

1. General description

Hyperfast power diode in a 2-lead TO247-2L plastic package.

2. Features and benefits

- Fast switching and soft reverse recovery characteristics
- Low forward voltage drop
- Low leakage current
- Low reverse recovery current
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

- UPS
- EV Charger
- Welding Machine
- Air Conditioner

4. Quick reference data

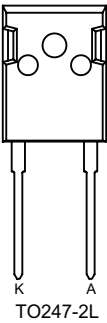
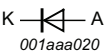
Table 1. Quick reference data

| 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; $T_{mb} \leq 90$ °C; Fig. 1 ; Fig. 2 ; Fig. 3 | 75 | | | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 90$ °C; square-wave pulse | 150 | | | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4 | 700 | | | A |
| | | $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse | 750 | | | A |
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 75$ A; $T_j = 25$ °C; Fig. 6 | - | 2.2 | 2.75 | V |
| | | $I_F = 75$ A; $T_j = 150$ °C; Fig. 6 | - | 1.6 | 2.1 | V |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 50$ A/ μ s; $T_j = 25$ °C; Fig. 7 | - | - | 50 | ns |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------|---|-----|-----|-----|------|
| | | $I_F = 75\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7 | - | 42 | - | ns |
| | | $I_F = 75\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 7 | - | 106 | - | ns |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------------------------|---|--|
| 1 | K | cathode |  <p style="text-align: center;">K A TO247-2L</p> |  <p style="text-align: center;">K — — A 001aaa020</p> |
| 2 | A | anode | | |
| mb | mb | mounting base; connected to cathode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|---------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| BYC75W-600PT2 | TO247-2L | BYC75W-600PT2Q | Tube | 30 | TO247L-2L | 28-Aug-2018 |

7. Marking

Table 4. Marking codes

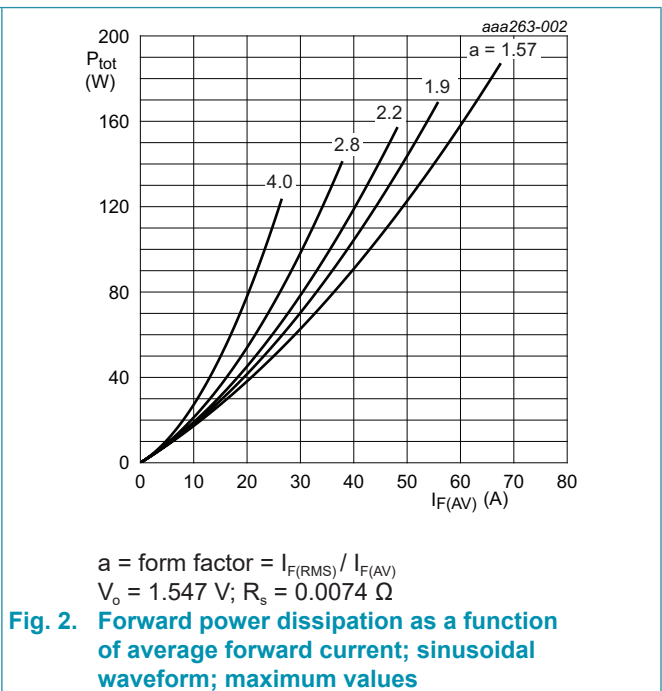
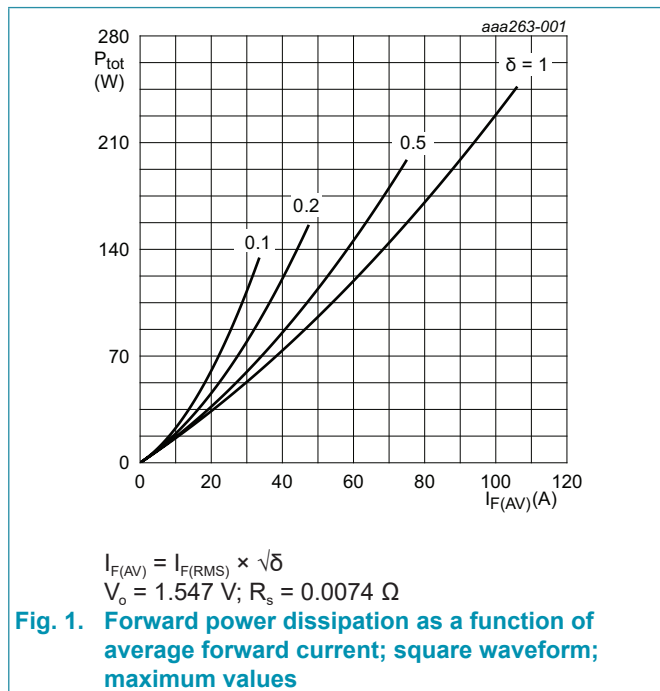
| Type number | Marking codes |
|---------------|---------------|
| BYC75W-600PT2 | BYC75W-600PT2 |

