

Complementary Power Transistors

D²PAK for Surface Mount

**MJB44H11 (NPN),
NJVMJB44H11 (NPN),
MJB45H11 (PNP),
NJVMJB45H11 (PNP)**

Complementary power transistors are for general purpose power amplification and switching such as output or driver stages in applications such as switching regulators, converters and power amplifiers.

Features

- Low Collector-Emitter Saturation Voltage – $V_{CE(sat)} = 1.0 \text{ V (Max) @ } 8.0 \text{ A}$
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs
- Epoxy Meets UL 94 V-0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B > 8000 V
Machine Model, C > 400 V
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- Pb-Free Packages are Available

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|----------------|--------------|--------------------------|
| Collector-Emitter Voltage | V_{CEO} | 80 | Vdc |
| Emitter-Base Voltage | V_{EB} | 5 | Vdc |
| Collector Current – Continuous – Peak | I_C | 10 20 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 50 0.4 | W W/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 2.0 0.016 | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to 150 | $^\circ\text{C}$ |

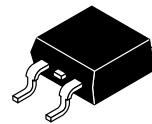
THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|-----|--------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 2.5 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 75 | $^\circ\text{C/W}$ |

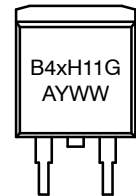
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**SILICON POWER
TRANSISTORS
10 AMPERES,
80 VOLTS, 50 WATTS**

MARKING DIAGRAM



D²PAK
CASE 418B
STYLE 1



x = 4 or 5
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|----------------|---------------------------------|-----------------------|
| MJB44H11G | D ² PAK (Pb-Free) | 50 Units / Rail |
| MJB44H11T4G | D ² PAK (Pb-Free) | 800 / Tape & Reel |
| NJVMJB44H11T4G | D ² PAK (Pb-Free) | 800 / Tape & Reel |
| MJB45H11G | D ² PAK (Pb-Free) | 50 Units / Rail |
| MJB45H11T4G | D ² PAK (Pb-Free) | 800 / Tape & Reel |
| NJVMJB45H11T4G | D ² PAK (Pb-Free) | 800 / 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](http://www.onsemi.com/BRD8011/D).

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|---------------|-----|-----|-----|---------------|
| OFF CHARACTERISTICS | | | | | |
| Collector-Emitter Sustaining Voltage ($I_C = 30\text{ mA}$, $I_B = 0$) | $V_{CE(sus)}$ | 80 | – | – | Vdc |
| Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE} = 0$) | I_{CES} | – | – | 10 | μA |
| Emitter Cutoff Current ($V_{EB} = 5\text{ Vdc}$) | I_{EBO} | – | – | 50 | μA |

ON CHARACTERISTICS

| | | | | | |
|--|---------------|----|---|-----|-----|
| Collector-Emitter Saturation Voltage ($I_C = 8\text{ Adc}$, $I_B = 0.4\text{ Adc}$) | $V_{CE(sat)}$ | – | – | 1.0 | Vdc |
| Base-Emitter Saturation Voltage ($I_C = 8\text{ Adc}$, $I_B = 0.8\text{ Adc}$) | $V_{BE(sat)}$ | – | – | 1.5 | Vdc |
| DC Current Gain ($V_{CE} = 1\text{ Vdc}$, $I_C = 2\text{ Adc}$) | h_{FE} | 60 | – | – | – |
| DC Current Gain ($V_{CE} = 1\text{ Vdc}$, $I_C = 4\text{ Adc}$) | | 40 | – | – | |

DYNAMIC CHARACTERISTICS

| | | | | | |
|--|----------|---|------------|---|-----|
| Collector Capacitance ($V_{CB} = 10\text{ Vdc}$, $f_{\text{test}} = 1\text{ MHz}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11 | C_{cb} | – | 130 230 | – | pF |
| Gain Bandwidth Product ($I_C = 0.5\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11 | f_T | – | 50 40 | – | MHz |

SWITCHING TIMES

| | | | | | |
|--|-------------|---|------------|---|----|
| Delay and Rise Times ($I_C = 5\text{ Adc}$, $I_{B1} = 0.5\text{ Adc}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11 | $t_d + t_r$ | – | 300 135 | – | ns |
| Storage Time ($I_C = 5\text{ Adc}$, $I_{B1} = I_{B2} = 0.5\text{ Adc}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11 | t_s | – | 500 500 | – | ns |
| Fall Time ($I_C = 5\text{ Adc}$, $I_{B1} = I_{B2} = 0.5\text{ Adc}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11 | t_f | – | 140 100 | – | ns |

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.

