

ZXMN3AMC

30V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on) max}$ | $I_D max$ $T_A = 25^\circ C$ (Notes 4 & 7) |
|---------------|---------------------------------|--|
| 30V | 120m Ω @ $V_{GS} = 10V$ | 3.7A |
| | 180m Ω @ $V_{GS} = 4.5V$ | 3.0A |

Description and Applications

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.

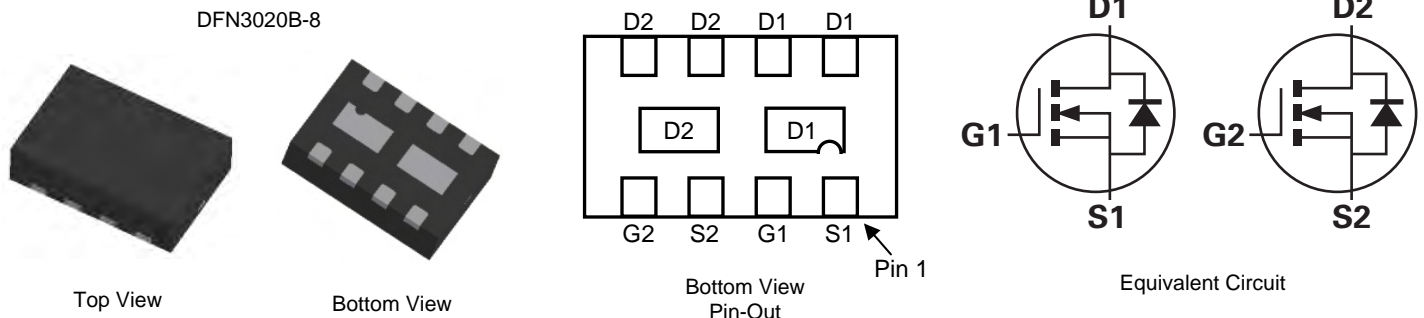
- DC-DC Converters
- Power management functions
- Disconnect switches
- Portable applications

Features and Benefits

- Low profile package, for thin applications
- Low $R_{\theta JA}$, thermally efficient package
- 6mm² footprint, 50% smaller than TSOP6 and SOT23-6
- Low on-resistance
- Fast switching speed
- "Lead-Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: DFN3020B-8
- Terminals: Pre-Plated NiPdAu leadframe
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)



Ordering Information (Note 3)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| ZXMN3AMCTA | DNB | 7 | 8 | 3000 |

- Notes:
1. No purposefully added lead
 2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



