

## N-Channel 100-V (D-S) MOSFET

| PRODUCT SUMMARY |                            |           |
|-----------------|----------------------------|-----------|
| $V_{DS}$ (V)    | $R_{DS(on)}$ ( $\Omega$ )  | $I_D$ (A) |
| 100             | 0.0075 at $V_{GS} = 10$ V  | 85        |
|                 | 0.0095 at $V_{GS} = 4.5$ V | 75        |

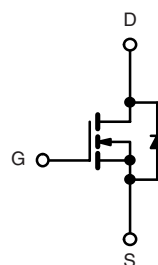
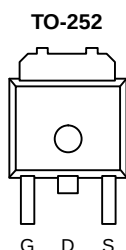
### FEATURES

- TrenchFET® Power MOSFET
- 100 %  $R_g$  Tested
- 100 % UIS Tested


**RoHS**  
 COMPLIANT

### APPLICATIONS

- Primary Side Switch
- Isolated DC/DC Converter



N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted |                |                 |      |
|----------------------------------------------------------------|----------------|-----------------|------|
| Parameter                                                      | Symbol         | Limit           | Unit |
| Drain-Source Voltage                                           | $V_{DS}$       | 100             | V    |
| Gate-Source Voltage                                            | $V_{GS}$       | $\pm 20$        |      |
| Continuous Drain Current ( $T_J = 150$ °C)                     | $I_D$          | 85              | A    |
|                                                                |                | 75 <sup>a</sup> |      |
| Pulsed Drain Current                                           | $I_{DM}$       | 300             |      |
| Avalanche Current                                              | $I_{AS}$       | 75              | mJ   |
| Single Pulse Avalanche Energy <sup>b</sup>                     | $E_{AS}$       | 280             |      |
| Maximum Power Dissipation <sup>b</sup>                         | $P_D$          | 210             | W    |
|                                                                |                | 3.25            |      |
| Operating Junction and Storage Temperature Range               | $T_J, T_{stg}$ | - 55 to 175     | °C   |

| THERMAL RESISTANCE RATINGS               |            |         |         |      |              |
|------------------------------------------|------------|---------|---------|------|--------------|
| Parameter                                | Symbol     | Typical | Maximum | Unit |              |
| Maximum Junction-to-Ambient <sup>b</sup> | $R_{thJA}$ | 40      | 50      | °C/W | Steady State |
| Maximum Junction-to-Case                 | $R_{thJC}$ | 0.85    | 1.1     |      |              |

Notes:

a. Package limited.

b. Surface mounted on 1" x 1" FR4 board.

