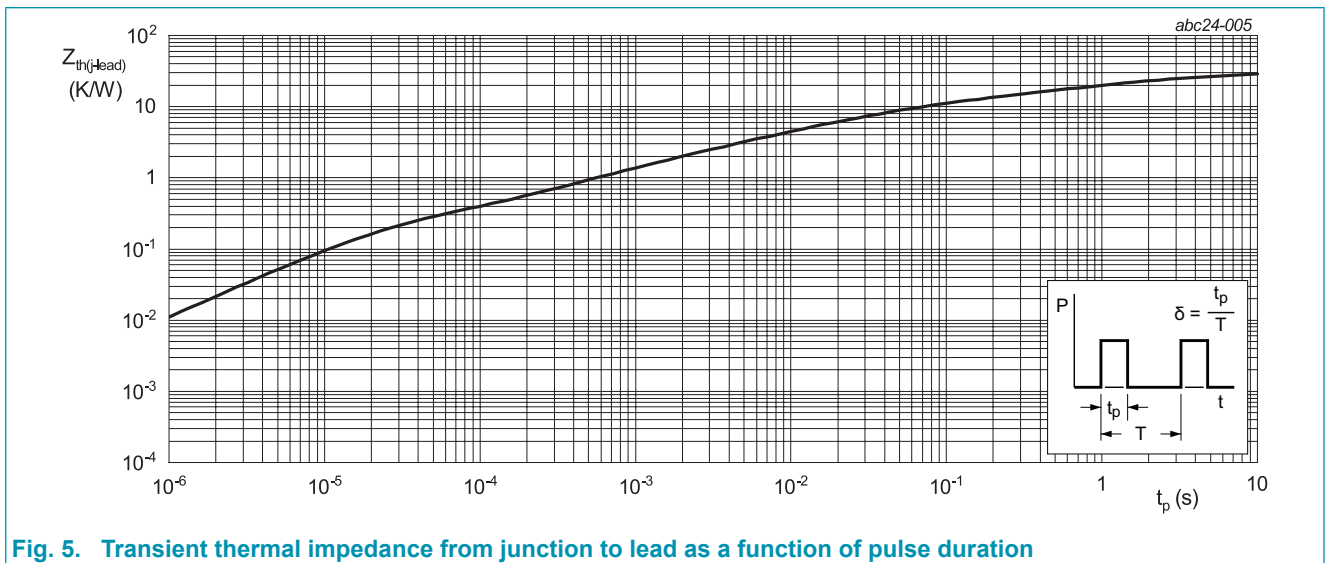
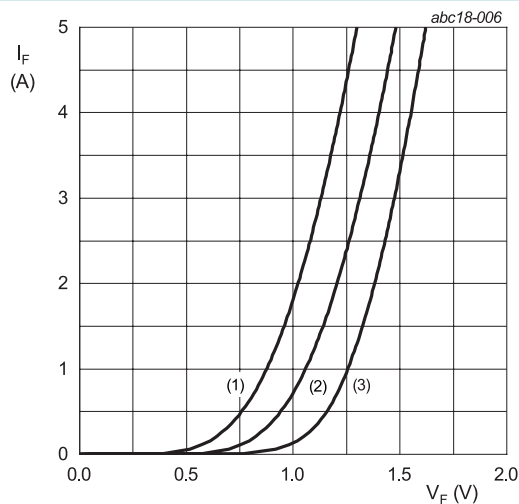


Fig. 5. Transient thermal impedance from junction to lead as a function of pulse duration

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|---------------------------------|--|-----|-----|------|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 1\text{ A}; T_J = 25\text{ °C}$ | - | - | 1.25 | V |
| | | $I_F = 1\text{ A}; T_J = 150\text{ °C}$ | - | - | 1.05 | V |
| I_R | reverse current | $V_R = 600\text{ V}; T_J = 25\text{ °C}$ | - | - | 5 | μA |
| | | $V_R = 600\text{ V}; T_J = 150\text{ °C}$ | - | - | 150 | μA |
| Dynamic characteristics | | | | | | |
| Q_r | reverse charge | $I_F = 1\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A/us}; T_J = 25\text{ °C}; \text{Fig. 7}$ | - | 45 | - | nC |
| | | $I_F = 1\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A/us}; T_J = 125\text{ °C}; \text{Fig. 7}$ | - | 81 | - | nC |
| t_{rr} | reverse recovery time | $I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A/us}; T_J = 25\text{ °C}; \text{Fig. 7}$ | - | - | 75 | ns |
| | | $I_F = 0.5\text{ A}; I_R = 1\text{ A}; I_{R(\text{meas})} = 0.25\text{ A}; T_J = 25\text{ °C}; \text{Step recovery}$ | - | - | 56 | ns |
| | | $I_F = 1\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A/us}; T_J = 25\text{ °C}; \text{Fig. 7}$ | - | 31 | - | ns |
| | | $I_F = 1\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A/us}; T_J = 125\text{ °C}; \text{Fig. 7}$ | - | 46 | - | ns |
| I_{RM} | peak reverse recovery current | $I_F = 1\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A/us}; T_J = 25\text{ °C}; \text{Fig. 7}$ | - | 2.9 | - | A |
| | | $I_F = 1\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A/us}; T_J = 125\text{ °C}; \text{Fig. 7}$ | - | 3.5 | - | A |
| E_{as} | non-repetitive avalanche energy | $I_R = 0.9\text{ A}; L = 15\text{ mH}; T_{J(\text{init})} = 25\text{ °C}$ | 6 | - | - | mJ |