DNB = Product Type Marking Code
Top View, Dot Denotes Pin 1

ZXMN3AMC

Maximum Ratings @T_A = 25°C unless otherwise specified

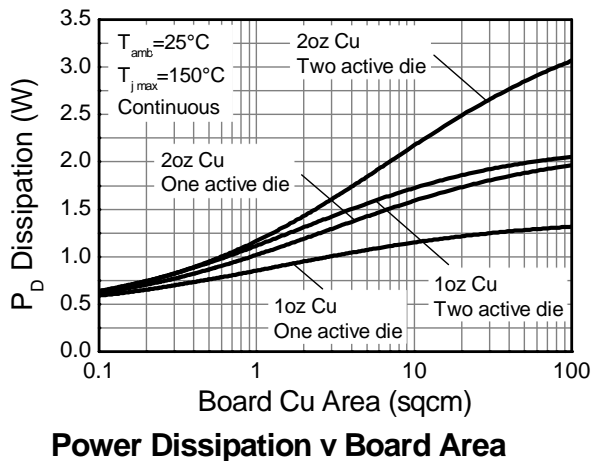
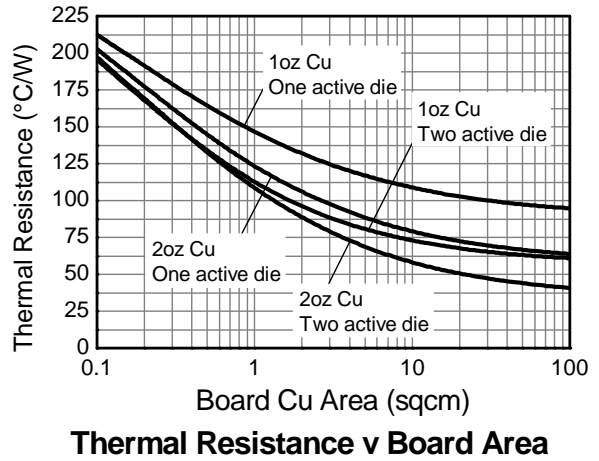
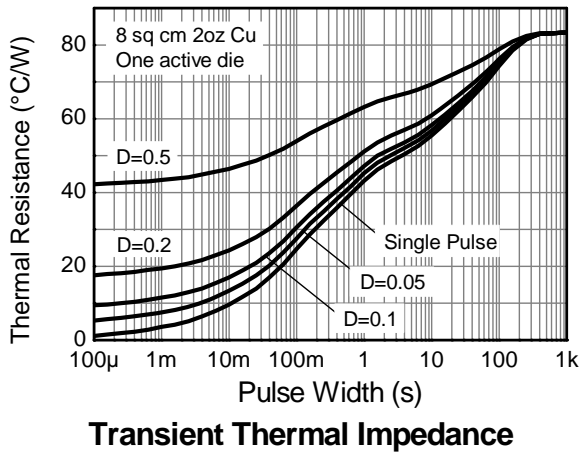
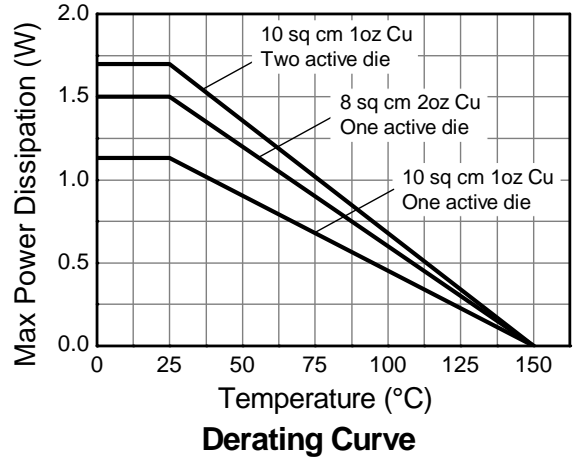
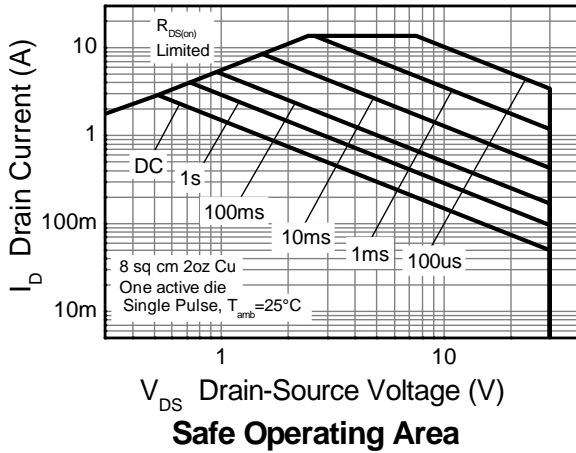
| Characteristic | | | Symbol | Value | Unit |
|--|-----------------------|-------------------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | 30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | |
| Continuous Drain Current | V _{GS} = 10V | (Notes 4 & 7) | I _D | 3.7 | A |
| | | T _A = 70°C (Notes 4 & 7) | | 3.0 | |
| | | (Notes 3 & 7) | | 2.9 | |
| Pulsed Drain Current | V _{GS} = 10V | (Notes 6 & 7) | I _{DM} | 13 | |
| Continuous Source Current (Body diode) | | | I _S | 3.2 | |
| Pulse Source Current (Body diode) | | | I _{SM} | 13 | |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|-----------------------------------|------------------|-------|------------|
| Power Dissipation Linear Derating Factor | (Notes 3 & 7) | P _D | 1.50 | W mW/°C |
| | (Notes 4 & 7) | | 12 | |
| | (Notes 5 & 7) | | 2.45 | |
| | (Notes 5 & 8) | | 19.6 | |
| | (Notes 5 & 8) | | 1.13 | |
| Thermal Resistance, Junction to Ambient | (Notes 3 & 7) | R _{θJA} | 9 | °C/W |
| | (Notes 4 & 7) | | 1.70 | |
| | (Notes 5 & 7) | | 13.6 | |
| | (Notes 5 & 8) | | 83.3 | |
| Thermal Resistance, Junction to Lead | (Notes 7 & 9) | R _{θJL} | 51.0 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | 17.1 | |
| | | | | °C |

