

**70V P-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

| BV <sub>DSS</sub> | R <sub>DS(on)</sub> max         | I <sub>D</sub><br>T <sub>A</sub> = +25°C |
|-------------------|---------------------------------|------------------------------------------|
| -70V              | 160mΩ @ V <sub>GS</sub> = -10V  | -5.7A                                    |
|                   | 250mΩ @ V <sub>GS</sub> = -4.5V | -5.3A                                    |

**Description**

This new generation of trench MOSFETs utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. The ZXMP7A17KQ is ideal for high efficiency, low voltage power management applications.

**Applications**

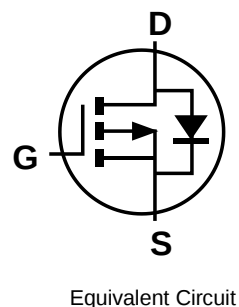
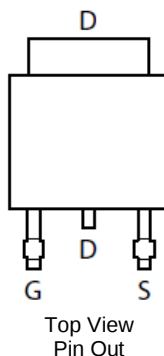
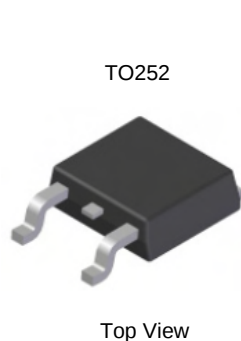
- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control
- Class D Audio Output Stages

**Features and Benefits**

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- DPAK Package
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

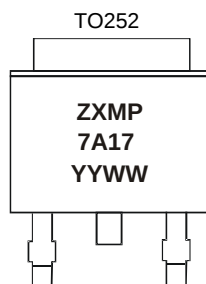
**Mechanical Data**

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208③
- Weight: 0.315 grams (Approximate)


**Ordering Information (Note 5)**

| Part Number  | Case  | Packaging         |
|--------------|-------|-------------------|
| ZXMP7A17KQTC | TO252 | 2,500/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


ZXMP7A17 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 10 = 2010)  
 WW = Week (01 - 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                         |                       |                                 | Symbol           | Value | Unit |
|----------------------------------------|-----------------------|---------------------------------|------------------|-------|------|
| Drain-Source Voltage                   |                       |                                 | V <sub>DSS</sub> | -70   | V    |
| Gate-Source Voltage                    |                       |                                 | V <sub>GS</sub>  | ±20   | V    |
| Continuous Drain Current               | V <sub>GS</sub> = 10V | (Note 7)                        | I <sub>D</sub>   | -5.7  | A    |
|                                        |                       | T <sub>A</sub> = +70°C (Note 7) |                  | -4.6  |      |
|                                        |                       | (Note 6)                        |                  | -3.8  |      |
| Pulsed Drain Current                   | V <sub>GS</sub> = 10V | (Note 8)                        | I <sub>DM</sub>  | -17.7 | A    |
| Continuous Source Current (Body diode) |                       |                                 | I <sub>S</sub>   | -9.2  | A    |
| Pulsed Source Current (Body diode)     |                       |                                 | I <sub>SM</sub>  | -17.7 | A    |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

