

1. General description

Hyperfast power diode in a TO247 plastic package.

2. Features and benefits

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

3. Applications

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

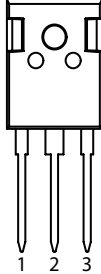
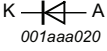
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Values | | | Unit |
|--------------------------------|-------------------------------------|--|--------|------|------|------|
| Absolute maximum rating | | | | | | |
| V_{RRM} | repetitive peak reverse voltage | DC | 600 | | | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_{mb} \leq 115$ °C; Fig. 1 ; Fig. 2 ; Fig. 3 | 30 | | | 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 | 300 | | | 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 | 1.8 | 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 | 22 | ns |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------------------------|---|---|
| 1 | A | anode |  |  |
| 2 | K | cathode | | |
| 3 | 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 |
|---------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| BYC30WT-600PS | TO247 | BYC30WT-600PSQ | Tube | 30 | SOT429 (L) | 25-Mar-2013 |
| | | | | | TO247P (P) | 31-Mar-2023 |

7. Marking

Table 4. Marking codes

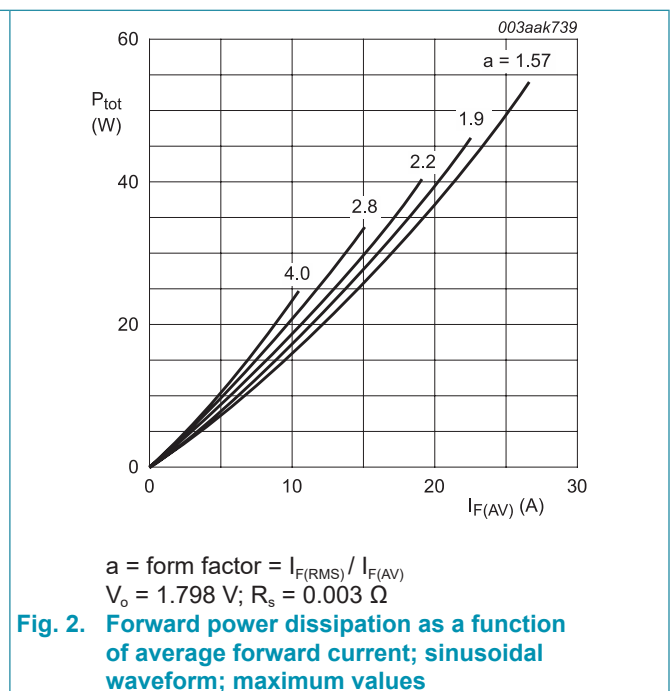
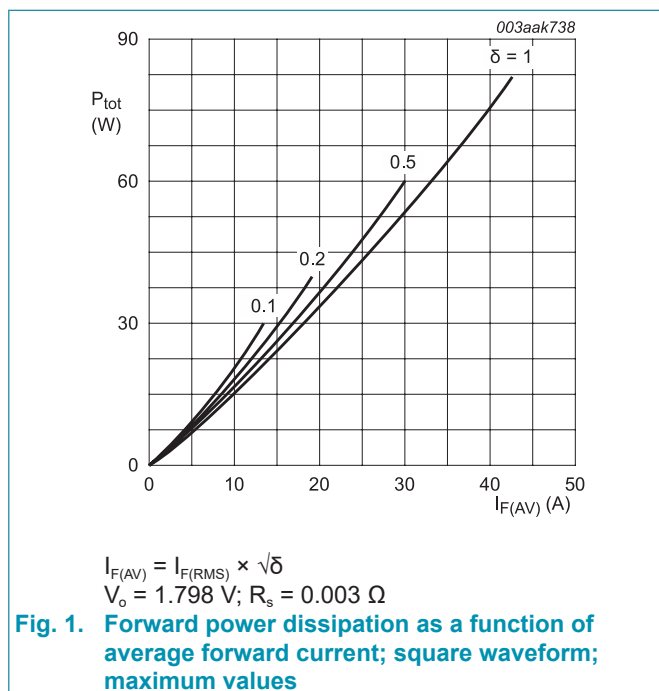
| Type number | Marking codes | |
|---------------|--------------------------------|--------------------------------|
| | Assembly factory: L | Assembly factory: P |
| BYC30WT-600PS | BYC30WT 600PS PJLxxxx xx | BYC30WT 600PS PJPxxxx xx |

