

ZXMN10A09K

100V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ | I_D $T_A = 25^\circ C$ |
|---------------|-----------------------|-----------------------------|
| 100V | 85mΩ @ $V_{GS} = 10V$ | 7.7A |
| | 100mΩ @ $V_{GS} = 6V$ | 7.1A |

Description and Applications

This MOSFET features low on-resistance, fast switching and a high avalanche withstand capability, making it ideal for high efficiency power management applications.

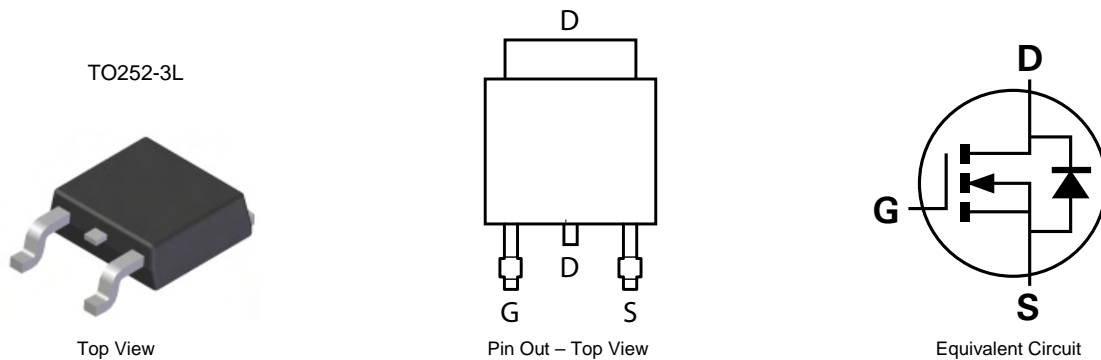
- DC-DC Converters
- Power management functions
- Disconnect switches
- Motor control
- Uninterrupted power supply

Features and Benefits

- Low input capacitance
- Low on-resistance
- Fast switching speed
- “Green” Component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: TO252-3L
- Case Material: Molded Plastic “Green” Molding Compound, UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)

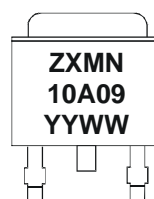


Ordering Information (Note 1)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|-----------|--------------------|-----------------|-------------------|
| ZXMN10A09KTC | ZXMN10A09 | 13 | 16 | 2,500 |

Notes: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.’s “Green” Policy can be found on our website. For packaging details, go to our website.

Marking Information



ZXMN = Product Type Marking Code, Line 1
 10A09 = Product Type Marking Code, Line 2
 YYWW = Date Code Marking
 YY = Year (ex: 09 = 2009)
 WW = Week (01-52)

