# Switch Mode Power Rectifiers
# MBR440MFS, NRVB440MFS

These state−of−the−art devices have the following features:

### Features

- Low Power Loss / High Efficiency
- New Package Provides Capability of Inspection and Probe After Board Mounting
- Guardring for Stress Protection
- Low Forward Voltage Drop
- 175°C Operating Junction Temperature
- NRVB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- WF Suffix for Products with Wettable Flanks
- These are Pb−Free and Halide−Free Devices

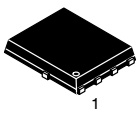
### Mechanical Characteristics:

- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94−0 @ 0.125 in.
- Lead Finish: 100% Matte Sn (Tin)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Device Meets MSL 1 Requirements

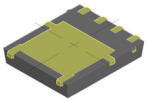
### Applications

- Ideally Suited for use as an Output Rectifier in High Frequency (up to 2 MHz) Automotive and Non−Automotive Applications
- Output Rectification in Compact Portable Consumer Applications
- Freewheeling Diode used with Inductive Loads

## SCHOTTKY BARRIER RECTIFIERS
## 4 AMPERES
## 40 VOLTS

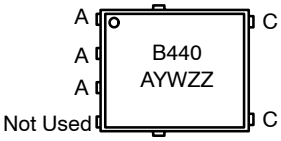




**SO−8 FLAT LEAD**
**CASE 488AA**
**STYLE 2**



**(FULL−CUT SO8FL WF)**
**CASE 507BA**
**DFNW5**

### MARKING DIAGRAM




| | |
|---|---|
| B440 | = Specific Device Code |
| A | = Assembly Location |
| Y | = Year |
| W | = Work Week |
| ZZ | = Lot Traceability |

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| MBR440MFST1G | SO−8 FL (Pb−Free) | 1500 / Tape & Reel |
| MBR440MFST3G | SO−8 FL (Pb−Free) | 5000 / Tape & Reel |
| NRVB440MFST1G | SO−8 FL (Pb−Free) | 1500 / Tape & Reel |
| NRVB440MFST3G | SO−8 FL (Pb−Free) | 5000 / Tape & Reel |
| NRVB440MFSWFT1G | SO−8 FL (Pb−Free) | 1500 / Tape & Reel |
| NRVB440MFSWFT3G | SO−8 FL (Pb−Free) | 5000 / 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.

## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | <br><br>40 | V |
| Average Rectified Forward Current<br>(Rated $V_R$, $T_C$ = 165°C) | $I_{F(AV)}$ | 4.0 | A |
| Peak Repetitive Forward Current,<br>(Rated $V_R$, Square Wave, 20 kHz, $T_C$ = 165°C) | $I_{FRM}$ | 8.0 | A |
| Non−Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$ | 40 | A |
| Storage Temperature Range | $T_{stg}$ | −65 to +175 | °C |
| Operating Junction Temperature | $T_J$ | −55 to +175 | °C |
| Unclamped Inductive Switching Energy (10 mH Inductor, Non−repetitive) | $E_{AS}$ | 10 | mJ |
| ESD Rating (Human Body Model) | | 3B | |
| ESD Rating (Machine Model) | | M4 | |

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

| Characteristic | Symbol | Typ | Max | Unit |
|---|---|---|---|---|
| Thermal Resistance, Junction−to−Case, Steady State<br>(Assumes 600 $mm^2$ 1 oz. copper bond pad, on a FR4 board) | $R_{\theta JC}$ | − | 2.4 | °C/W |

## ELECTRICAL CHARACTERISTICS

| | | | | |
|---|---|---|---|---|
| Instantaneous Forward Voltage (Note 1)<br>($i_F$ = 4 Amps, $T_J$ = 125°C)<br>($i_F$ = 4 Amps, $T_J$ = 25°C) | $v_F$ | <br>0.58<br>0.59 | <br>0.63<br>0.65 | V |
| Instantaneous Reverse Current (Note 1)<br>(Rated dc Voltage, $T_J$ = 125°C)<br>(Rated dc Voltage, $T_J$ = 25°C) | $i_R$ | <br>10<br>0.070 | <br>15<br>0.8 | mA |

