

Product Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D Max T _A = +25°C |
|-------------------|-------------------------------|--|
| 20V | 29mΩ @ V _{GS} = 10V | 6.5A |
| | 35mΩ @ V _{GS} = 4.5V | 5.2A |

Description

This new generation 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

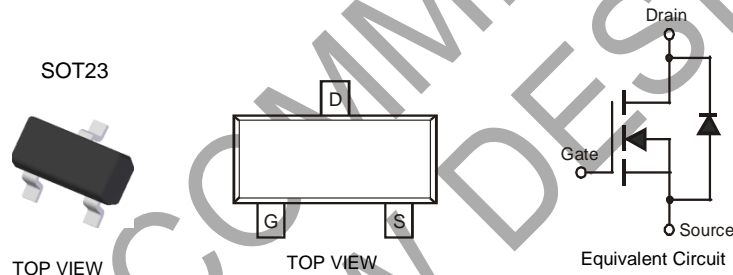
- General Purpose Interfacing Switch
- Power Management Functions

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- 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**
- PPAP Capable (Note 4)**

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- 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)

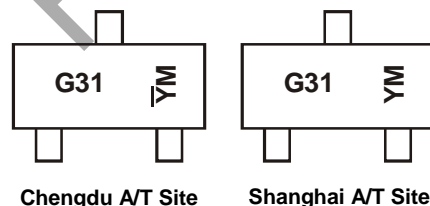


Ordering Information (Note 5)

| Part Number | Qualification | Case | Packaging |
|-------------|---------------|-------|------------------|
| DMG3420U-7 | Standard | SOT23 | 3000/Tape & Reel |
| DMG3420UQ-7 | Automotive | SOT23 | 3000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - 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 <https://www.diodes.com/quality/product-compliance-definitions/>.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



G31 = Product Type Marking Code
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 Y = Date Code Marking for CAT (Chengdu Assembly/ Test site)
 Y or Y = Year (ex: E = 2017)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | ~ | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|------|------|---|------|------|------|------|------|------|------|------|------|
| Code | W | ~ | E | F | G | H | I | J | K | L | M |

| 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 | Unit |
|-----------------------------------|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | 20 | V |
| Gate-Source Voltage | | | V _{GSS} | ±12 | V |
| Continuous Drain Current (Note 6) | Steady State | T _A = +25°C | I _D | 5.47 | A |
| | | T _A = +85°C | | 3.43 | |
| Pulsed Drain Current (Note 7) | | | I _{DM} | 20 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 6) | P _D | 0.74 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6) | R _{θJA} | 167 | °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 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 20 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | 1.0 | μA | V _{DS} = 20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±12V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 0.5 | 0.95 | 1.2 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 21 | 29 | mΩ | V _{GS} = 10V, I _D = 6A |
| | | | 25 | 35 | | V _{GS} = 4.5V, I _D = 5A |
| | | | 34 | 48 | | V _{GS} = 2.5V, I _D = 4A |
| | | | 65 | 91 | | V _{GS} = 1.8V, I _D = 2A |
| Forward Transfer Admittance | Y _{fs} | — | 9 | — | s | V _{DS} = 5V, I _D = 3.8A |
| Diode Forward Voltage | V _{SD} | — | 0.75 | 1.0 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | 434.7 | — | pF | V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 69.1 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 61.2 | — | pF | |
| Gate Resistance | R _g | — | 1.53 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge | Q _g | — | 5.4 | — | nC | V _{GS} = 4.5V, V _{DS} = 10V, I _D = 6A |
| Gate-Source Charge | Q _{gs} | — | 0.9 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 1.5 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 6.5 | — | ns | V _{DD} = 10V, V _{GS} = 5V, R _L = 1.7Ω, R _g = 6Ω |
| Turn-On Rise Time | t _R | — | 8.3 | — | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 21.6 | — | ns | |
| Turn-Off Fall Time | t _F | — | 5.3 | — | ns | |

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Repetitive rating, pulse width limited by junction temperature.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to production testing.

