



**THE DATASHEET OF
BYC30W-600PT2Q**



1. General description

Hyperfast power diode in a TO-247 (True 2- pin) plastic package.

2. Features and benefits

- Low thermal resistance
- Low leakage current
- Low reverse recovery current
- Reduces switching losses in associated MOSFET or IGBT
- Increased creepage distance

3. Applications

- Active PFC in air conditioner
- Continuous Current Mode (CCM) Power Factor Correction (PFC)
- Half-bridge / full-bridge switched-mode power supplies

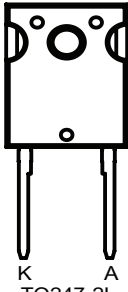

4. Quick reference data

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; $T_{mb} \leq 117$ °C; Fig. 1 ; Fig. 2 ; Fig. 3 | 30 | | | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 117$ °C; square-wave pulse | 60 | | | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4 | 270 | | | A |
| | | $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; | 295 | | | A |
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 30$ A; $T_j = 25$ °C; Fig. 6 | - | 2 | 2.75 | V |
| | | $I_F = 30$ A; $T_j = 150$ °C; Fig. 6 | - | 1.38 | 2 | V |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 200$ A/ μ s; $T_j = 25$ °C; Fig. 7 | - | 18 | - | ns |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|------------------------------------|---|--|
| 1 | K | cathode |  <p>K A TO247-2L</p> |  <p>K — <— A 001aaa020</p> |
| 2 | A | anode | | |
| mb | mb | mounting base; connected to cathod | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | Version |
|---------------|----------|--|-----------|
| | Name | Description | |
| BYC30W-600PT2 | TO247-2L | Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 2 leads TO-247 | TO247A-2L |

7. Marking

Table 4. Marking codes

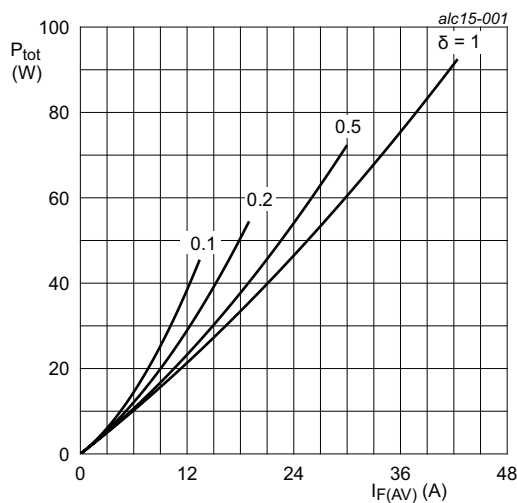
| Type number | Marking codes |
|---------------|---------------|
| BYC30W-600PT2 | BYC30W-600PT2 |

8. Limiting values

Table 5. Limiting values

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

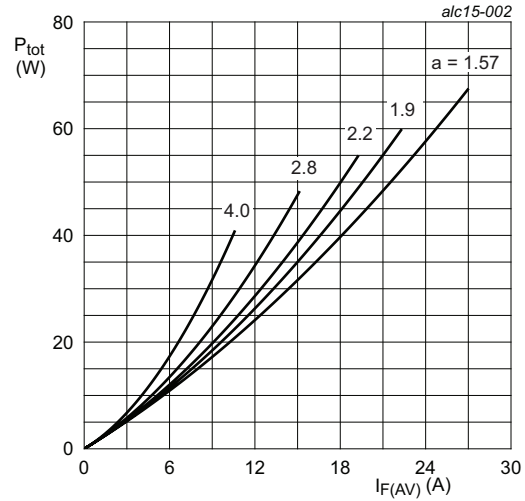
| Symbol | Parameter | Conditions | Values | Unit |
|-------------|-------------------------------------|---|------------|------------------|
| V_{RRM} | repetitive peak reverse voltage | | 600 | V |
| V_{RWM} | crest working reverse voltage | | 600 | V |
| V_R | reverse voltage | DC | 600 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_{mb} \leq 117\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3 | 30 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 117\text{ }^\circ\text{C}$; square-wave pulse | 60 | 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 | 270 | A |
| | | $t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse; | 295 | A |
| T_{stg} | storage temperature | | -55 to 175 | $^\circ\text{C}$ |
| T_j | junction temperature | | 175 | $^\circ\text{C}$ |



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 1.620\text{ V}; R_s = 0.0132\text{ }\Omega$$

Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$$V_o = 1.620\text{ V}; R_s = 0.0132\text{ }\Omega$$

Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

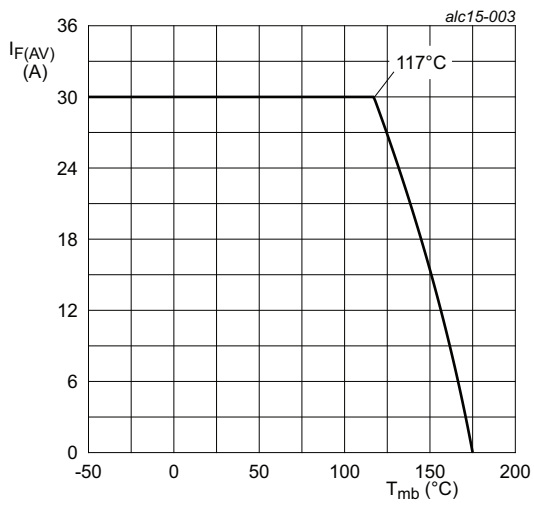


Fig. 3. Forward current as a function of mounting base temperature; maximum values

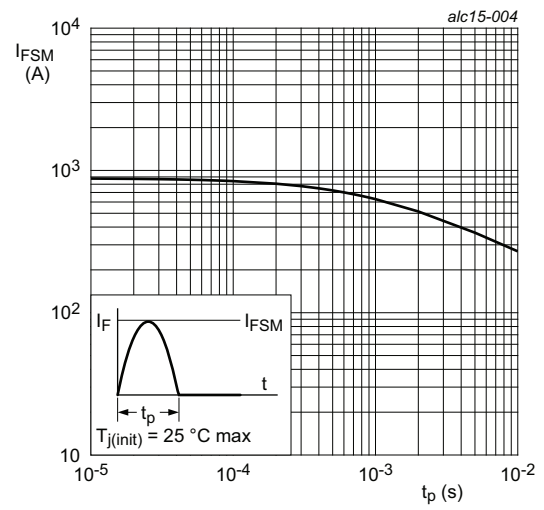


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|--|------------------------|-----|-----|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | Fig. 5 | - | - | 0.8 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | in free air | - | 40 | - | K/W |

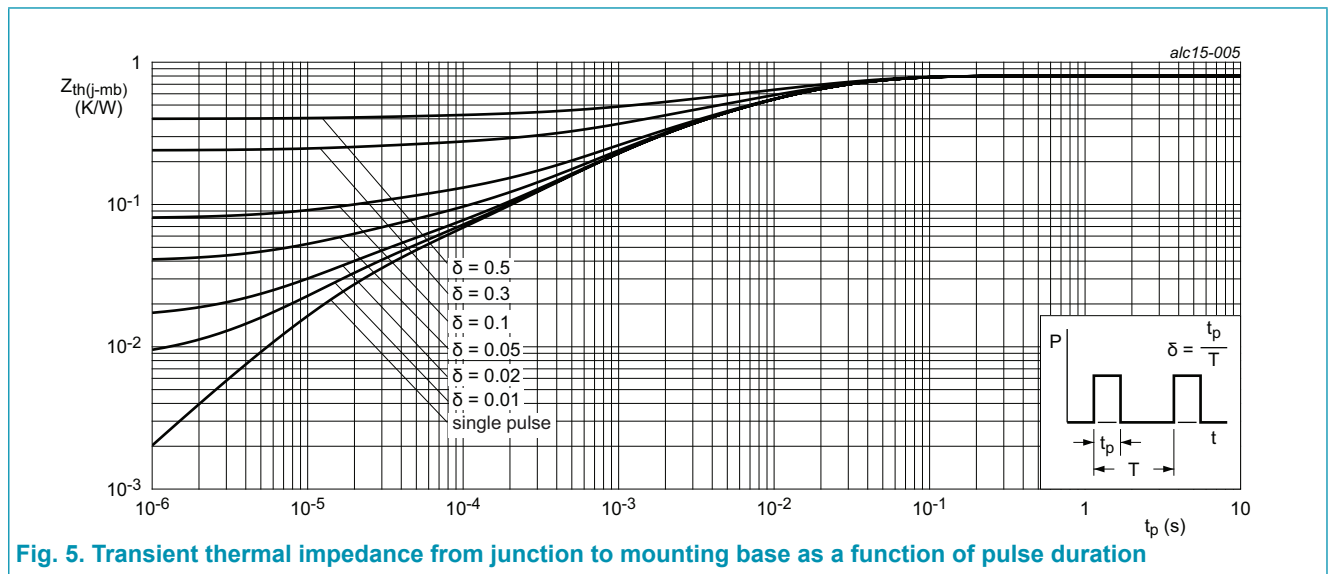
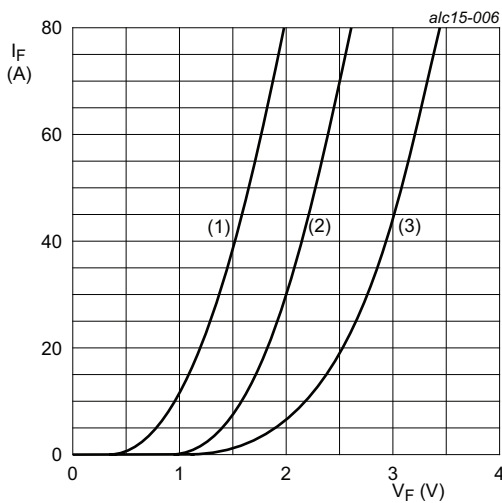


