

MOSFET – N-Channel, POWERTRENCH®

40 V, 7.6 A, 29 mΩ

FDS8449, FDS8449-G

General Description

These N-Channel MOSFETs are produced using onsemi's advanced POWERTRENCH process that has been especially tailored to minimize on-state resistance and yet maintain superior switching performance.

Features

- 7.6 A, 40 V $R_{DS(on)} = 29\text{ m}\Omega @ V_{GS} = 10\text{ V}$
 $R_{DS(on)} = 36\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- High Power Handling Capability in a Widely Used Surface Mount Package
- Pb-Free, Halide Free and RoHS Compliant

ABSOLUTE MAXIMUM RATINGS

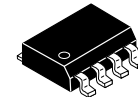
$T_A = 25^\circ\text{C}$ unless otherwise noted.

| Symbol | Parameter | Ratings | Unit |
|----------------|--|-------------|------------------|
| V_{DSS} | Drain to Source Voltage | 40 | V |
| V_{GSS} | Gate to Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous (Note 1a) – Pulsed | 7.6 50 | A |
| P_D | Power Dissipation for Single Operation (Note 1a) (Note 1b) | 2.5 1 | W |
| T_J, T_{STG} | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ\text{C}$ |

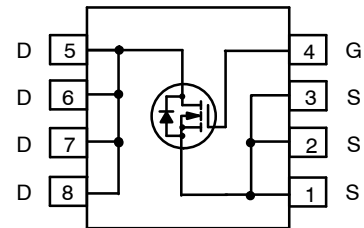
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

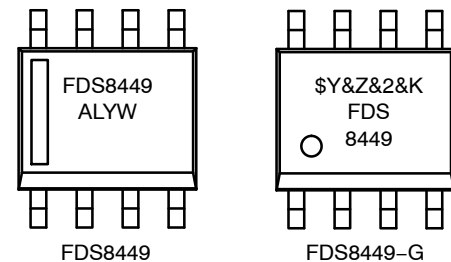
| Symbol | Parameter | Ratings | Unit |
|-----------------|---|---------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient (Note 1a) | 50 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient (Note 1b) | 125 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case (Note 1) | 25 | $^\circ\text{C/W}$ |



SOIC8
CASE 751EB



MARKING DIAGRAM



- FDS8449 = Specific Device Code
A = Assembly Site
L = Wafer Lot Number
YW = Assembly Start Week
\$Y = onsemi Logo
&Z = Assembly Plant Code
&2 = 2-Digit Code Format
&K = 2-Digits Lot Run Traceability Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------|------------------------------------|-----------------------|
| FDS8449 | SOIC8 (Pb-Free/ Halide Free) | 2500 / Tape & Reel |
| FDS8449-G | SOIC8 (Pb-Free/ Halide Free) | 2500 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

FDS8449, FDS8449-G

ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise noted.

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|--------|-----------|-----------------|-----|-----|-----|------|
|--------|-----------|-----------------|-----|-----|-----|------|

DRAIN-SOURCE AVALANCHE RATINGS (Note 3)

| | | | | | | |
|----------|-----------------------------------|---|---|-----|----|----|
| E_{AS} | Drain to Source Avalanche Energy | $V_{DD} = 40\text{ V}, I_D = 7.3\text{ A}, L = 1\text{ mH}$ | - | - | 27 | mJ |
| I_{AS} | Drain to Source Avalanche Current | | - | 7.3 | - | A |

OFF CHARACTERISTICS

| | | | | | | |
|--------------------------------------|---|---|----|----|-----------|----------------------|
| BV_{DSS} | Drain to Source Breakdown Voltage | $I_D = 250\ \mu\text{A}, V_{GS} = 0\text{ V}$ | 40 | - | - | V |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | Breakdown Voltage Temperature Coefficient | $I_D = 250\ \mu\text{A}$, Referenced to 25°C | - | 34 | - | mV/ $^\circ\text{C}$ |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}$ | - | - | 1 | μA |
| I_{GSS} | Gate-Body Leakage | $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ | - | - | ± 100 | nA |