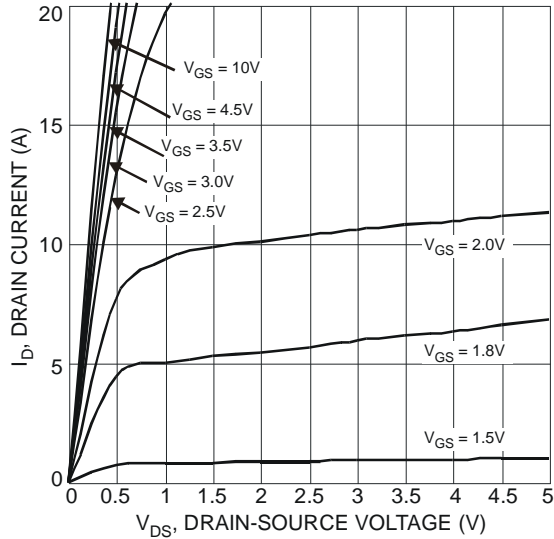


Fig. 1 Typical Output Characteristics

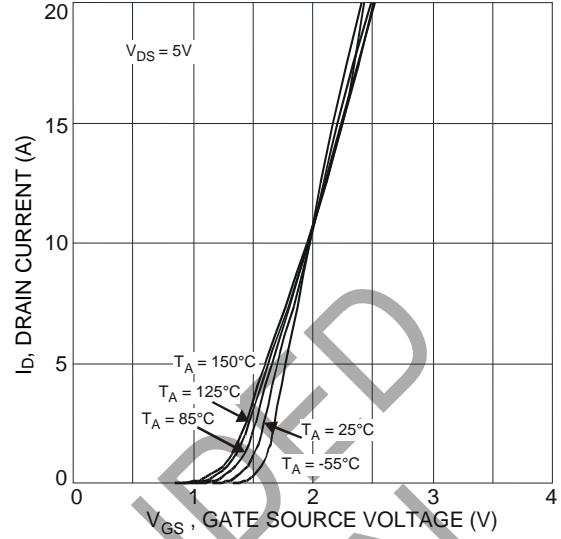


Fig. 2 Typical Transfer Characteristics

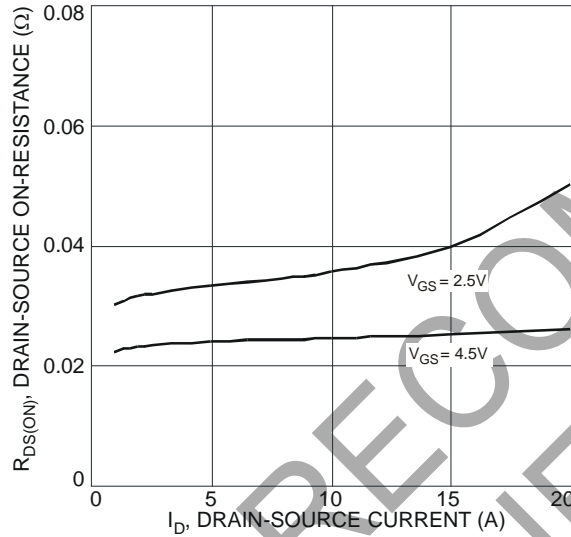


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

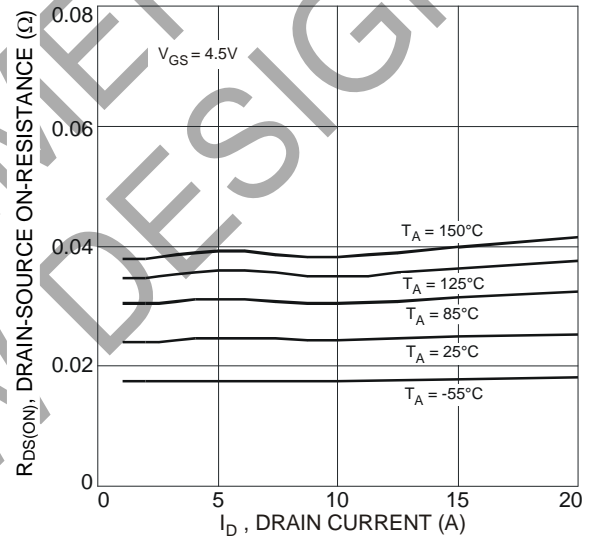