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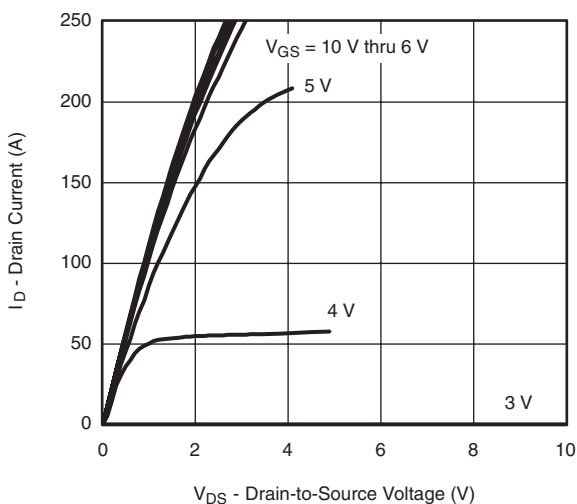
| SPECIFICATIONS T <sub>J</sub> = 25 °C, unless otherwise noted                      |                      |                                                                                                                          |      |        |       |      |
|------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------|------|--------|-------|------|
| Parameter                                                                          | Symbol               | Test Conditions                                                                                                          | Min. | Typ.   | Max.  | Unit |
| Static                                                                             |                      |                                                                                                                          |      |        |       |      |
| Drain-Source Breakdown Voltage                                                     | V <sub>DS</sub>      | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA                                                                           | 100  |        |       | V    |
| Gate-Threshold Voltage                                                             | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA                                                              | 1    |        | 3     |      |
| Gate-Body Leakage                                                                  | I <sub>GSS</sub>     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V                                                                          |      |        | ± 100 | nA   |
| Zero Gate Voltage Drain Current                                                    | I <sub>DSS</sub>     | V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V                                                                           |      |        | 1     | μA   |
|                                                                                    |                      | V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C                                                  |      |        | 50    |      |
|                                                                                    |                      | V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C                                                  |      |        | 250   |      |
| On-State Drain Current <sup>a</sup>                                                | I <sub>D(on)</sub>   | V <sub>DS</sub> = ≥ 5 V, V <sub>GS</sub> = 10 V                                                                          | 120  |        |       | A    |
| Drain-Source On-State Resistance <sup>a</sup>                                      | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A                                                                            |      | 0.0075 |       | Ω    |
|                                                                                    |                      | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A                                                                           |      | 0.0095 |       |      |
|                                                                                    |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125 °C                                                   |      | 0.017  |       |      |
|                                                                                    |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175 °C                                                   |      | 0.022  |       |      |
| Forward Transconductance <sup>a</sup>                                              | g <sub>fs</sub>      | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A                                                                            | 25   |        |       | S    |
| Dynamic <sup>b</sup>                                                               |                      |                                                                                                                          |      |        |       |      |
| Input Capacitance                                                                  | C <sub>iss</sub>     | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz                                                                 |      | 4550   |       | pF   |
| Output Capacitance                                                                 | C <sub>oss</sub>     |                                                                                                                          |      | 565    |       |      |
| Reverse Transfer Capacitance                                                       | C <sub>rss</sub>     |                                                                                                                          |      | 205    |       |      |
| Total Gate Charge <sup>c</sup>                                                     | Q <sub>g</sub>       | V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 85 A                                                    |      | 105    | 160   | nC   |
| Gate-Source Charge <sup>c</sup>                                                    | Q <sub>gs</sub>      |                                                                                                                          |      | 17     |       |      |
| Gate-Drain Charge <sup>c</sup>                                                     | Q <sub>gd</sub>      |                                                                                                                          |      | 23     |       |      |
| Turn-On Delay Time <sup>c</sup>                                                    | t <sub>d(on)</sub>   | V <sub>DD</sub> = 50 V, R <sub>L</sub> = 0.6 Ω<br>I <sub>D</sub> ≅ 85 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 2.5 Ω |      | 12     | 25    | ns   |
| Rise Time <sup>c</sup>                                                             | t <sub>r</sub>       |                                                                                                                          |      | 90     | 135   |      |
| Turn-Off DelayTime <sup>c</sup>                                                    | t <sub>d(off)</sub>  |                                                                                                                          |      | 55     | 85    |      |
| Fall Time <sup>c</sup>                                                             | t <sub>f</sub>       |                                                                                                                          |      | 130    | 195   |      |
| Source-Drain Diode Ratings and Characteristics T <sub>C</sub> = 25 °C <sup>b</sup> |                      |                                                                                                                          |      |        |       |      |
| Continuous Current                                                                 | I <sub>S</sub>       |                                                                                                                          |      |        | 85    | A    |
| Pulsed Current                                                                     | I <sub>SM</sub>      |                                                                                                                          |      |        | 240   |      |
| Forward Voltage <sup>a</sup>                                                       | V <sub>SD</sub>      | I <sub>F</sub> = 85 A, V <sub>GS</sub> = 0 V                                                                             |      | 1.0    | 1.5   | V    |
| Reverse Recovery Time                                                              | t <sub>rr</sub>      | I <sub>F</sub> = 50 A, dI/dt = 100 A/μs                                                                                  |      | 85     | 140   | ns   |
| Peak Reverse Recovery Current                                                      | I <sub>RM(REC)</sub> |                                                                                                                          |      | 4.5    | 7     | A    |
| Reverse Recovery Charge                                                            | Q <sub>rr</sub>      |                                                                                                                          |      |        | 0.17  | 0.35 |

Notes:

