



ZXMN15A27K

150V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| | | |
|---------------|--------------------------------|-----------------------------|
| $V_{(BR)DSS}$ | $R_{DS(on)}$ | I_D $T_A = 25^\circ C$ |
| 150V | 650m Ω @ $V_{GS} = 10V$ | 2.6A |

Description and Applications

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

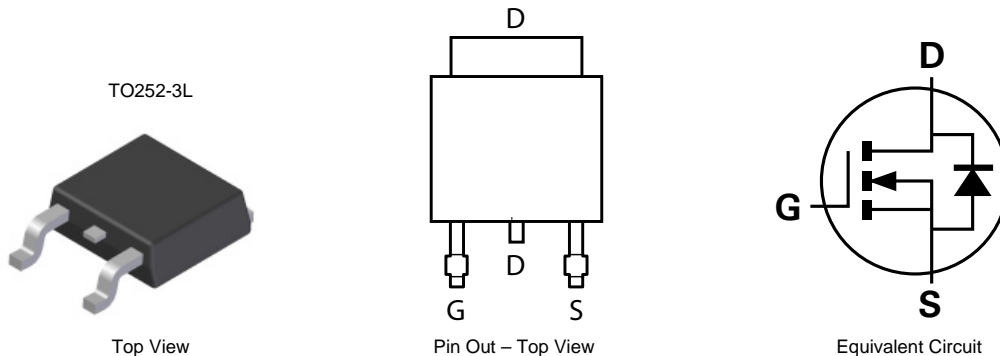
- SLIC line drivers for VoIP applications
- Transformer Driving Switch
- Power management functions
- Motor control
- Uninterrupted power supply

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) test in production
- High avalanche energy pulse withstand capability
- 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
- 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)

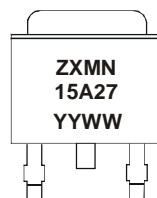


Ordering Information (Note 1)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|-----------|--------------------|-----------------|-------------------|
| ZXMN15A27KTC | See Below | 13 | 16 | 2,500 |

Notes: 1. Diodes, Inc. defines "Green" products as those which are Eu 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
 15A27 = Product Type Marking Code, Line 2
 YYWW = Date Code Marking
 YY = Last two digits of year (ex: 09 = 2009)
 WW = Week (01-52)