ON CHARACTERISTICS (Note 2)

| | | | | | | |
|--|--|---|---|-----|----|----------------------|
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$ | 1 | 1.9 | 3 | V |
| $\frac{\Delta V_{GS(th)}}{\Delta T_J}$ | Gate Threshold Voltage Temperature Coefficient | $I_D = 250\ \mu\text{A}$, Referenced to 25°C | - | -5 | - | mV/ $^\circ\text{C}$ |
| $R_{DS(on)}$ | Static Drain to Source On-Resistance | $I_D = 7.6\text{ A}, V_{GS} = 10\text{ V}$, | - | 21 | 29 | m Ω |
| | | $I_D = 6.8\text{ A}, V_{GS} = 4.5\text{ V}$ | - | 26 | 36 | |
| | | $I_D = 7.6\text{ A}, V_{GS} = 10\text{ V}$, $T_J = 125^\circ\text{C}$ | - | 29 | 43 | |
| g_{FS} | Forward Transconductance | $V_{DS} = 10\text{ V}, I_D = 7.6\text{ A}$ | - | 21 | - | S |

DYNAMIC CHARACTERISTICS

| | | | | | | |
|-----------|------------------------------|---|---|-----|---|----------|
| C_{iss} | Input Capacitance | $V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$ | - | 760 | - | pF |
| C_{oss} | Output Capacitance | | - | 100 | - | |
| C_{rss} | Reverse Transfer Capacitance | | - | 60 | - | |
| R_G | Gate Resistance | $f = 1.0\text{ MHz}$ | - | 1.2 | - | Ω |

SWITCHING CHARACTERISTICS (Note 2)

| | | | | | | |
|--------------|---------------------|--|---|-----|----|----|
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD} = 20\text{ V}, I_D = 1\text{ A}$, $V_{GS} = 10\text{ V}, R_{GS} = 6\ \Omega$ | - | 9 | 18 | ns |
| t_r | Turn-On Rise Time | | - | 5 | 10 | |
| $t_{d(off)}$ | Turn-Off Delay Time | | - | 23 | 17 | |
| t_f | Turn-Off Fall Time | | - | 3 | 6 | |
| Q_g | Total Gate Charge | $V_{DS} = 20\text{ V}, I_D = 7.6\text{ A}$, $V_{GS} = 5\text{ V}$ | - | 7.7 | 11 | nC |
| Q_{gs} | Gate-Source Charge | | - | 2.4 | - | |
| Q_{gd} | Gate-Drain Charge | | - | 2.8 | - | |

DRAIN-SOURCE DIODE CHARACTERISTICS

| | | | | | | |
|----------|---------------------------------------|--|---|------|-----|----|
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS} = 0\text{ V}, I_S = 2.1\text{ A}$ (Note 2) | - | 0.76 | 1.2 | V |
| t_{rr} | Diode Reverse Recovery Time | $I_F = 7.6\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$ | - | 17 | - | ns |
| Q_{rr} | Diode Reverse Recovery Charge | | - | 7 | - | nC |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTES:

- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) $50^\circ\text{C}/\text{W}$ when mounted on a 1 in² pad of 2 oz. copper.



b) $125^\circ\text{C}/\text{W}$ when mounted on a minimum pad.

- Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%
- $BV(\text{avalanche})$ Single-Pulse rating is guaranteed if device is operated within the UIS SOA boundary of the device.

