

# MOSFET – N-Channel, POWERTRENCH®

30 V, 15 A, 5.7 mΩ

## FDMC8854

### General Description

This N-Channel MOSFET is a rugged gate version of onsemi's advanced Power Trench process. It has been optimized for power management applications.

### Features

- Max  $r_{DS(on)}$  = 5.7 mΩ at  $V_{GS}$  = 10 V,  $I_D$  = 15 A
- Max  $r_{DS(on)}$  = 7.6 mΩ at  $V_{GS}$  = 4.5 V,  $I_D$  = 13 A
- Low Profile – 1 mm Max in Power 33
- This Device is Pb-Free, Halide Free and is RoHS Compliant

### Applications

- DC-DC Conversion

### ABSOLUTE MAXIMUM RATINGS ( $T_A$ = 25°C unless otherwise noted.)

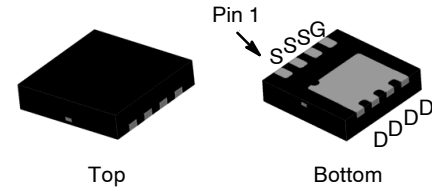
| Symbol         | Parameter  | Value       | Unit |
|----------------|--|-------------|------|
| $V_{DS}$       | Drain to Source Voltage                              | 30          | V    |
| $V_{GS}$       | Gate to Source Voltage                               | ±20         | V    |
| $I_D$          | Drain Current  |             | A    |
|                | – Continuous $T_C = 25^\circ\text{C}$                | 15          |      |
|                | – Continuous (Note 1a) $T_A = 25^\circ\text{C}$      | 15          |      |
|                | – Pulsed   | 100         |      |
| $P_D$          | Power Dissipation $T_C = 25^\circ\text{C}$           | 41          | W    |
|                | Power Dissipation (Note 1a) $T_A = 25^\circ\text{C}$ | 2.0         |      |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range     | –55 to +150 | °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 ( $T_A$ = 25°C unless otherwise noted.)

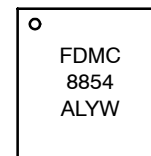
| Symbol          | Parameter   | Value | Unit |
|-----------------|---|-------|------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case              | 3     | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient (Note 1a) | 60    | °C/W |

| $V_{DS}$ | $R_{DS(on)}$ MAX | $I_D$ MAX |
|----------|------------------|-----------|
| 30 V     | 5.7 mΩ @ 10 V    | 15 A      |
|          | 7.6 mΩ @ 4.5 V   |           |



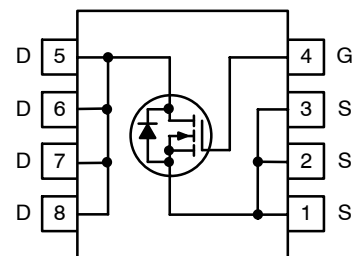
WDFN8 3.3x3.3, 0.65P  
CASE 511DH

### MARKING DIAGRAM



FDMC8854 = Device Code  
A = Assembly Site  
L = Wafer Lot Number  
YW = Assembly Start Week

### PIN ASSIGNMENT



N-Channel MOSFET

### ORDERING INFORMATION

| Device   | Package                      | Shipping†          |
|----------|------------------------------|--------------------|
| FDMC8854 | WDFN8 (Pb-Free, Halide Free) | 3000 / 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](#).

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

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

**OFF CHARACTERISTICS**

|                                |   |   |    |    |           |                      |
|--------------------------------|---|---|----|----|-----------|----------------------|
| $BV_{DSS}$                     | Drain to Source Breakdown Voltage         | $I_D = 250\ \mu\text{A}$ , $V_{GS} = 0\ \text{V}$           | 30 | –  | –         | V                    |
| $\Delta BV_{DSS} / \Delta T_J$ | Breakdown Voltage Temperature Coefficient | $I_D = 250\ \mu\text{A}$ , referenced to $25^\circ\text{C}$ | –  | 21 | –         | mV/ $^\circ\text{C}$ |
| $I_{DSS}$                      | Zero Gate Voltage Drain Current           | $V_{DS} = 24\ \text{V}$ , $V_{GS} = 0\ \text{V}$            | –  | –  | 1         | $\mu\text{A}$        |
| $I_{GSS}$                      | Gate to Source Leakage Current            | $V_{GS} = \pm 20\ \text{V}$ , $V_{DS} = 0\ \text{V}$        | –  | –  | $\pm 100$ | nA                   |