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

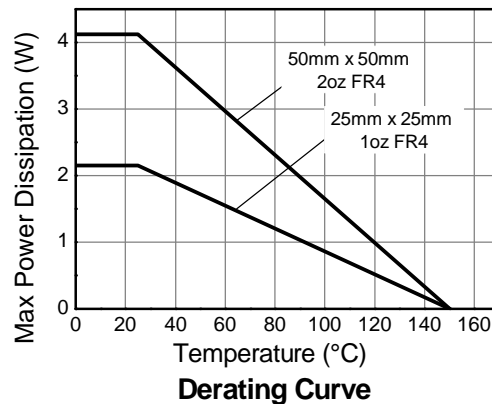
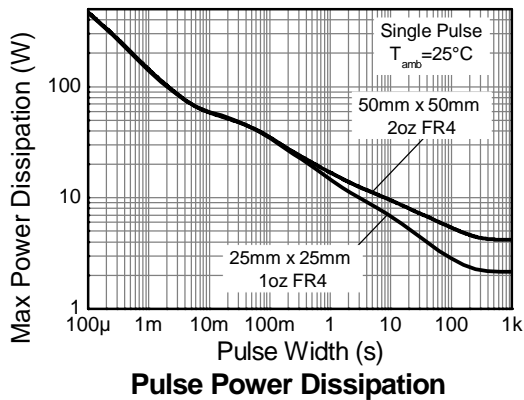
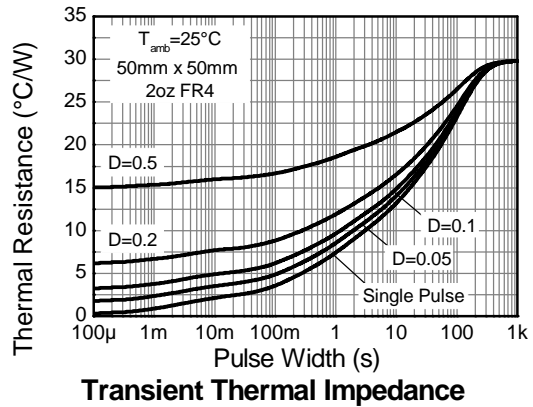
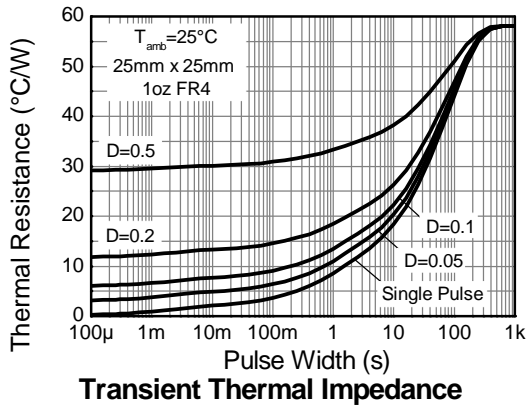
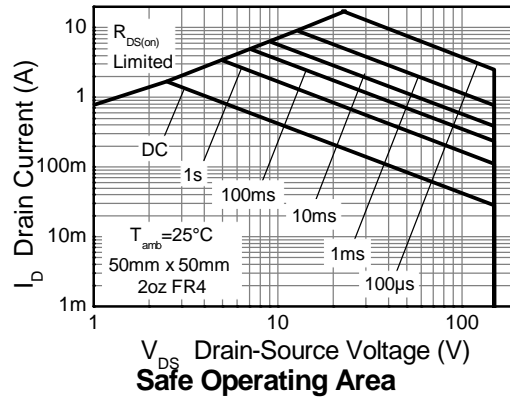
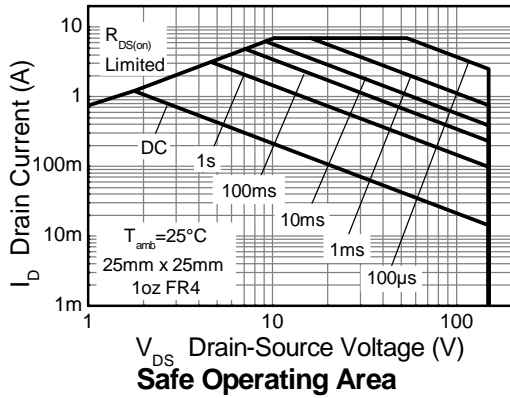
| Characteristic | | Symbol | Value | Unit |
|--|--|-----------|----------|------|
| Drain-Source voltage | | V_{DSS} | 150 | V |
| Gate-Source voltage | | V_{GS} | ± 25 | V |
| Single Pulsed Avalanche Energy | (Note 7) | E_{AS} | 55 | mJ |
| Single Pulsed Avalanche Energy | (Note 7) | I_{AS} | 4.3 | A |
| Repetitive Avalanche Energy | (Note 4) | E_{AR} | 3.0 | mJ |
| Repetitive Avalanche Current | (Note 4) | I_{AR} | 4.3 | A |
| Continuous Drain current | $V_{GS} = 10\text{V}$ $T_A = 70^\circ\text{C}$ (Note 3) | I_D | 2.55 | A |
| | | | 2.0 | |
| | | | 1.7 | |
| Pulsed Drain current | $V_{GS} = 10\text{V}$ (Note 4) | I_{DM} | 17.2 | A |
| Continuous Source current (Body diode) | | I_S | 5.2 | A |
| Pulsed Source current (Body diode) | | I_{SM} | 17.2 | A |

Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|---|----------|-----------------|------------|---------------------------|
| Power dissipation Linear derating factor | (Note 2) | P_D | 4.2 | W mW/ $^\circ\text{C}$ |
| | | | 33.6 | |
| | (Note 3) | | 9.5 | |
| Thermal Resistance, Junction to Ambient | (Note 2) | $R_{\theta JA}$ | 76.0 | $^\circ\text{C/W}$ |
| | | | 2.2 | |
| | | | 17.2 | |
| Thermal Resistance, Junction to Lead | (Note 2) | $R_{\theta JL}$ | 30.2 | $^\circ\text{C/W}$ |
| | (Note 3) | | 13.1 | |
| | (Note 6) | | 58.1 | |
| Operating and storage temperature range | | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

- 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 $t \leq 10$ sec.
 4. Same as note 2, except the device is operating in a repetitive state with pulse width and duty cycle limited by 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 high coverage single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition..
 7. UIS in production with $L = 5.95\text{mH}$, $I_{AS} = 4.3\text{A}$, $R_G = 25\Omega$, $V_{DD} = 100\text{V}$, starting $T_J = 25^\circ\text{C}$.