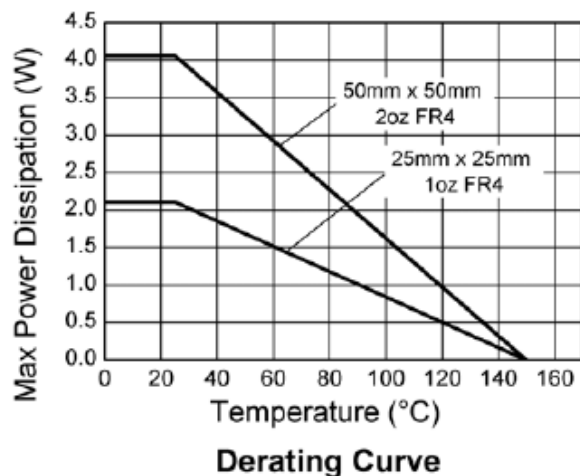
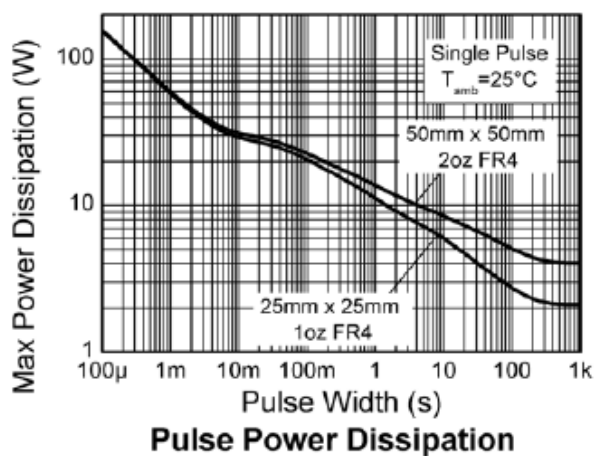
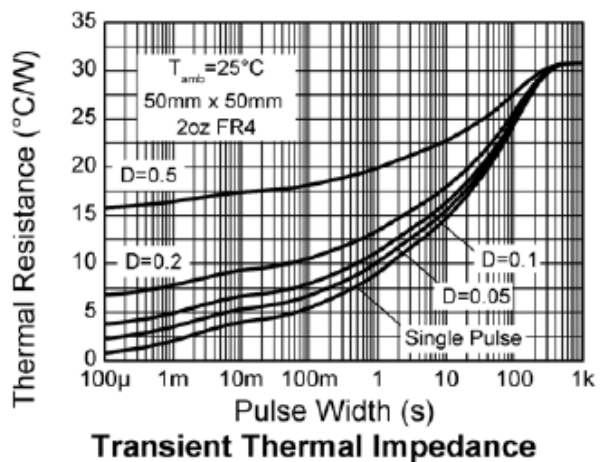
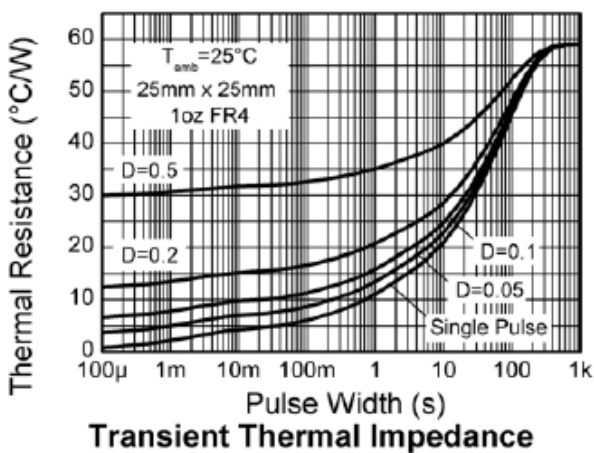
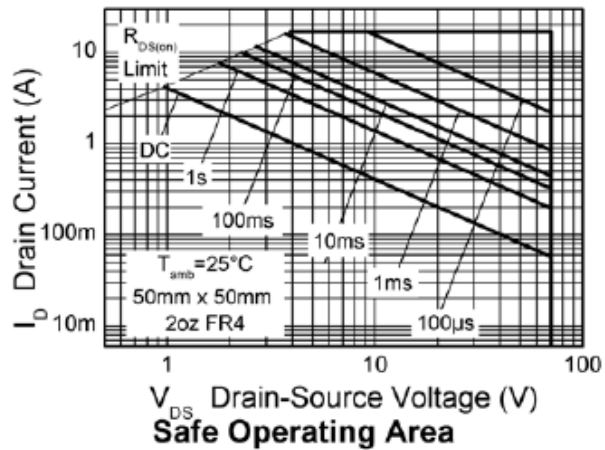
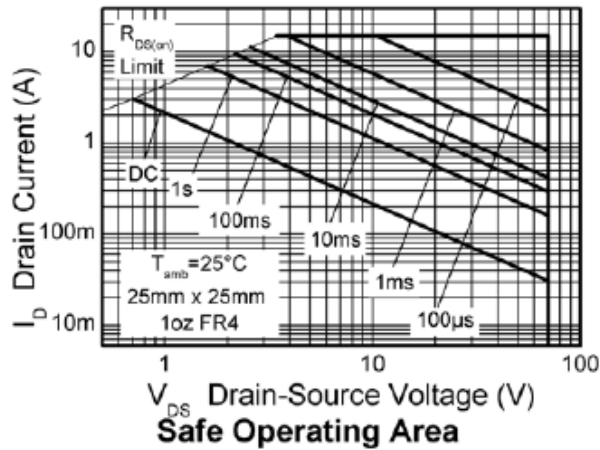
| Characteristic                              |          | Symbol                            | Value       | Unit       |
|---------------------------------------------|----------|-----------------------------------|-------------|------------|
| Power Dissipation<br>Linear Derating Factor | (Note 6) | P <sub>D</sub>                    | 4.17        | W<br>mW/°C |
|                                             | (Note 7) |                                   | 33.3        |            |
|                                             | (Note 9) |                                   | 9.25        |            |
|                                             | (Note 8) |                                   | 74          |            |
| Thermal Resistance, Junction to Ambient     | (Note 6) | R <sub>θJA</sub>                  | 2.11        | °C/W       |
|                                             | (Note 7) |                                   | 16.8        |            |
|                                             | (Note 8) |                                   | 30          |            |
| Operating and Storage Temperature Range     |          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C         |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