**ON CHARACTERISTICS** (Note 2)

|                                  |  |  |   |     |     |                      |
|----------------------------------|--|--|---|-----|-----|----------------------|
| $V_{GS(th)}$                     | Gate to Source Threshold Voltage                         | $V_{GS} = V_{DS}$ , $I_D = 250\ \mu\text{A}$                               | 1 | 1.9 | 3   | V                    |
| $\Delta V_{GS(th)} / \Delta T_J$ | Gate to Source Threshold Voltage Temperature Coefficient | $I_D = 250\ \mu\text{A}$ , referenced to $25^\circ\text{C}$                | – | –6  | –   | mV/ $^\circ\text{C}$ |
| $r_{DS(on)}$                     | Static Drain to Source On Resistance                     | $V_{GS} = 10\ \text{V}$ , $I_D = 15\ \text{A}$                             | – | 4.4 | 5.7 | m $\Omega$           |
|                                  |  | $V_{GS} = 4.5\ \text{V}$ , $I_D = 13\ \text{A}$                            | – | 5.6 | 7.6 |                      |
|                                  |  | $V_{GS} = 10\ \text{V}$ , $I_D = 15\ \text{A}$ , $T_J = 125^\circ\text{C}$ | – | 6.6 | 9.0 |                      |
| $g_{FS}$                         | Forward Transconductance                                 | $V_{DS} = 5\ \text{V}$ , $I_D = 15\ \text{A}$                              | – | 60  | –   | S                    |

**DYNAMIC CHARACTERISTICS**

|           |                              |   |   |      |      |          |
|-----------|------------------------------|---|---|------|------|----------|
| $C_{iss}$ | Input Capacitance            | $V_{DS} = 10\ \text{V}$ , $V_{GS} = 0\ \text{V}$ ,<br>$f = 1\ \text{MHz}$ | – | 2560 | 3405 | pF       |
| $C_{oss}$ | Output Capacitance           |   | – | 515  | 685  | pF       |
| $C_{rss}$ | Reverse Transfer Capacitance |   | – | 290  | 435  | pF       |
| $R_g$     | Gate Resistance              | $f = 1\ \text{MHz}$   | – | 1.3  | –    | $\Omega$ |

**SWITCHING CHARACTERISTICS**

|              |                               |   |   |    |    |    |
|--------------|-------------------------------|---|---|----|----|----|
| $t_{d(on)}$  | Turn-On Delay Time            | $V_{DD} = 10\ \text{V}$ , $I_D = 15\ \text{A}$ ,<br>$V_{GS} = 10\ \text{V}$ , $R_{GEN} = 6\ \Omega$ | – | 13 | 23 | ns |
| $t_r$        | Rise Time                     |   | – | 5  | 10 | ns |
| $t_{d(off)}$ | Turn-Off Delay Time           |   | – | 31 | 50 | ns |
| $t_f$        | Fall Time                     |   | – | 5  | 10 | ns |
| $Q_g(TOT)$   | Total Gate Charge             | $V_{DD} = 10\ \text{V}$ , $I_D = 15\ \text{A}$ ,<br>$V_{GS} = 10\ \text{V}$                         | – | 41 | 57 | nC |
| $Q_{gs}$     | Gate to Source Gate Charge    |   | – | 7  | –  | nC |
| $Q_{gd}$     | Gate to Drain “Miller” Charge |   | – | 7  | –  | nC |

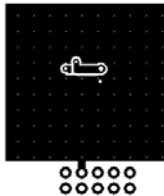
**DRAIN-SOURCE DIODE CHARACTERISTICS**

|          |                                       |  |   |     |     |    |
|----------|---------------------------------------|--|---|-----|-----|----|
| $V_{SD}$ | Source to Drain Diode Forward Voltage | $V_{GS} = 0\ \text{V}$ , $I_S = 15\ \text{A}$ (Note 2)     | – | 0.8 | 1.3 | V  |
| $t_{rr}$ | Reverse Recovery Time                 | $I_F = 15\ \text{A}$ , $di/dt = 100\ \text{A}/\mu\text{s}$ | – | 33  | 50  | ns |
| $Q_{rr}$ | Reverse Recovery Charge               |  | – | 28  | 42  | 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 determined with the device mounted on a 1 in<sup>2</sup> pad 2 oz copper pad on a 1.5 × 1.5 in. board of FR-4 material.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



- 60°C/W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper.



- 135°C/W when mounted on a minimum pad of 2 oz copper.

