

**60V N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

| $V_{(BR)DSS}$ | $R_{DS(on)}$                  | $I_D$<br>$T_A = 25^\circ C$ |
|---------------|-------------------------------|-----------------------------|
| 100V          | 80m $\Omega$ @ $V_{GS}=10V$   | 3.5A                        |
|               | 150m $\Omega$ @ $V_{GS}=4.5V$ | 2.5A                        |

**Description and Applications**

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- DC-DC Converters
- Power management functions
- Disconnect switches
- Motor control

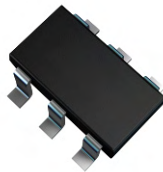
**Features and Benefits**

- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- “Green” component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

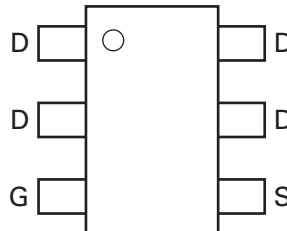
**Mechanical Data**

- Case: SOT23-6
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.018 grams (approximate)

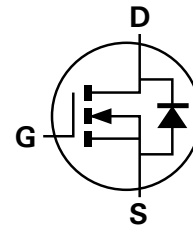
SOT23-6



Top View



Pin Out - Top View

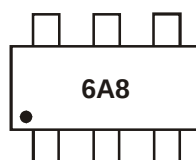


Equivalent Circuit

**Ordering Information (Note 1)**

| Product      | Marking   | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|-----------|--------------------|-----------------|-------------------|
| ZXMN6A08E6TA | See below | 7                  | 8               | 3,000             |