TYPICAL CHARACTERISTICS

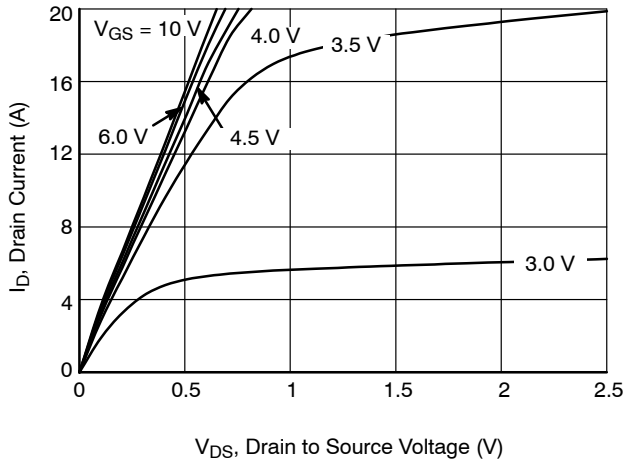


Figure 1. On Region Characteristics

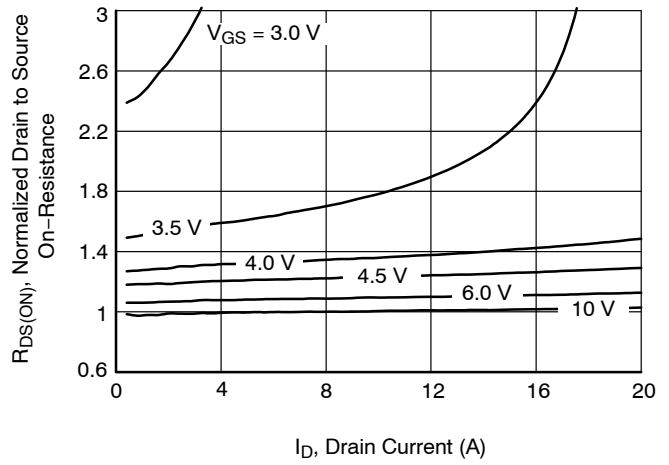


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

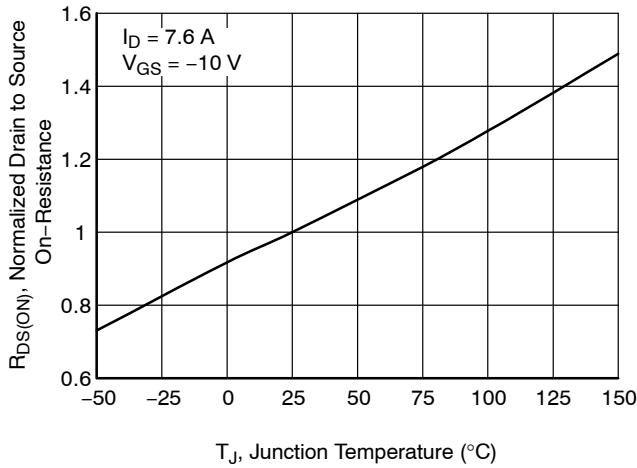


Figure 3. On-Resistance Variation with Temperature

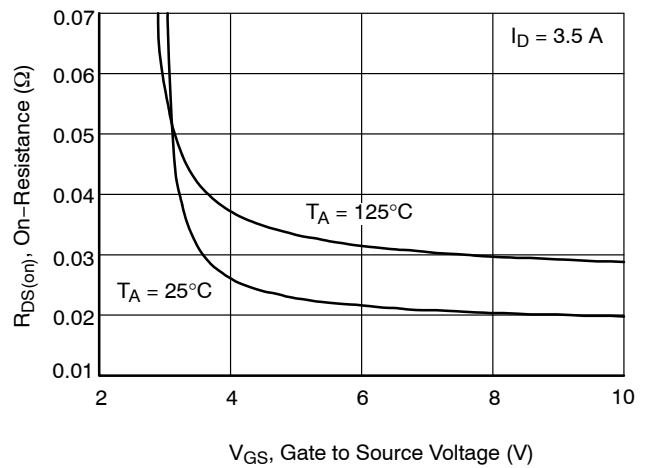


Figure 4. On-Resistance Variation with Gate-to-Source Voltage

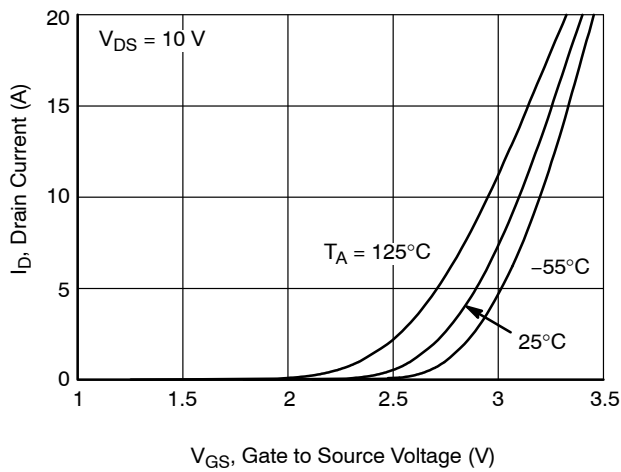


Figure 5. Transfer Characteristics

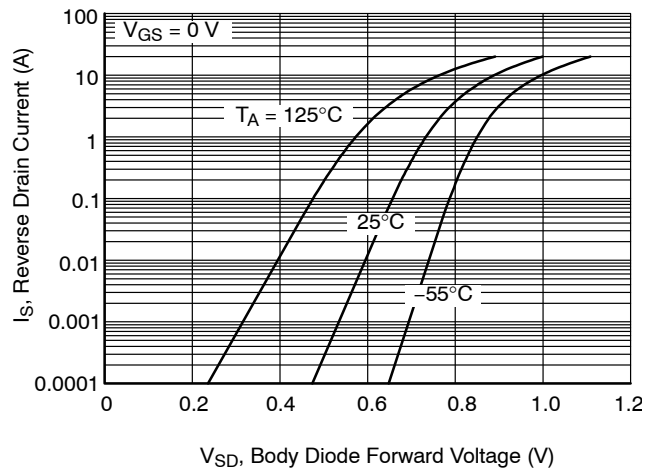


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

TYPICAL CHARACTERISTICS (continued)

