

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

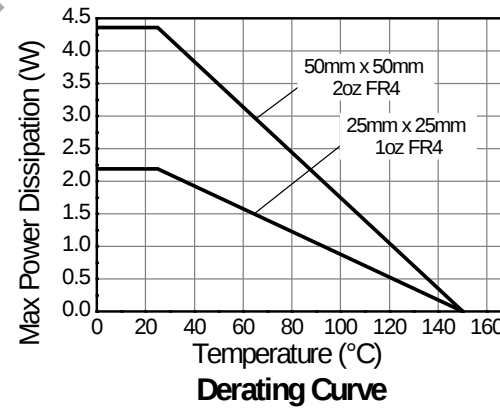
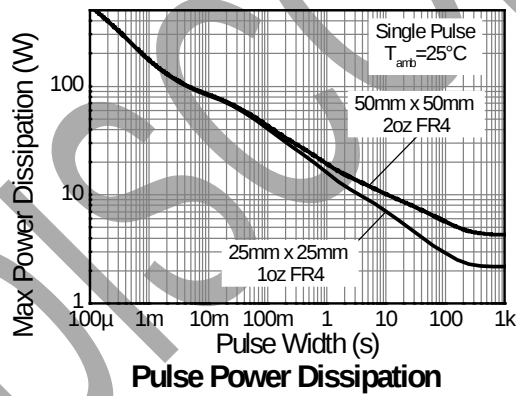
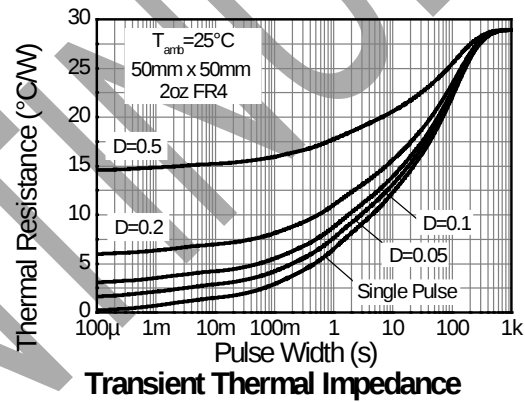
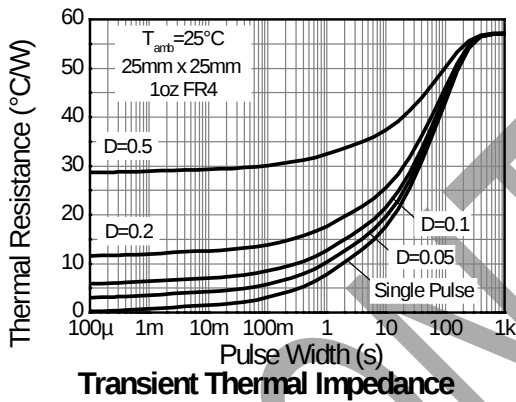
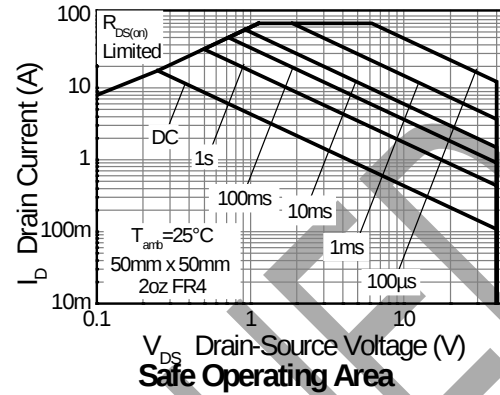
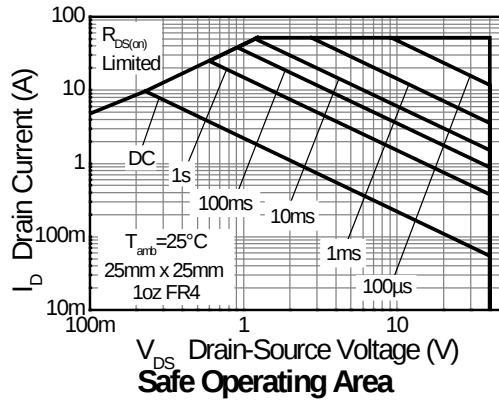
| Characteristic                         |                       |                                | Symbol           | Value | Unit |
|----------------------------------------|-----------------------|--------------------------------|------------------|-------|------|
| Drain-Source voltage                   |                       |                                | V <sub>DSS</sub> | 40    | V    |
| Gate-Source voltage                    |                       |                                | V <sub>GS</sub>  | ±20   | V    |
| Continuous Drain current               | V <sub>GS</sub> = 10V | (Note 3)                       | I <sub>D</sub>   | 27.6  | A    |
|                                        |                       | T <sub>A</sub> = 70°C (Note 3) |                  | 22.1  |      |
|                                        |                       | (Note 2)                       |                  | 18.0  |      |
| Pulsed Drain current                   | V <sub>GS</sub> = 10V | (Note 4)                       | I <sub>DM</sub>  | 96.6  | A    |
| Continuous Source current (Body diode) |                       |                                | I <sub>S</sub>   | 13.2  | A    |
| Pulsed Source current (Body diode)     |                       |                                | I <sub>SM</sub>  | 96.6  | 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>                    | 4.36         | W<br>mW/°C |
|                                             | (Note 3) |                                   | 34.8         |            |
|                                             | (Note 3) |                                   | 10.3         |            |
|                                             | (Note 3) |                                   | 82.4         |            |
|                                             | (Note 5) |                                   | 2.19<br>17.5 |            |
| Thermal Resistance, Junction to Ambient     | (Note 2) | R <sub>θJA</sub>                  | 28.6         | °C/W       |
|                                             | (Note 3) |                                   | 12.1         |            |
|                                             | (Note 5) |                                   | 57.0         |            |
| Thermal Resistance, Junction to Lead        | (Note 6) | R <sub>θJL</sub>                  | 0.85         |            |
| 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 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. 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.
  6. Thermal resistance from junction to solder-point (at the end of the drain lead).