Thermal Characteristics

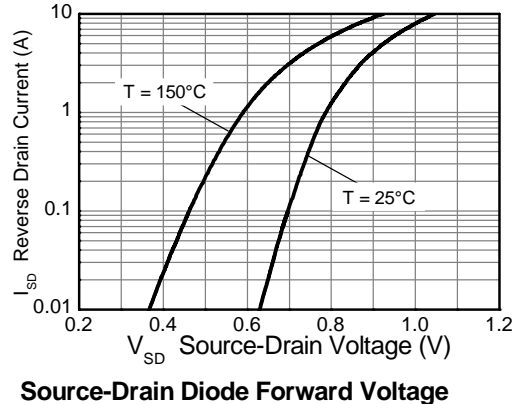
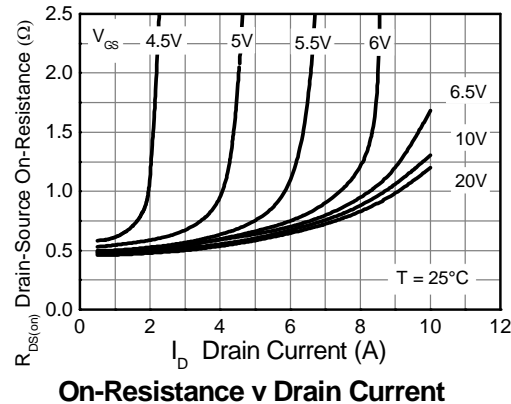
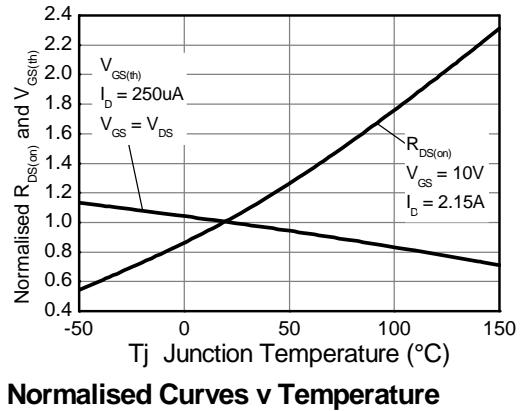
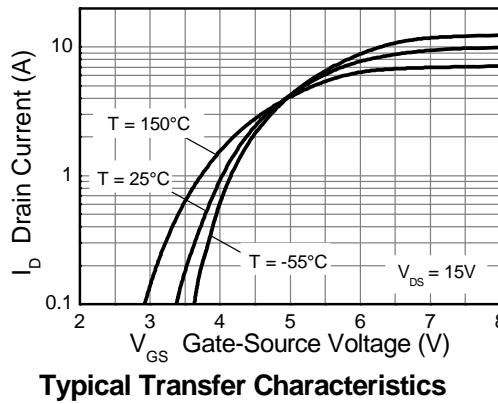
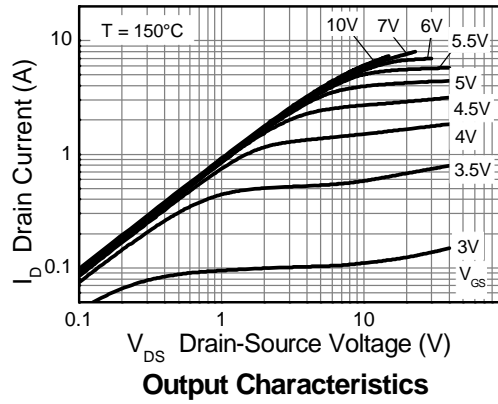
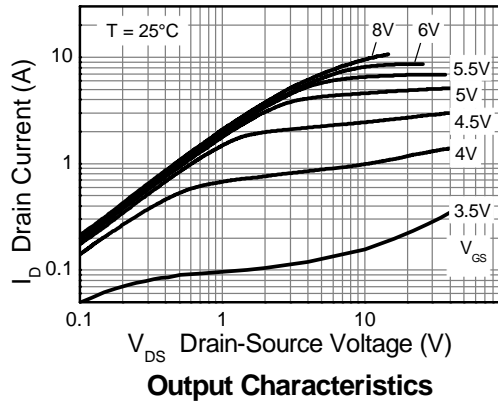