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; $T_{mb} \leq 115\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3 | 30 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 115\text{ }^\circ\text{C}$; 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 | 300 | A |
| T_{stg} | storage temperature | | -65 to 175 | $^\circ\text{C}$ |
| T_j | junction temperature | | 175 | $^\circ\text{C}$ |



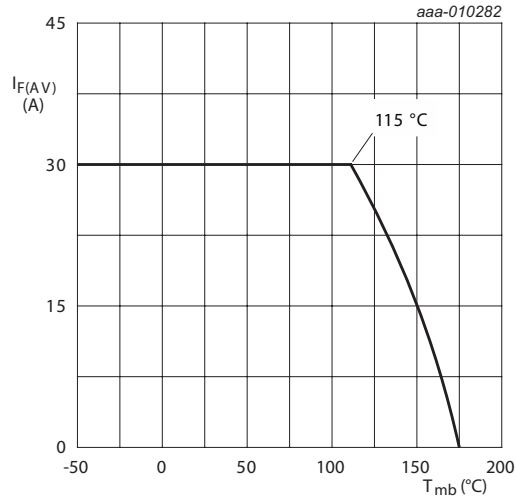


Fig. 3. Forward current as a function of mounting base temperature; maximum values

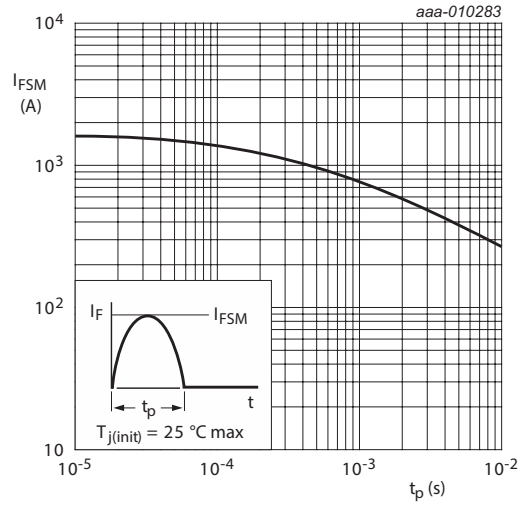


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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 | - | - | 1 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | in free air | - | 45 | - | K/W |