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**


6A8 = Product Type Marking Code

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

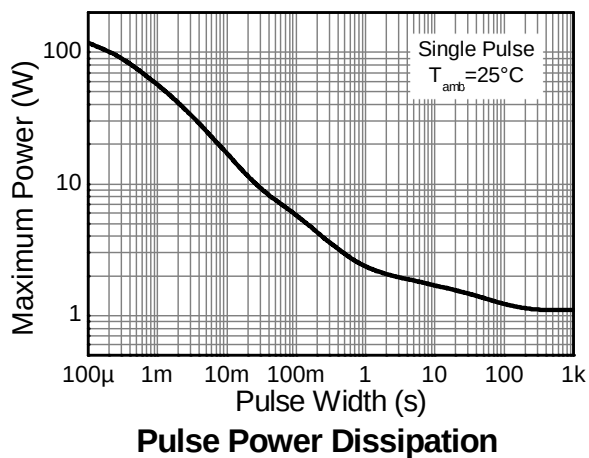
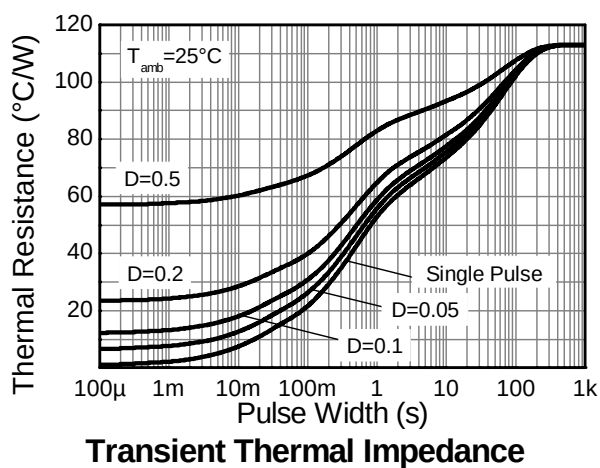
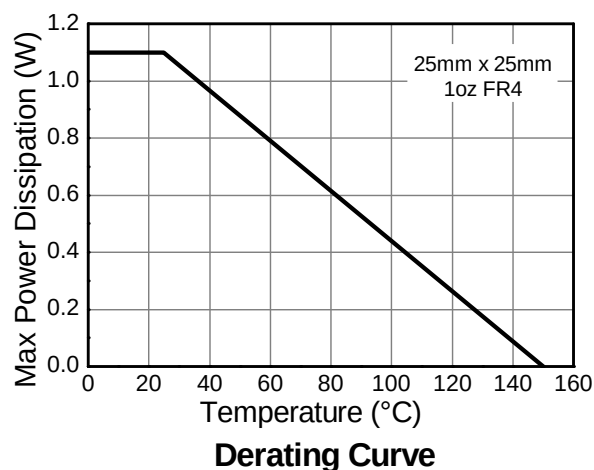
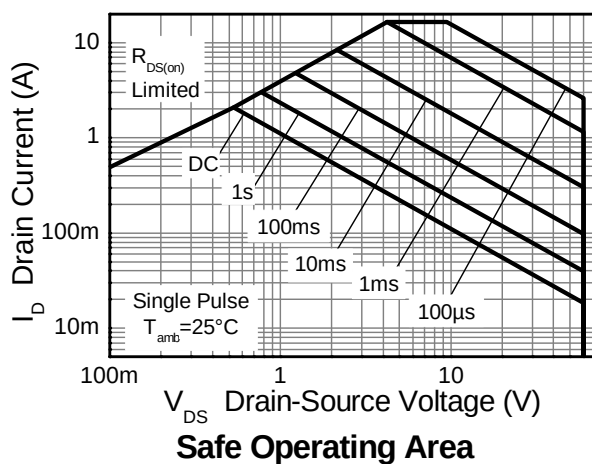
| Characteristic                         |                       |                                | Symbol           | Value | Unit |
|----------------------------------------|-----------------------|--------------------------------|------------------|-------|------|
| Drain-Source voltage                   |                       |                                | V <sub>DSS</sub> | 60    | V    |
| Gate-Source voltage                    |                       |                                | V <sub>GS</sub>  | ±20   | V    |
| Continuous Drain current               | V <sub>GS</sub> = 10V | (Note 3)                       | I <sub>D</sub>   | 3.5   | A    |
|                                        |                       | T <sub>A</sub> = 70°C (Note 3) |                  | 2.8   |      |
|                                        |                       | (Note 2)                       |                  | 2.8   |      |
| Pulsed Drain current                   | V <sub>GS</sub> = 10V | (Note 4)                       | I <sub>DM</sub>  | 16    | A    |
| Continuous Source current (Body diode) |                       | (Note 3)                       | I <sub>S</sub>   | 2.6   | A    |
| Pulsed Source current (Body diode)     |                       | (Note 4)                       | I <sub>SM</sub>  | 16    | A    |

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                              |          | Symbol                            | Value      | Unit       |
|---------------------------------------------|----------|-----------------------------------|------------|------------|
| Power dissipation<br>Linear derating factor | (Note 2) | P <sub>D</sub>                    | 1.1        | W<br>mW/°C |
|                                             |          |                                   | 8.8        |            |
|                                             | (Note 3) |                                   | 1.7        |            |
| Thermal Resistance, Junction to Ambient     | (Note 1) | R <sub>θJA</sub>                  | 113        | °C/W       |
|                                             | (Note 3) |                                   | 73         |            |
| Operating and storage temperature range     |          | T <sub>J</sub> , T <sub>STG</sub> | -55 to 150 | °C         |

- Notes:
2. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz 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 300μs. The pulse current is limited by the maximum junction temperature.