Maximum Ratings @T_A = 25°C unless otherwise specified

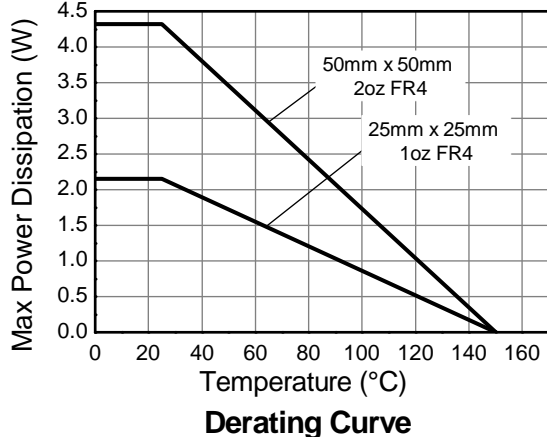
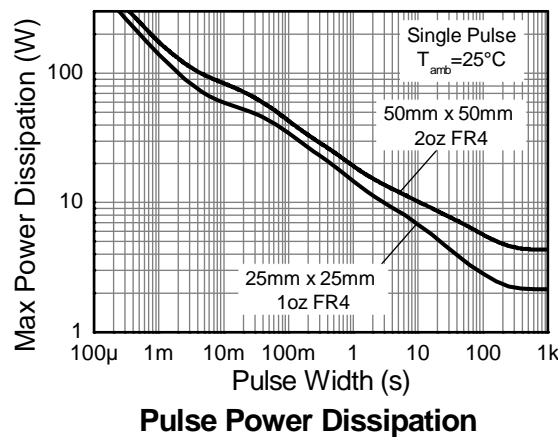
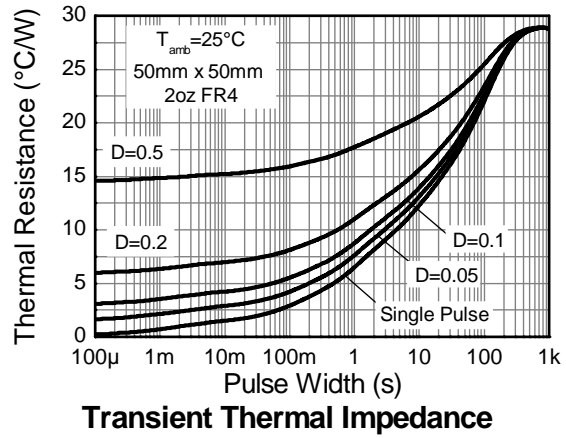
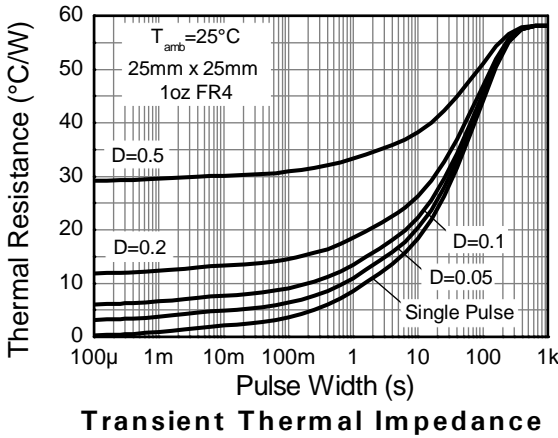
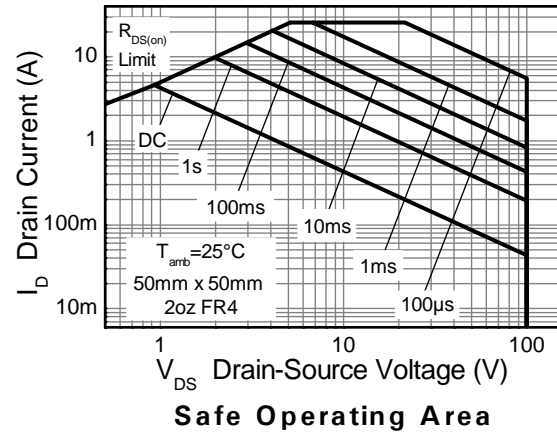
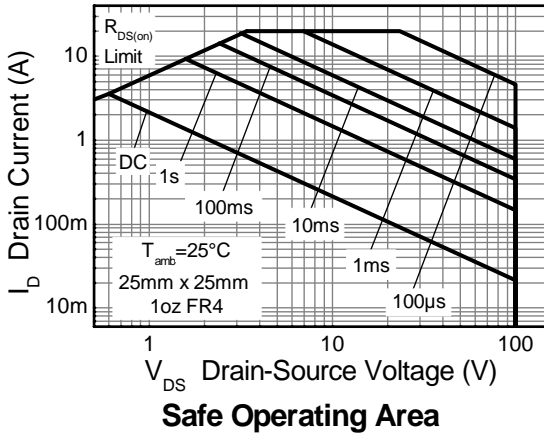
| Characteristic | | | Symbol | Value | Unit | |
|--|-----------------------|--------------------------------|------------------|-----------------|------|---|
| Drain-Source voltage | | | V _{DSS} | 100 | V | |
| Gate-Source voltage | | | V _{GS} | ±20 | V | |
| Continuous Drain current | V _{GS} = 10V | (Note 3) | I _D | 7.7 | A | |
| | | T _A = 70°C (Note 3) | | 6.2 | | |
| | | (Note 2) | | 5.0 | | |
| Pulsed Drain current | V _{GS} = 10V | (Note 4) | I _{DM} | 27 | A | |
| Continuous Source current (Body diode) | | | (Note 3) | I _S | 11 | A |
| Pulsed Source current (Body diode) | | | (Note 4) | I _{SM} | 27 | A |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|----------|-----------------------------------|------------|------------|
| Power dissipation Linear derating factor | (Note 2) | P _D | 4.31 | W mW/°C |
| | | | 34.4 | |
| | (Note 3) | | 10.1 | |
| | (Note 6) | | 80.8 | |
| Thermal Resistance, Junction to Ambient | (Note 2) | R _{θJA} | 2.15 | °C/W |
| | (Note 3) | | 17.2 | |
| | (Note 6) | | 29 | |
| Thermal Resistance, Junction to Lead | (Note 2) | R _{θJA} | 12.3 | °C/W |
| | (Note 3) | | 58 | |
| | (Note 6) | | 1.14 | |
| Operating and storage temperature range | | T _J , T _{STG} | -55 to 150 | °C |