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

## TYPICAL CHARACTERISTICS

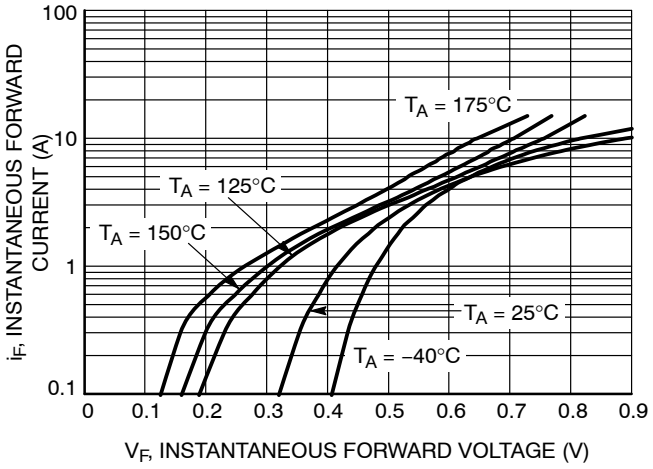



**Figure 1. Typical Instantaneous Forward Characteristics**

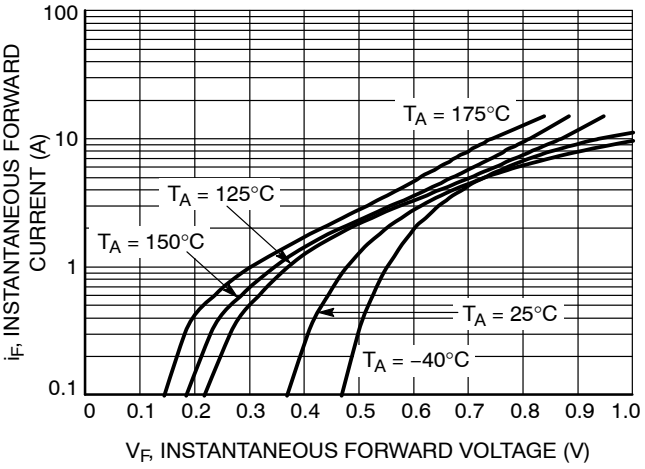



**Figure 2. Maximum Instantaneous Forward Characteristics**

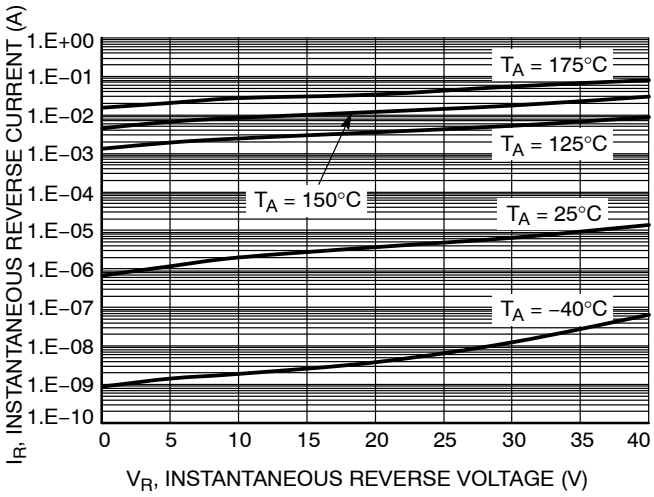