## Thermal Characteristics

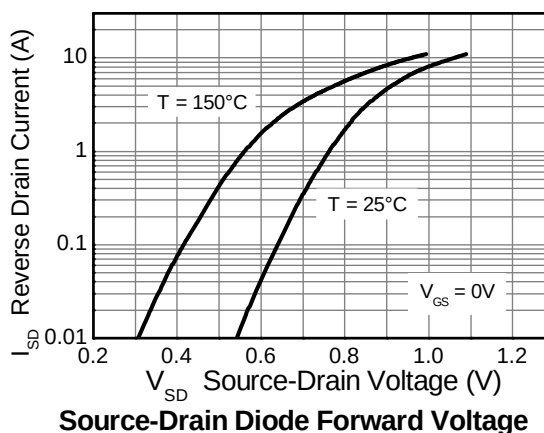
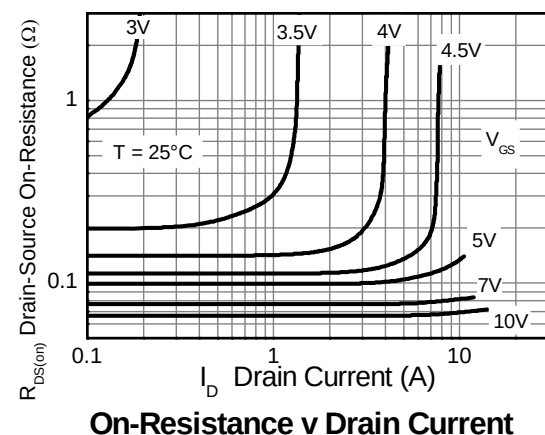
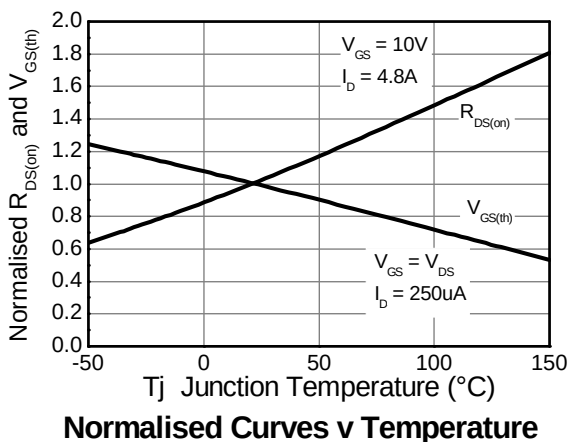
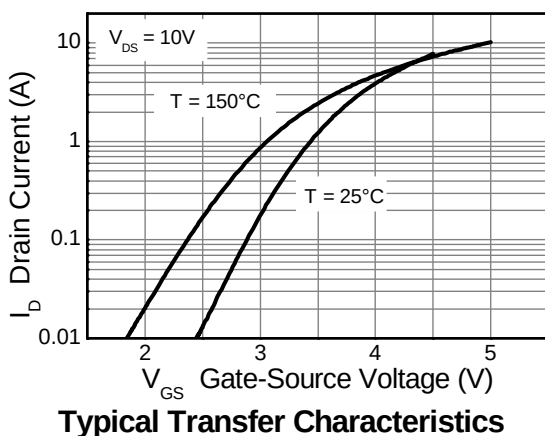
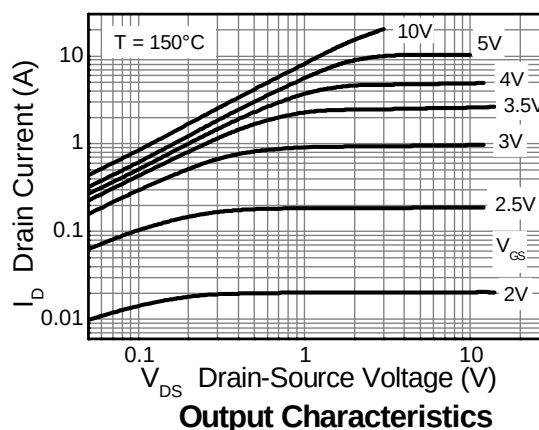
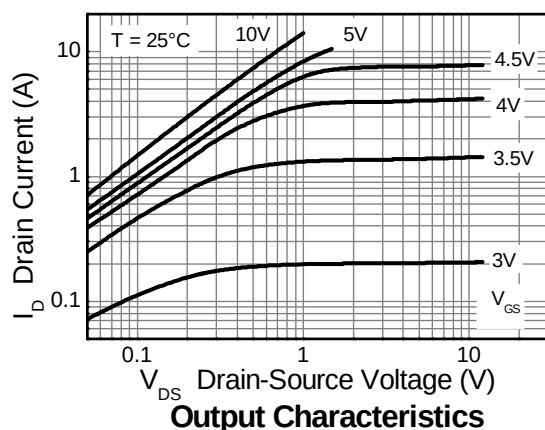