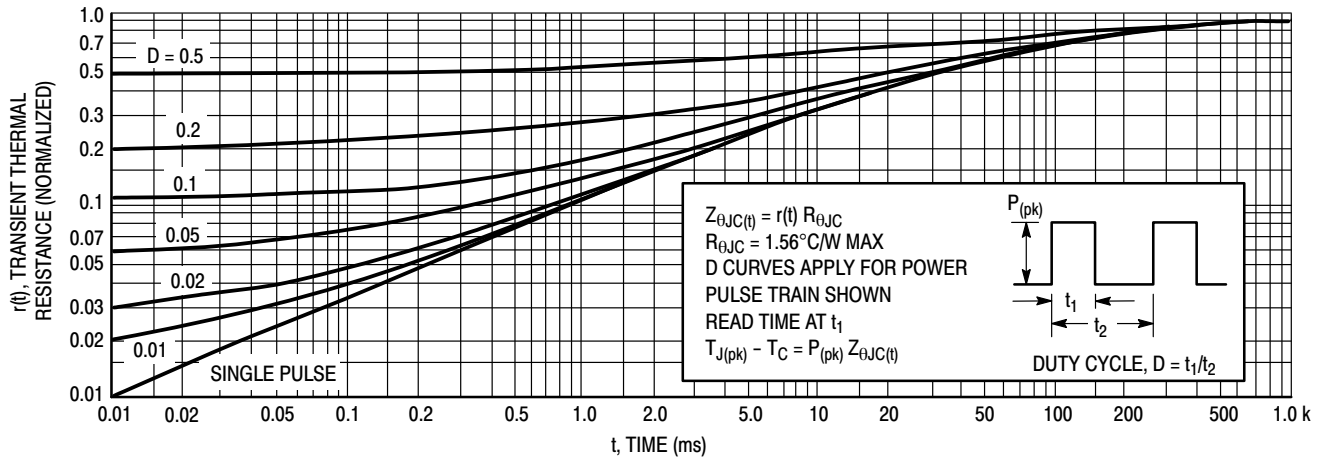


Figure 1. Thermal Response

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

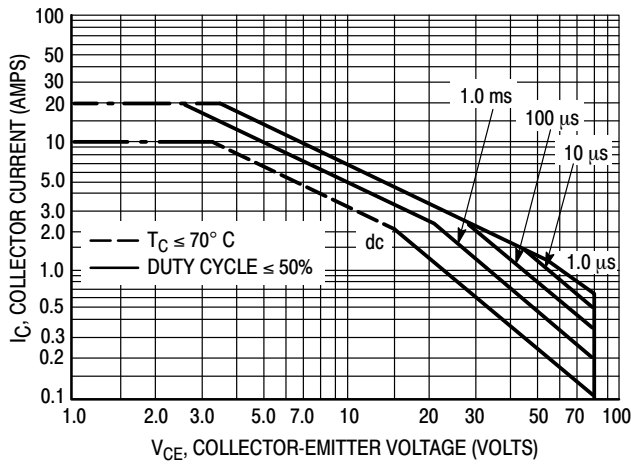


Figure 2. Maximum Rated Forward Bias Safe Operating Area

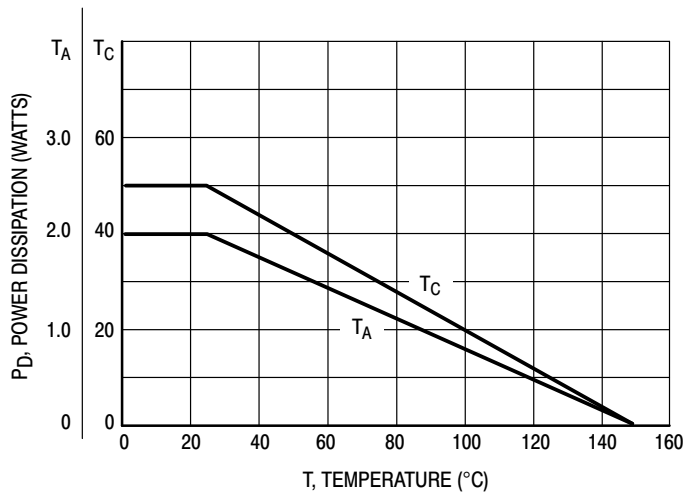


Figure 3. Power Derating

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 2 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 1. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