## Thermal Characteristics

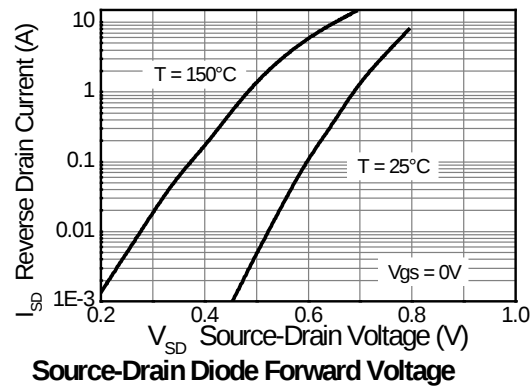
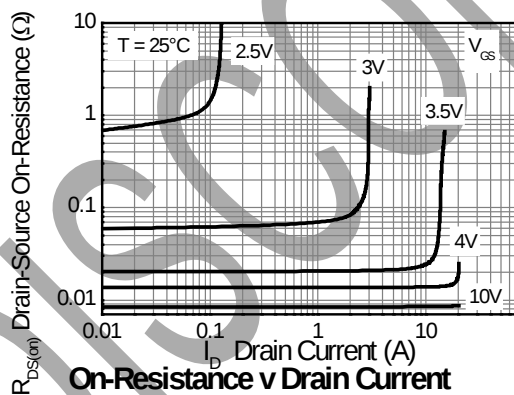
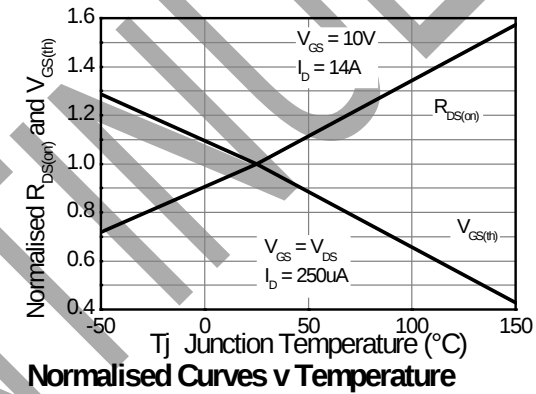
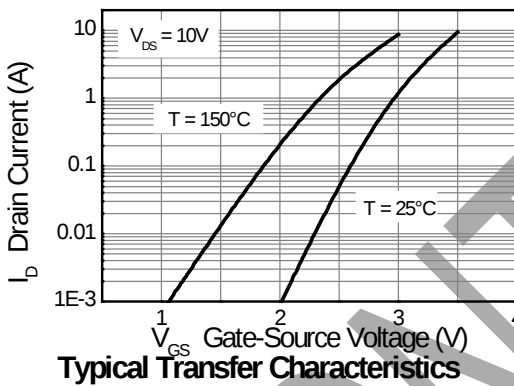
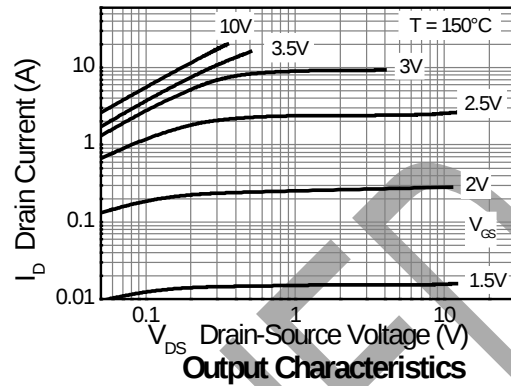
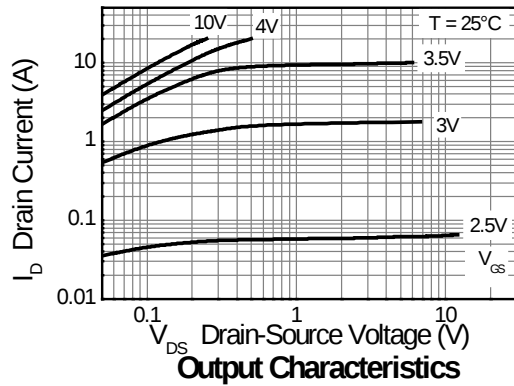