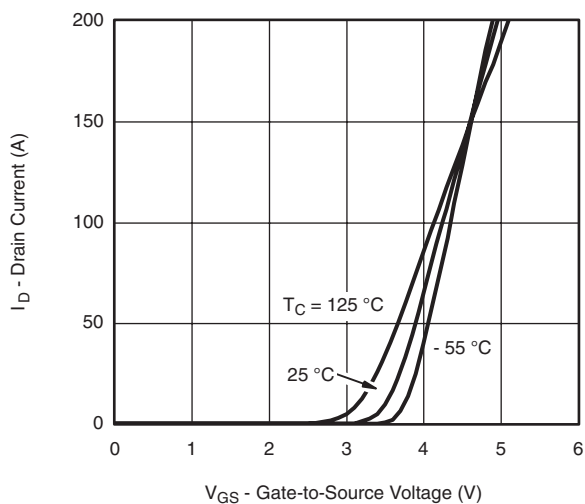
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.  
 c. Independent of operating temperature.

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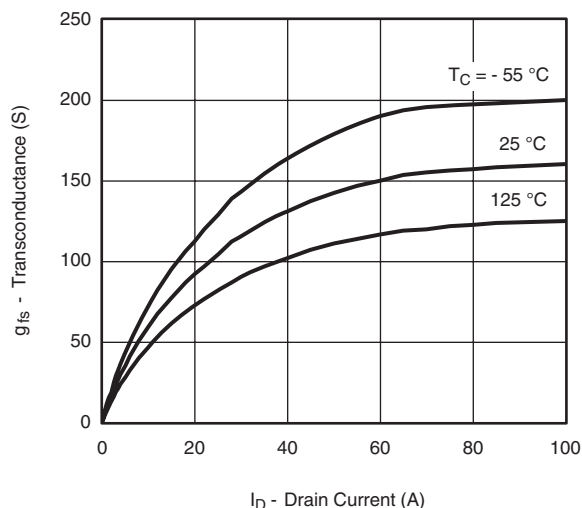
## TYPICAL CHARACTERISTICS $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted



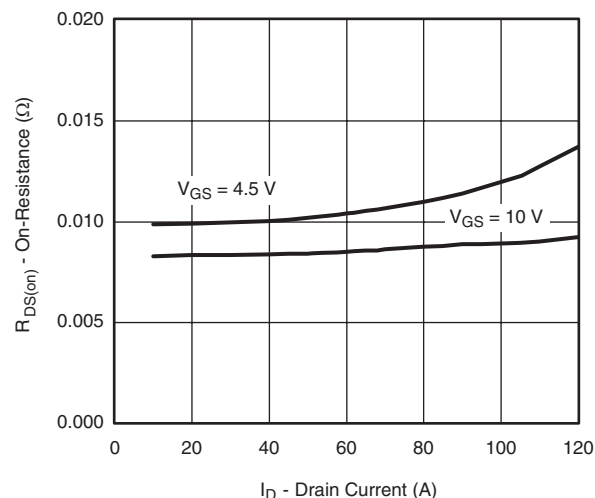
Output Characteristics



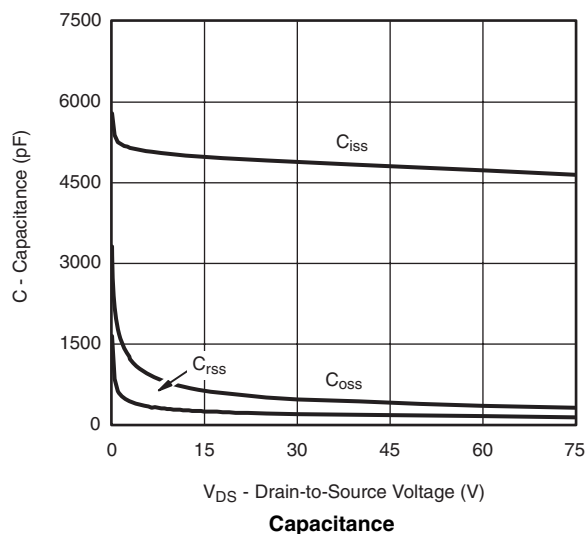
Transfer Characteristics



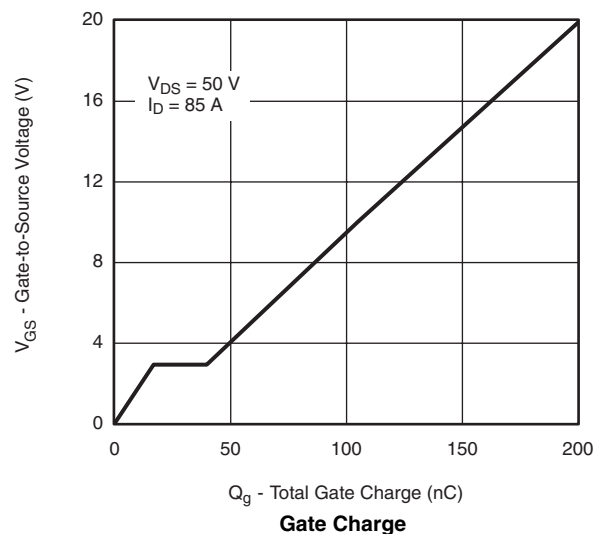
Transconductance



On-Resistance vs. Drain Current

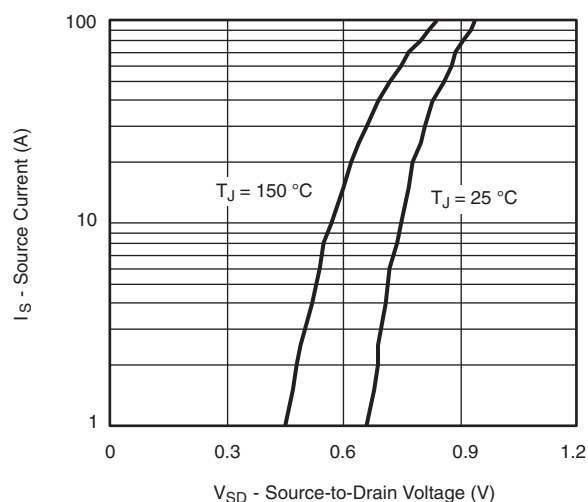
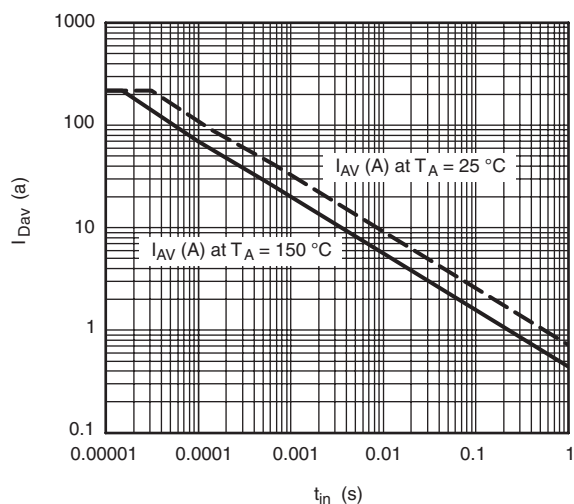