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

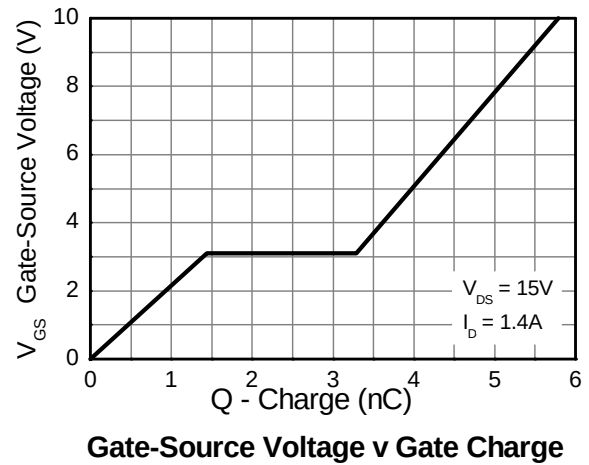
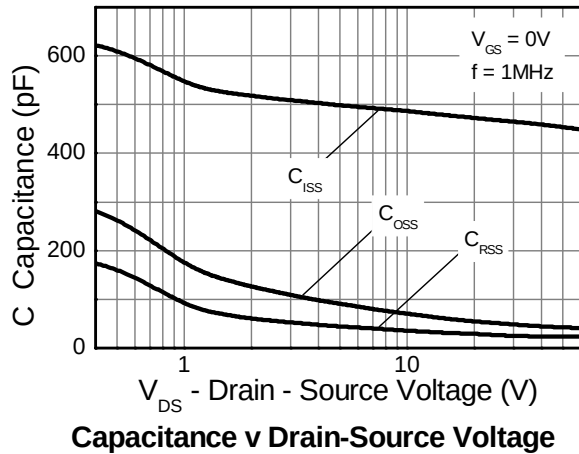
| Characteristic                             | Symbol               | Min | Typ   | Max   | Unit | Test Condition                                                                               |                                                |
|--------------------------------------------|----------------------|-----|-------|-------|------|----------------------------------------------------------------------------------------------|------------------------------------------------|
| OFF CHARACTERISTICS                        |                      |     |       |       |      |                                                                                              |                                                |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>    | 60  | —     | —     | V    | I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V                                                 |                                                |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>     | —   | —     | 0.5   | μA   | V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V                                                  |                                                |
| Gate-Source Leakage                        | I <sub>GSS</sub>     | —   | —     | ±100  | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                 |                                                |
| ON CHARACTERISTICS                         |                      |     |       |       |      |                                                                                              |                                                |
| Gate Threshold Voltage                     | V <sub>GS(th)</sub>  | 1.0 | —     | —     | V    | I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>                                    |                                                |
| Static Drain-Source On-Resistance (Note 5) | R <sub>DS (ON)</sub> | —   | 0.067 | 0.080 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.8A                                                 |                                                |
|                                            |                      |     | 0.100 | 0.150 |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.2A                                                |                                                |
| Forward Transconductance (Notes 5 & 6)     | g <sub>fs</sub>      | —   | 6.6   | —     | S    | V <sub>DS</sub> = 15V, I <sub>D</sub> = 4.8A                                                 |                                                |
| Diode Forward Voltage (Note 5)             | V <sub>SD</sub>      | —   | 0.88  | 1.2   | V    | I <sub>S</sub> = 4A, V <sub>GS</sub> = 0V, T <sub>J</sub> = 25°C                             |                                                |
| Reverse recovery time (Note 6)             | t <sub>rr</sub>      | —   | 19.2  | —     | ns   | I <sub>F</sub> = 1.4A, di/dt = 100A/μs,<br>T <sub>J</sub> = 25°C                             |                                                |
| Reverse recovery charge (Note 6)           | Q <sub>rr</sub>      | —   | 30.3  | —     | nC   |                                                                                              |                                                |
| DYNAMIC CHARACTERISTICS (Note 6)           |                      |     |       |       |      |                                                                                              |                                                |
| Input Capacitance                          | C <sub>iss</sub>     | —   | 459   | —     | pF   | V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V<br>f = 1MHz                                      |                                                |
| Output Capacitance                         | C <sub>oss</sub>     | —   | 44.2  | —     | pF   |                                                                                              |                                                |
| Reverse Transfer Capacitance               | C <sub>rss</sub>     | —   | 24.1  | —     | pF   |                                                                                              |                                                |
| Total Gate Charge (Note 7)                 | Q <sub>g</sub>       | —   | 3.7   | —     | nC   | V <sub>GS</sub> = 4.5V                                                                       | V <sub>DS</sub> = 30V<br>I <sub>D</sub> = 1.4A |
| Total Gate Charge (Note 7)                 | Q <sub>g</sub>       | —   | 5.8   | —     | nC   | V <sub>GS</sub> = 10V                                                                        |                                                |
| Gate-Source Charge (Note 7)                | Q <sub>gs</sub>      | —   | 1.4   | —     | nC   |                                                                                              |                                                |
| Gate-Drain Charge (Note 7)                 | Q <sub>gd</sub>      | —   | 1.9   | —     | nC   |                                                                                              |                                                |
| Turn-On Delay Time (Note 7)                | t <sub>D(on)</sub>   | —   | 2.6   | —     | ns   | V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 1.5A, R <sub>G</sub> ≅ 6.0Ω |                                                |
| Turn-On Rise Time (Note 7)                 | t <sub>r</sub>       | —   | 2.1   | —     | ns   |                                                                                              |                                                |
| Turn-Off Delay Time (Note 7)               | t <sub>D(off)</sub>  | —   | 12.3  | —     | ns   |                                                                                              |                                                |
| Turn-Off Fall Time (Note 7)                | t <sub>f</sub>       | —   | 4.6   | —     | ns   |                                                                                              |                                                |