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

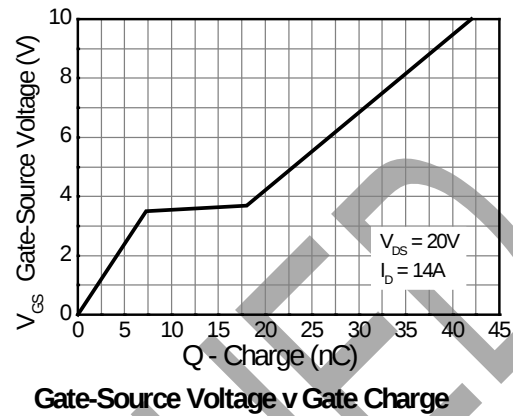
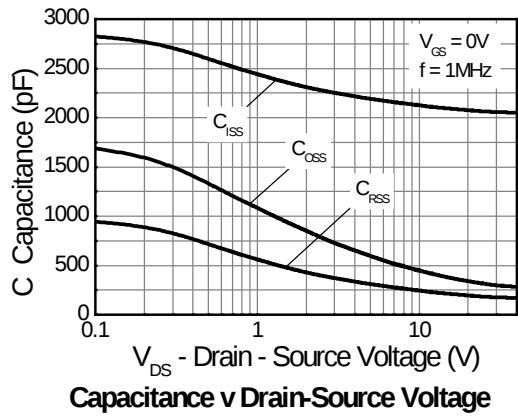
| Characteristic                             | Symbol               | Min | Typ  | Max  | Unit | Test Condition                                                                              |                                               |
|--------------------------------------------|----------------------|-----|------|------|------|---------------------------------------------------------------------------------------------|-----------------------------------------------|
| OFF CHARACTERISTICS                        |                      |     |      |      |      |                                                                                             |                                               |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>    | 40  | —    | —    | 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> = 40V, 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 | —    | 3.0  | V    | I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>                                   |                                               |
| Static Drain-Source On-Resistance (Note 7) | R <sub>DS (ON)</sub> | —   | —    | 8.5  | m•   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 14A                                                 |                                               |
|                                            |                      |     |      | 14   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 11A                                                |                                               |
| Forward Transconductance (Notes 7 & 8)     | g <sub>fs</sub>      | —   | 35.3 | —    | S    | V <sub>DS</sub> = 15V, I <sub>D</sub> = 12A                                                 |                                               |
| Diode Forward Voltage (Note 7)             | V <sub>SD</sub>      | —   | 0.82 | 1.0  | V    | I <sub>S</sub> = 14A, V <sub>GS</sub> = 0V                                                  |                                               |
| Reverse recovery time (Note 8)             | t <sub>rr</sub>      | —   | 141  | —    | ns   | I <sub>S</sub> = 14A, di/dt= 100A/μs                                                        |                                               |
| Reverse recovery charge (Note 8)           | Q <sub>rr</sub>      | —   | 872  | —    | nC   |                                                                                             |                                               |
| DYNAMIC CHARACTERISTICS (Note 8)           |                      |     |      |      |      |                                                                                             |                                               |
| Input Capacitance                          | C <sub>iSS</sub>     | —   | 2072 | —    | pF   | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V<br>f= 1MHz                                      |                                               |
| Output Capacitance                         | C <sub>oSS</sub>     | —   | 338  | —    | pF   |                                                                                             |                                               |
| Reverse Transfer Capacitance               | C <sub>rSS</sub>     | —   | 193  | —    | pF   |                                                                                             |                                               |
| Total Gate Charge                          | Q <sub>g</sub>       | —   | 21   | —    | nC   | V <sub>GS</sub> = 4.5V                                                                      | V <sub>DS</sub> = 20V<br>I <sub>D</sub> = 14A |
| Total Gate Charge                          | Q <sub>g</sub>       | —   | 42   | —    | nC   | V <sub>GS</sub> = 10V                                                                       |                                               |
| Gate-Source Charge                         | Q <sub>gs</sub>      | —   | 7.3  | —    | nC   |                                                                                             |                                               |
| Gate-Drain Charge                          | Q <sub>gd</sub>      | —   | 10.7 | —    | nC   |                                                                                             |                                               |
| Turn-On Delay Time (Note 9)                | t <sub>D(on)</sub>   | —   | 7.8  | —    | ns   | V <sub>DD</sub> = 20V, V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 14A, R <sub>G</sub> ≅ 6.0Ω |                                               |
| Turn-On Rise Time (Note 9)                 | t <sub>r</sub>       | —   | 18.5 | —    | ns   |                                                                                             |                                               |
| Turn-Off Delay Time (Note 9)               | t <sub>D(off)</sub>  | —   | 37.3 | —    | ns   |                                                                                             |                                               |
| Turn-Off Fall Time (Note 9)                | t <sub>f</sub>       | —   | 14.9 | —    | 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.

