

Product Summary

| | | |
|---------------|-----------------------------|------------------------------------|
| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_A = +25^\circ\text{C}$ |
| -200V | 25Ω @ $V_{GS} = 10\text{V}$ | 200mA |

Description

This new generation trench MOSFET features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Applications

- Active clamping of primary aide MOSFETs in 48 Volt DC-DC converters

Features and Benefits

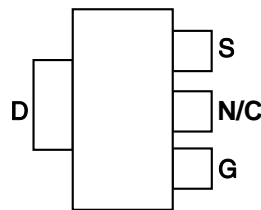
- High Voltage
- Low On-resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

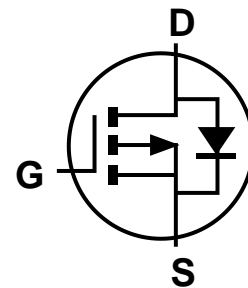
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.112 grams (Approximate)



Top View



Pin Out - Top



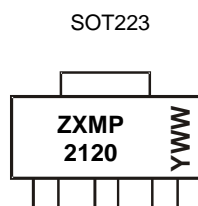
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|----------|--------------------|-----------------|-------------------|
| ZXMP2120G4TA | ZXMP2120 | 7 | 12 | 1,000 |
| ZXMP2120G4TC | ZXMP2120 | 13 | 12 | 4,000 |

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 - See 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



ZXMP2120 = 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_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|------------------|-------|------|
| Drain-Source Voltage | V _{DSS} | -200 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current (V _{GS} = 10V; T _A = +25°C) (Note 5) | I _D | -200 | mA |
| Pulsed Drain Current (Note 6) | I _{DM} | -1 | A |
| Pulsed Source Current (Body Diode) (Note 6) | I _{SM} | -1 | A |

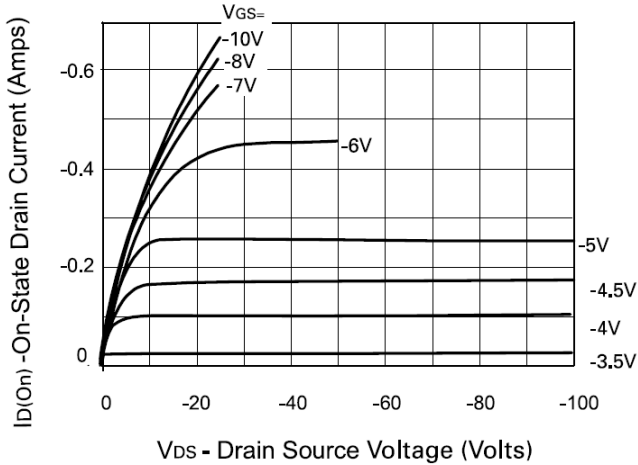
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|-------|
| Power Dissipation at T _A = +25°C (Note 5) | P _D | 2.0 | W |
| Linear Derating Factor | | 1.6 | mW/°C |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 62.5 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