- Pulse Test: Pulse Width < 300  $\mu\text{s}$ , Duty cycle < 2.0%.

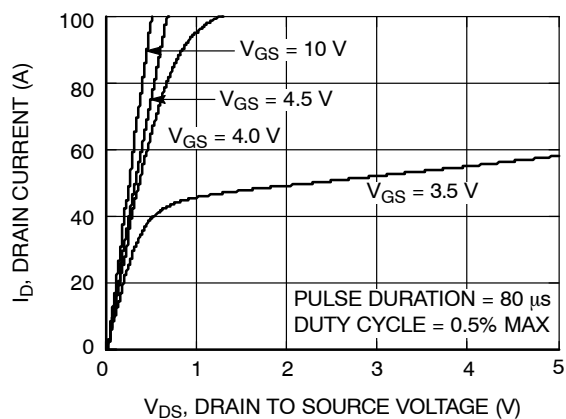
TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Figure 1. On Region Characteristics

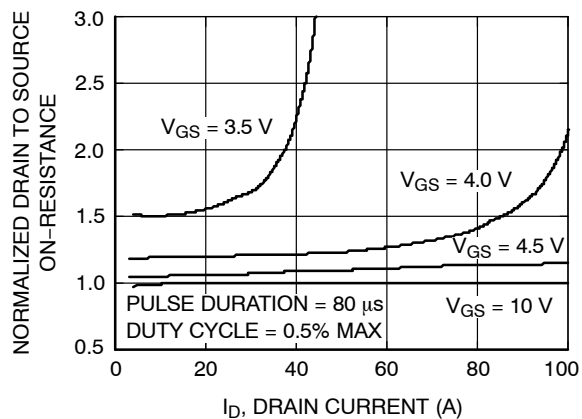


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

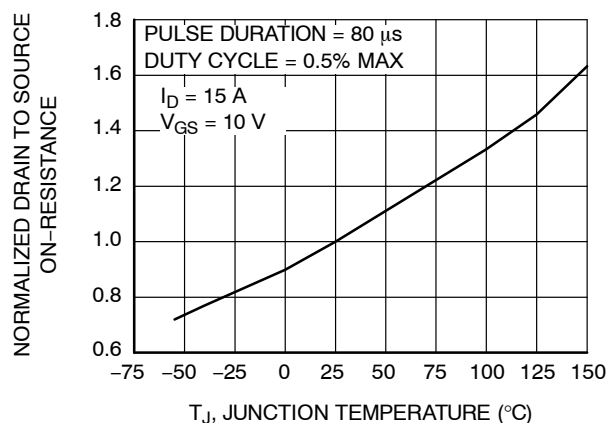


Figure 3. Normalized On Resistance vs. Junction Temperature

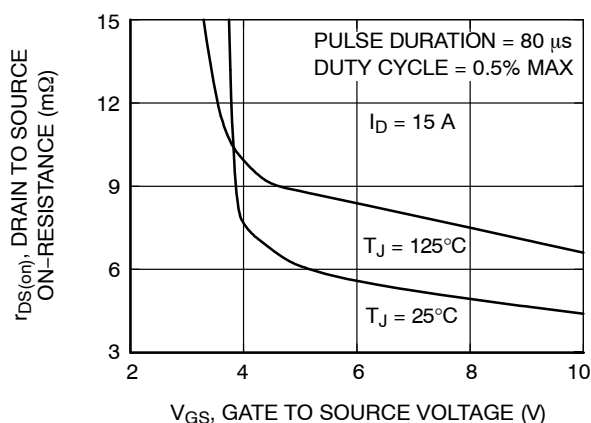


Figure 4. On-Resistance vs. Gate to Source Voltage

