

Product Summary

| | | |
|------------|--------------------------|------------------------------|
| BV_{DSS} | $R_{DS(ON)}$ | I_D $T_A = +25^\circ C$ |
| -20V | 200mΩ @ $V_{GS} = -4.5V$ | -2.3A |

Description

This new generation of high density MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

Applications

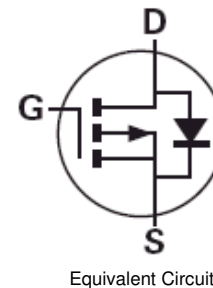
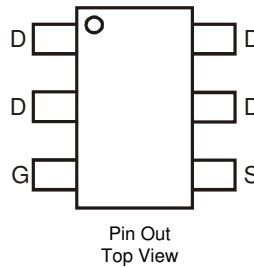
- DC - DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

Features and Benefits

- Low On-resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: SOT26
- 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
- Weight: 0.018 grams (Approximate)

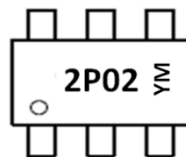


Ordering Information (Note 4)

| Part Number | Reel Size (inch) | Tape Width (mm) | Quantity Per Reel |
|--------------|------------------|-----------------|-------------------|
| ZXM62P02E6TA | 7 | 8 | 3,000 |
| ZXM62P02E6TC | 13 | 8 | 10,000 |

- 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



2P02 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: C = 2015)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | C | D | E | F | G | H | I | J | K | L | M | N |

| 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 |

Absolute Maximum Ratings

| Characteristic | | Symbol | Value | Unit | |
|--|------------------|----------------|------------------------------|------------|---|
| Drain-Source Voltage | | V_{DSS} | -20 | V | |
| Gate-Source Voltage | | V_{GSS} | ± 12 | V | |
| Continuous Drain Current | $V_{GS} = -4.5V$ | I_D | $T_A = +25^\circ C$ (Note 6) | -2.3 | A |
| | | | $T_A = +70^\circ C$ (Note 6) | -1.7 | |
| Pulsed Drain Current | | (Note 7) | I_{DM} | -13 | A |
| Continuous Source Current (Body Diode) | | (Note 6) | I_S | -1.9 | A |
| Pulsed Source Current (Body Diode) | | (Note 7) | I_{SM} | -13 | A |
| Power Dissipation at $T_A = +25^\circ C$ | | (Note 5) | P_D | 1.1 | W |
| Linear Derating Factor | | | | 8.8 | |
| Power Dissipation at $T_A = +25^\circ C$ | | (Note 6) | P_D | 1.7 | W |
| Linear Derating Factor | | | | 13.7 | |
| Operating and Storage Temperature Range | | T_J, T_{STG} | -55 to +150 | $^\circ C$ | |