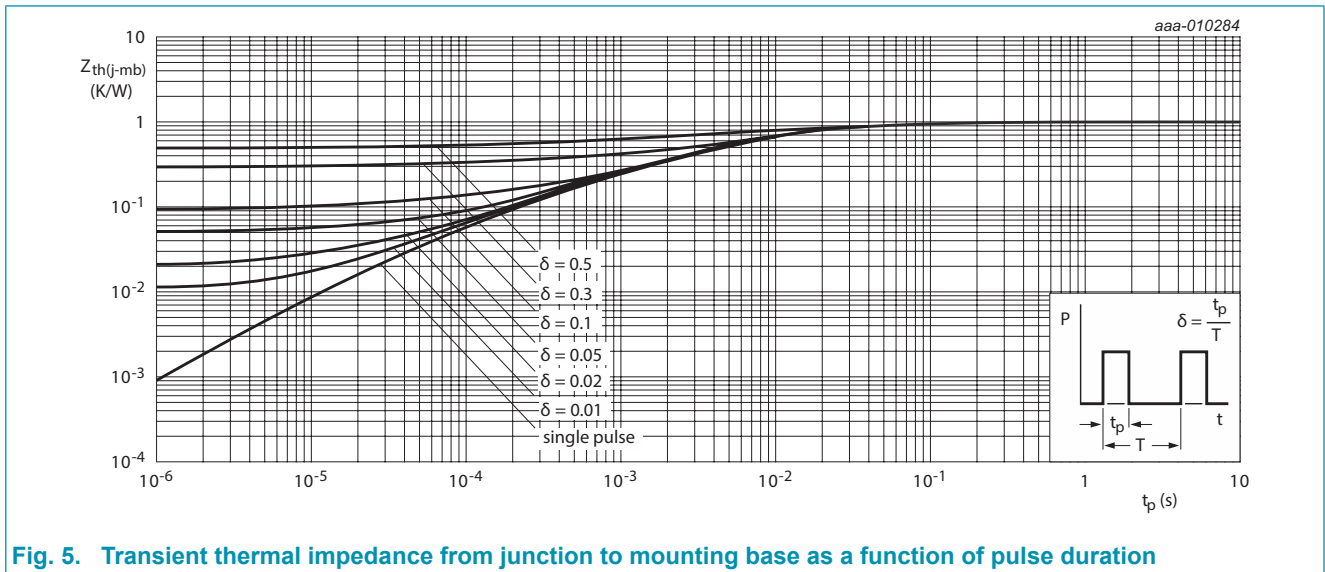
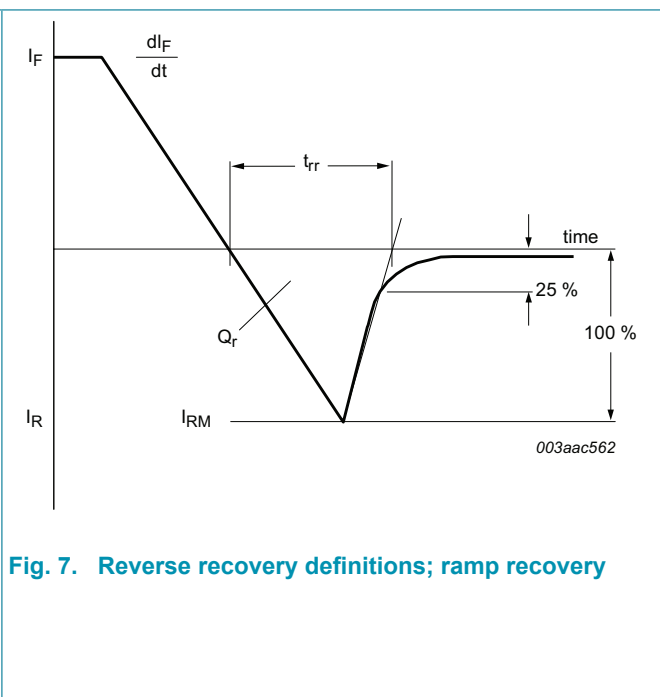
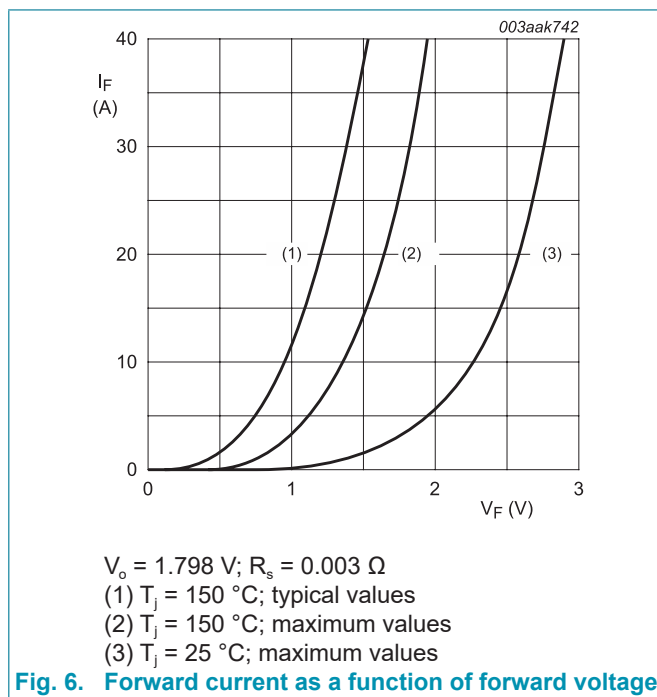


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|---|-----|------|------|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 30\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$ | - | 2 | 2.75 | V |
| | | $I_F = 30\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$ | - | 1.38 | 1.8 | V |
| I_R | reverse current | $V_R = 600\text{ V}; T_j = 25\text{ °C}$ | - | - | 10 | μA |
| | | $V_R = 600\text{ V}; T_j = 150\text{ °C}$ | - | - | 1 | mA |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1\text{ A}; V_R = 30\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$ | - | 18 | 22 | ns |
| | | $I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$ | - | 35 | - | ns |
| | | $I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$ | - | 70 | - | ns |
| | | $I_F = 30\text{ A}; V_R = 400\text{ V}; di_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$ | - | 29 | - | ns |
| I_{RM} | peak reverse recovery current | $I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$ | - | 3.5 | - | A |
| | | $I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$ | - | 7.6 | - | A |
| Q_r | reverse charge | $I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$ | - | 50 | - | nC |
| | | $I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$ | - | 280 | - | nC |