- Notes:
3. For a device surface mounted on 28mm x 28mm (8cm²) FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed drain pads connected to each half.
 4. Same as note (3) except the device is measured at t < 5 sec.
 5. Same as note (3), except the device is surface mounted on 31mm x 31mm (10cm²) FR4 PCB with high coverage of single sided 1oz copper.
 6. Same as note (3), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
 7. For a dual device with one active die.
 8. For dual device with 2 active die running at equal power.
 9. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

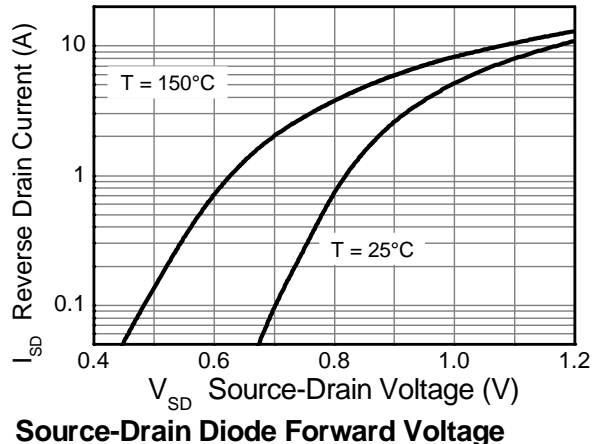
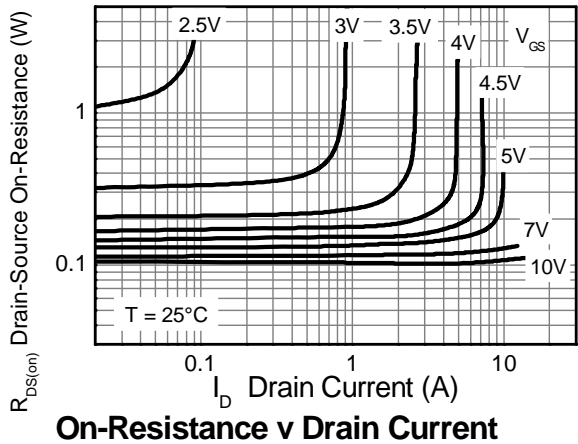
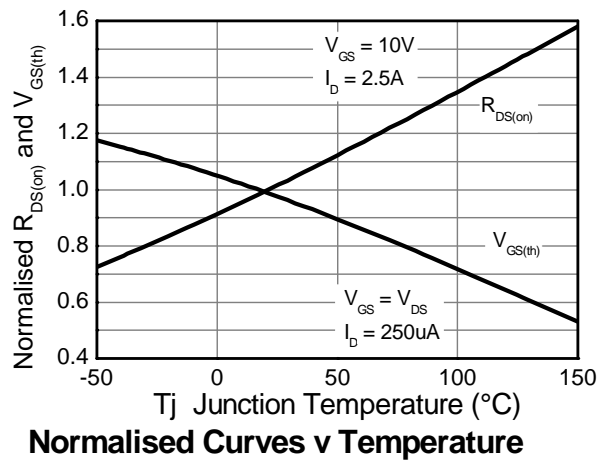
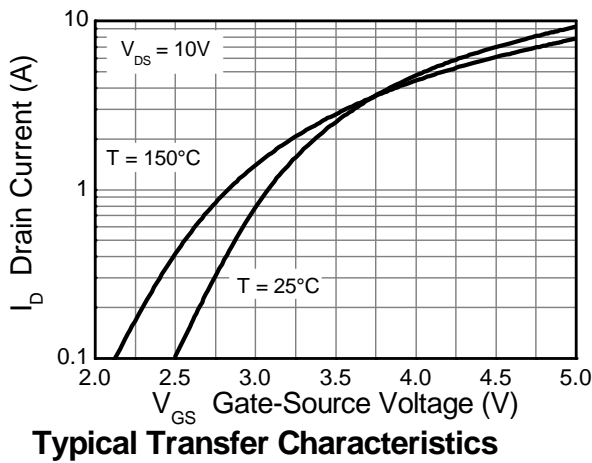
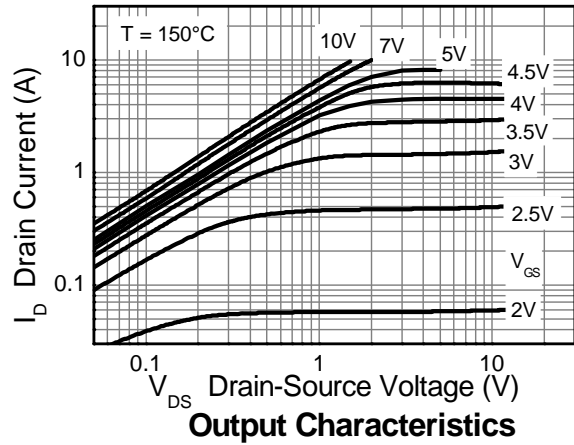
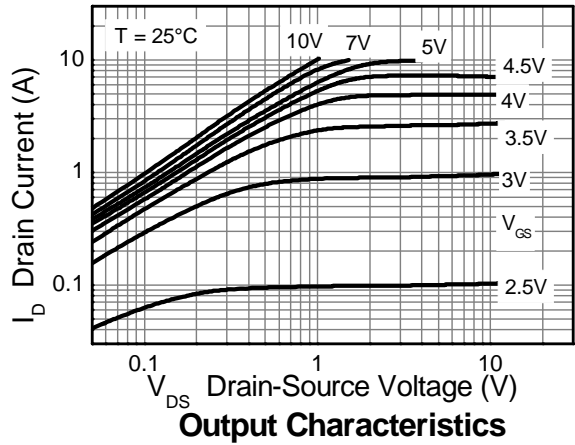