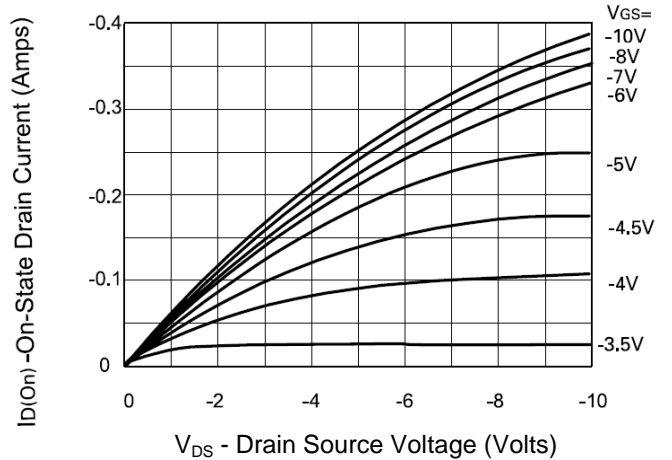
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|------|-----|-------------|------|--|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -200 | - | - | V | V _{GS} = 0V, I _D = -1mA |
| Zero Gate Voltage Drain Current | I _{DSS} | - | - | -10 -100 | µA | V _{DS} = -200V, V _{GS} = 0V V _{DS} = -160V, V _{GS} = 0V, T = +125°C |
| Gate-Source Leakage | I _{GSS} | - | - | 20 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | -1.5 | - | -3.5 | V | V _{DS} = V _{GS} , I _D = -1mA |
| Static Drain-Source On-Resistance (Note 7) | R _{DS(ON)} | - | - | 25 | Ω | V _{GS} = -10V, I _D = -150mA |
| Forward Transconductance (Notes 7 & 8) | g _{fs} | 50 | - | - | mS | V _{DS} = -25V, I _D = -150mA |
| On-State Drain Current (Note 7) | I _{D(ON)} | -300 | - | - | mA | V _{DS} = -25V, V _{GS} = -10V |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance (Note 8) | C _{iss} | - | - | 100 | pF | V _{DS} = -25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance (Note 8) | C _{oss} | - | - | 25 | pF | |
| Reverse Transfer Capacitance (Note 8) | C _{rss} | - | - | 7 | pF | V _{DD} = -25V, I _D = -150mA |
| Turn-On Delay Time (Notes 8 & 9) | t _{D(ON)} | - | - | 7 | ns | |
| Turn-On Rise Time (Notes 8 & 9) | t _R | - | - | 15 | ns | |
| Turn-Off Delay Time (Notes 8 & 9) | t _{D(OFF)} | - | - | 12 | ns | |
| Turn-Off Fall Time (Notes 8 & 9) | t _F | - | - | 15 | ns | |

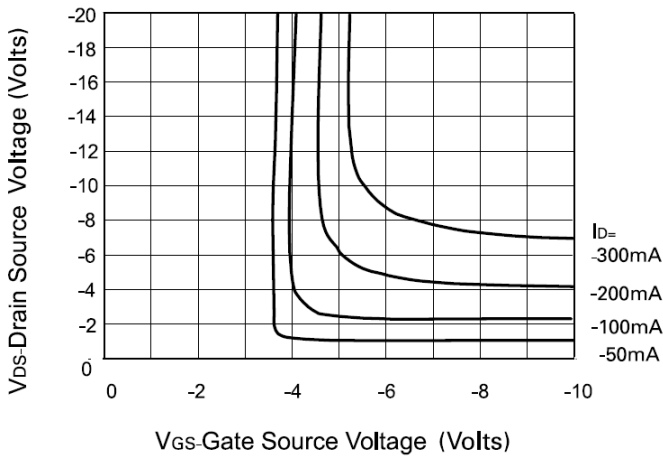
- Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 6. Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
 7. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.
 8. Sample test.
 9. Switching characteristics are independent of operating junction temperature.