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|--|-----|------|------|------|
| Static characteristics | | | | | | |
| V _F | forward current | I _F = 30 A; T _j = 25 °C; Fig. 6 | - | 2 | 2.75 | V |
| | | I _F = 30 A; T _j = 150 °C; Fig. 6 | - | 1.38 | 2 | V |
| I _R | reverse current | V _R = 600 V; T _j = 25 °C | - | - | 10 | μA |
| | | V _R = 600 V; T _j = 150 °C | - | - | 1 | mA |
| Dynamic characteristics | | | | | | |
| Q _r | reverse charge | I _F = 30 A; V _R = 200 V; di _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7 | - | 51 | - | nC |
| | | I _F = 30 A; V _R = 200 V; di _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7 | - | 205 | - | nC |
| t _{rr} | reverse recovery time | I _F = 1 A; V _R = 30 V; di _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7 | - | 18 | - | ns |
| | | I _F = 30 A; V _R = 200 V; di _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7 | - | 34 | - | ns |
| | | I _F = 30 A; V _R = 200 V; di _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7 | - | 54 | - | ns |
| | | I _F = 30 A; V _R = 400 V; di _F /dt = 500 A/μs; T _j = 25 °C; Fig. 7 | - | 26 | - | ns |
| I _{RM} | peak reverse recovery current | I _F = 30 A; V _R = 200 V; di _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7 | - | 3 | - | A |
| | | I _F = 30 A; V _R = 200 V; di _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7 | - | 7.7 | - | A |



V₀ = 1.620 V; R_s = 0.0132 Ω
 (1) T_j = 150 °C; typical values
 (2) T_j = 150 °C; maximum values
 (3) T_j = 25 °C; maximum values