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

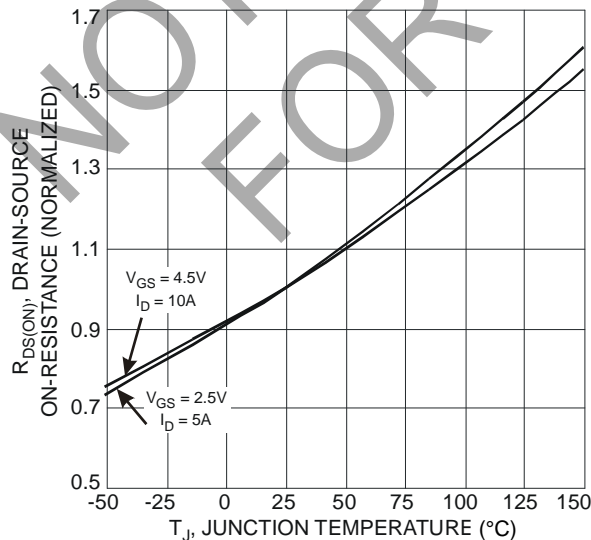


Fig. 5 On-Resistance Variation with Temperature

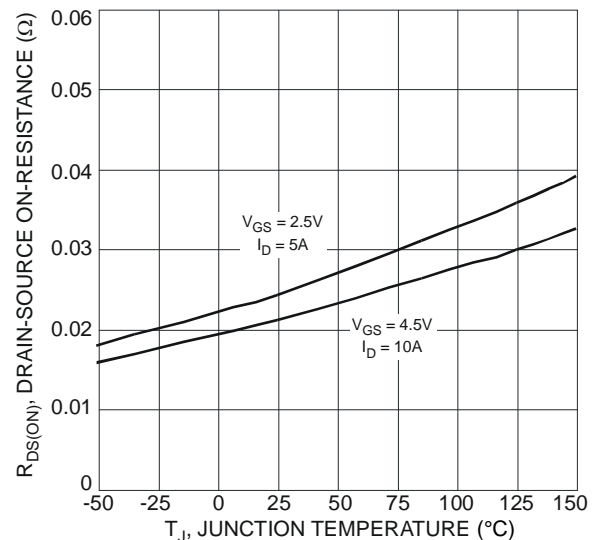


Fig. 6 On-Resistance Variation with Temperature

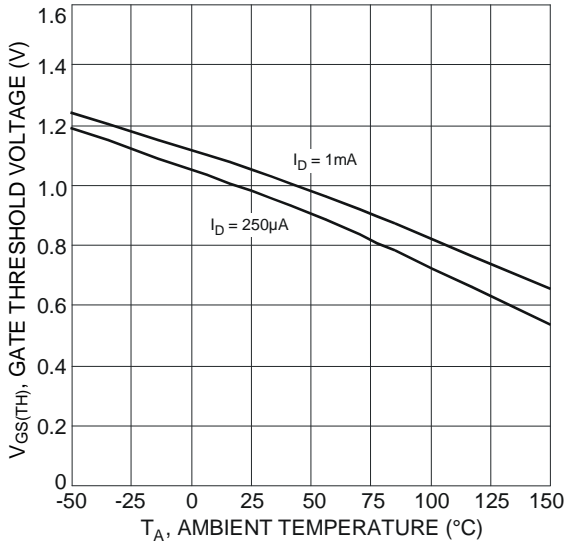


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