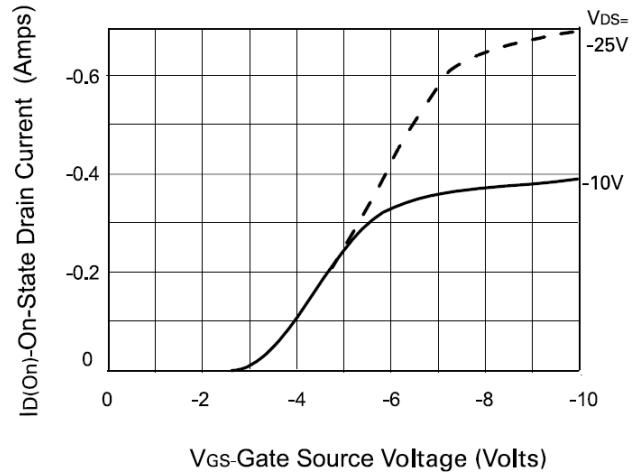
Output Characteristics



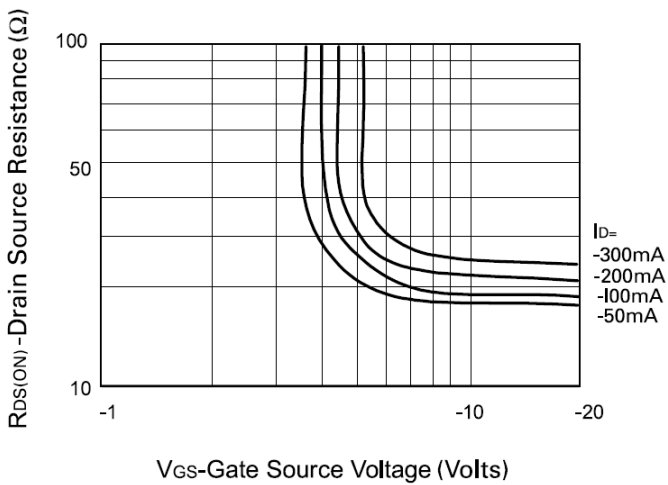
Saturation Characteristics



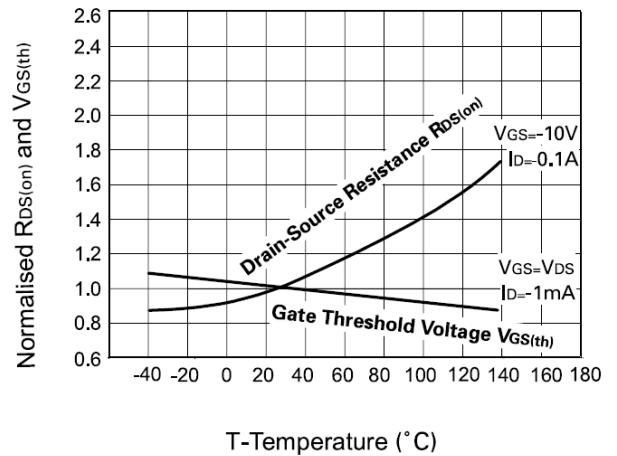
Voltage Saturation Characteristics



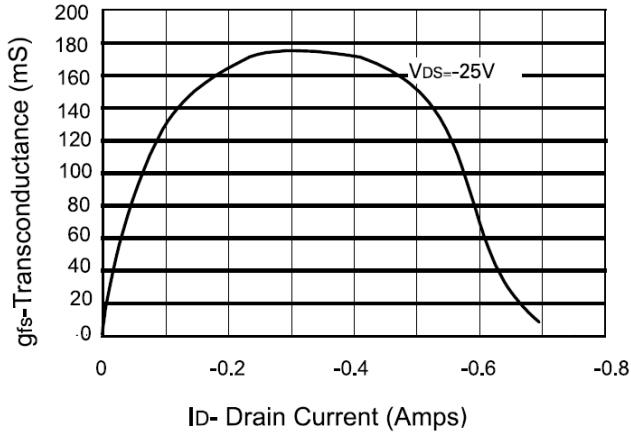
Transfer Characteristics



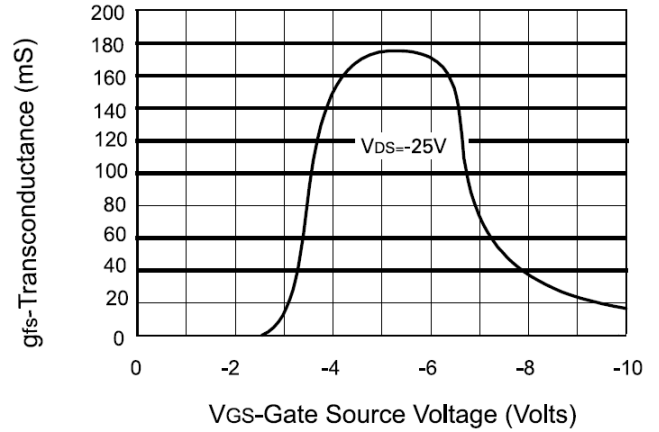
On-resistance vs gate-source voltage



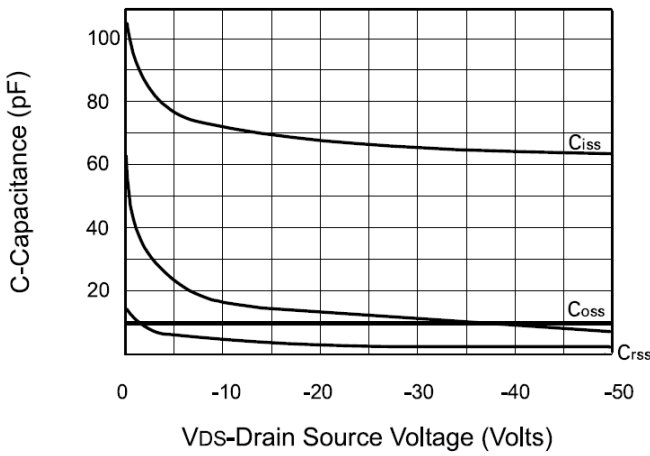
Normalised $R_{DS(on)}$ and $V_{GS(th)}$ vs Temperature