$V_o = 0.934\text{ V}; R_s = 0.1331\ \Omega$
 (1) $T_J = 150\text{ °C}$; typical values
 (2) $T_J = 150\text{ °C}$; maximum values
 (3) $T_J = 25\text{ °C}$; maximum values

Fig. 6. Forward current as a function of forward voltage

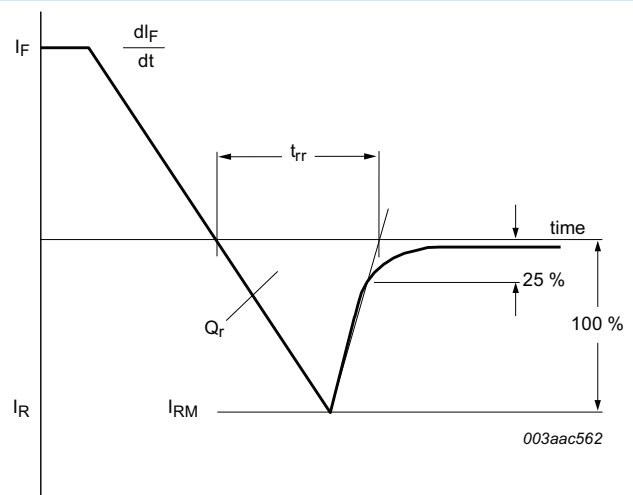
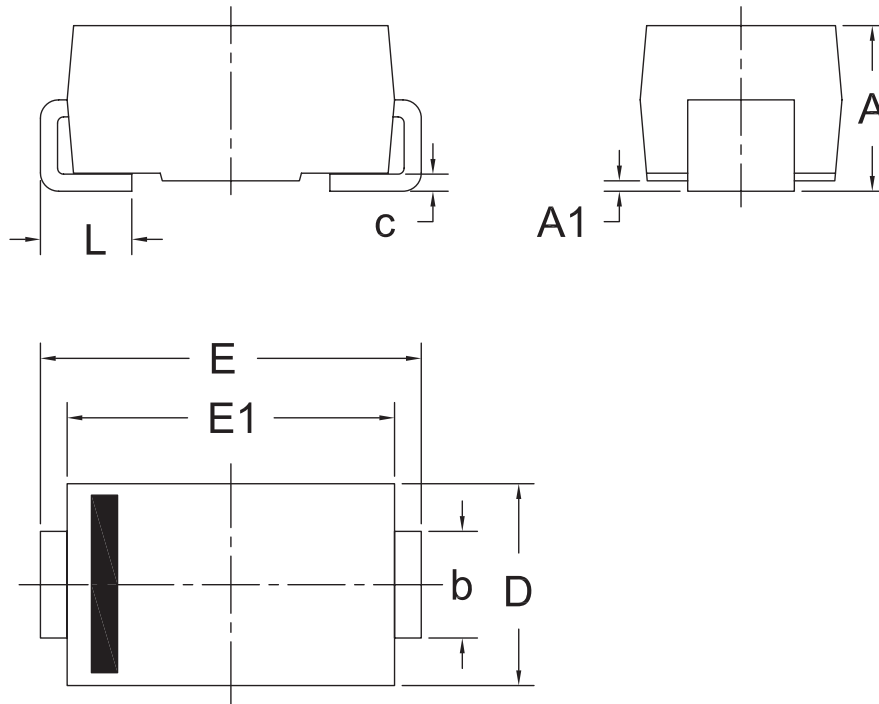


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline



| UNIT | A | A1 | b | c | D | E | E1 | L | |
|------|-----|------|------|-----|------|------|-----|------|-----|
| mm | Max | 2.35 | 0.21 | 1.5 | 0.25 | 2.80 | 5.2 | 4.45 | 1.5 |
| | Min | 1.95 | 0.05 | 1.3 | 0.15 | 2.50 | 4.8 | 4.15 | 0.9 |

Remark: Dimensions D and E1 do not include mold flash.

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| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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