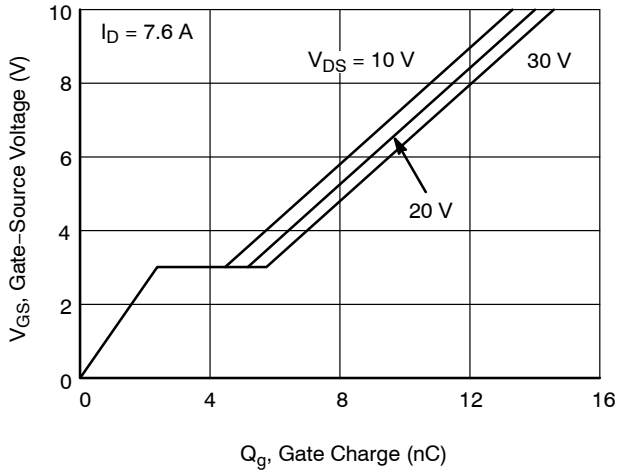


Figure 7. Gate Charge Characteristics

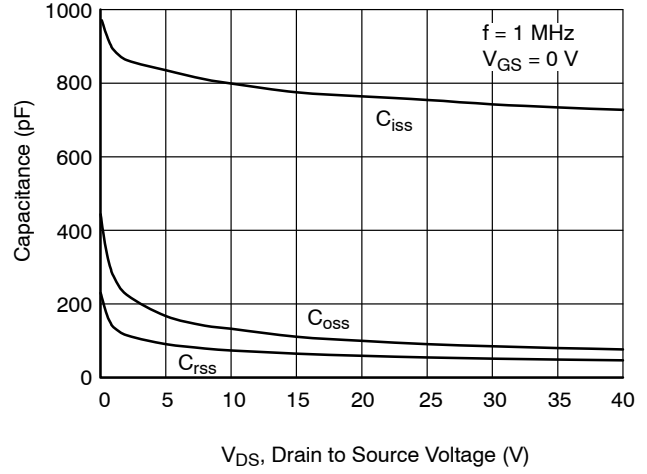


Figure 8. Capacitance Characteristics

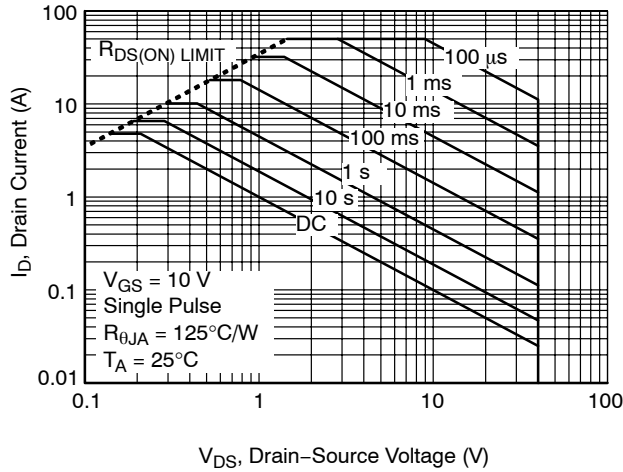


Figure 9. Maximum Safe Operating Area

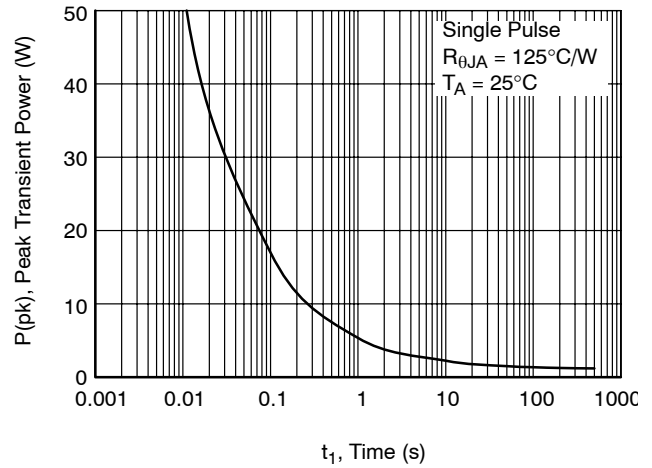