Electrical Characteristics @T_A = 25°C unless otherwise specified

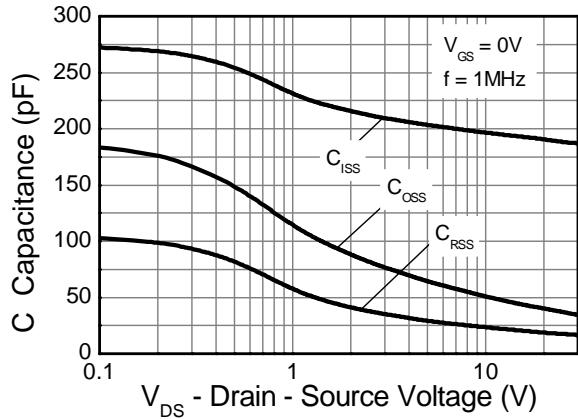
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---------------------|-----|-------|-------|------|--|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | - | - | V | I _D = 250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS} | - | - | 0.5 | μA | V _{DS} = 30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | - | - | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | - | 3.0 | V | I _D = 250μA, V _{DS} = V _{GS} |
| Static Drain-Source On-Resistance (Note 10) | R _{DS(ON)} | - | 0.100 | 0.120 | Ω | V _{GS} = 10V, I _D = 2.5A |
| | | | 0.140 | 0.180 | | V _{GS} = 4.5V, I _D = 2.0A |
| Forward Transconductance (Note 10 & 11) | g _{fs} | - | 3.5 | - | S | V _{DS} = 10V, I _D = 2.5A |
| Diode Forward Voltage (Note 10) | V _{SD} | - | 0.85 | 0.95 | V | I _S = 1.7A, V _{GS} = 0V |
| Reverse Recover Time (Note 11) | t _{rr} | - | 17.7 | - | ns | I _S = 2.5A, di/dt = 100A/μs |
| Reverse Recover Charge (Note 11) | Q _{rr} | - | 13.0 | - | nC | |
| DYNAMIC CHARACTERISTICS (Note 11) | | | | | | |
| Input Capacitance | C _{iSS} | - | 190 | - | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | - | 38 | - | pF | |
| Reverse Transfer Capacitance | C _{rSS} | - | 20 | - | pF | |
| Total Gate Charge (Note 12) | Q _g | - | 2.3 | - | nC | V _{GS} = 4.5V |
| Total Gate Charge (Note 12) | Q _g | - | 3.9 | - | nC | V _{GS} = 10V |
| Gate-Source Charge (Note 12) | Q _{gs} | - | 0.6 | - | nC | |
| Gate-Drain Charge (Note 12) | Q _{gd} | - | 0.9 | - | nC | |
| Turn-On Delay Time (Note 12) | t _{D(on)} | - | 1.7 | - | ns | V _{DS} = 15V, I _D = 2.5A V _{GS} = 10V, R _G = 6Ω |
| Turn-On Rise Time (Note 12) | t _r | - | 2.3 | - | ns | |
| Turn-Off Delay Time (Note 12) | t _{D(off)} | - | 6.6 | - | ns | |
| Turn-Off Fall Time (Note 12) | t _f | - | 2.9 | - | ns | |

Notes: 10. Measured under pulsed conditions. Width ≤ 300μs. Duty cycle ≤ 2%.
 11. For design aid only, not subject to production testing.
 12. Switching characteristics are independent of operating junction temperature.

