

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$                            | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|---|------------------------------------|
| -70V          | 160m $\Omega$ @ $V_{GS} = -10\text{V}$  | -2.6A                              |
|               | 250m $\Omega$ @ $V_{GS} = -4.5\text{V}$ | -1.6A                              |

## Description

This MOSFET is designed to minimize on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

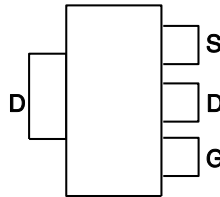
## Applications

- Motor Control
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

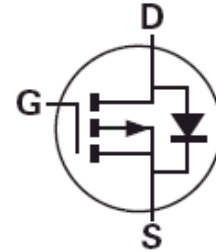
SOT223



Top View



Pin Out - Top



Equivalent Circuit

## Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed
- **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 Available (Note 4)**

## Mechanical Data

- Case: SOT223
- 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 208 <sup>(3)</sup>
- Weight: 0.112 grams (Approximate)

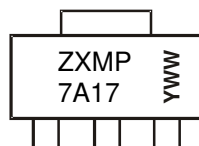
## Ordering Information (Notes 4 & 5)

| Part Number  | Qualification | Case   | Packaging         |
|--------------|---------------|--------|-------------------|
| ZXMP7A17GQTA | Automotive    | SOT223 | 1,000/Tape & Reel |
| ZXMP7A17GQTC | Automotive    | SOT223 | 4,000/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

SOT223



ZXMP7A17 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 5= 2015)  
 WW or  $\bar{W}W$  = Week Code (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>   | -3.7            | A    |   |
|  |                        | T <sub>A</sub> = +70°C (Note 7) |                  | -2.9            |      |   |
|  |                        | (Note 6)                        |                  | -2.6            |      |   |
| Pulsed Drain Current                   | V <sub>GS</sub> = -10V | (Note 8)                        | I <sub>DM</sub>  | -9.6            | A    |   |
| Continuous Source Current (Body Diode) |                        |                                 | (Note 7)         | I <sub>S</sub>  | -4.8 | A |
| Pulsed Source Current (Body Diode)     |                        |                                 | (Note 8)         | I <sub>SM</sub> | -9.6 | A |