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

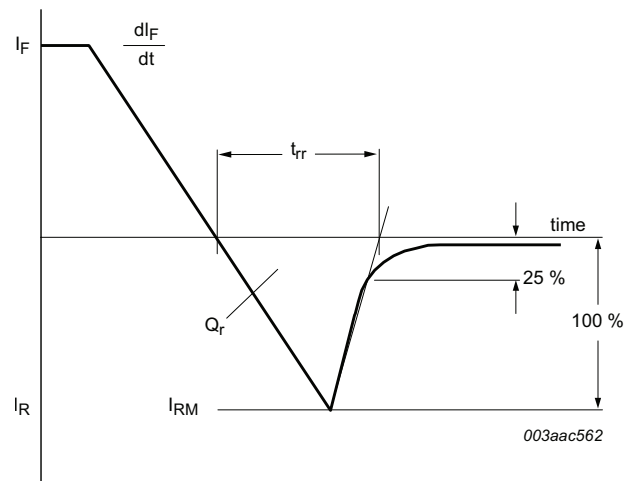
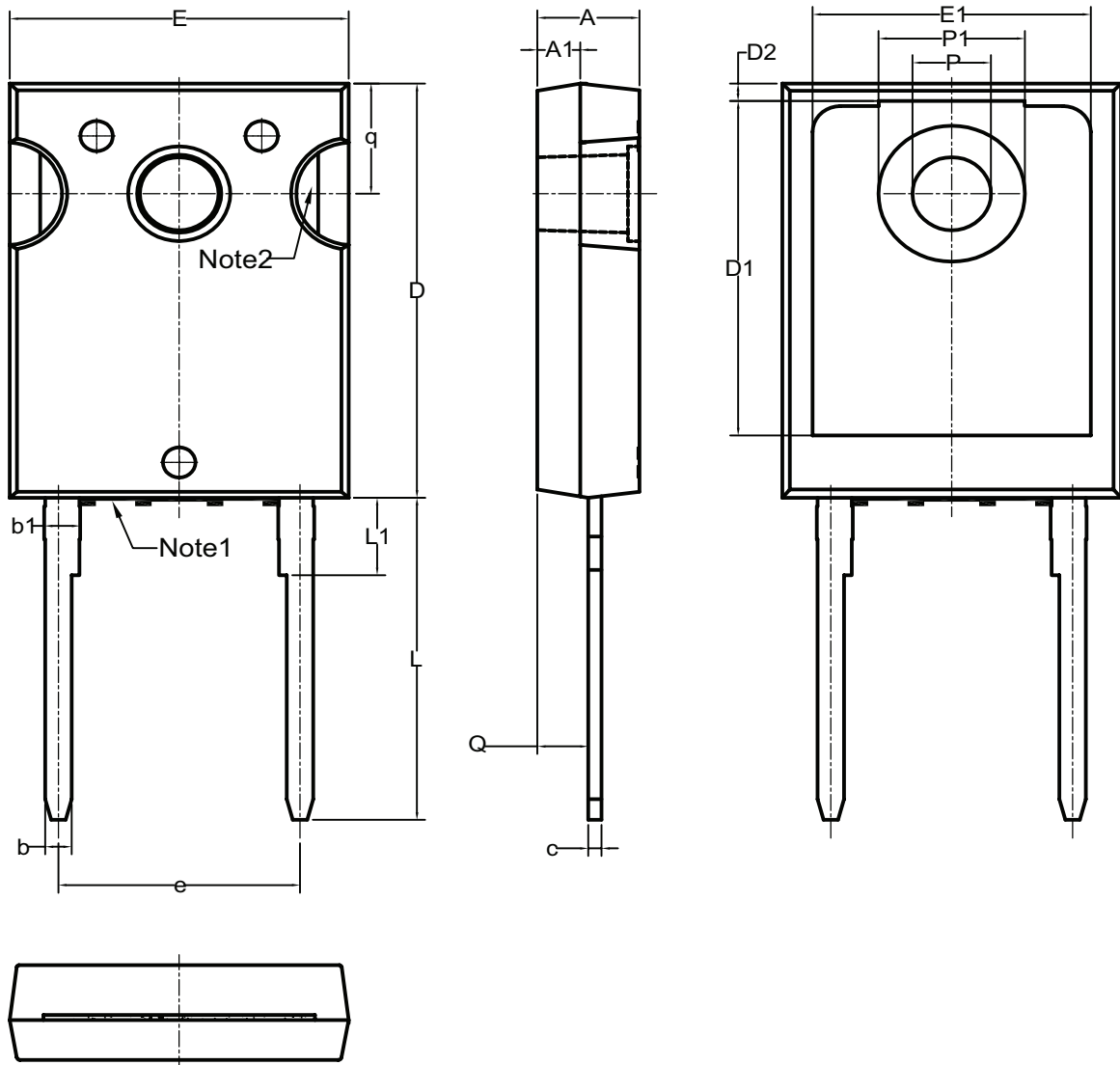


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

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

TO247-2L



| Unit | A | A1 | b | b1 | c | D | D1 | D2 | E | E1 | e | L | L1 | P | P1 | Q | q |
|------|------|------|------|------|------|-------|-------|------|-------|-------|-----------------|-------|------|------|------|------|------|
| min | 4.58 | 1.83 | 1.17 | 1.53 | 0.51 | 20.32 | 13.08 | 0.51 | 15.37 | 12.81 | 11.126 (BSC) | 15.75 | 3.69 | 3.51 | 6.61 | 2.29 | 5.34 |
| max | 4.82 | 2.13 | 1.35 | 1.77 | 0.71 | 20.82 | --- | 1.35 | 15.87 | --- | | 16.25 | 3.93 | 3.65 | 6.85 | 2.66 | 5.58 |

Note:
 1. Mold resin protrusion.
 2. Metal exposed with Sn plating.

12. Legal information

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|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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Date of release: 8 September 2017

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