- Notes:
2. For a device surface mounted on 50mm x 50mm x 1.6mm 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.
 3. Same as note 2, except the device is measured at t ≤ 10 sec.
 4. Same as note 2, except the device is pulsed with D = 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
 5. Thermal resistance from junction to solder-point (at the end of the drain lead).
 6. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with the high coverage single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.

Thermal Characteristics

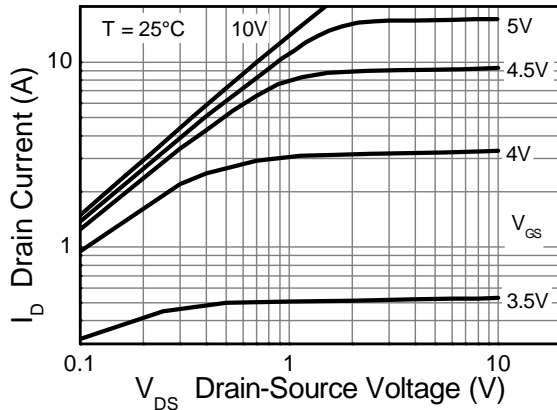


Electrical Characteristics @T_A = 25°C unless otherwise specified

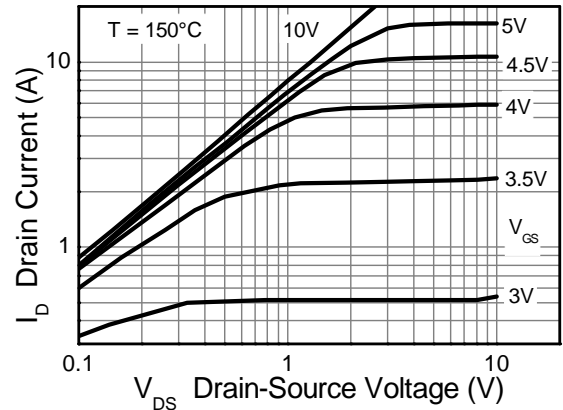
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition | |
|--|---------------------|-----|-------|-------|------|---|---|
| OFF CHARACTERISTICS | | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 100 | — | — | V | I _D = 250μA, V _{GS} = 0V | |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | μA | V _{DS} = 100V, V _{GS} = 0V | |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V | |
| ON CHARACTERISTICS | | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 2 | — | 4 | V | I _D = 250μA, V _{DS} = V _{GS} | |
| Static Drain-Source On-Resistance (Note 7) | R _{DS(on)} | — | — | 0.085 | Ω | V _{GS} = 10V, I _D = 4.6A | |
| | | | | 0.100 | | V _{GS} = 6V, I _D = 4.2A | |
| Forward Transconductance (Notes 7 & 8) | g _{fs} | — | 10.7 | — | S | V _{DS} = 15V, I _D = 4.6A | |
| Diode Forward Voltage (Note 7) | V _{SD} | — | 0.850 | 0.950 | V | I _S = 4.7A, V _{GS} = 0V | |
| Reverse recovery time (Note 8) | t _{rr} | — | 40 | — | ns | I _S = 3.0A, di/dt = 100A/μs | |
| Reverse recovery charge (Note 8) | Q _{rr} | — | 62 | — | nC | | |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | | |
| Input Capacitance | C _{iss} | — | 1313 | — | pF | V _{DS} = 50V, V _{GS} = 0V f = 1MHz | |
| Output Capacitance | C _{oss} | — | 83 | — | pF | | |
| Reverse Transfer Capacitance | C _{rss} | — | 56 | — | pF | | |
| Total Gate Charge (Note 9) | Q _g | — | 17.2 | — | nC | V _{GS} = 6V | V _{DS} = 50V, I _D = 4.6A |
| Total Gate Charge (Note 9) | Q _g | — | 26.0 | — | nC | V _{GS} = 10V | |
| Gate-Source Charge (Note 9) | Q _{gs} | — | 5.6 | — | nC | | |
| Gate-Drain Charge (Note 9) | Q _{gd} | — | 7.6 | — | nC | | |
| Turn-On Delay Time (Note 9) | t _{D(on)} | — | 6.8 | — | ns | V _{DD} = 50V, V _{GS} = 10V I _D = 1.0A, R _G ≅ 25Ω | |
| Turn-On Rise Time (Note 9) | t _r | — | 5.3 | — | ns | | |
| Turn-Off Delay Time (Note 9) | t _{D(off)} | — | 27.5 | — | ns | | |
| Turn-Off Fall Time (Note 9) | t _f | — | 12.3 | — | ns | | |