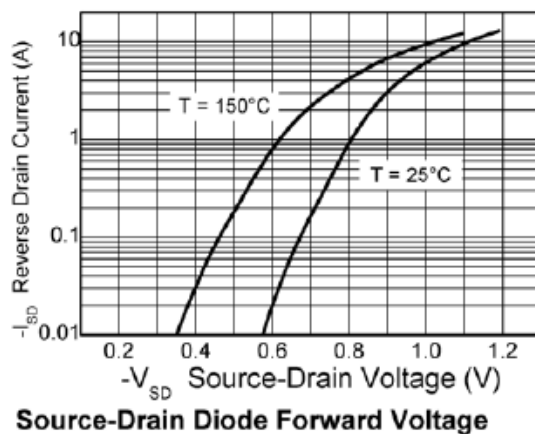
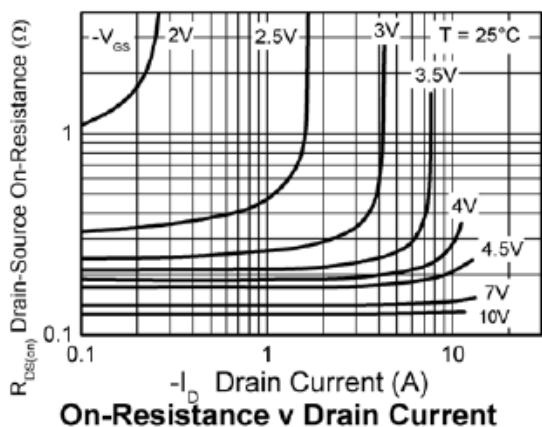
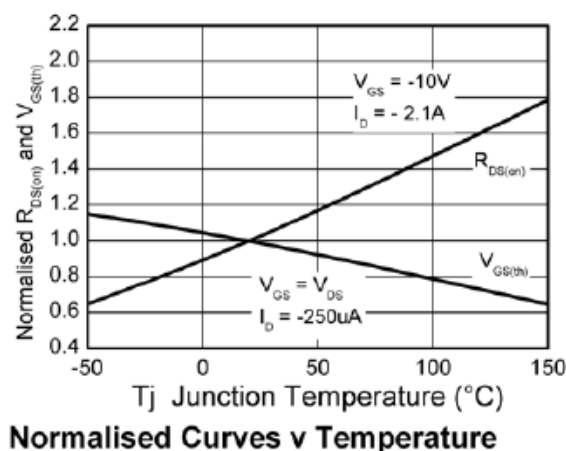
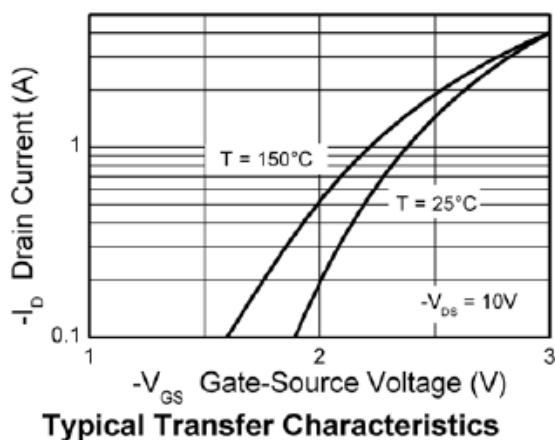
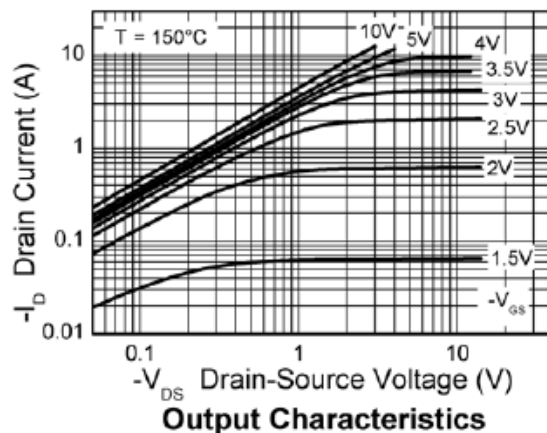
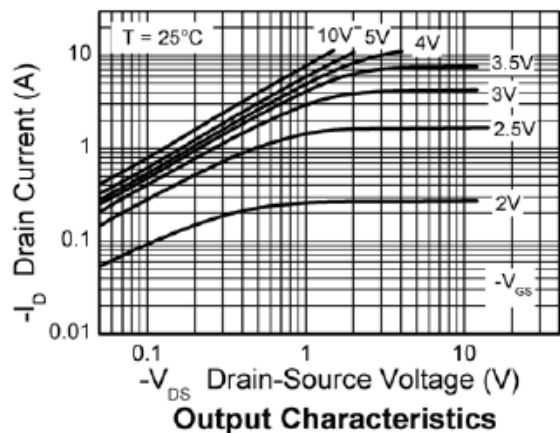
| Characteristic                              | Symbol              | Min  | Typ   | Max   | Unit | Test Condition                                                                                |                                                  |
|---------------------------------------------|---------------------|------|-------|-------|------|-----------------------------------------------------------------------------------------------|--------------------------------------------------|
| OFF CHARACTERISTICS                         |                     |      |       |       |      |                                                                                               |                                                  |
| Drain-Source Breakdown Voltage              | BV <sub>DSS</sub>   | -70  | —     | —     | V    | I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V                                                 |                                                  |
| Zero Gate Voltage Drain Current             | I <sub>DSS</sub>    | —    | —     | -1    | μA   | V <sub>DS</sub> = -70V, V <sub>GS</sub> = 0V                                                  |                                                  |
| Gate-Source Leakage                         | I <sub>GSS</sub>    | —    | —     | ±100  | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                  |                                                  |
| ON CHARACTERISTICS                          |                     |      |       |       |      |                                                                                               |                                                  |
| Gate Threshold Voltage                      | V <sub>GS(th)</sub> | -1.0 | —     | —     | V    | I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>                                    |                                                  |
| Static Drain-Source On-Resistance (Note 10) | R <sub>DS(ON)</sub> | —    | —     | 0.16  | Ω    | V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.1A                                                |                                                  |
|                                             |                     |      |       | 0.25  |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.7A                                               |                                                  |
| Forward Transconductance (Notes 10 & 11)    | g <sub>fs</sub>     | —    | 4.4   | —     | S    | V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.1A                                                |                                                  |
| Diode Forward Voltage (Note 10)             | V <sub>SD</sub>     | —    | -0.85 | -0.95 | V    | I <sub>S</sub> = -2.0A, V <sub>GS</sub> = 0V, T <sub>J</sub> = +25°C                          |                                                  |
| Reverse Recovery Time (Note 11)             | t <sub>rr</sub>     | —    | 29.8  | —     | ns   | I <sub>S</sub> = -2.1A, di/dt= 100A/μs                                                        |                                                  |