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; $T_{mb} \leq 90\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3 | 75 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 90\text{ }^\circ\text{C}$; square-wave pulse | 150 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse; Fig. 4 | 700 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse | 750 | A |
| T_{stg} | storage temperature | | -55 to 175 | $^\circ\text{C}$ |
| T_j | junction temperature | | 175 | $^\circ\text{C}$ |



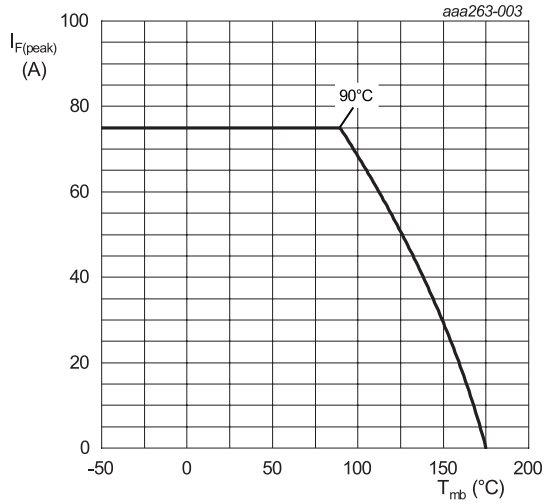


Fig. 3. Forward current as a function of mounting base temperature; typical values

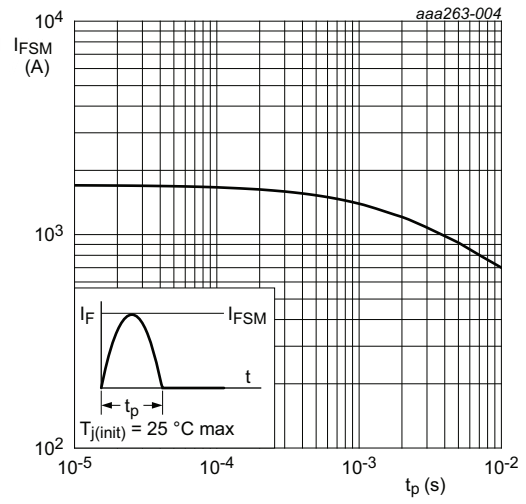


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|--|------------------------|-----|------|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | Fig. 5 | - | 0.43 | 0.6 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | in free air | - | 45 | - | K/W |