**Figure 3. Typical Reverse Characteristics**

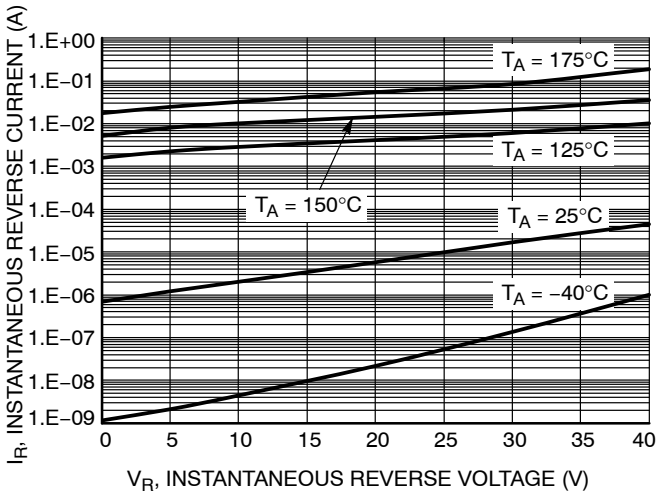



**Figure 4. Maximum Reverse Characteristics**

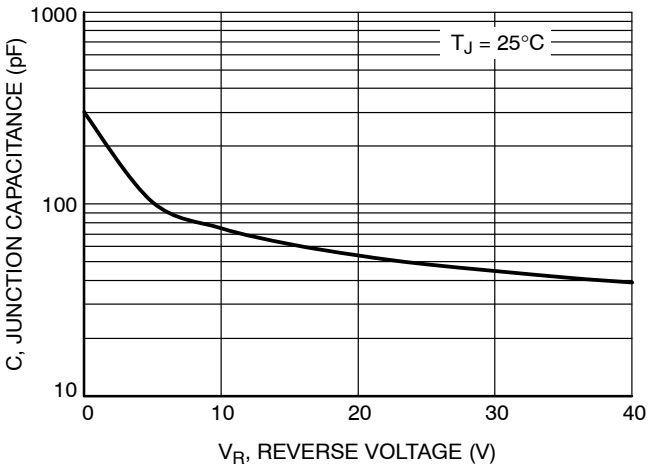



**Figure 5. Typical Junction Capacitance**

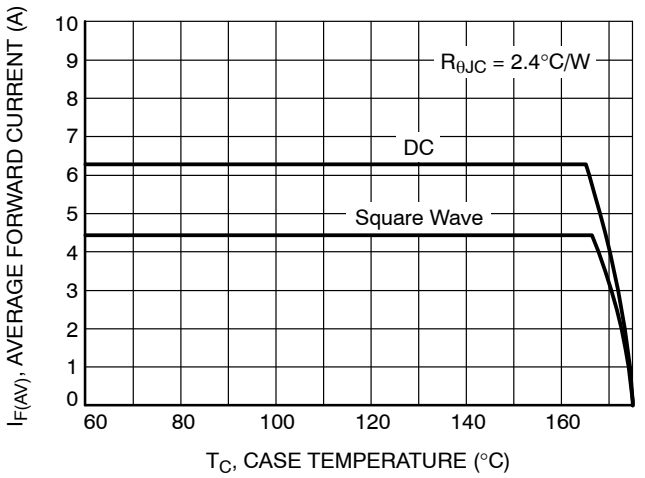



**Figure 6. Current Derating TO−220AB**

## TYPICAL CHARACTERISTICS

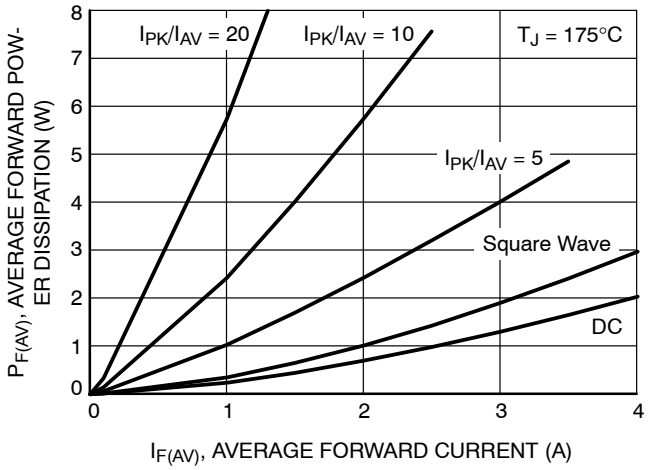