| Reverse Recovery Charge (Note 11)           | Q <sub>rr</sub>     | —    | 38.5  | —     | nC   |                                                                                               |                                                  |
| DYNAMIC CHARACTERISTICS (Note 11)           |                     |      |       |       |      |                                                                                               |                                                  |
| Input Capacitance                           | C <sub>iss</sub>    | —    | 635   | —     | pF   | V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V<br>f= 1MHz                                       |                                                  |
| Output Capacitance                          | C <sub>oss</sub>    | —    | 52    | —     | pF   |                                                                                               |                                                  |
| Reverse Transfer Capacitance                | C <sub>rss</sub>    | —    | 42.5  | —     | pF   |                                                                                               |                                                  |
| Total Gate Charge (Note 12)                 | Q <sub>g</sub>      | —    | 9.6   | —     | nC   | V <sub>GS</sub> = -5V                                                                         | V <sub>DS</sub> = -35V<br>I <sub>D</sub> = -2.1A |
| Total Gate Charge (Note 12)                 | Q <sub>g</sub>      | —    | 18    | —     | nC   | V <sub>GS</sub> = -10V                                                                        |                                                  |
| Gate-Source Charge (Note 12)                | Q <sub>gs</sub>     | —    | 1.77  | —     | nC   |                                                                                               |                                                  |
| Gate-Drain Charge (Note 12)                 | Q <sub>gd</sub>     | —    | 3.66  | —     | nC   |                                                                                               |                                                  |
| Turn-On Delay Time (Note 12)                | t <sub>D(on)</sub>  | —    | 2.5   | —     | ns   | V <sub>DD</sub> = -35V, V <sub>GS</sub> = -10V<br>I <sub>D</sub> = -1A, R <sub>G</sub> ≐ 6.0Ω |                                                  |
| Turn-On Rise Time (Note 12)                 | t <sub>r</sub>      | —    | 3.4   | —     | ns   |                                                                                               |                                                  |
| Turn-Off Delay Time (Note 12)               | t <sub>D(off)</sub> | —    | 27.9  | —     | ns   |                                                                                               |                                                  |
| Turn-Off Fall Time (Note 12)                | t <sub>f</sub>      | —    | 8     | —     | ns   |                                                                                               |                                                  |