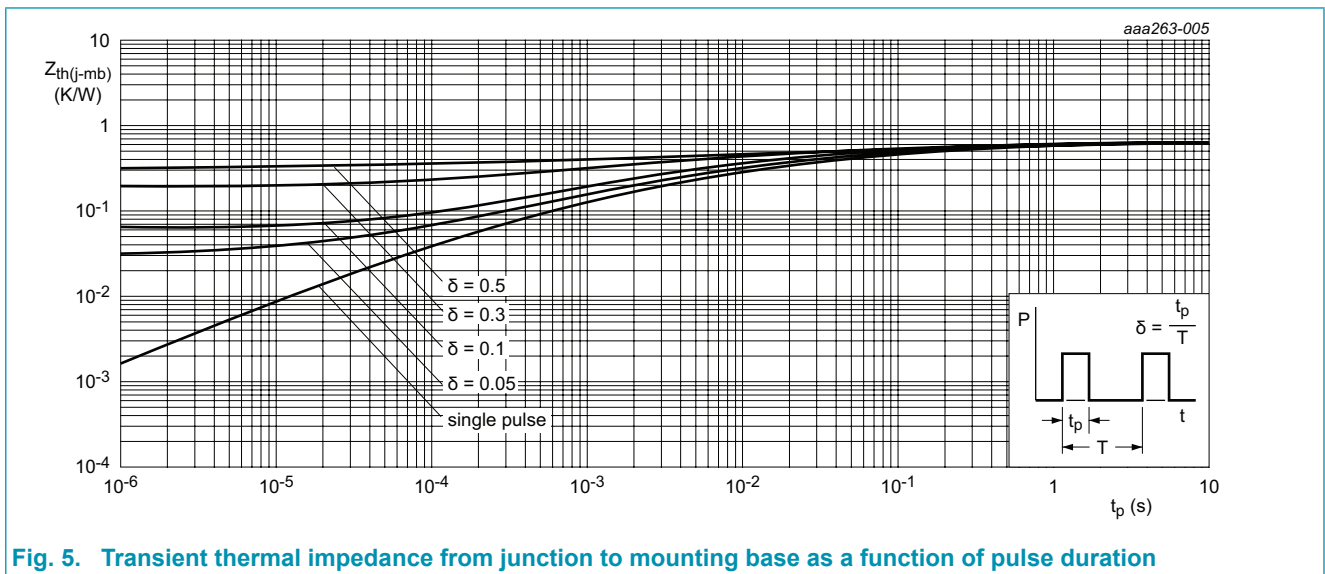
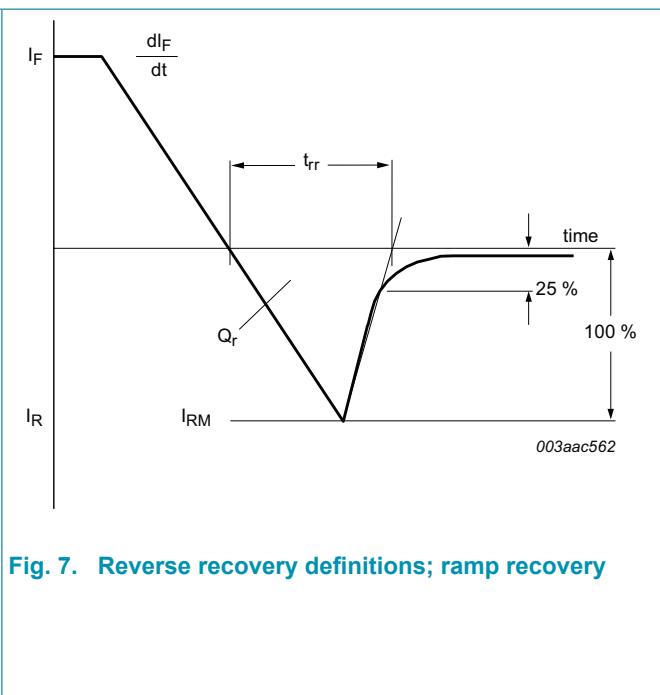
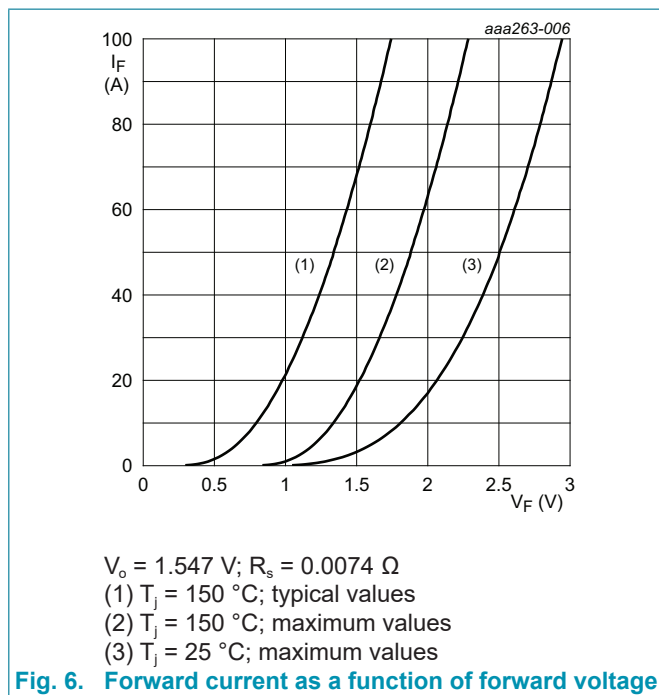