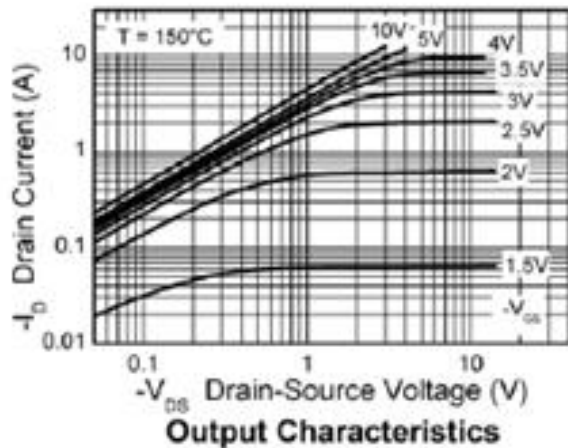
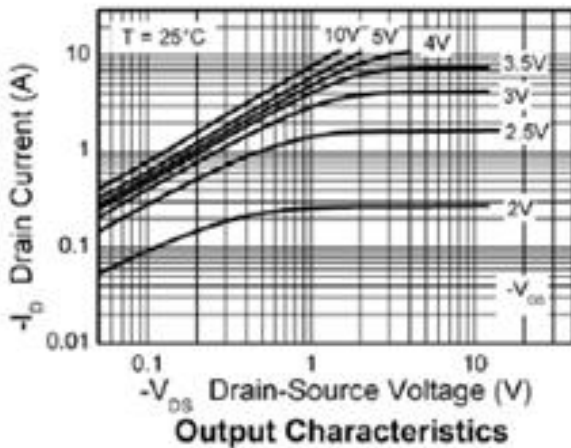
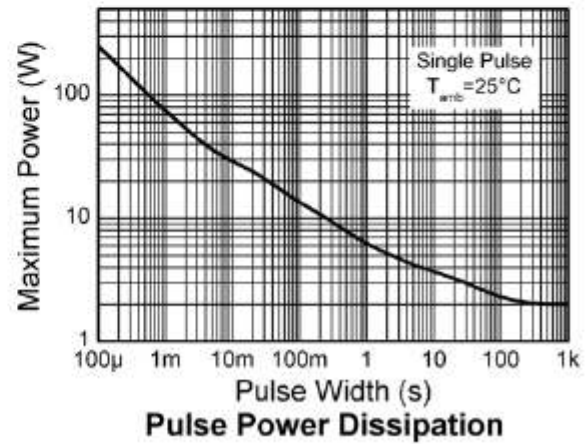
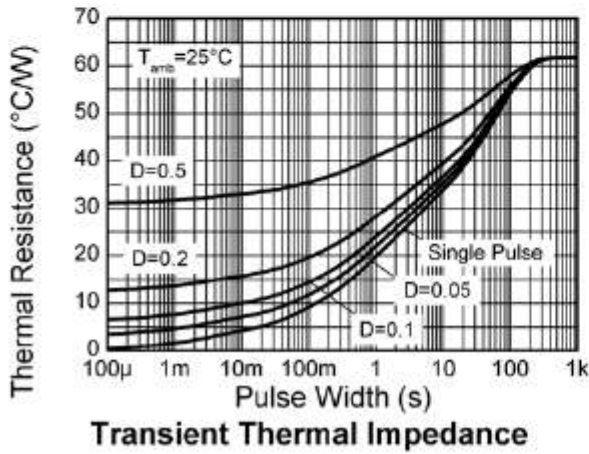
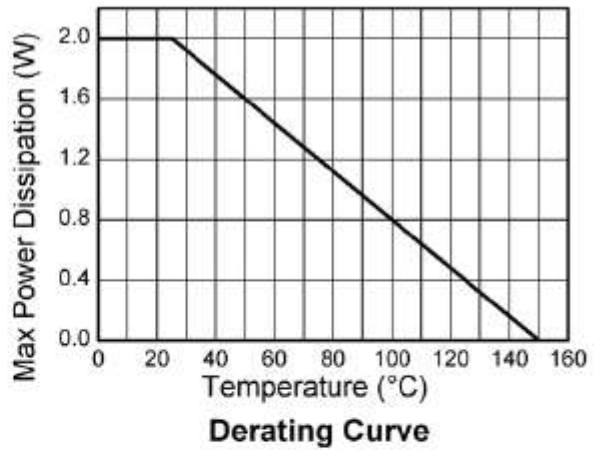
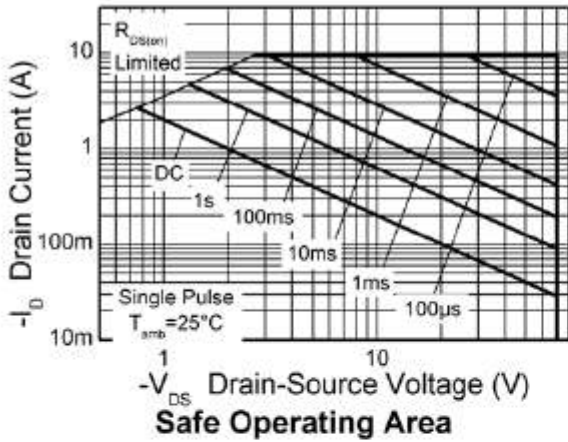
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

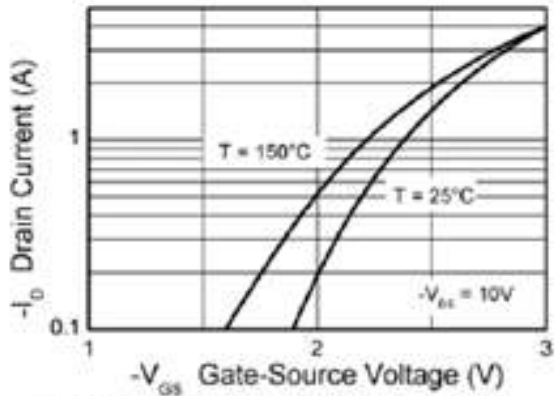
| Characteristic                          |          | Symbol                            | Value       | Unit  |
|---|----------|-----------------------------------|-------------|-------|
| Power Dissipation                       | (Note 6) | P <sub>D</sub>                    | 2           | W     |
|   | (Note 7) |                                   | 16          |       |
| Linear Derating Factor                  | (Note 6) | R <sub>θJA</sub>                  | 3.9         | mW/°C |
|   | (Note 7) |                                   | 31          |       |
| Thermal Resistance, Junction to Ambient | (Note 6) | R <sub>θJA</sub>                  | 62.5        | °C/W  |
|   | (Note 7) |                                   | 34          |       |
| 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.)