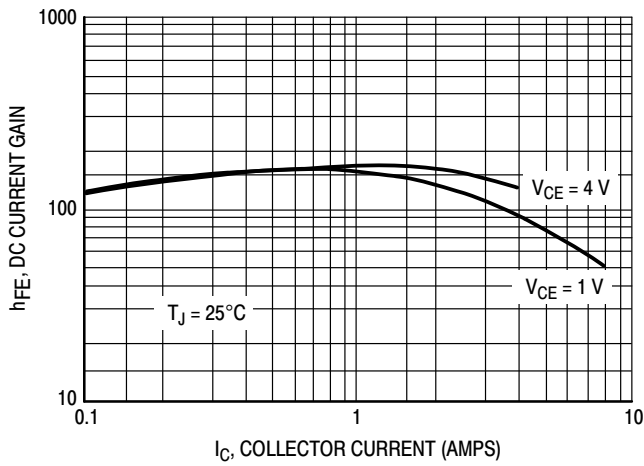


Figure 4. MJB44H11 DC Current Gain

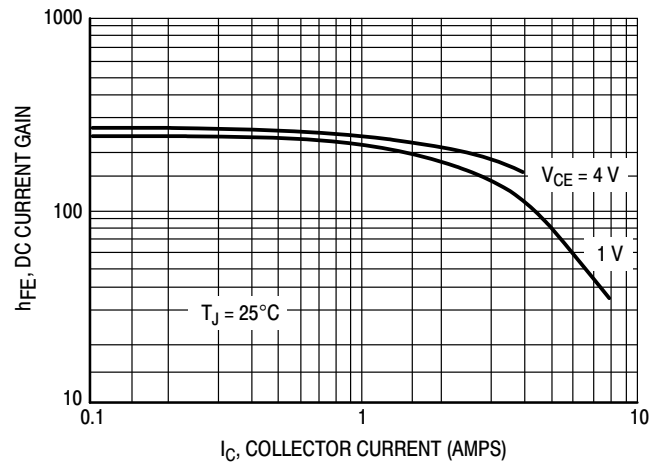


Figure 5. MJB45H11 DC Current Gain

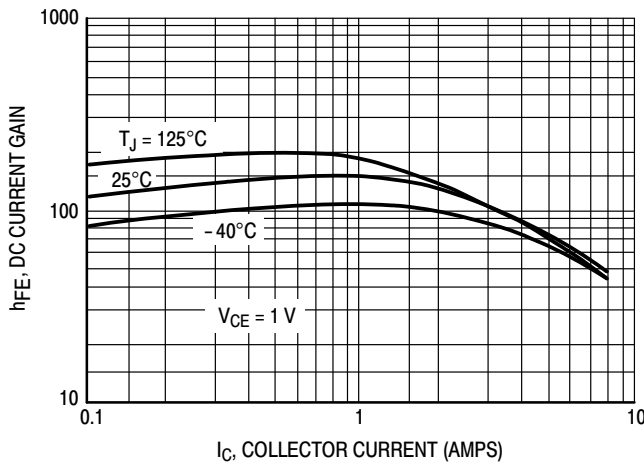


Figure 6. MJB44H11 Current Gain versus Temperature

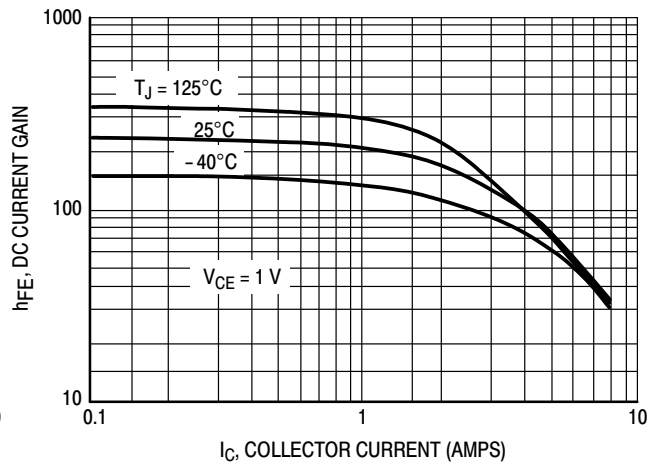


Figure 7. MJB45H11 Current Gain versus Temperature

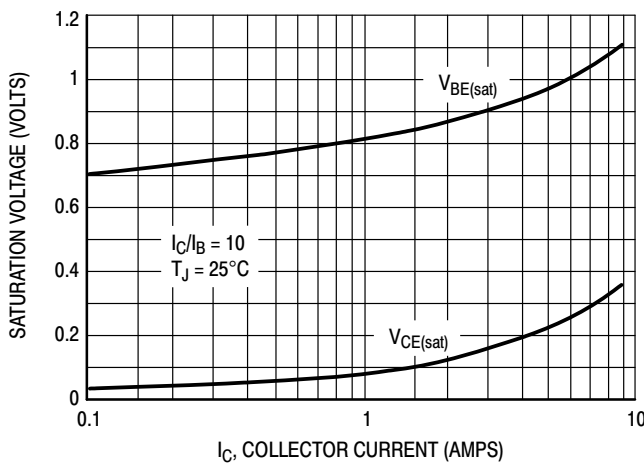


Figure 8. MJB44H11 On-Voltages