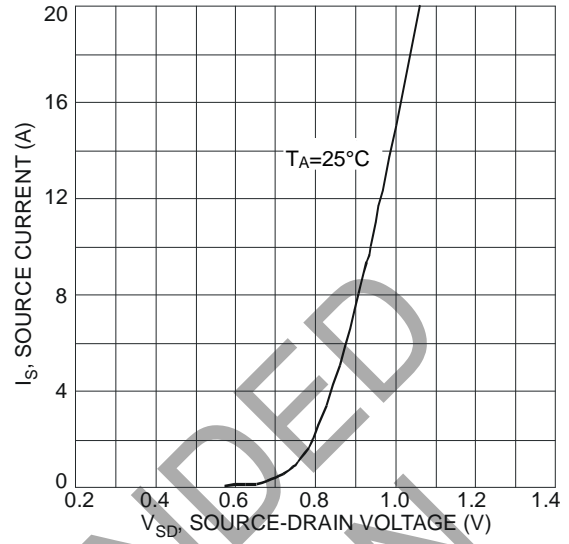


Fig. 8 Diode Forward Voltage vs. Current

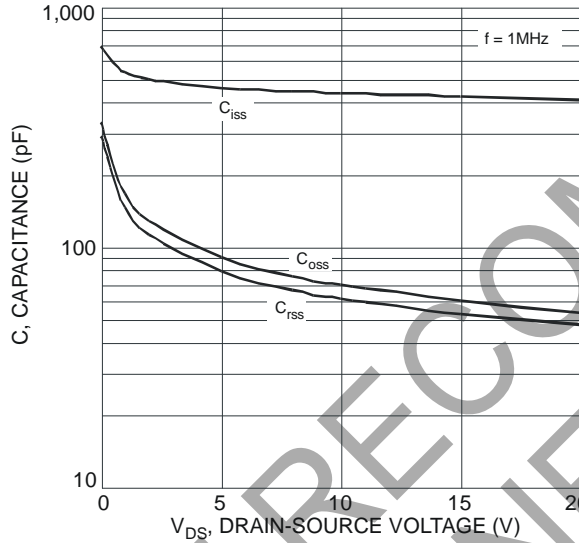


Fig. 9 Typical Capacitance

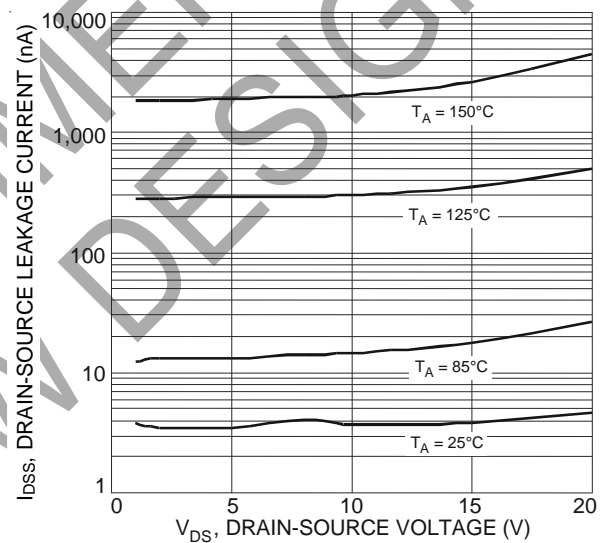


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

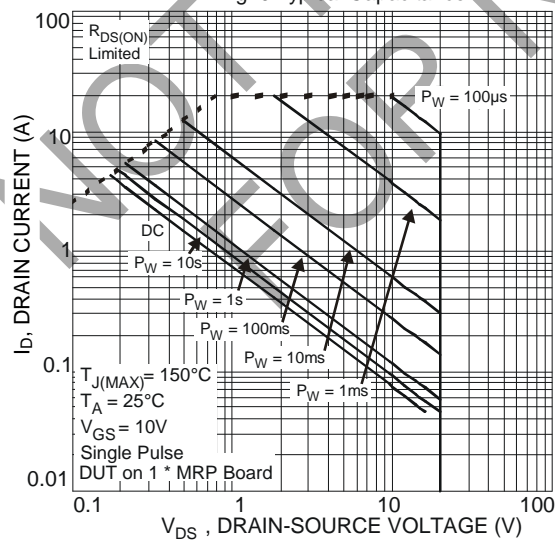


Fig. 11 SOA, Safe Operation Area