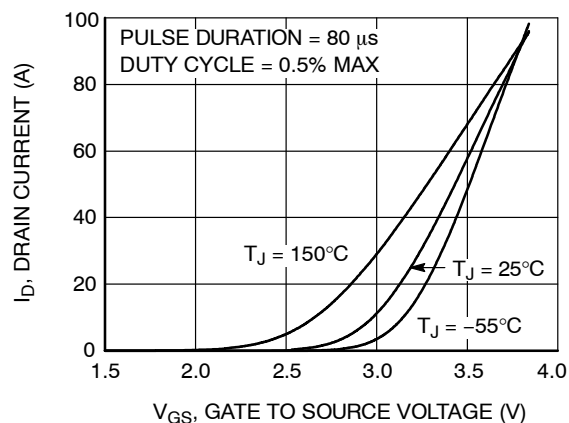


Figure 5. Transfer Characteristics

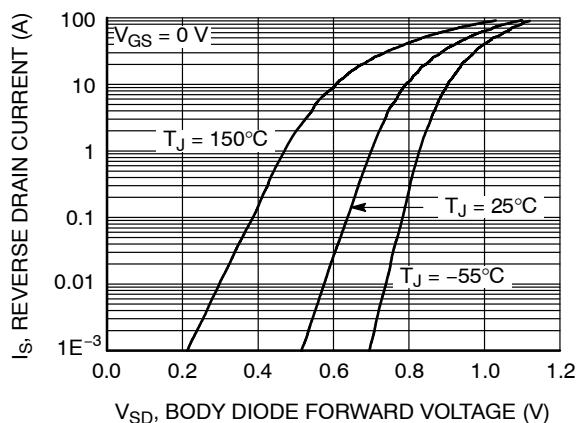
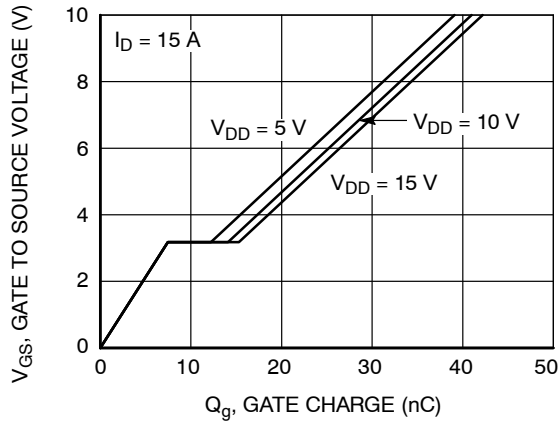
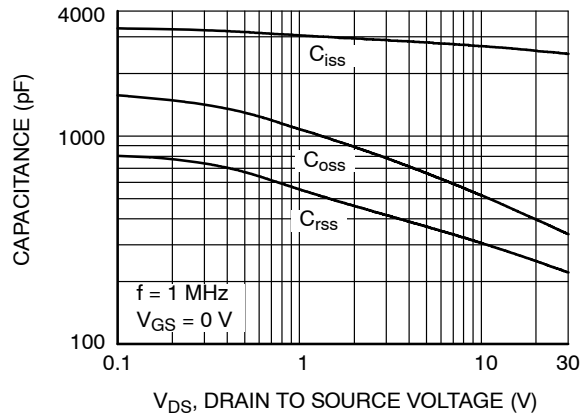


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

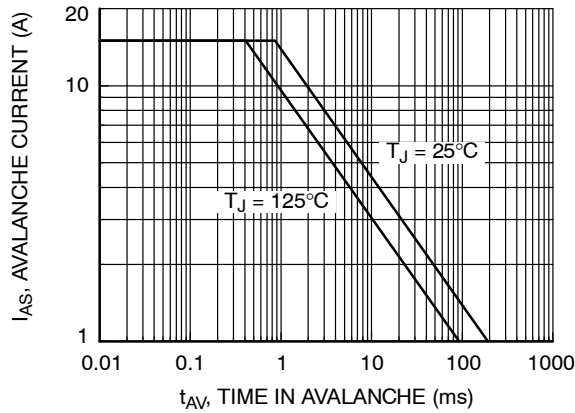
**TYPICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted) (continued)



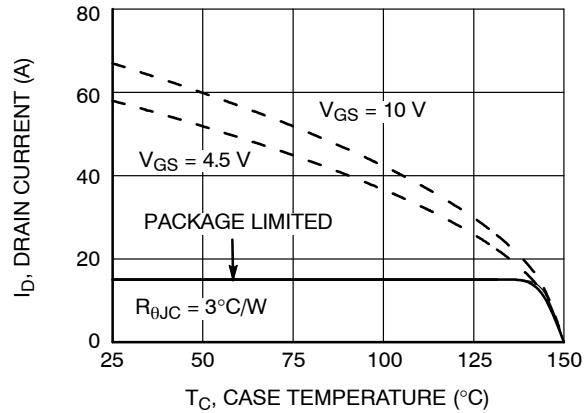
**Figure 7. Gate Charge Characteristics**