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

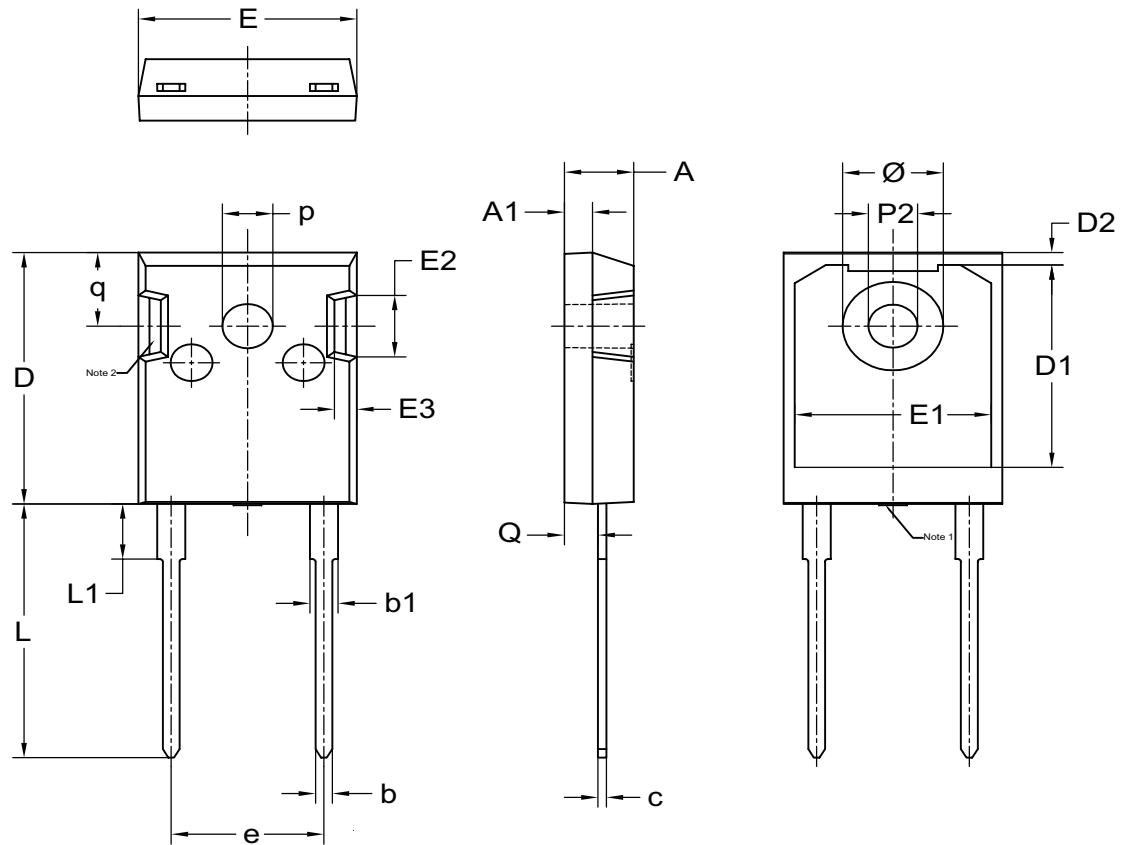
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|--|-----|------|------|---------------|
| Static characteristics | | | | | | |
| V_F | forward current | $I_F = 75 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$ | - | 2.2 | 2.75 | V |
| | | $I_F = 75 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 6}$ | - | 1.6 | 2.1 | V |
| I_R | reverse current | $V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$ | - | - | 10 | μA |
| | | $V_R = 600 \text{ V}; T_j = 125 \text{ }^\circ\text{C}$ | - | - | 1 | mA |
| Dynamic characteristics | | | | | | |
| Q_r | reverse charge | $I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$ | - | 85 | - | nC |
| | | $I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{ Fig. 7}$ | - | 640 | - | nC |
| t_{rr} | reverse recovery time | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$ | - | - | 50 | ns |
| | | $I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$ | - | 42 | - | ns |
| | | $I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{ Fig. 7}$ | - | 106 | - | ns |
| I_{RM} | peak reverse recovery current | $I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$ | - | 4.1 | - | A |
| | | $I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{ Fig. 7}$ | - | 12.2 | - | A |



11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 2 leads TO-247

TO247-2L



| UNIT | A | A ₁ | b | b ₁ | c | D | D ₁ | D ₂ | E | E ₁ | E ₂ | E ₃ | e | L | L ₁ | P ₂ | p | Q | q | Ø |
|------|------|----------------|------|----------------|------|-------|----------------|----------------|-------|----------------|----------------|----------------|-------|-------|----------------|----------------|------|------|------|------|
| mm | 5.20 | 2.10 | 1.40 | 2.20 | 0.70 | 20.60 | 17.78 | 1.20 | 15.75 | 14.22 | 5.20 | 1.80 | 10.90 | 20.72 | 4.75 | 3.60 | 3.70 | 2.60 | 6.18 | 7.30 |
| | 4.70 | 1.90 | 1.00 | 1.80 | 0.50 | 20.30 | 17.28 | 0.80 | 15.45 | 13.82 | 4.80 | 1.40 | BSC | 20.22 | 4.25 | 3.40 | 3.50 | 2.20 | 5.78 | 7.10 |

Note:

1. Mold resin protrusion max 0.127mm.
2. Metal exposed with Sn plating.

12. Legal information

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| Document status [1][2] | Product status [3] | Definition |
|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 07 January 2020

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