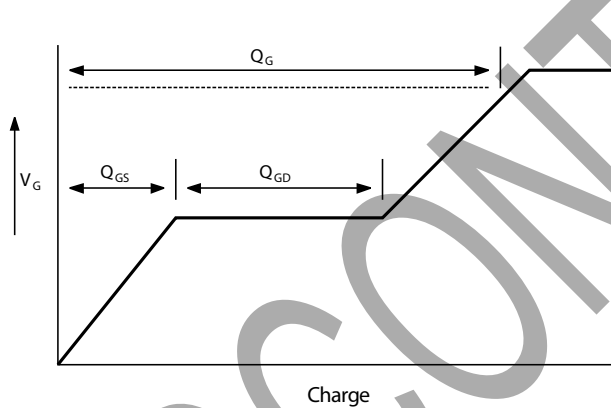
## Typical Characteristics



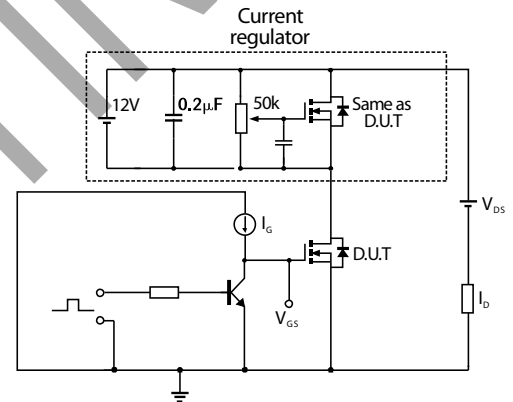
## Typical Characteristics - continued



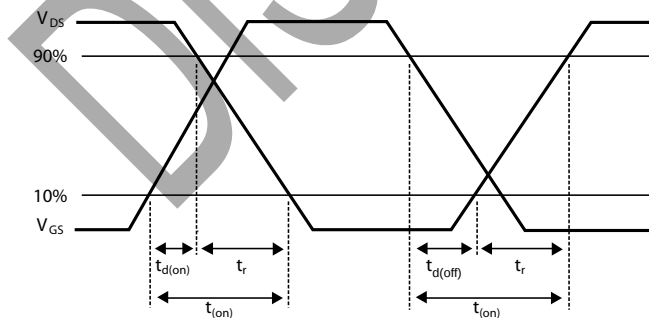
## Test Circuits



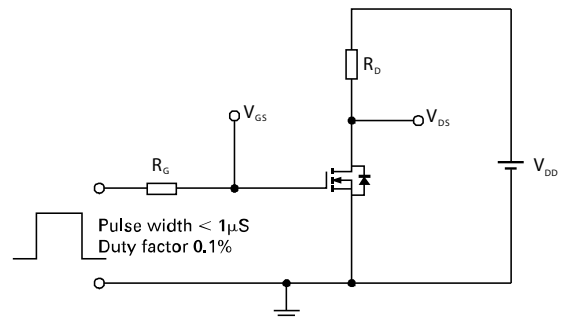
Basic gate charge waveform



Gate charge test circuit

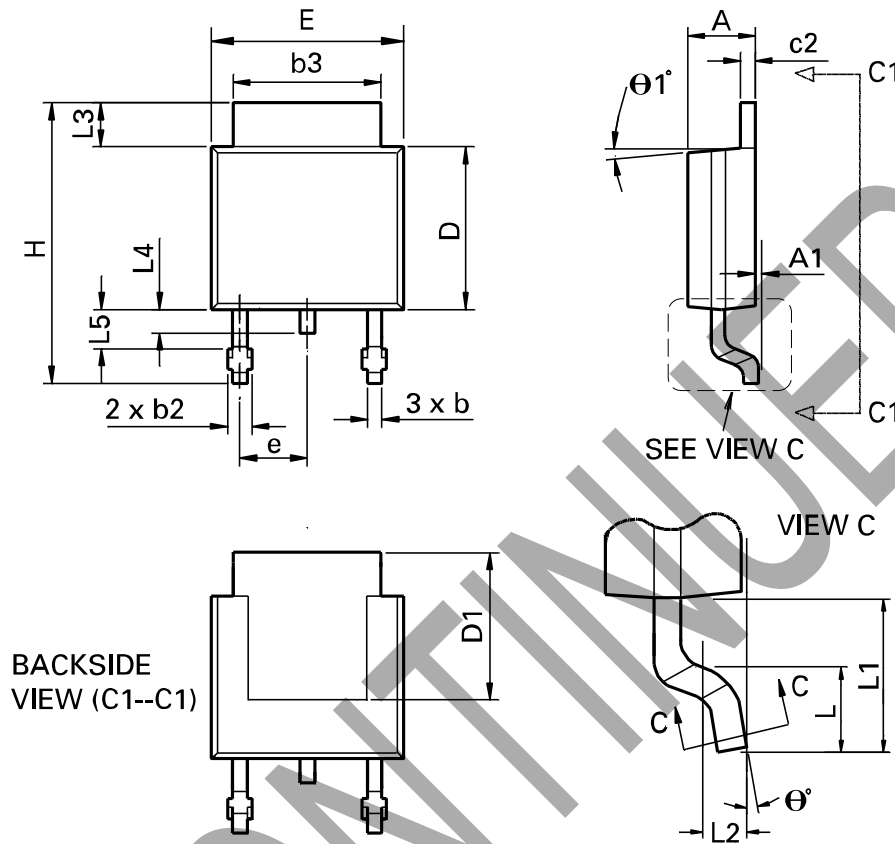


Switching time waveforms



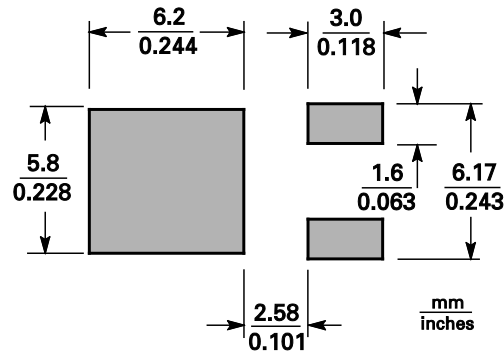
Switching time test circuit

## 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        | -     | •1° | 0°        | 10°   | 0°          | 10°   |
| E   | 0.250  | 0.265 | 6.35        | 6.73  | •°  | 0°        | 15°   | 0°          | 15°   |
| E1  | 0.170  | -     | 4.32        | -     | -   | -         | -     | -           | -     |

## Suggested Pad Layout



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