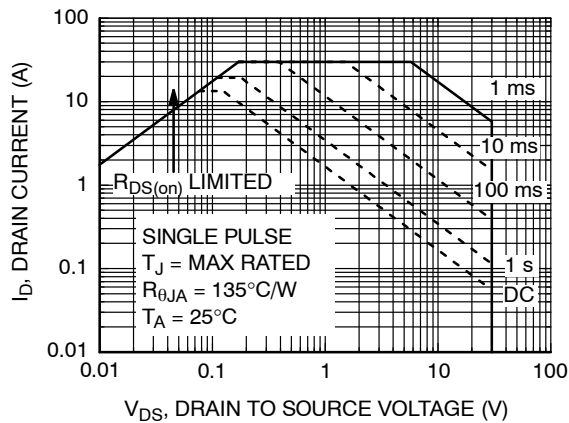
**Figure 8. Capacitance vs. Drain to Source Voltage**



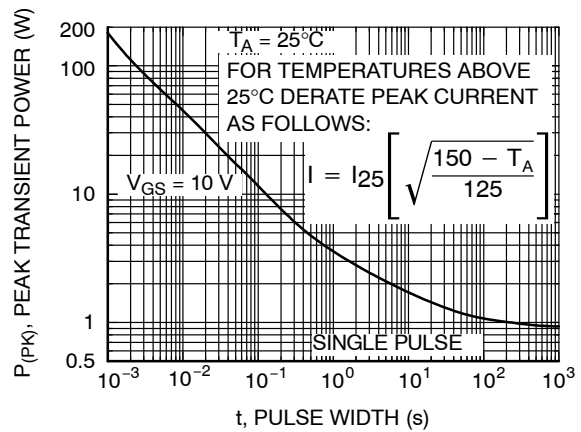
**Figure 9. Unclamped Inductive Switching Capability**



**Figure 10. Maximum Continuous Drain Current vs. Case Temperature**



**Figure 11. Forward Bias Safe Operating Area**



**Figure 12. Single Pulse Maximum Power Dissipation**

TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted) (continued)

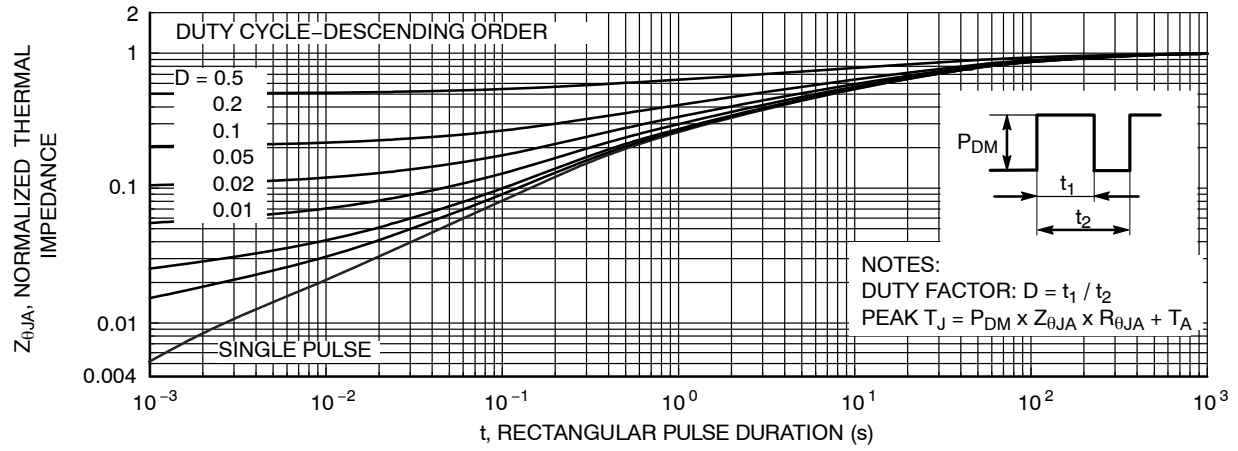
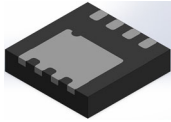