- Notes:
6. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
  7. For a device surface mounted on FR4 PCB measured at t ≤ 10 sec.
  8. Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, D=0.02 pulse width=300μs - pulse width limited by maximum junction temperature.
  9. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  10. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
  11. Switching characteristics are independent of operating junction temperature.
  12. For design aid only, not subject to production testing.

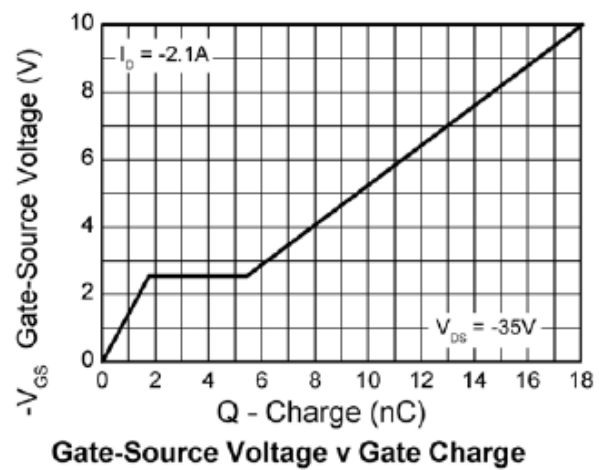
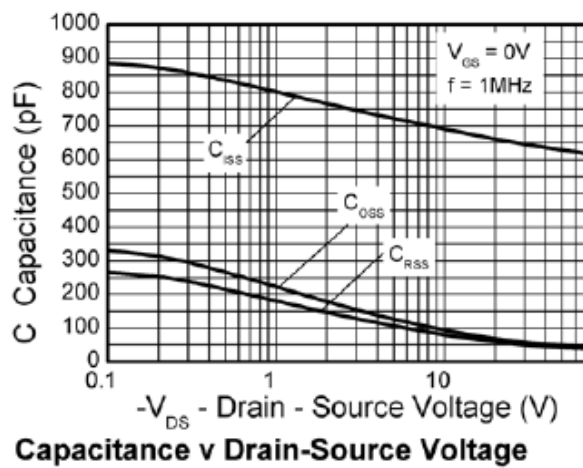
## Thermal Characteristics