Figure 10. Single Pulse Maximum Power Dissipation

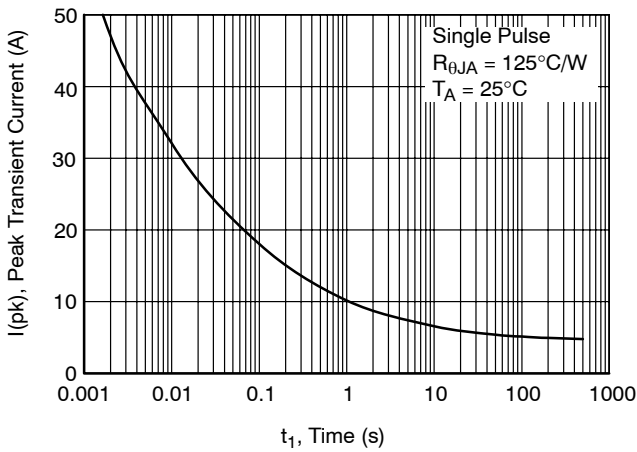


Figure 11. Single Pulse Maximum Peak Current

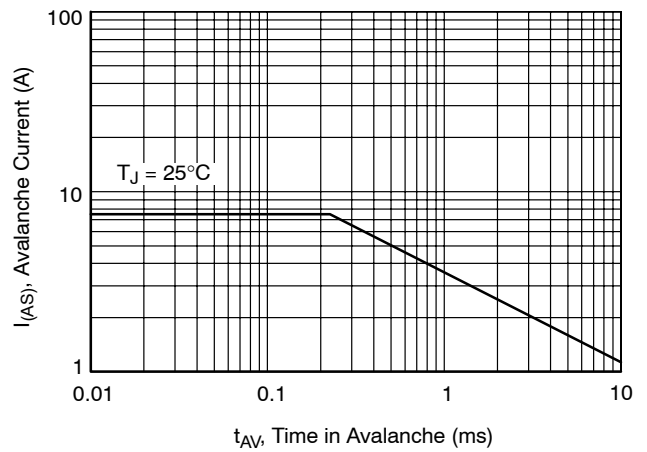


Figure 12. Unclamped Inductive Switching Capability

TYPICAL CHARACTERISTICS (continued)