**Figure 7. Forward Power Dissipation**

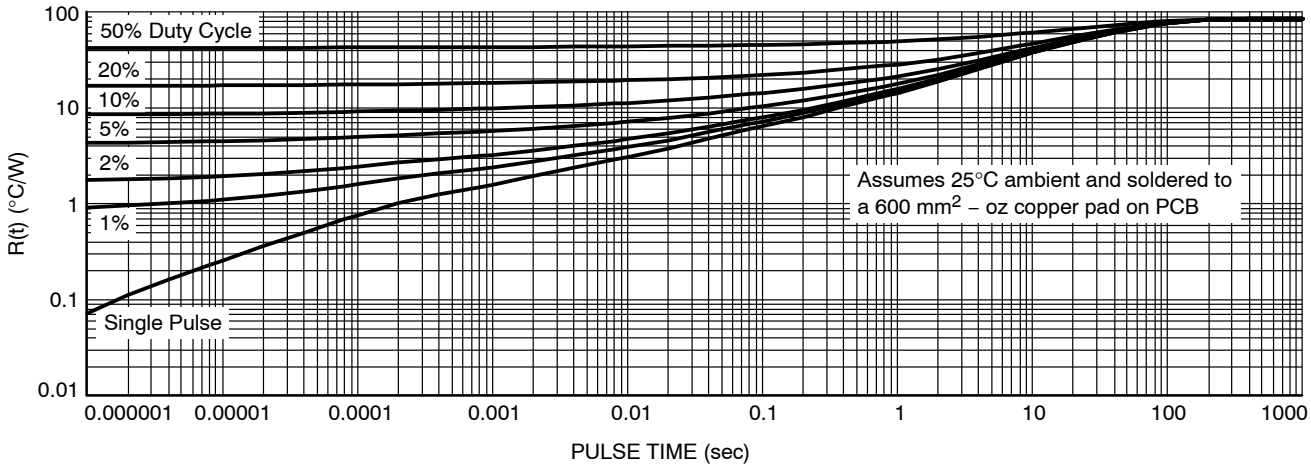
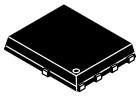



**Figure 8. Thermal Characteristics**

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

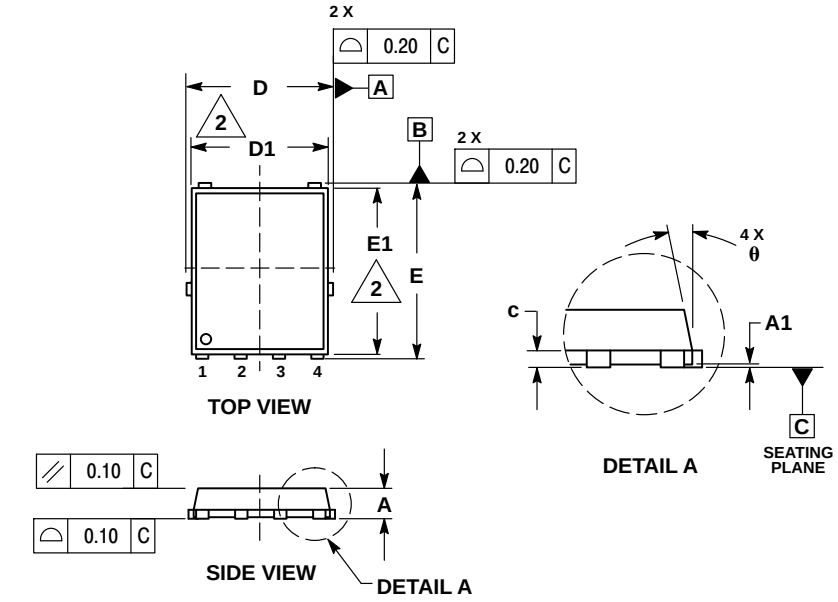
ON Semiconductor®



SCALE 2:1

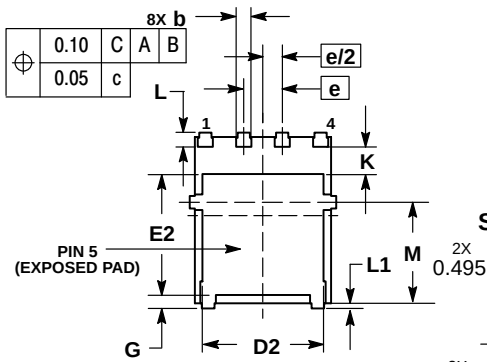
**DFN5 5x6, 1.27P**
**(SO−8FL)**
CASE 488AA
ISSUE N