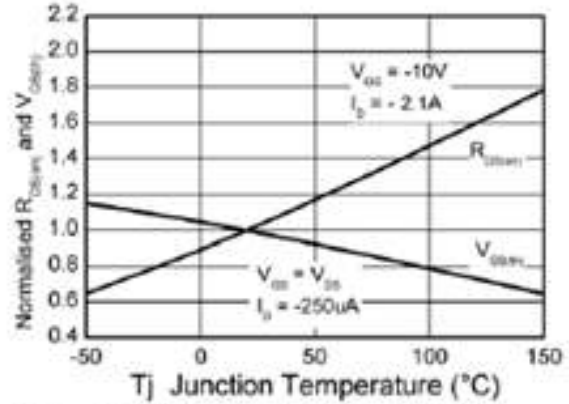
| Characteristic                             | Symbol              | Min | Typ   | Max   | Unit | Test Condition  |
|--|---------------------|-----|-------|-------|------|---|
| <b>OFF CHARACTERISTICS</b>                 |                     |     |       |       |      |   |
| Drain-Source Breakdown 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  |
| <b>ON CHARACTERISTICS</b>                  |                     |     |       |       |      |   |
| Gate Threshold Voltage                     | V <sub>GS(th)</sub> | -1  | —     | —     | V    | I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>  |
| Static Drain-Source On-Resistance (Note 9) | R <sub>DS(on)</sub> | —   | —     | 0.16  | Ω    | V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.1A<br>V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.7A |
|  |                     |     |       | 0.25  |      |   |
| Forward Transconductance (Notes 9 & 10)    | g <sub>fs</sub>     | —   | 4.4   | —     | S    | V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.1A  |
| Diode Forward Voltage (Note 9)             | V <sub>SD</sub>     | —   | -0.85 | -0.95 | V    | I <sub>S</sub> = -2A, V <sub>GS</sub> = 0V  |
| Reverse Recovery Time (Note 10)            | t <sub>rr</sub>     | —   | 29.8  | —     | ns   | I <sub>S</sub> = -2.1A, di/dt = 100A/μs   |
| Reverse Recovery Charge (Note 10)          | Q <sub>rr</sub>     | —   | 38.5  | —     | nC   |   |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 10)   |                     |     |       |       |      |   |
| 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 11)                | Q <sub>g</sub>      | —   | 9.6   | —     | nC   | V <sub>GS</sub> = -5V   |
| Total Gate Charge (Note 11)                | Q <sub>g</sub>      | —   | 18    | —     | nC   |   |
| Gate-Source Charge (Note 11)               | Q <sub>gs</sub>     | —   | 1.77  | —     | nC   | V <sub>GS</sub> = -10V  |
| Gate-Drain Charge (Note 11)                | Q <sub>gd</sub>     | —   | 3.66  | —     | nC   |   |
| Turn-On Delay Time (Note 11)               | 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> = 6Ω       |
| Turn-On Rise Time (Note 11)                | t <sub>r</sub>      | —   | 3.4   | —     | ns   |   |
| Turn-Off Delay Time (Note 11)              | t <sub>D(off)</sub> | —   | 27.9  | —     | ns   |   |
| Turn-Off Fall Time (Note 11)               | t <sub>f</sub>      | —   | 8     | —     | ns   |   |

- Notes:
- For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Same as Note 6, except the device is measured at t ≤ 5 seconds.
  - Same as Note 6, except the device is pulsed with D = 0.05 and pulse width 10μs. The pulse current is limited by the maximum junction temperature.
  - Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
  - For design aid only, not subject to production testing.
  - Switching characteristics are independent of operating junction temperatures.

