

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON) \max}$ | Package | I_D $T_A = +25^\circ\text{C}$ |
|---------------|---|---------|------------------------------------|
| -20V | 52m Ω @ $V_{GS} = -4.5\text{V}$ | SOT23 | -5.0A |
| | 100m Ω @ $V_{GS} = -2.5\text{V}$ | | -3.6A |

Description

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

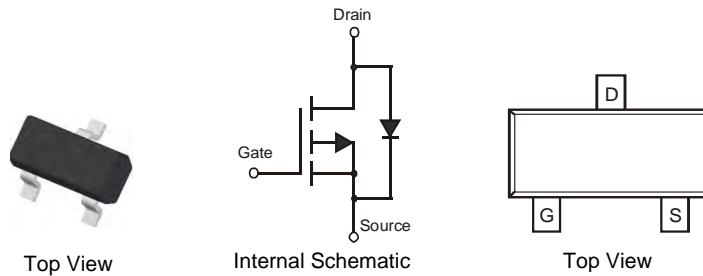
- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor Control

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 standards for High Reliability**

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (approximate)

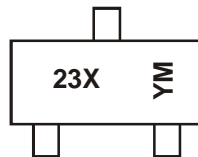


Ordering Information (Note 4)

| Part Number | Compliance | Case | Packaging |
|--------------|------------|-------|-------------------|
| DMG2305UX-7 | Standard | SOT23 | 3000/Tape & Reel |
| DMG2305UX-13 | Standard | SOT23 | 10000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. 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.
 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



23X = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: W = 2009)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|
| Code | W | X | Y | Z | A | B | C |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|---|--------------|--|------------------|--------------|-------|
| Drain-Source Voltage | | | V _{DSS} | -20 | V |
| Gate-Source Voltage | | | V _{GSS} | ±8 | V |
| Continuous Drain Current (Note 5) V _{GS} = -4.5V | Steady State | T _A = +25°C T _A = +70°C | I _D | -4.2 -3.3 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | -5.0 -4.0 | A |
| Pulsed Drain Current (Note 6) | | | I _{DM} | -10 | A |

Thermal Characteristics

| Characteristic | | | Symbol | Value | Unit |
|--|--------------|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | | | P _D | 1.4 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | | R _{θJA} | 90 | °C/W |
| | t < 10s | | | 64 | °C/W |
| Thermal Resistance, Junction to Case (Note 7) | | | R _{θJC} | 33 | °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 (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -20 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -1.0 | μA | T _J = +25°C, V _{DS} = -20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±8V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -0.5 | — | -0.9 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 40 | 52 | mΩ | V _{GS} = -4.5V, I _D = -4.2A |
| | | | 52 | 100 | | V _{GS} = -2.5V, I _D = -3.4A |
| | | | 68 | 200 | | V _{GS} = -1.8V, I _D = -2A |
| Forward Transfer Admittance | Y _{fs} | — | 9 | — | S | V _{DS} = -5V, I _D = -4A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 808 | — | pF | V _{DS} = -15V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 85 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 77 | — | pF | |
| Gate Resistance | R _G | — | 15.2 | — | Ω | V _{GS} = 0V, V _{DS} = 0V, f = 1.0MHz |
| SWITCHING CHARACTERISTICS (Note 8) | | | | | | |
| Total Gate Charge | Q _g | — | 10.2 | — | nC | V _{GS} = -4.5V, V _{DS} = -4V, I _D = -3.5A |
| Gate-Source Charge | Q _{gs} | — | 1.3 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 2.2 | — | nC | |
| Turn-On Delay Time | t _{D(on)} | — | 10.8 | — | ns | V _{DS} = -4V, V _{GS} = -4.5V, R _G = 6Ω, I _D = -1A |
| Turn-On Rise Time | t _r | — | 13.7 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 79.3 | — | ns | |
| Turn-Off Fall Time | t _f | — | 34.7 | — | ns | |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Repetitive rating, pulse width limited by junction temperature.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing