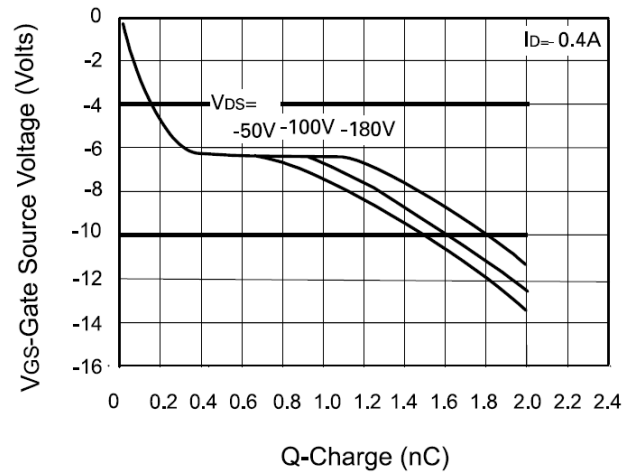
Transconductance v drain current



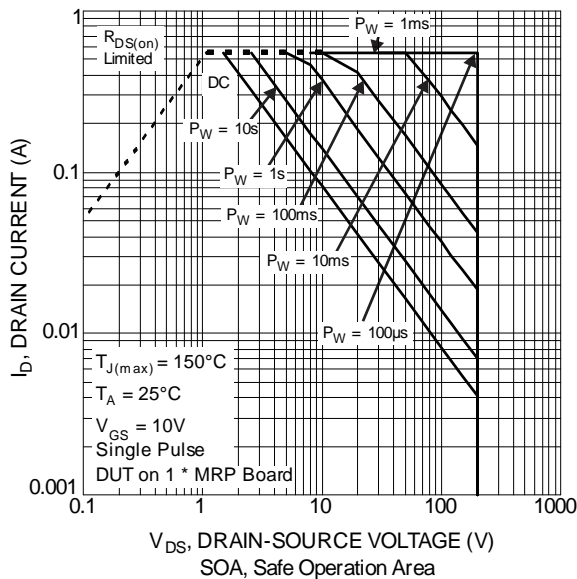
Transconductance v gate-source voltage

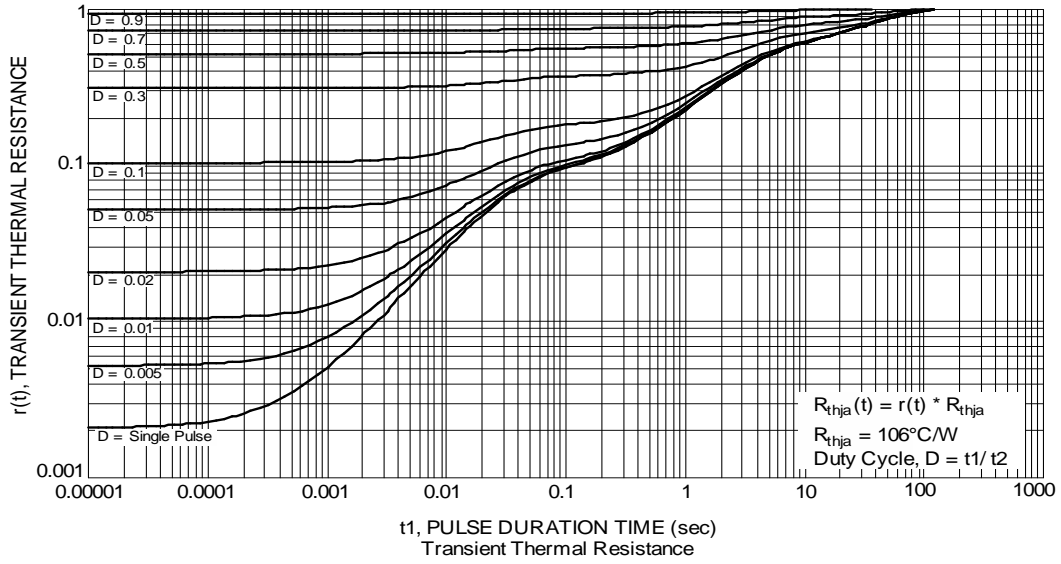


Capacitance v drain-source voltage



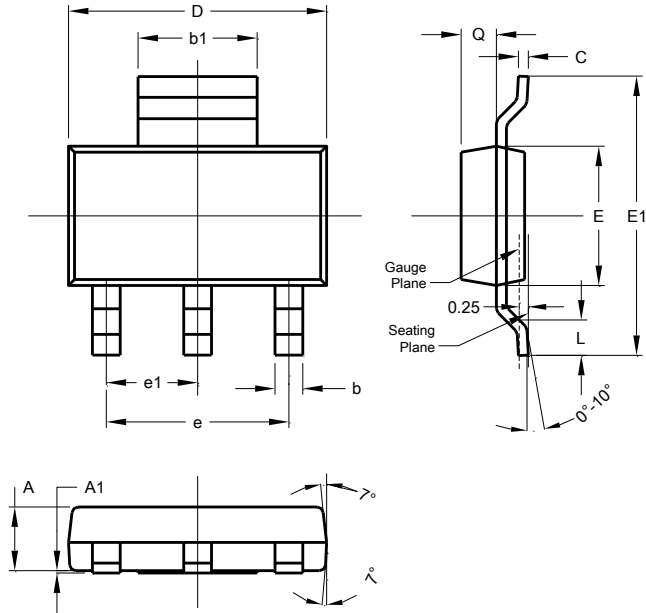
Gate charge v gate-source voltage





Package Outline Dimensions

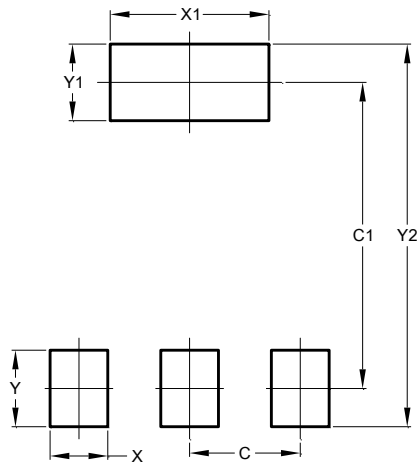
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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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