## Typical Characteristics

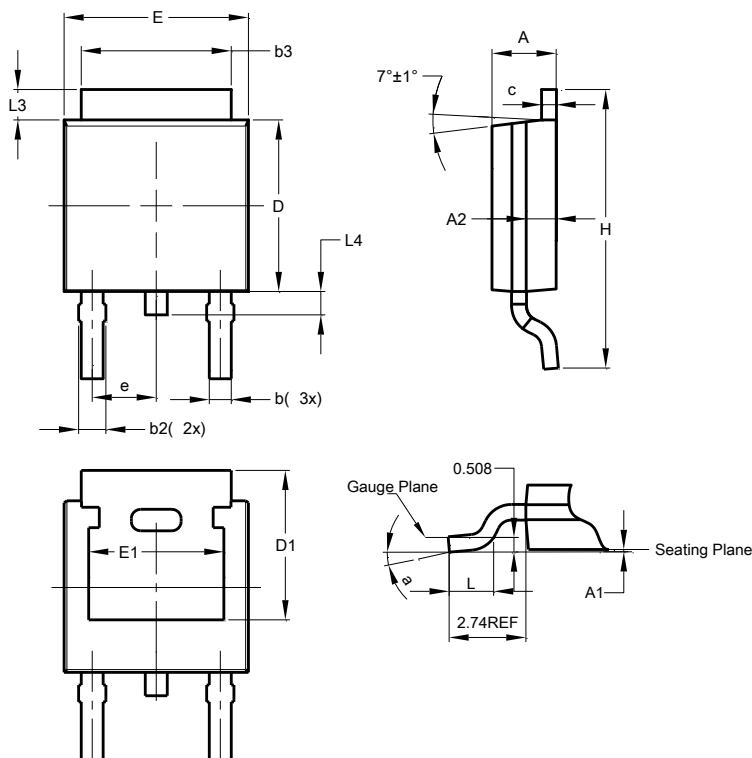


**Typical Characteristics (cont.)**



## Package Outline Dimensions

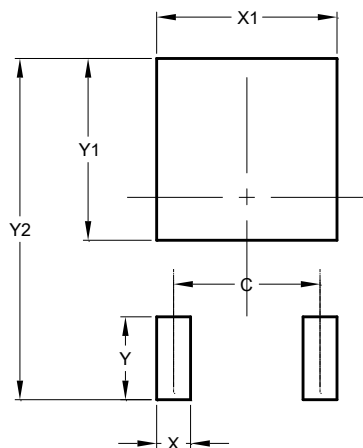
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| TO252 (DPAK)         |      |       |       |
|----------------------|------|-------|-------|
| Dim                  | Min  | Max   | Typ   |
| A                    | 2.19 | 2.39  | 2.29  |
| A1                   | 0.00 | 0.13  | 0.08  |
| A2                   | 0.97 | 1.17  | 1.07  |
| b                    | 0.64 | 0.88  | 0.783 |
| b2                   | 0.76 | 1.14  | 0.95  |
| b3                   | 5.21 | 5.46  | 5.33  |
| c                    | 0.45 | 0.58  | 0.531 |
| D                    | 6.00 | 6.20  | 6.10  |
| D1                   | 5.21 | -     | -     |
| e                    | -    | -     | 2.286 |
| E                    | 6.45 | 6.70  | 6.58  |
| E1                   | 4.32 | -     | -     |
| H                    | 9.40 | 10.41 | 9.91  |
| L                    | 1.40 | 1.78  | 1.59  |
| L3                   | 0.88 | 1.27  | 1.08  |
| L4                   | 0.64 | 1.02  | 0.83  |
| a                    | 0°   | 10°   | -     |
| All Dimensions in mm |      |       |       |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 4.572         |
| X          | 1.060         |
| X1         | 5.632         |
| Y          | 2.600         |
| Y1         | 5.700         |
| Y2         | 10.700        |

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**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331