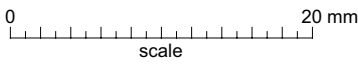
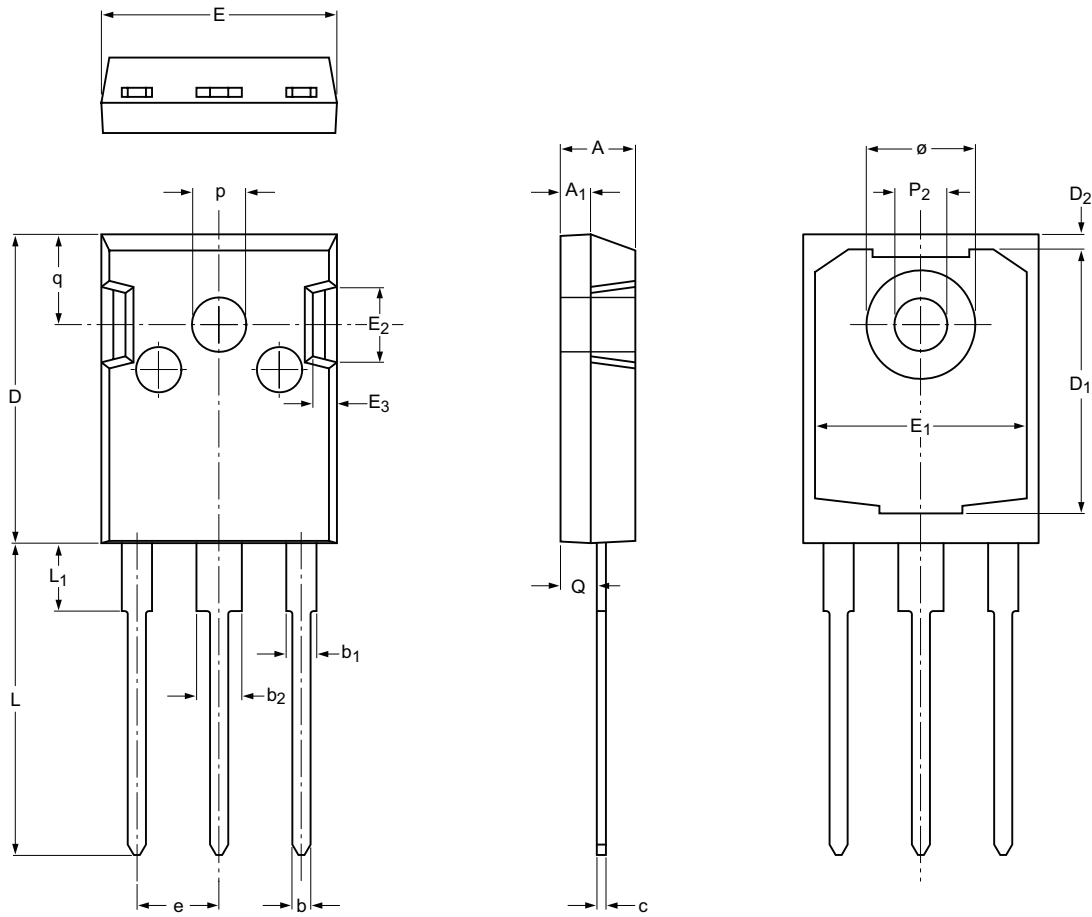


11. Package outline

Assembly factory: L

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247

SOT429



Dimensions (mm are the original dimensions)

| Unit ⁽¹⁾ | A | A ₁ | b | b ₁ | b ₂ | c | D | D ₁ | D ₂ | E | E ₁ | E ₂ | E ₃ | e ⁽¹⁾ | L | L ₁ | P ₂ | p | Q | q | ø | |
|---------------------|------|----------------|------|----------------|----------------|------|------|----------------|----------------|-------|----------------|----------------|----------------|------------------|-------|----------------|----------------|------|------|------|------|--|
| max | 5.20 | 2.10 | 1.40 | 2.20 | 3.20 | 0.70 | 20.6 | 17.68 | 1.20 | 15.75 | 14.22 | 5.20 | 1.80 | | 20.90 | 4.75 | 3.60 | 3.70 | 2.60 | 6.18 | 7.30 | |
| nom | | | | | | | | | | | | | | 5.45 | | | | | | | | |
| min | 4.70 | 1.90 | 1.00 | 1.80 | 2.80 | 0.50 | 20.3 | 17.28 | 0.80 | 15.45 | 13.82 | 4.80 | 1.40 | | 20.40 | 4.25 | 3.40 | 3.50 | 2.20 | 5.78 | 7.10 | |