Notes: 7. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
8. For design aid only, not subject to production testing.
9. Switching characteristics are independent of operating junction temperatures.

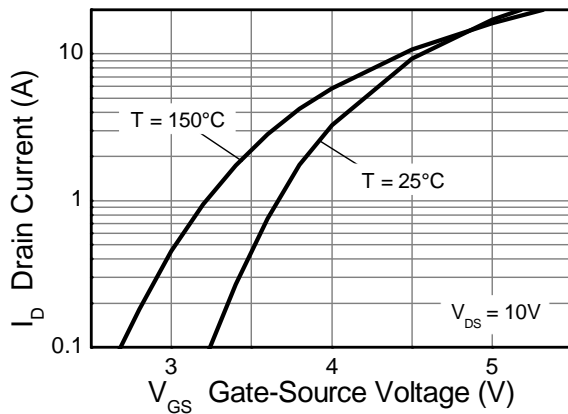
Typical Characteristics



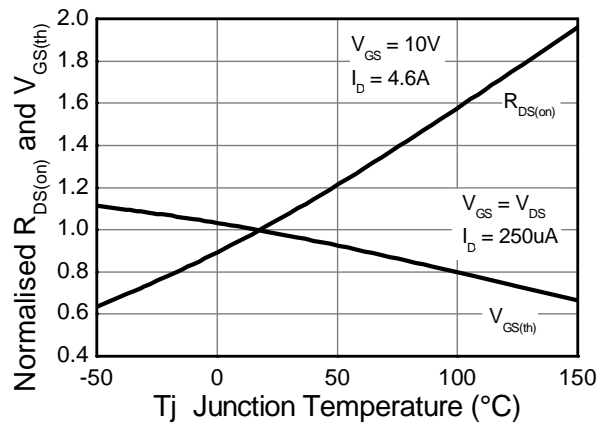
Output Characteristics



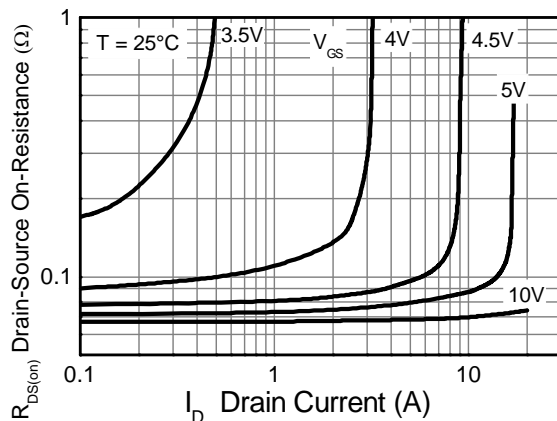
Output Characteristics