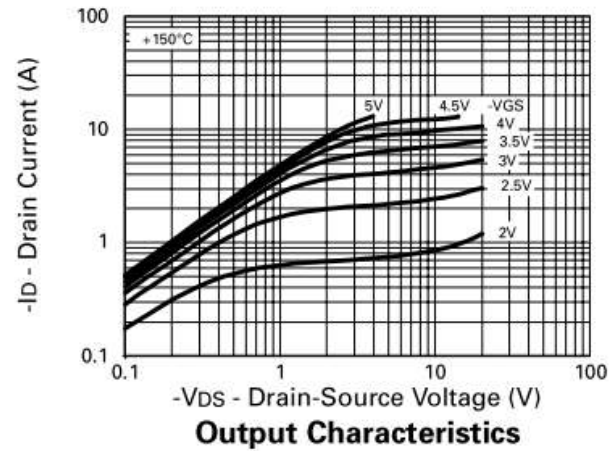
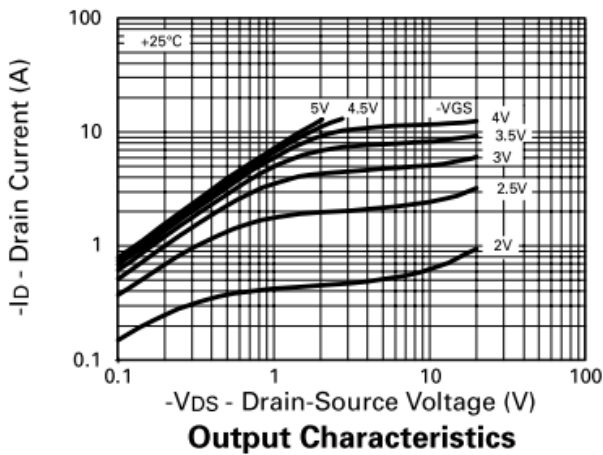
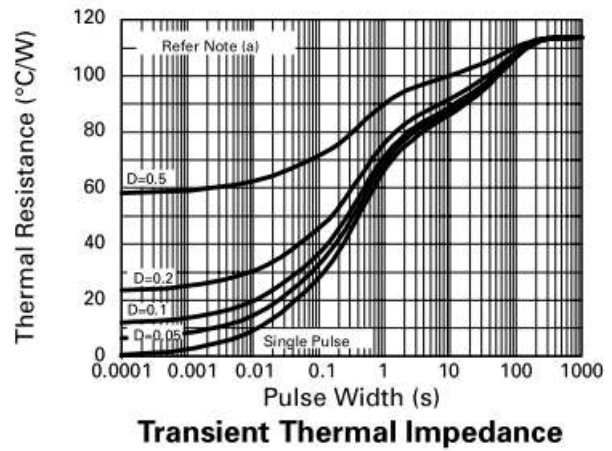
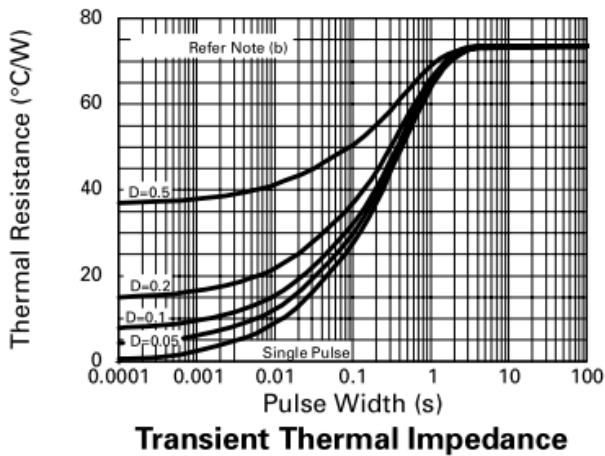
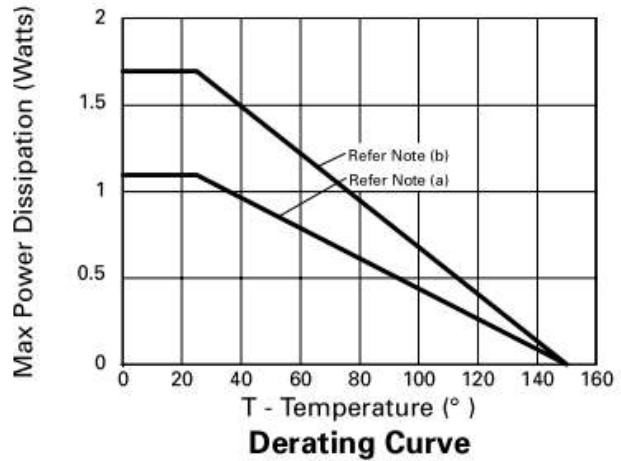
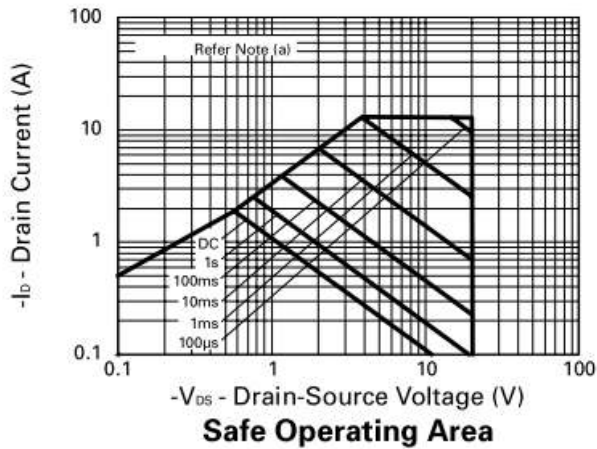
Thermal Resistance