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

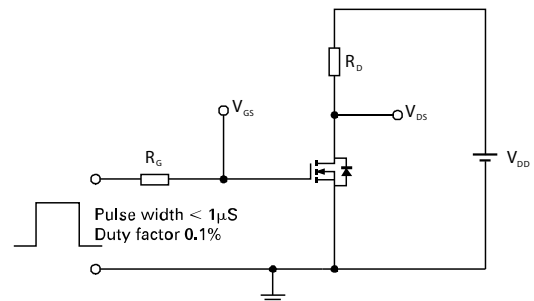
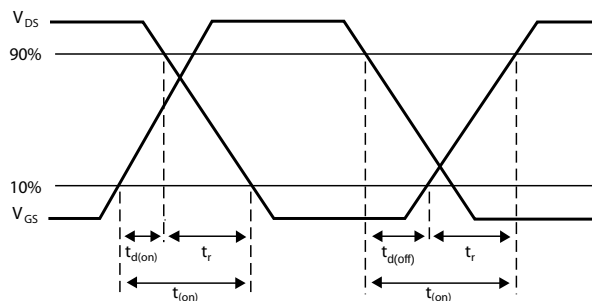
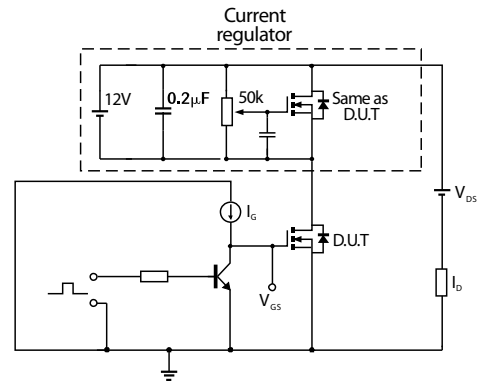
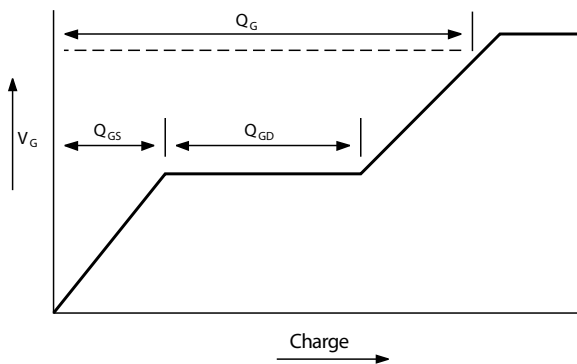
## Typical Characteristics