Electrical Characteristics @T_A = 25°C unless otherwise specified

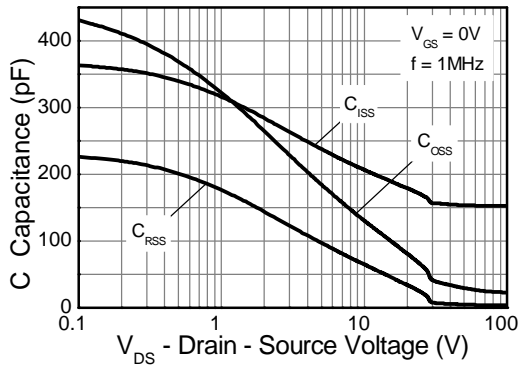
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|-------|-------|------|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 150 | — | — | V | I _D = 250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 500 | nA | V _{DS} = 150V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±25V, V _{DS} = 0V |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 2 | 2.7 | 4 | V | I _D = 250μA, V _{DS} = V _{GS} |
| Static Drain-Source On-Resistance (Note 8) | R _{DS(on)} | — | 0.500 | 0.650 | Ω | V _{GS} = 10V, I _D = 2.15A |
| Forward Transconductance (Notes 8 & 9) | g _{fs} | — | 2.8 | — | S | V _{DS} = 40V, I _D = 2.15A |
| Diode Forward Voltage (Note 8) | V _{SD} | — | 0.880 | 0.950 | V | I _S = 4.3A, V _{GS} = 0V |
| Reverse recovery time (Note 9) | t _{rr} | — | 153 | — | ns | I _S = 5.4A, V _{GS} = 0V, |
| Reverse recovery charge (Note 9) | Q _{rr} | — | 1.1 | — | μC | di/dt = 100A/μs |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | 169 | — | pF | V _{DS} = 25V, V _{GS} = 0V f = 1MHz |
| Output Capacitance | C _{oss} | — | 64.5 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 23.3 | — | pF | |
| Total Gate Charge | Q _g | — | 6.6 | — | nC | V _{DS} = 120V, V _{GS} = 10V I _D = 5.4A |
| Gate-Source Charge | Q _{gs} | — | 1.0 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 3.4 | — | nC | |
| Turn-On Delay Time (Note 10) | t _{D(on)} | — | 3.3 | — | ns | V _{DD} = 75V, V _{GS} = 10V I _D = 5.4A, R _G ≅ 25Ω |
| Turn-On Rise Time (Note 10) | t _r | — | 12.7 | — | ns | |
| Turn-Off Delay Time (Note 10) | t _{D(off)} | — | 17.1 | — | ns | |
| Turn-Off Fall Time (Note 10) | t _f | — | 13.3 | — | ns | |