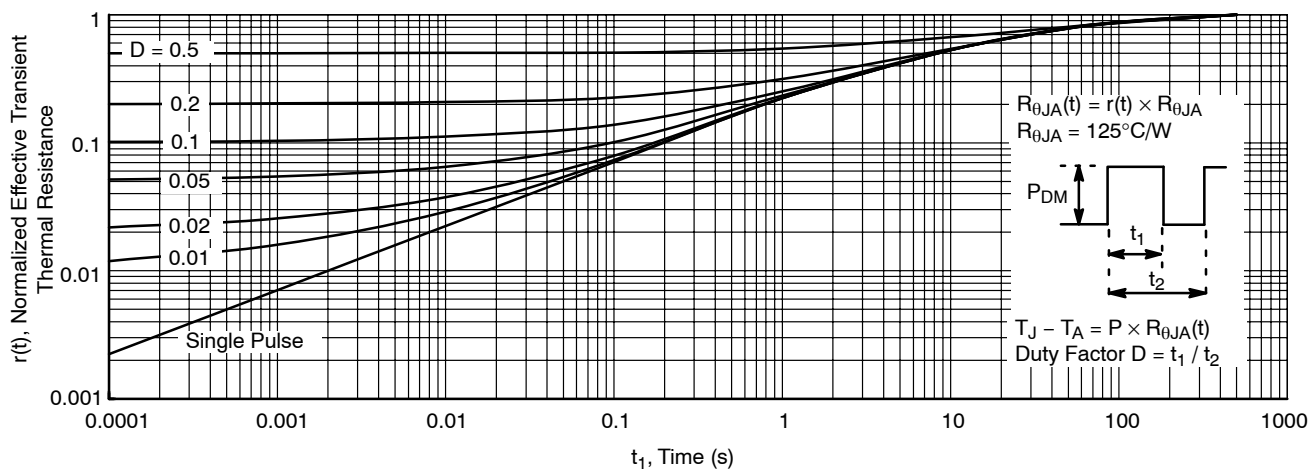


Figure 13. Transient Thermal Response Curve

NOTE: Transient thermal response will change depending on the circuit board design.