Figure 13. Transient Thermal Response Curve

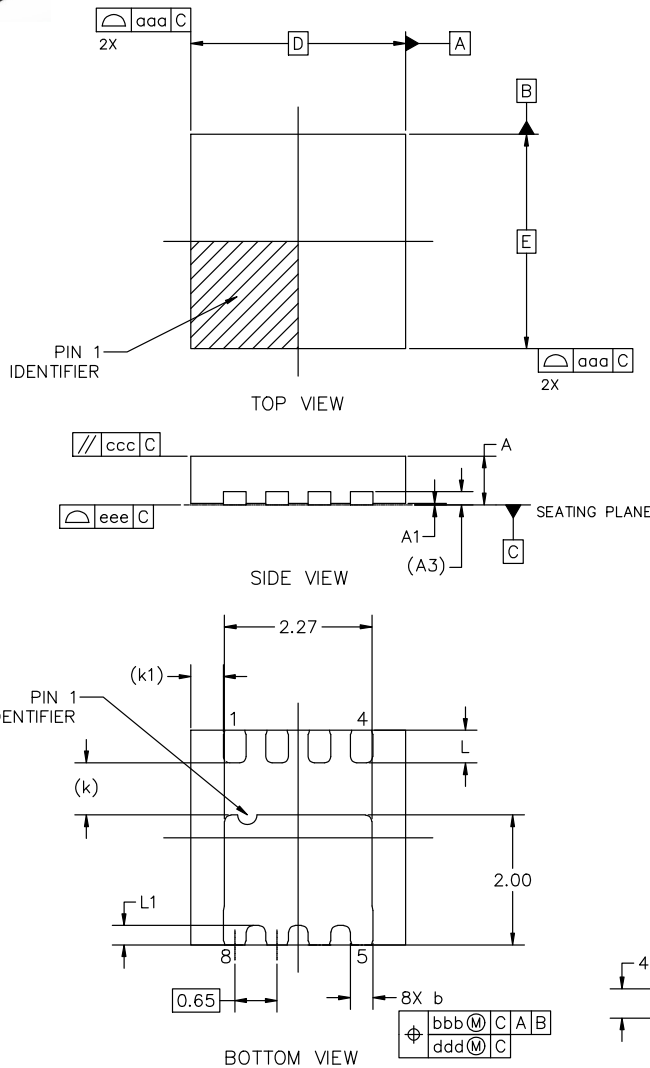


WDFN-8 3.30x3.30x0.75, 0.65P  
CASE 511DH  
ISSUE A

DATE 04 DEC 2025

NOTES:

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.



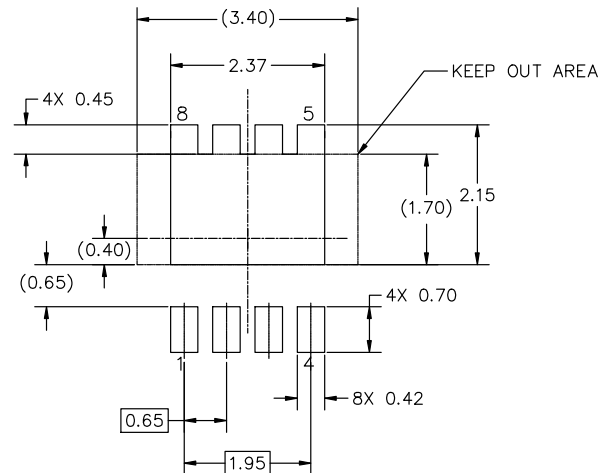
| MILLIMETERS               |          |       |      |
|---------------------------|----------|-------|------|
| DIM                       | MIN      | NOM   | MAX  |
| A                         | 0.70     | 0.75  | 0.80 |
| A1                        | 0.00     | 0.025 | 0.05 |
| A3                        | 0.20 REF |       |      |
| b                         | 0.30     | 0.35  | 0.40 |
| D                         | 3.30 BSC |       |      |
| D2                        | 2.22     | 2.27  | 2.32 |
| E                         | 3.30 BSC |       |      |
| E2                        | 1.95     | 2.00  | 2.05 |
| e                         | 0.65 BSC |       |      |
| k                         | 0.80 REF |       |      |
| k1                        | 0.50 REF |       |      |
| L                         | 0.45     | 0.50  | 0.55 |
| L1                        | 0.25     | 0.30  | 0.35 |
| TOLERANCE FORM & POSITION |          |       |      |
| aaa                       | 0.05     |       |      |
| bbb                       | 0.10     |       |      |
| ccc                       | 0.10     |       |      |
| ddd                       | 0.05     |       |      |
| eee                       | 0.08     |       |      |

GENERIC  
MARKING DIAGRAM\*



XXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

\* For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques reference manual, SOLDERM/D.

|                  |                              |  |
|------------------|------------------------------|--|
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| DESCRIPTION:     | WDFN-8 3.30x3.30x0.75, 0.65P | PAGE 1 OF 1  |

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