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

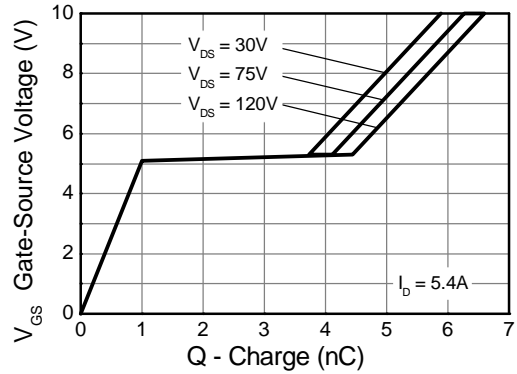
Typical Characteristics



Typical Characteristics - continued

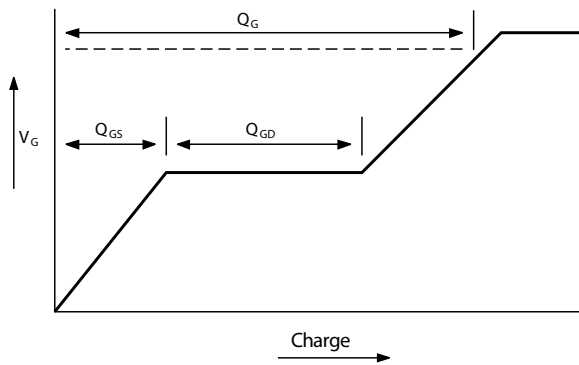


Capacitance v Drain-Source Voltage

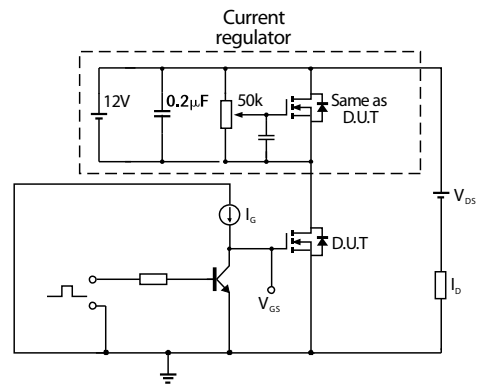


Gate-Source Voltage v Gate Charge

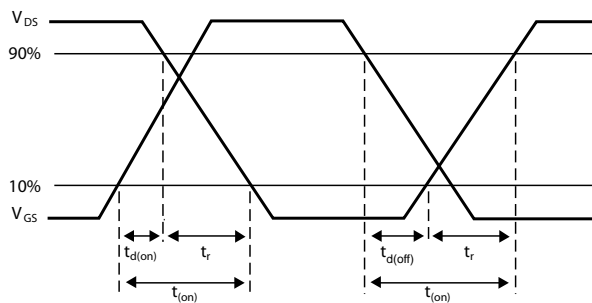
Test Circuits



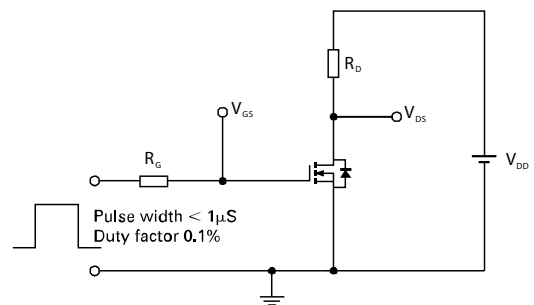
Basic gate charge waveform



Gate charge test circuit

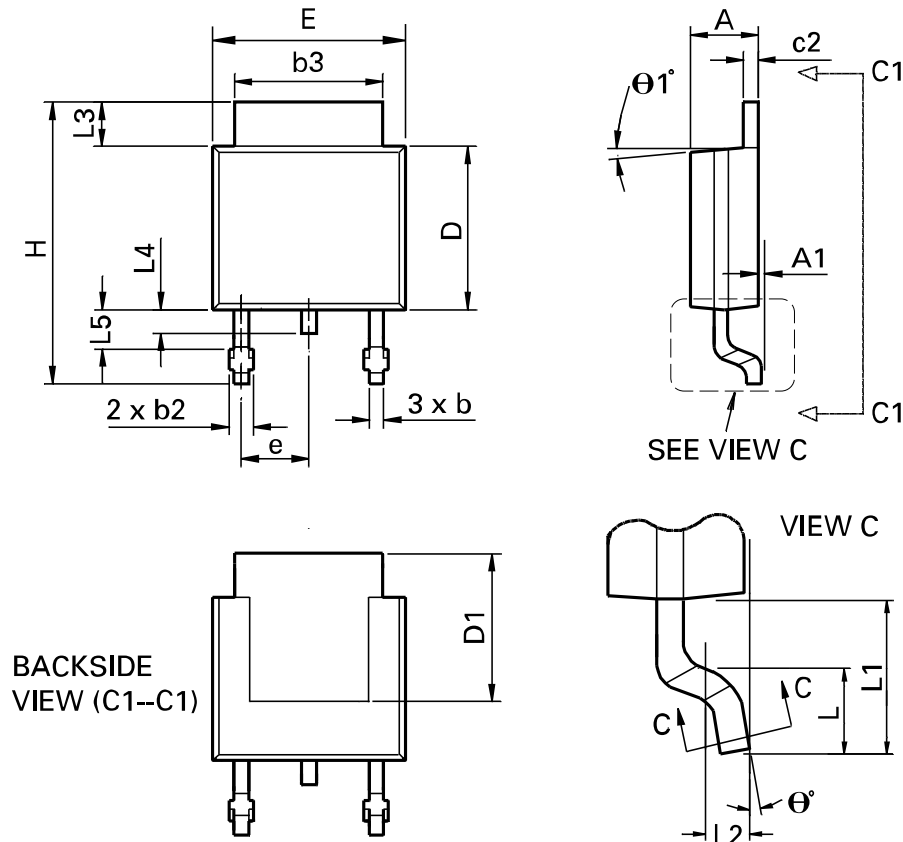


Switching time waveforms



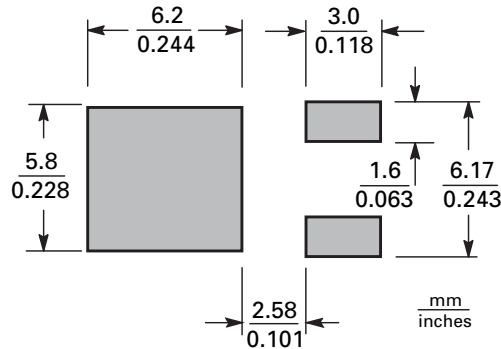
Switching time test circuit

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 | - | θ_1° | 0° | 10° | 0° | 10° |
| E | 0.250 | 0.265 | 6.35 | 6.73 | θ° | 0° | 15° | 0° | 15° |
| E1 | 0.170 | - | 4.32 | - | - | - | - | - | - |

Suggested Pad Layout



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