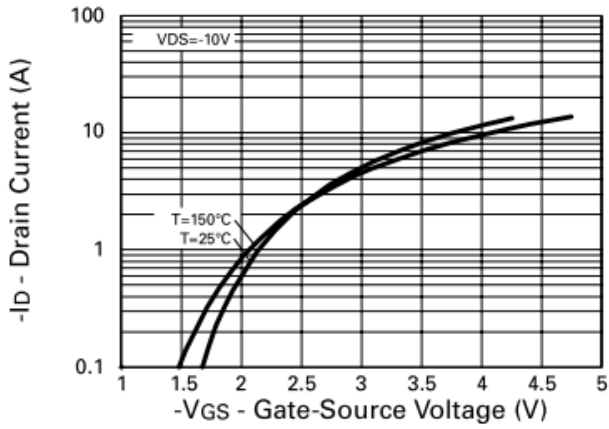
| Characteristic | | Symbol | Value | Unit |
|---------------------|----------|-----------------|-------|--------------|
| Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 113 | $^\circ C/W$ |
| | (Note 6) | | 73 | |

Electrical Characteristics (@ $T_A = +25^\circ C$, unless otherwise stated.)

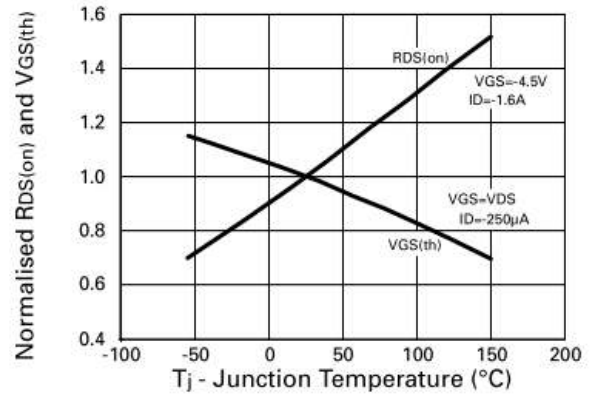
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--------------|------|------|-----------|----------|--|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -20 | — | — | V | $I_D = -250\mu A, V_{GS} = 0V$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | -1 | μA | $V_{DS} = -20V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 12V, V_{DS} = 0V$ |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -0.7 | — | — | V | $I_D = -250\mu A, V_{DS} = V_{GS}$ |
| Static Drain-Source On-Resistance (Note 8) | $R_{DS(ON)}$ | — | — | 0.2 | Ω | $V_{GS} = -4.5V, I_D = -1.6A$ |
| | | | | 0.375 | | $V_{GS} = -2.7V, I_D = -0.8A$ |
| Forward Transconductance (Note 10) | g_{fs} | 1.5 | — | — | S | $V_{DS} = -10V, I_D = -0.8A$ |
| DYNAMIC (Note 10) | | | | | | |
| Input Capacitance | C_{iss} | — | 320 | — | pF | $V_{DS} = -15V, V_{GS} = 0V$ $f = 1MHz$ |
| Output Capacitance | C_{oss} | — | 150 | — | pF | |
| Reverse Transfer Capacitance | C_{rss} | — | 75 | — | pF | |
| SWITCHING (Notes 9 and 10) | | | | | | |
| Total Gate Charge | Q_g | — | — | 5.8 | nC | $V_{DS} = -16V, V_{GS} = -4.5V$ $I_D = -1.6A$ (Refer to test circuit) |
| Gate-Source Charge | Q_{gs} | — | — | 1.25 | nC | |
| Gate-Drain Charge | Q_{gd} | — | — | 2.8 | nC | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 4.1 | — | ns | $V_{DD} = -10V, I_D = -1.6A, R_G = 6\Omega,$ $R_D = 6.1\Omega$ (Refer to test circuit) |
| Turn-On Rise Time | t_R | — | 15.4 | — | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 12.0 | — | ns | |
| Turn-Off Fall Time | t_F | — | 19.2 | — | ns | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (Note 8) | V_{SD} | — | — | -0.95 | V | $T_J = +25^\circ C, I_S = -1.6A,$ $V_{GS} = 0V$ |
| Reverse recovery time (Note 10) | t_{RR} | — | 22.5 | — | ns | $T_J = +25^\circ C, I_F = -1.6A,$ |
| Reverse recovery charge (Note 10) | Q_{RR} | — | 10.4 | — | nC | $di/dt = 100A/\mu s$ |

- Notes:
5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 6. For a device surface mounted on FR-4 PCB measured at $t \leq 5$ secs.
 7. Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
 8. Measured under pulsed conditions. Width= 300 μs ; duty cycle $\leq 2\%$.
 9. Switching characteristics are independent of operating junction temperatures.
 10. For design aid only, not subject to production testing.