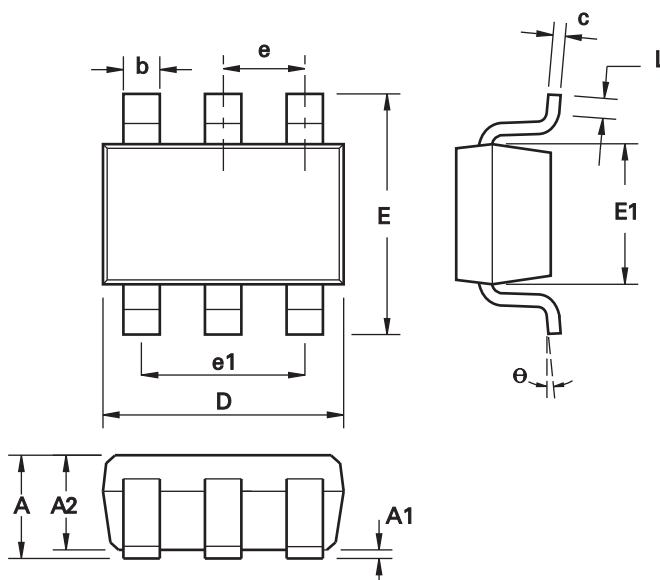
## Typical Characteristics – continued



## Test Circuits

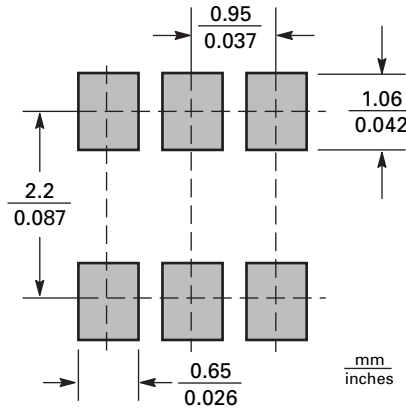


## Package Outline Dimensions



| DIM      | Millimeters |      | Inches     |        |
|----------|-------------|------|------------|--------|
|          | Min         | Max  | Min        | Max    |
| A        | 0.90        | 1.45 | 0.354      | 0.0570 |
| A1       | 0.00        | 0.15 | 0.00       | 0.0059 |
| A2       | 0.90        | 1.30 | 0.0354     | 0.0511 |
| b        | 0.20        | 0.50 | 0.0078     | 0.0196 |
| C        | 0.09        | 0.26 | 0.0035     | 0.0102 |
| D        | 2.70        | 3.10 | 0.1062     | 0.1220 |
| E        | 2.20        | 3.20 | 0.0866     | 0.1181 |
| E1       | 1.30        | 1.80 | 0.0511     | 0.0708 |
| L        | 0.10        | 0.60 | 0.0039     | 0.0236 |
| e        | 0.95 REF    |      | 0.0374 REF |        |
| e1       | 1.90 REF    |      | 0.0748 REF |        |
| $\theta$ | 0°          | 30°  | 0°         | 30°    |

## Suggested Pad Layout



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