DATE 25 JUN 2018

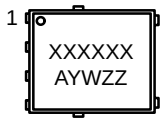



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

| | MILLIMETERS | | |
|---|---|---|---|
| DIM | MIN | NOM | MAX |
| A | 0.90 | 1.00 | 1.10 |
| A1 | 0.00 | ––– | 0.05 |
| b | 0.33 | 0.41 | 0.51 |
| c | 0.23 | 0.28 | 0.33 |
| D | 5.00 | 5.15 | 5.30 |
| D1 | 4.70 | 4.90 | 5.10 |
| D2 | 3.80 | 4.00 | 4.20 |
| E | 6.00 | 6.15 | 6.30 |
| E1 | 5.70 | 5.90 | 6.10 |
| E2 | 3.45 | 3.65 | 3.85 |
| e | 1.27 BSC | | |
| G | 0.51 | 0.575 | 0.71 |
| K | 1.20 | 1.35 | 1.50 |
| L | 0.51 | 0.575 | 0.71 |
| L1 | 0.125 REF | | |
| M | 3.00 | 3.40 | 3.80 |
| θ | 0 ° | ––– | 12 ° |



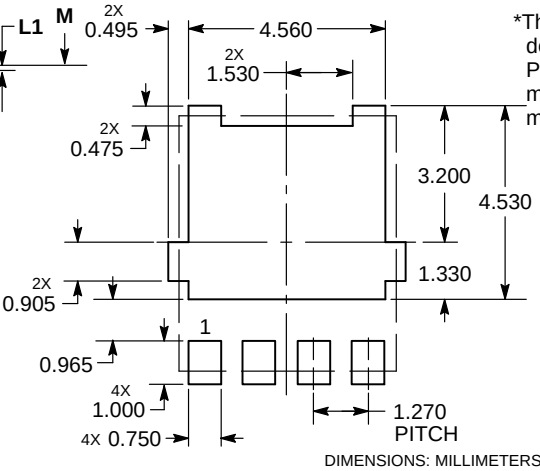

### GENERIC MARKING DIAGRAM*




XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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 SOLDERING FOOTPRINT*



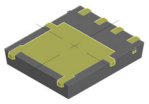

DIMENSIONS: MILLIMETERS

STYLE 1:
PIN 1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN

STYLE 2:
PIN 1. ANODE
2. ANODE
3. ANODE
4. NO CONNECT
5. CATHODE

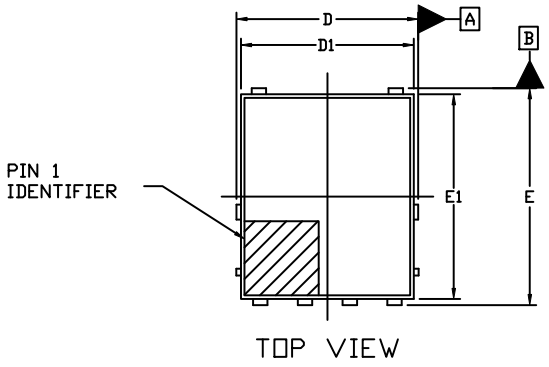
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

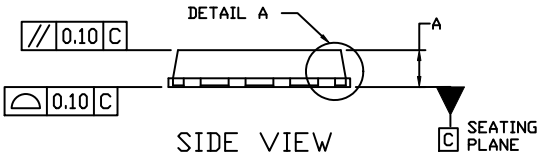
| | | |
|---|---|---|
| **DOCUMENT NUMBER:** | **98AON14036D** | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. |
| **DESCRIPTION:** | **DFN5 5x6, 1.27P (SO−8FL)** | **PAGE 1 OF 1** |