Capacitance



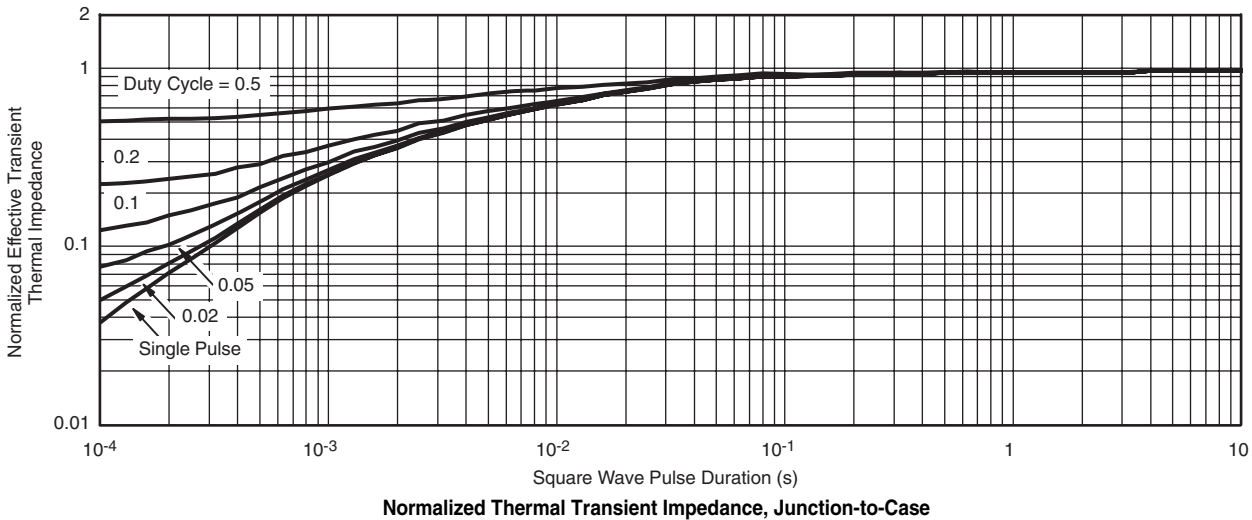
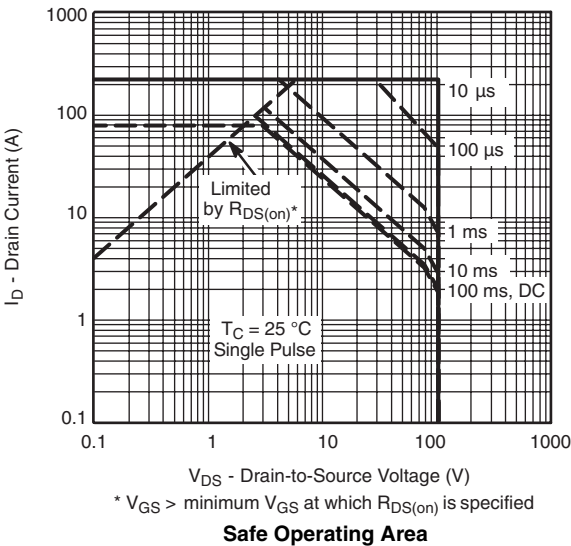
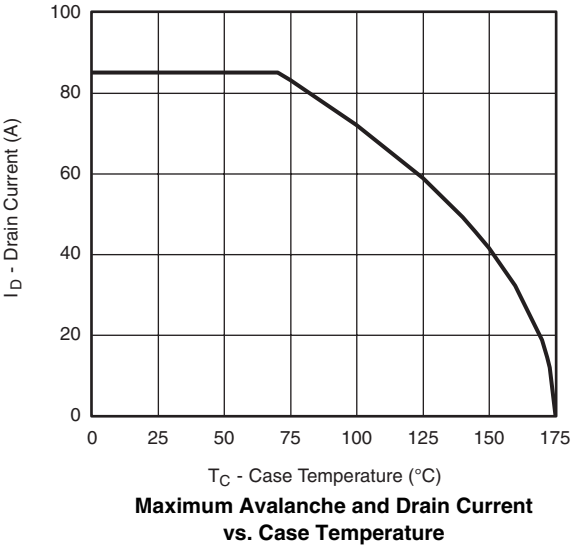
Gate Charge

**TYPICAL CHARACTERISTICS**  $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted

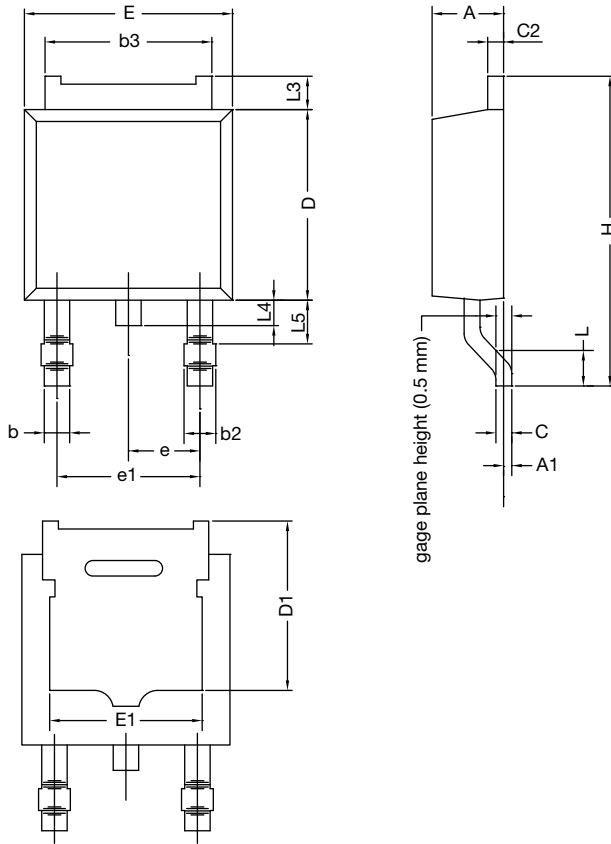
**On-Resistance vs. Junction Temperature**