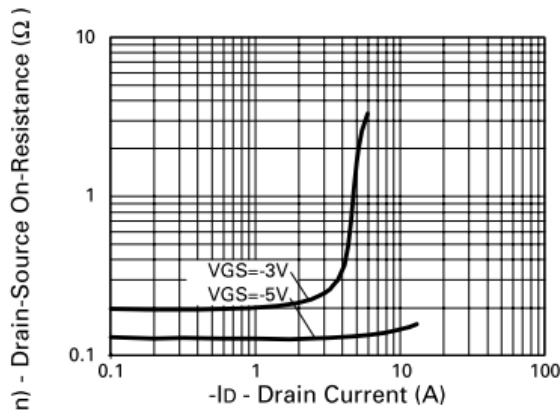




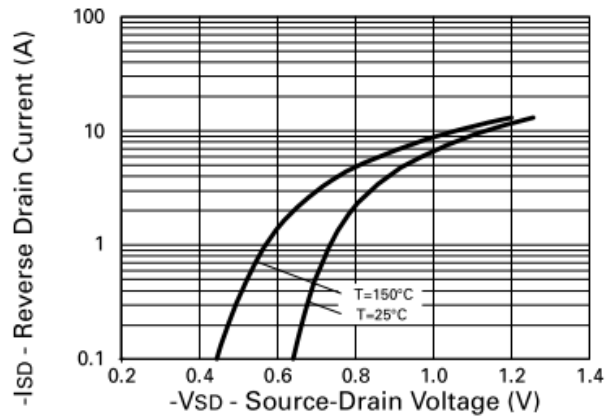
Typical Transfer Characteristics



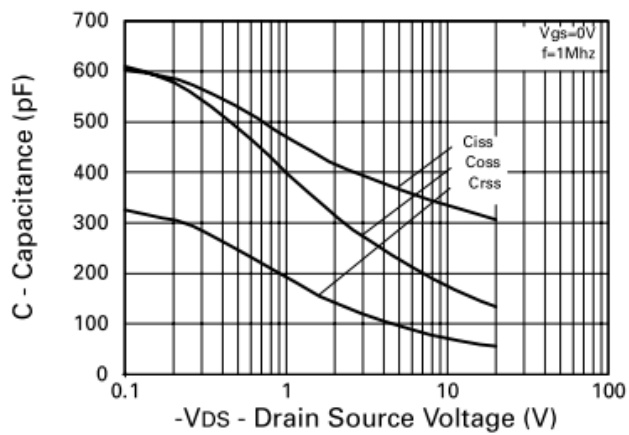
Normalised RDS(on) and VGS(th) v Temperature



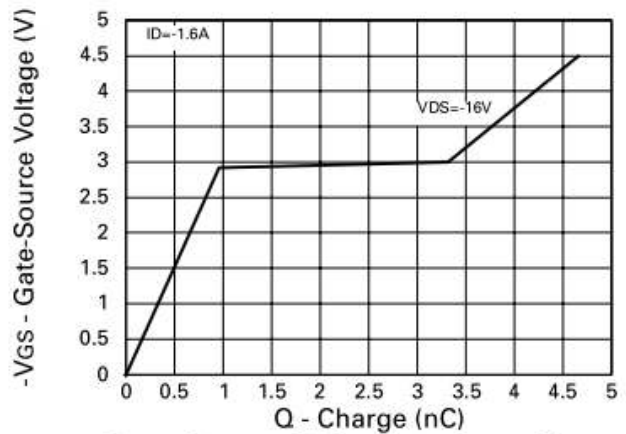
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