Note

1. Basic spacing between centers.

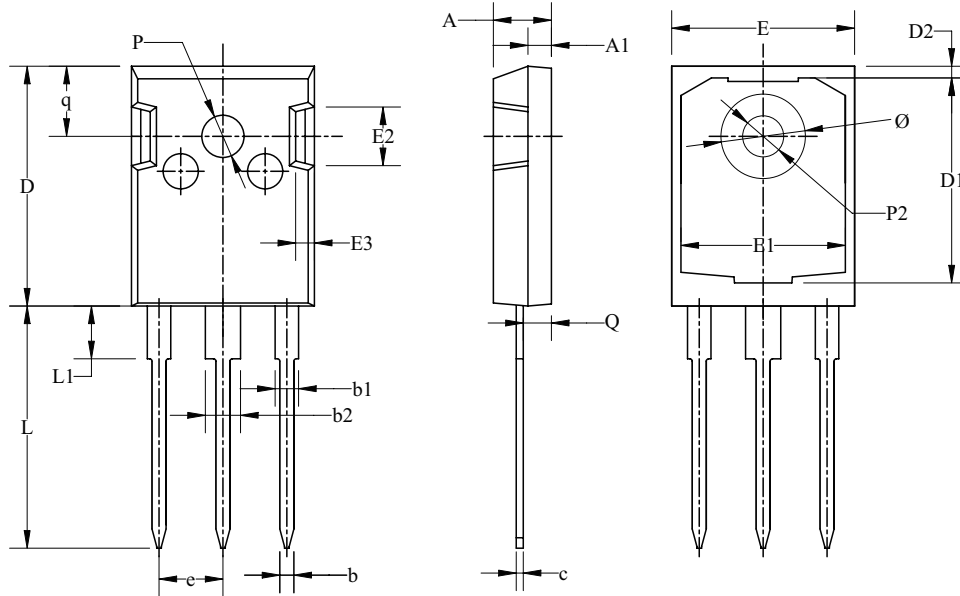
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| Outline version | References | | | European projection | Issue date |
|-----------------|------------|--------|-------|---------------------|-----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT429 | | TO-247 | | | 04-09-14- 13-03-25 |

Assembly factory: P

Plastic single-ended through-hole pack age; headsink mounted; 1 mounting hole; 3 leads TO-247

TO247



| Dim | All Dimensions in Millimeters | | |
|-----|-------------------------------|-------|-------|
| | Min | Typ | Max |
| A | 4.70 | 4.95 | 5.20 |
| A1 | 1.90 | 2.00 | 2.10 |
| b | 1.00 | 1.20 | 1.40 |
| b1 | 1.80 | 2.00 | 2.20 |
| b2 | 2.80 | 3.00 | 3.20 |
| c | 0.50 | 0.60 | 0.70 |
| D | 20.30 | 20.45 | 20.60 |
| D1 | 17.28 | 17.48 | 17.68 |
| D2 | 0.80 | 1.00 | 1.20 |
| E | 15.45 | 15.60 | 15.75 |
| E1 | 13.82 | 14.02 | 14.22 |
| E2 | 4.80 | 5.00 | 5.20 |
| E3 | 1.40 | 1.60 | 1.80 |
| e | 5.45 BSC | | |
| L | 20.40 | 20.65 | 20.90 |
| L1 | 4.25 | 4.50 | 4.75 |
| P2 | 3.40 | 3.50 | 3.60 |
| P | 3.50 | 3.60 | 3.70 |
| Q | 2.20 | 2.40 | 2.60 |
| q | 5.78 | 5.98 | 6.18 |
| Ø | 7.10 | 7.19 | 7.30 |

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. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
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Date of release: 18 May 2023