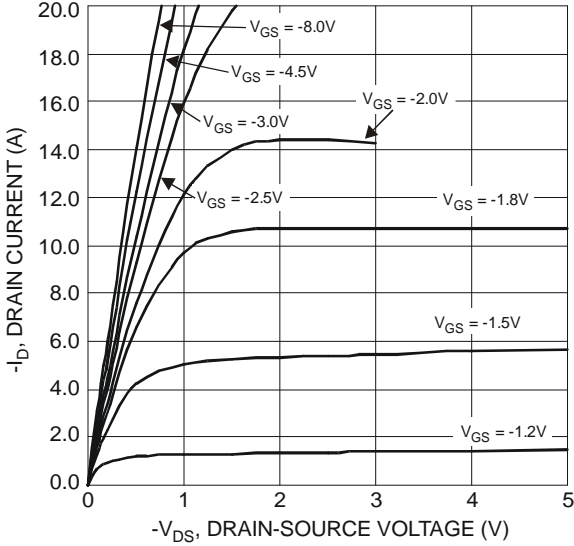


Figure 1 Typical Output Characteristics

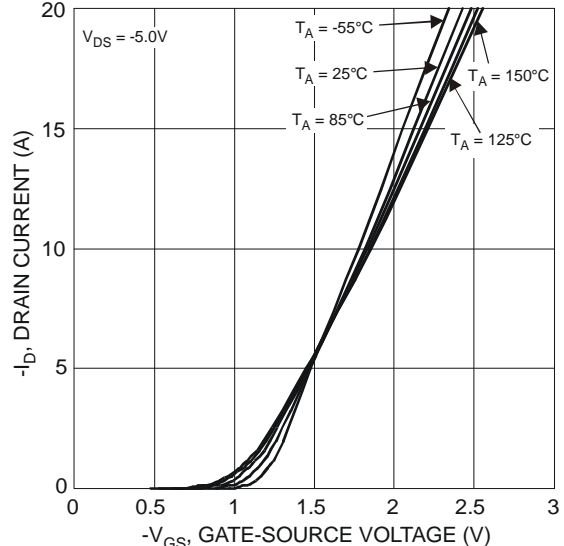


Figure 2 Typical Transfer Characteristics

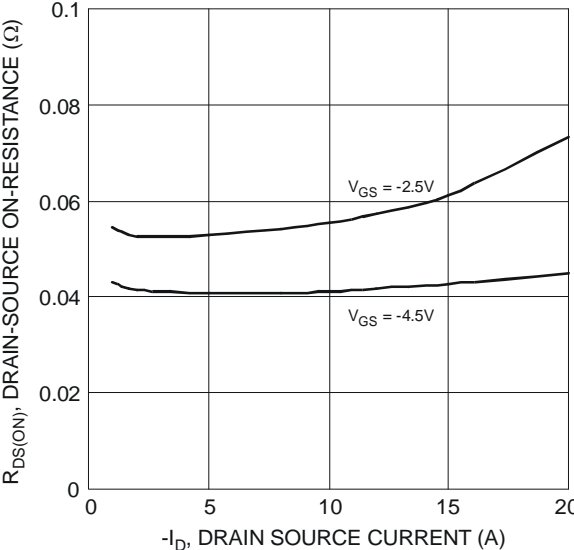


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

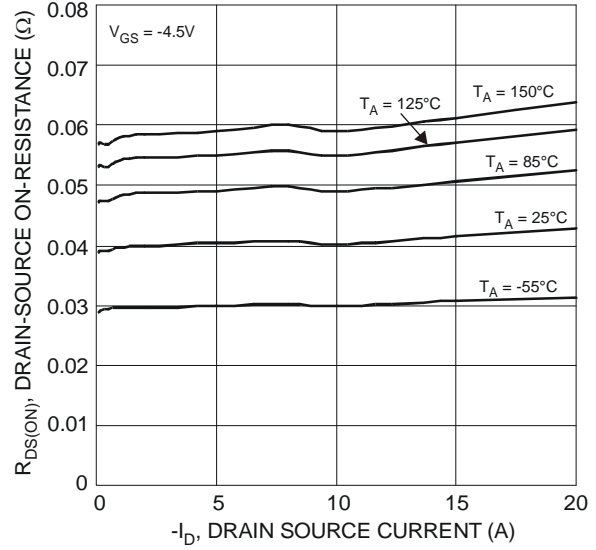


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

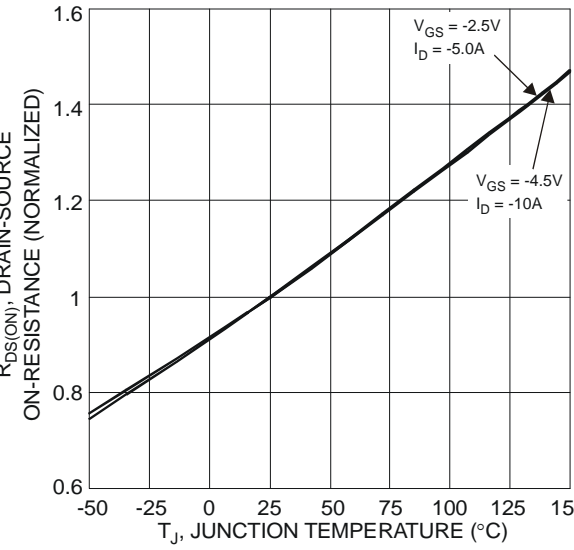


Figure 5 On-Resistance Variation with Temperature

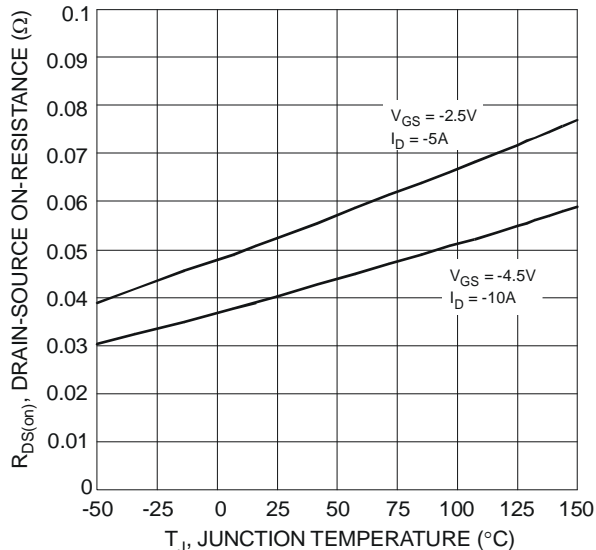


Figure 6 On-Resistance Variation with Temperature

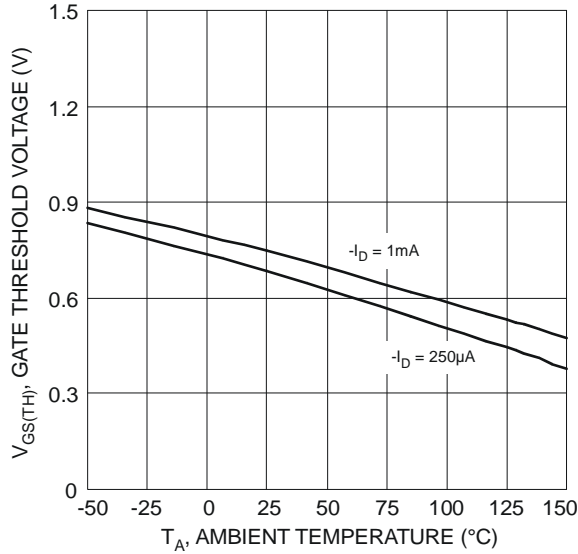


Figure 7 Gate Threshold Variation vs. Ambient Temperature