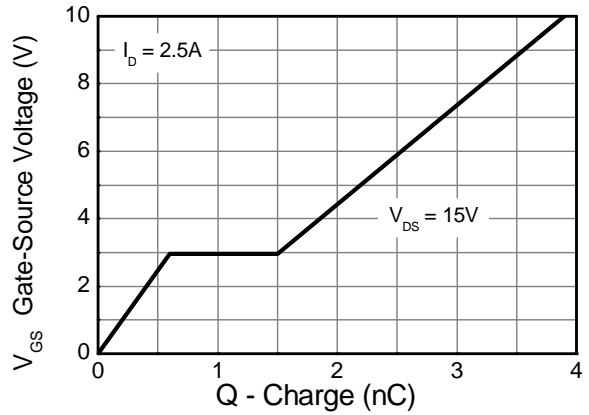
Typical Electrical Characteristics



Typical Electrical Characteristics - Continued

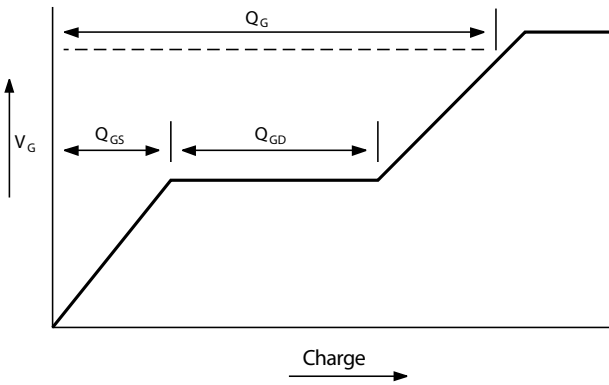


Capacitance v Drain-Source Voltage

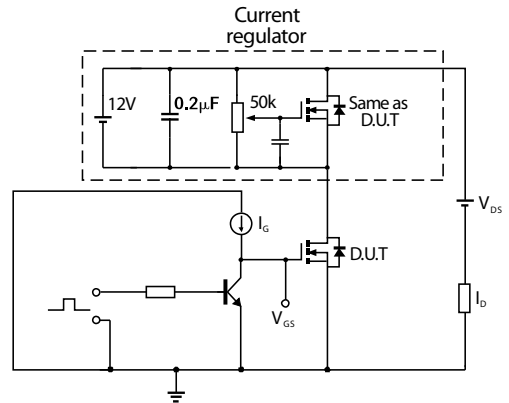


Gate-Source Voltage v Gate Charge

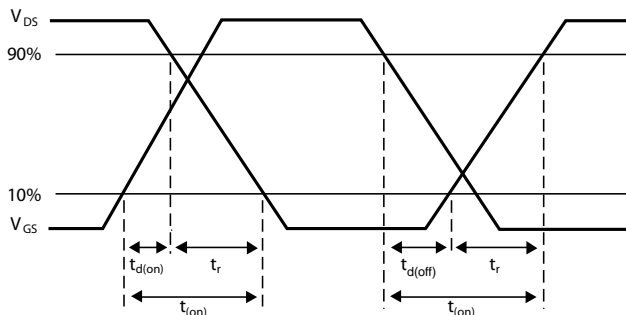
Test Circuits



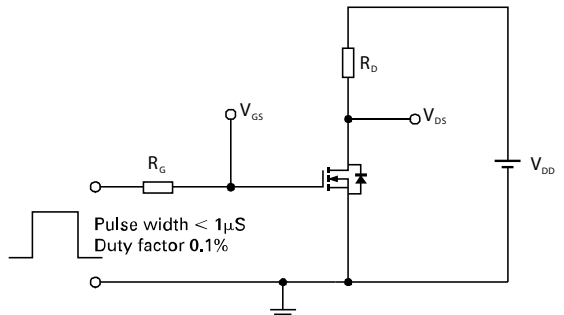
Basic gate charge waveform



Gate charge test circuit



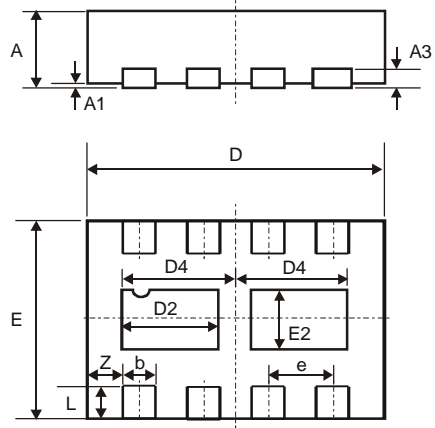
Switching time waveforms



Switching time test circuit

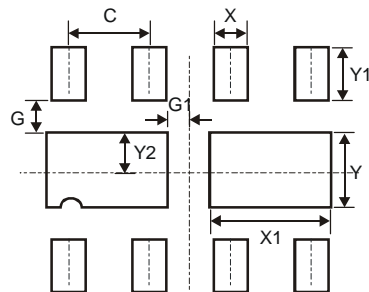
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Package Outline Dimensions



| DFN3020B-8 | | | |
|----------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.77 | 0.83 | 0.80 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | - | - | 0.15 |
| b | 0.25 | 0.35 | 0.30 |
| D | 2.95 | 3.075 | 3.00 |
| D2 | 0.82 | 1.02 | 0.92 |
| D4 | 1.01 | 1.21 | 1.11 |
| e | - | - | 0.65 |
| E | 1.95 | 2.075 | 2.00 |
| E2 | 0.43 | 0.63 | 0.53 |
| L | 0.25 | 0.35 | 0.30 |
| Z | - | - | 0.375 |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 0.285 |
| G1 | 0.090 |
| X | 0.400 |
| X1 | 1.120 |
| Y | 0.730 |
| Y1 | 0.500 |
| Y2 | 0.365 |

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