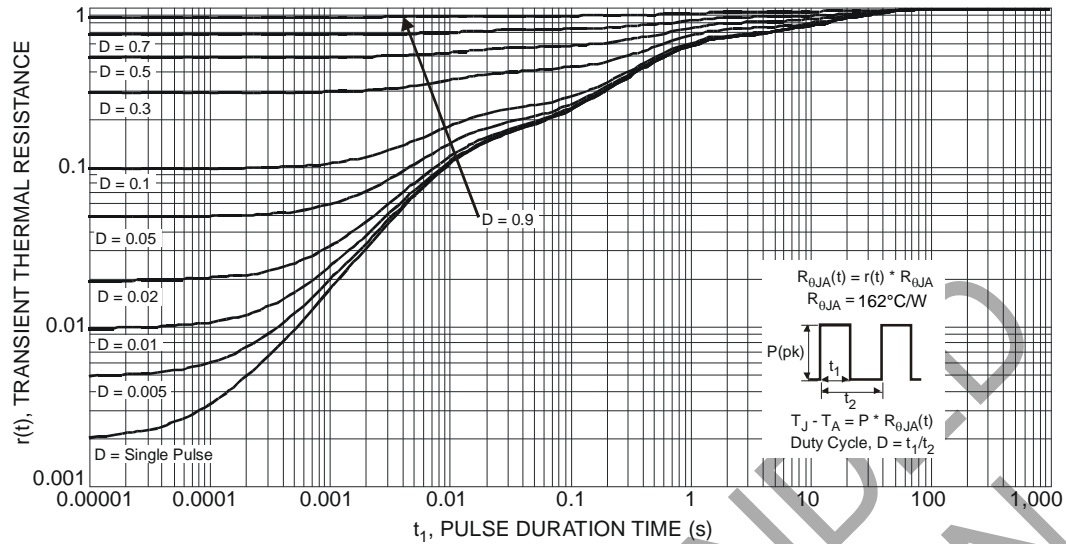
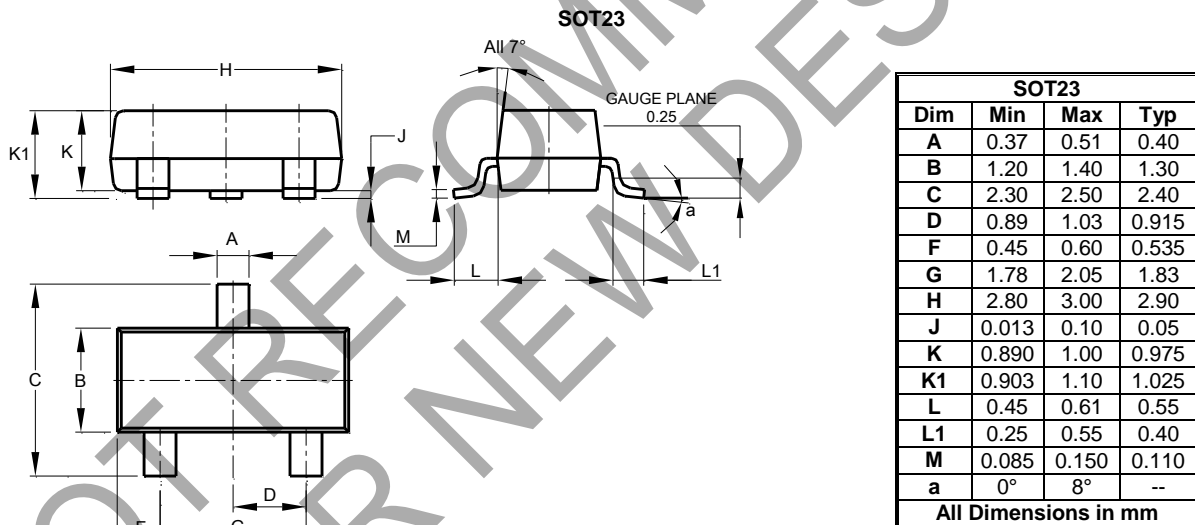


Fig. 12 Transient Thermal Response

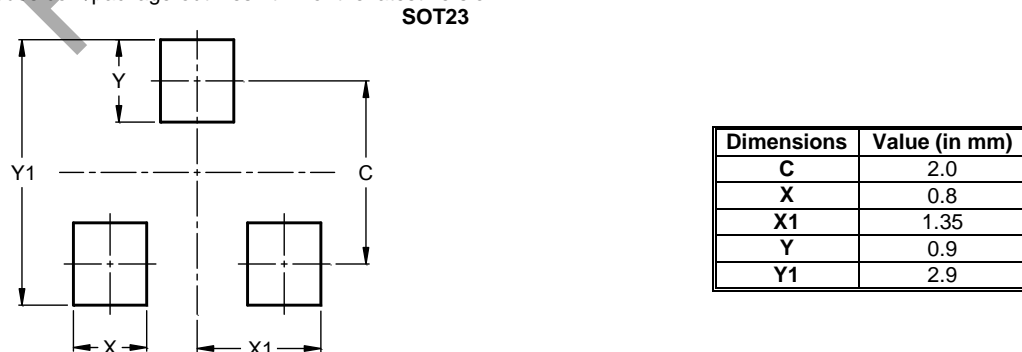
Package Outline Dimensions

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Suggested Pad Layout

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