**Source-Drain Diode Forward Voltage**

**Avalanche Current vs. Time**

 **$T_J$  - Drain-Source Breakdown vs. Junction-Temperature**

**THERMAL RATINGS**



## TO-252AA CASE OUTLINE

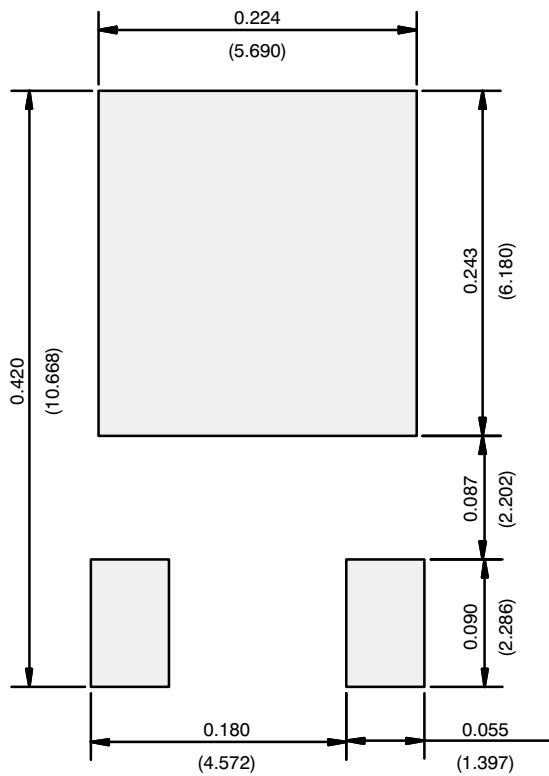


| DIM.                            | MILLIMETERS |       | INCHES    |       |
|---------------------------------|-------------|-------|-----------|-------|
|                                 | MIN.        | MAX.  | MIN.      | MAX.  |
| A                               | 2.18        | 2.38  | 0.086     | 0.094 |
| A1                              | -           | 0.127 | -         | 0.005 |
| b                               | 0.64        | 0.88  | 0.025     | 0.035 |
| b2                              | 0.76        | 1.14  | 0.030     | 0.045 |
| b3                              | 4.95        | 5.46  | 0.195     | 0.215 |
| C                               | 0.46        | 0.61  | 0.018     | 0.024 |
| C2                              | 0.46        | 0.89  | 0.018     | 0.035 |
| D                               | 5.97        | 6.22  | 0.235     | 0.245 |
| D1                              | 5.21        | -     | 0.205     | -     |
| E                               | 6.35        | 6.73  | 0.250     | 0.265 |
| E1                              | 4.32        | -     | 0.170     | -     |
| H                               | 9.40        | 10.41 | 0.370     | 0.410 |
| e                               | 2.28 BSC    |       | 0.090 BSC |       |
| e1                              | 4.56 BSC    |       | 0.180 BSC |       |
| L                               | 1.40        | 1.78  | 0.055     | 0.070 |
| L3                              | 0.89        | 1.27  | 0.035     | 0.050 |
| L4                              | -           | 1.02  | -         | 0.040 |
| L5                              | 1.14        | 1.52  | 0.045     | 0.060 |
| ECN: X12-0247-Rev. M, 24-Dec-12 |             |       |           |       |
| DWG: 5347                       |             |       |           |       |

### Note

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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