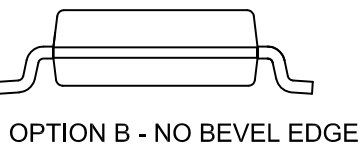
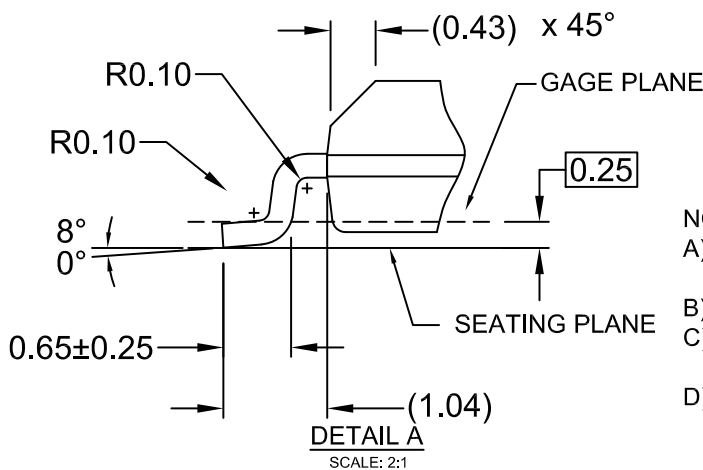
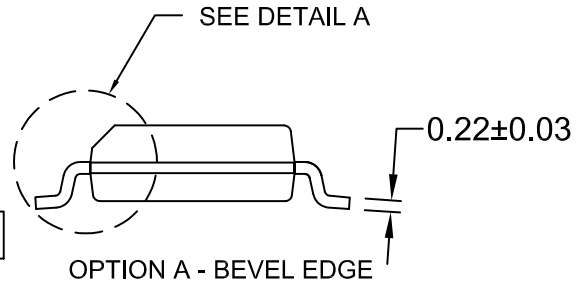
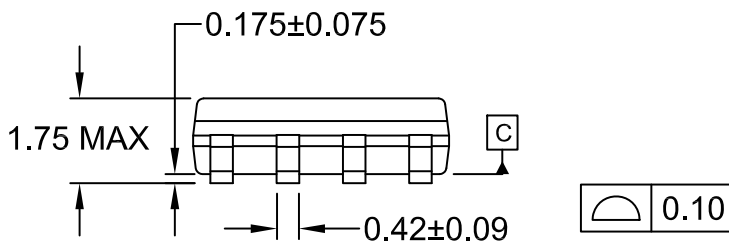
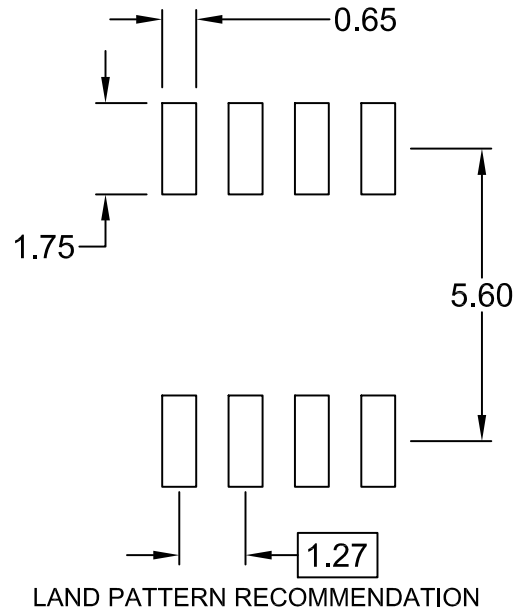
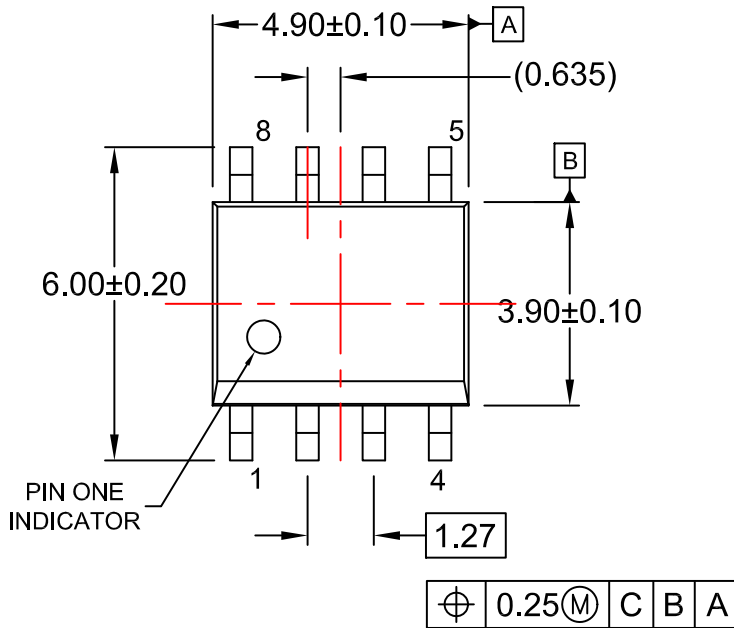
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®



SOIC8
CASE 751EB
ISSUE A

DATE 24 AUG 2017



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