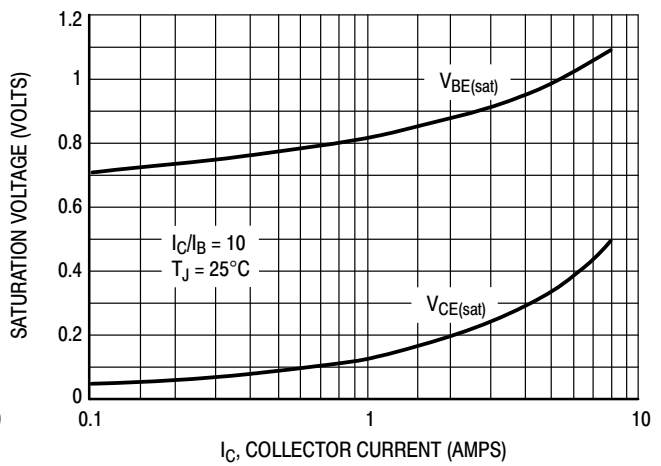


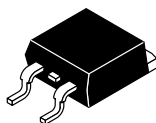
Figure 9. MJB45H11 On-Voltages

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

REVISION HISTORY

| Revision | Description of Changes | Date |
|----------|---|------------|
| 6 | Rebranded the Data Sheet to onsemi format. | 10/27/2025 |

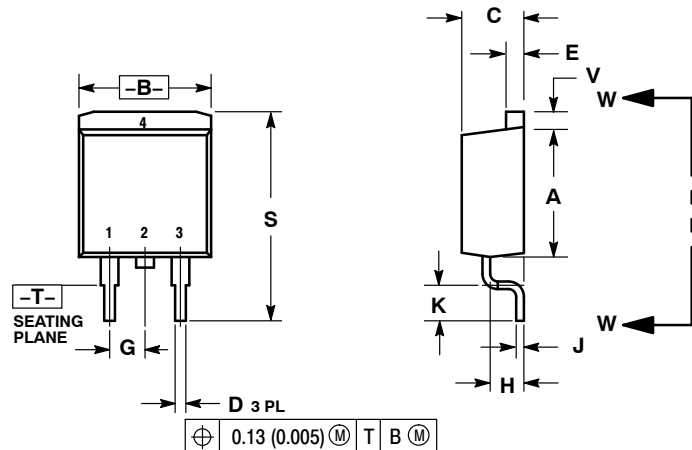
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