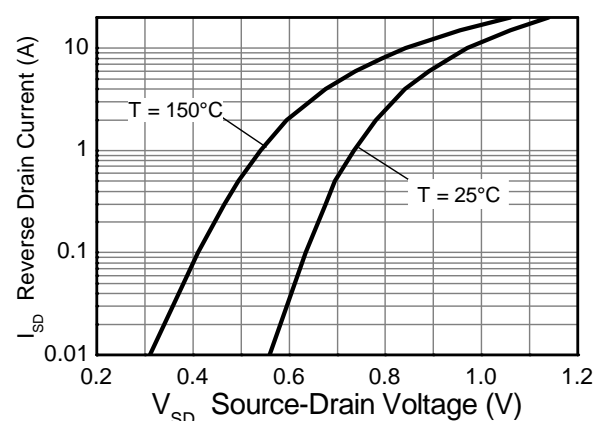
Typical Transfer Characteristics



Normalised Curves v Temperature

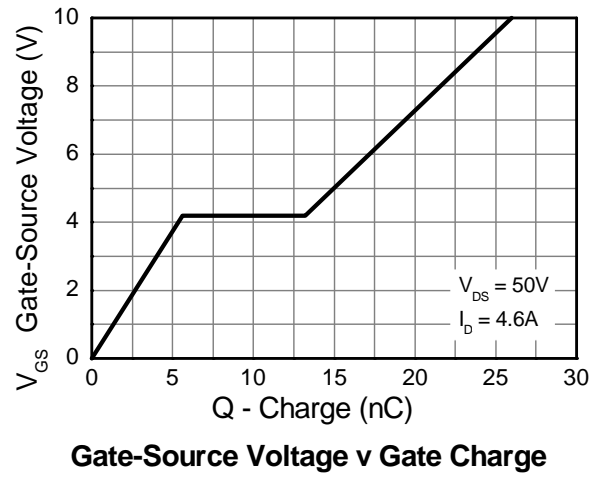
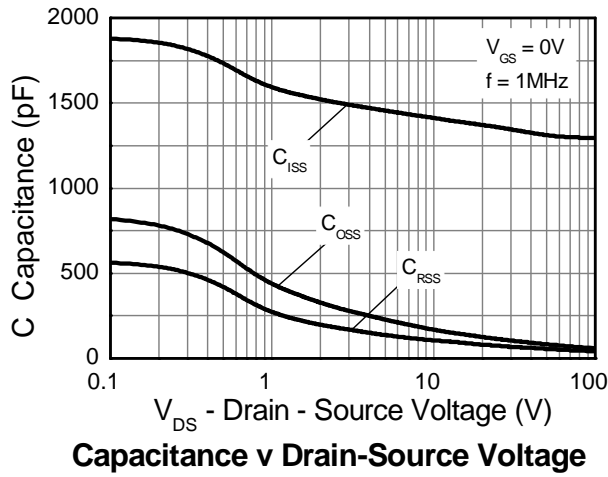


On-Resistance v Drain Current

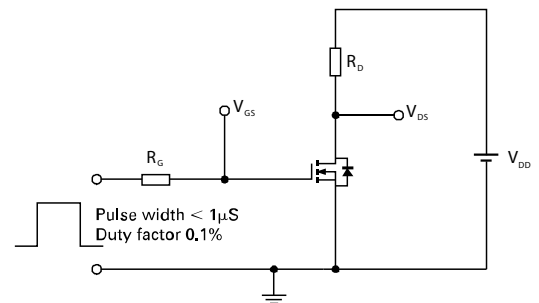
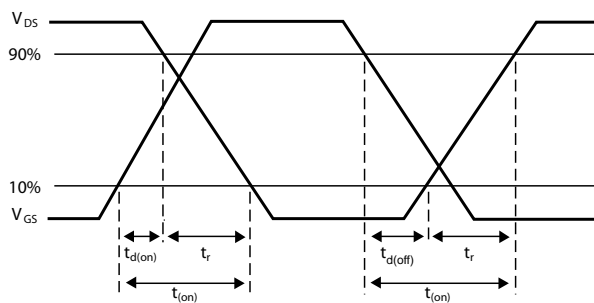
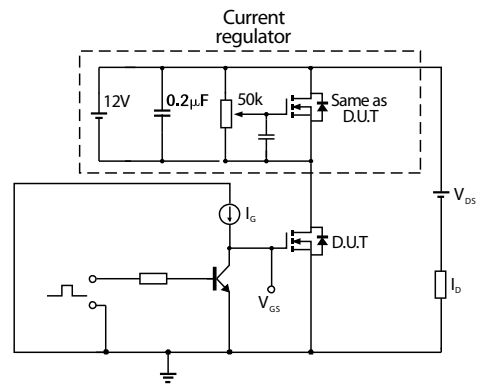
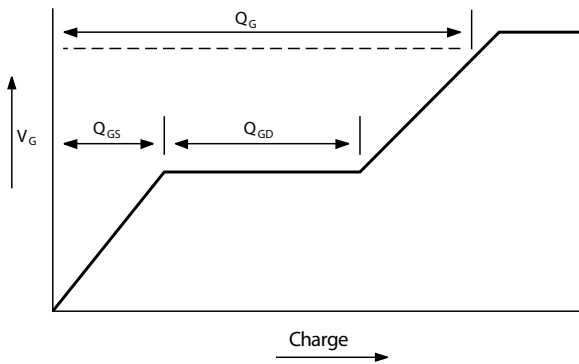