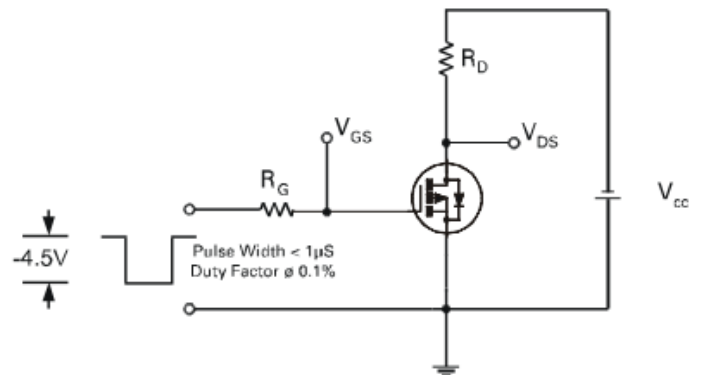
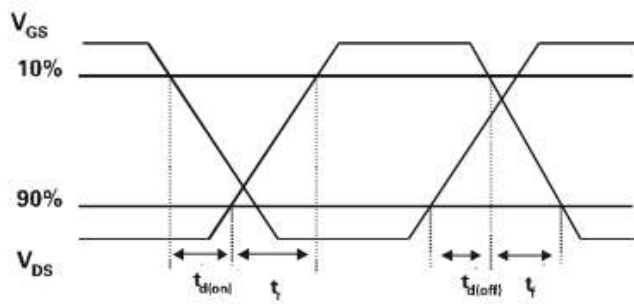
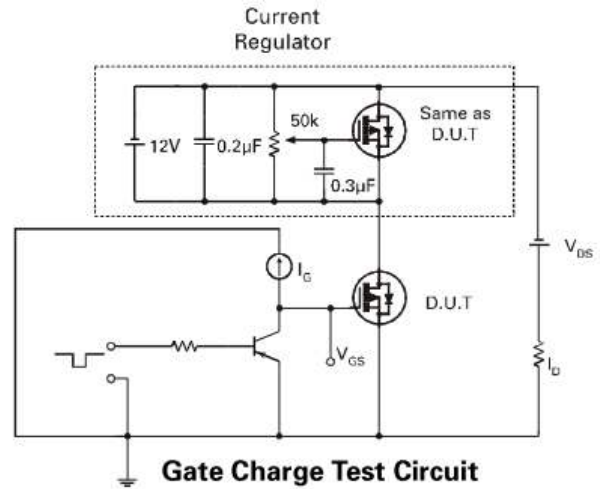
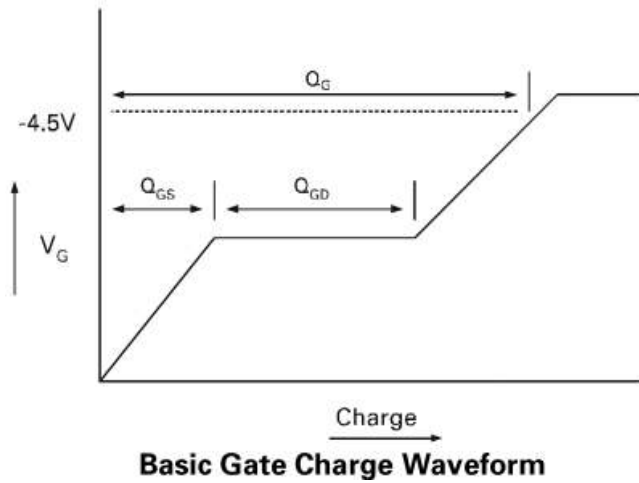


Capacitance v Drain-Source Voltage



Gate-Source Voltage v Gate Charge

Test Circuits

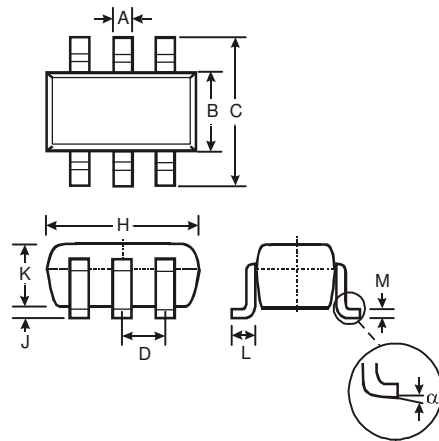


Switching Time Waveforms

Switching Time Test Circuit

Package Outline Dimensions

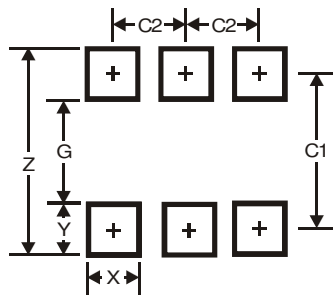
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT26 | | | |
|----------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 0.35 | 0.50 | 0.38 |
| B | 1.50 | 1.70 | 1.60 |
| C | 2.70 | 3.00 | 2.80 |
| D | — | — | 0.95 |
| H | 2.90 | 3.10 | 3.00 |
| J | 0.013 | 0.10 | 0.05 |
| K | 1.00 | 1.30 | 1.10 |
| L | 0.35 | 0.55 | 0.40 |
| M | 0.10 | 0.20 | 0.15 |
| 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 | 3.20 |
| G | 1.60 |
| X | 0.55 |
| Y | 0.80 |
| C1 | 2.40 |
| C2 | 0.95 |

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