D²PAK 3
CASE 418B-04
ISSUE L

DATE 17 FEB 2015

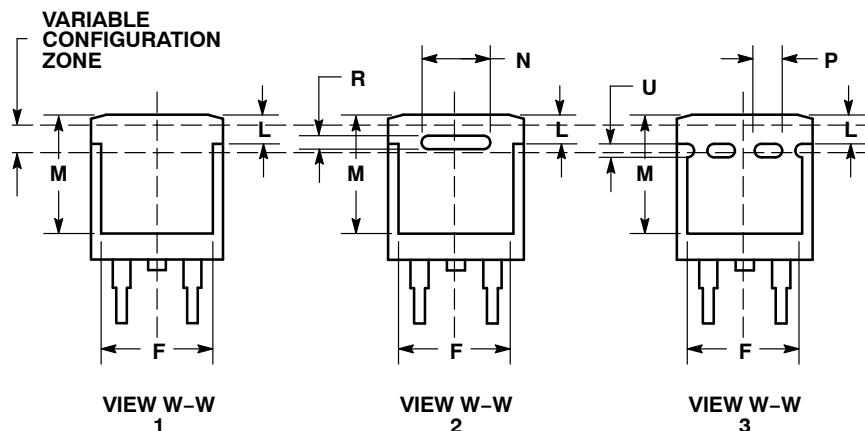
SCALE 1:1



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.340 | 0.380 | 8.64 | 9.65 |
| B | 0.380 | 0.405 | 9.65 | 10.29 |
| C | 0.160 | 0.190 | 4.06 | 4.83 |
| D | 0.020 | 0.035 | 0.51 | 0.89 |
| E | 0.045 | 0.055 | 1.14 | 1.40 |
| F | 0.310 | 0.350 | 7.87 | 8.89 |
| G | 0.100 | BSC | 2.54 | BSC |
| H | 0.080 | 0.110 | 2.03 | 2.79 |
| J | 0.018 | 0.025 | 0.46 | 0.64 |
| K | 0.090 | 0.110 | 2.29 | 2.79 |
| L | 0.052 | 0.072 | 1.32 | 1.83 |
| M | 0.280 | 0.320 | 7.11 | 8.13 |
| N | 0.197 | REF | 5.00 | REF |
| P | 0.079 | REF | 2.00 | REF |
| R | 0.039 | REF | 0.99 | REF |
| S | 0.575 | 0.625 | 14.60 | 15.88 |
| V | 0.045 | 0.055 | 1.14 | 1.40 |



| | | | | | |
|---|--|--|---|--|---|
| STYLE 1: PIN 1. BASE 2. COLLECTOR 3. EMITTER 4. COLLECTOR | STYLE 2: PIN 1. GATE 2. DRAIN 3. SOURCE 4. DRAIN | STYLE 3: PIN 1. ANODE 2. CATHODE 3. ANODE 4. CATHODE | STYLE 4: PIN 1. GATE 2. COLLECTOR 3. EMITTER 4. COLLECTOR | STYLE 5: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. ANODE | STYLE 6: PIN 1. NO CONNECT 2. CATHODE 3. ANODE 4. CATHODE |
|---|--|--|---|--|---|

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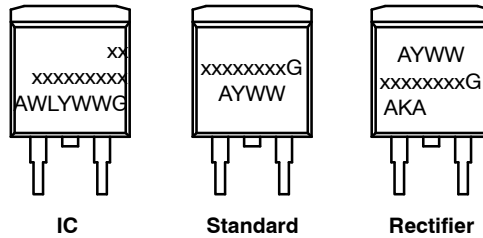
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D²PAK 3
CASE 418B-04
ISSUE L

DATE 17 FEB 2015

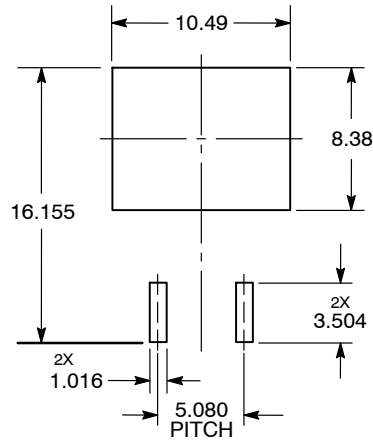
**GENERIC
MARKING DIAGRAM***



xx = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
WW = Work Week
G = Pb-Free Package
AKA = Polarity Indicator

*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.

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

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