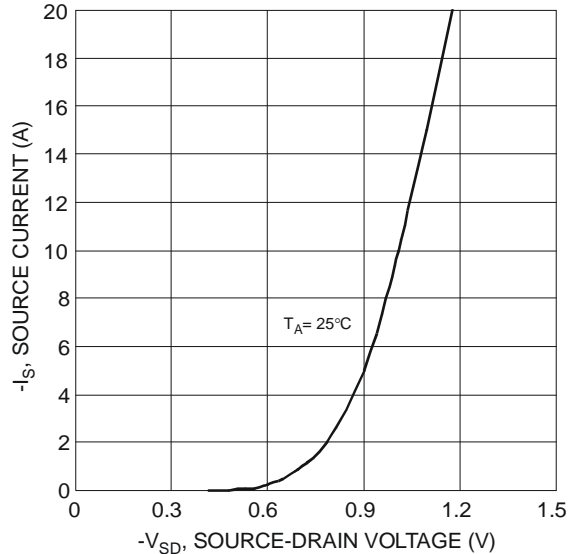
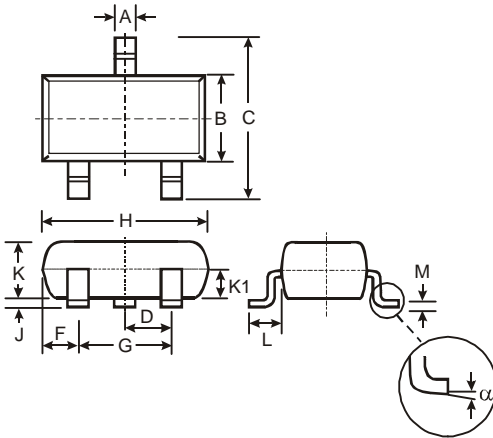


Figure 8 Diode Forward Voltage vs. Current

Package Outline Dimensions

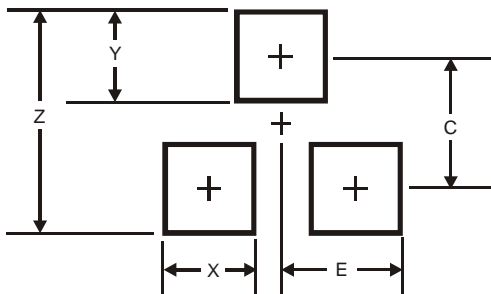
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT23 | | | |
|----------------------|-------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.903 | 1.10 | 1.00 |
| K1 | - | - | 0.400 |
| L | 0.45 | 0.61 | 0.55 |
| M | 0.085 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| 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) |
|------------|---------------|
| Z | 2.9 |
| X | 0.8 |
| Y | 0.9 |
| C | 2.0 |
| E | 1.35 |

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