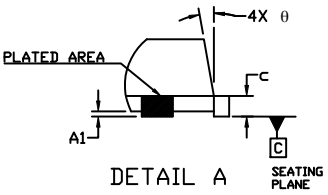


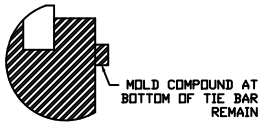
## DFNW5 5x6 (FULL−CUT SO8FL WF)
CASE 507BA
ISSUE A

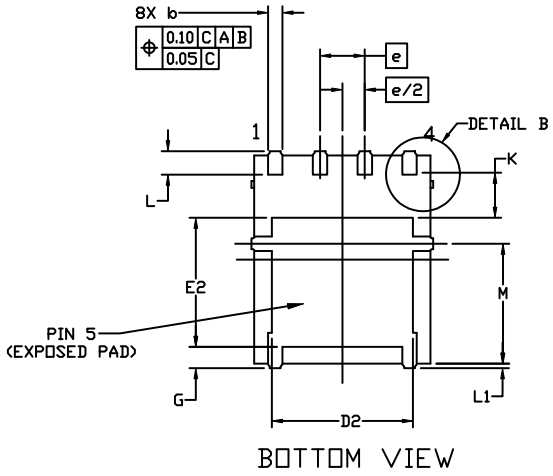
DATE 03 FEB 2021




NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
4. THIS PACKAGE CONTAINS WETTABLE FLANK DESIGN FEATURES TO AID IN FILLET FORMATION ON THE LEADS DURING MOUNTING.

| | MILLIMETERS | | |
|---|---|---|---|
| DIM | MIN. | NOM. | MAX. |
| A | 0.90 | 1.00 | 1.10 |
| A1 | 0.00 | --- | 0.05 |
| b | 0.33 | 0.41 | 0.51 |
| c | 0.23 | 0.28 | 0.33 |
| D | 5.00 | 5.15 | 5.30 |
| D1 | 4.70 | 4.90 | 5.10 |
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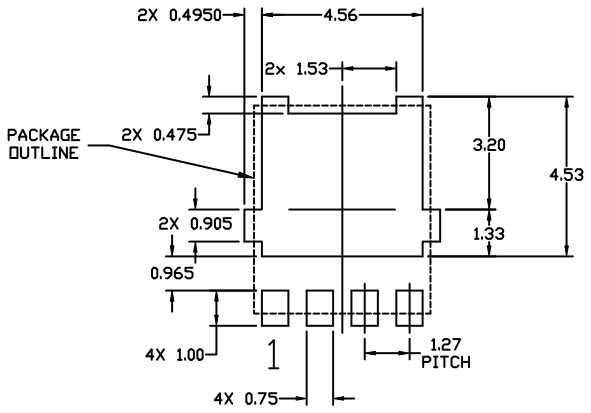
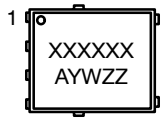
| E2 | 3.45 | 3.65 | 3.85 |
| e | 1.27 BSC | | |
| G | 0.51 | 0.575 | 0.71 |
| K | 1.20 | 1.35 | 1.50 |
| L | 0.51 | 0.575 | 0.71 |
| L1 | 0.150 REF | | |
| M | 3.00 | 3.40 | 3.80 |
| θ | 0° | --- | 12° |




* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

### GENERIC MARKING DIAGRAM*

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W = Work Week
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*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.

| | | |
|---|---|---|
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| **DESCRIPTION:** | **DFNW5 5x6 (FULL−CUT SO8FL WF)** | **PAGE 1 OF 1** |

## PUBLICATION ORDERING INFORMATION

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**onsemi Website:** www.onsemi.com

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**North American Technical Support:**
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Phone: 011 421 33 790 2910

**Europe, Middle East and Africa Technical Support:**
Phone: 00421 33 790 2910
For additional information, please contact your local Sales Representative

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