Source-Drain Diode Forward Voltage

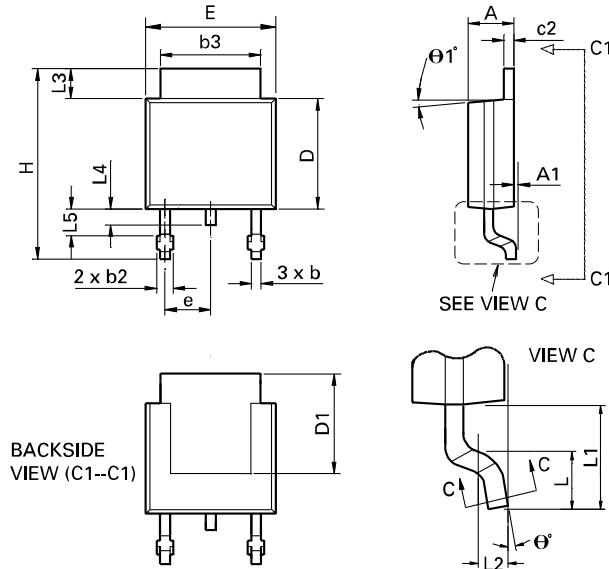
Typical Characteristics - continued



Test Circuits

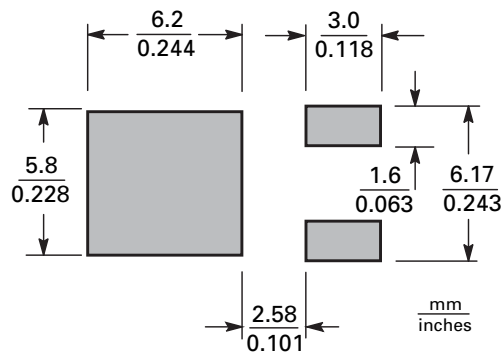


Package Outline Dimensions



| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|-------|----------|-----------|-------|-------------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 0.086 | 0.094 | 2.18 | 2.39 | e | 0.090 BSC | | 2.29 BSC | |
| A1 | - | 0.005 | - | 0.127 | H | 0.370 | 0.410 | 9.40 | 10.41 |
| b | 0.020 | 0.035 | 0.508 | 0.89 | L | 0.055 | 0.070 | 1.40 | 1.78 |
| b2 | 0.030 | 0.045 | 0.762 | 1.14 | L1 | 0.108 REF | | 2.74 REF | |
| b3 | 0.205 | 0.215 | 5.21 | 5.46 | L2 | 0.020 BSC | | 0.508 BSC | |
| c | 0.018 | 0.024 | 0.457 | 0.61 | L3 | 0.035 | 0.065 | 0.89 | 1.65 |
| c2 | 0.018 | 0.023 | 0.457 | 0.584 | L4 | 0.025 | 0.040 | 0.635 | 1.016 |
| D | 0.213 | 0.245 | 5.41 | 6.22 | L5 | 0.045 | 0.060 | 1.14 | 1.52 |
| D1 | 0.205 | - | 5.21 | - | theta 1° | 0° | 10° | 0° | 10° |
| E | 0.250 | 0.265 | 6.35 | 6.73 | theta° | 0° | 15° | 0° | 15° |
| E1 | 0.170 | - | 4.32 | - | - | - | - | - | - |

Suggested Pad Layout



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