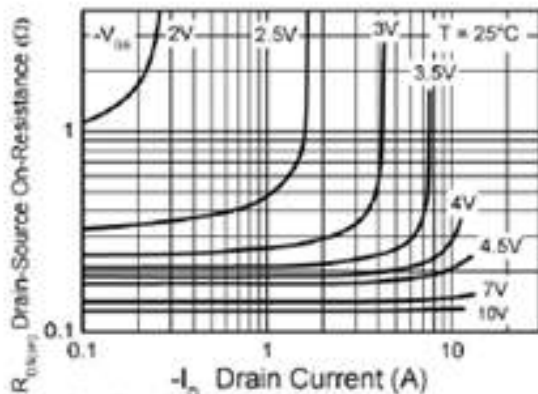




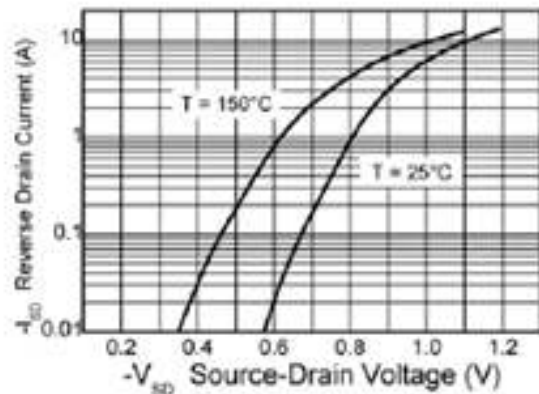
**Typical Transfer Characteristics**



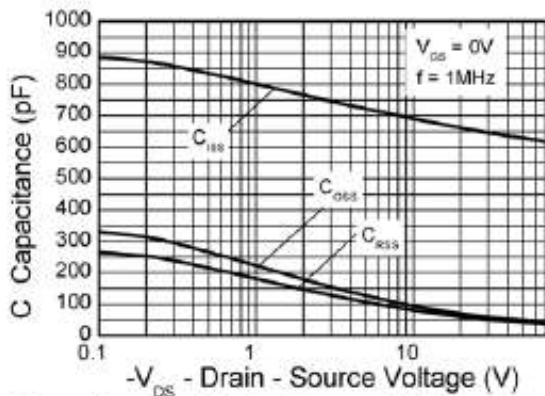
**Normalised Curves v Temperature**



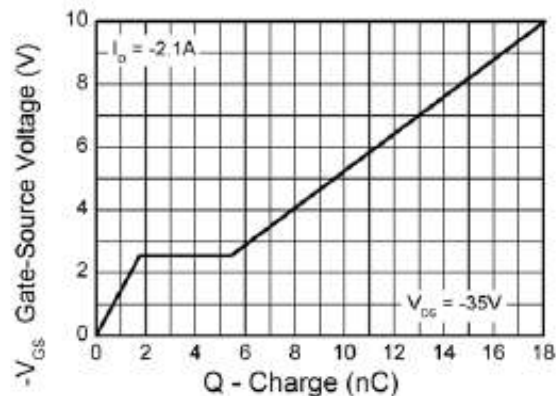
**On-Resistance v Drain Current**



**Source-Drain Diode Forward Voltage**



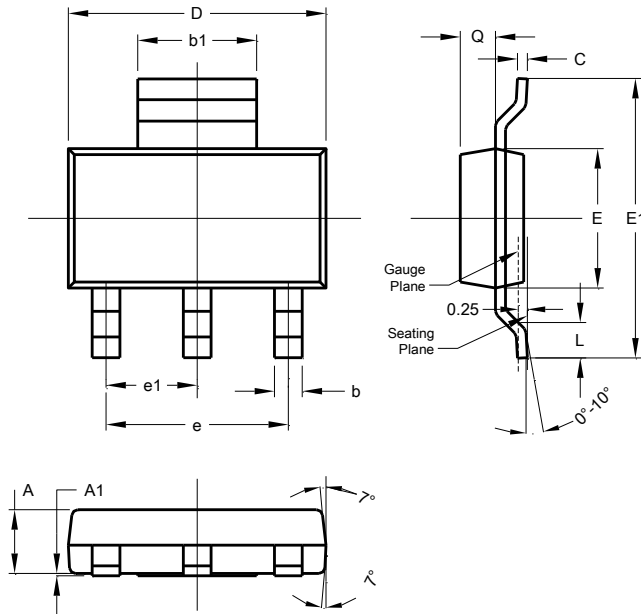
**Capacitance v Drain-Source Voltage**



**Gate-Source Voltage v Gate Charge**

**Package Outline Dimensions**

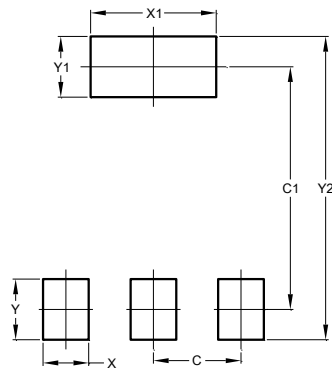
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT223               |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 1.55  | 1.65 | 1.60 |
| A1                   | 0.010 | 0.15 | 0.05 |
| b                    | 0.60  | 0.80 | 0.70 |
| b1                   | 2.90  | 3.10 | 3.00 |
| C                    | 0.20  | 0.30 | 0.25 |
| D                    | 6.45  | 6.55 | 6.50 |
| E                    | 3.45  | 3.55 | 3.50 |
| E1                   | 6.90  | 7.10 | 7.00 |
| e                    | -     | -    | 4.60 |
| e1                   | -     | -    | 2.30 |
| L                    | 0.85  | 1.05 | 0.95 |
| Q                    | 0.84  | 0.94 | 0.89 |
| 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          | 2.30          |
| C1         | 6.40          |
| X          | 1.20          |
| X1         | 3.30          |
| Y          | 1.60          |
| Y1         | 1.60          |
| Y2         | 8.00          |

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