

# NJD1718, NJVNJD1718

## Power Transistors

### PNP Silicon DPAK For Surface Mount Applications

Designed for high-gain audio amplifier and power switching applications.

#### Features

- Low Collector-Emitter Saturation Voltage
- High Switching Speed
- Epoxy Meets UL 94 V-0 @ 0.125 in
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

| Rating                                                                                             | Symbol         | Value         | Unit                     |
|----------------------------------------------------------------------------------------------------|----------------|---------------|--------------------------|
| Collector-Base Voltage                                                                             | $V_{CB}$       | -50           | Vdc                      |
| Collector-Emitter Voltage                                                                          | $V_{CEO}$      | -50           | Vdc                      |
| Emitter-Base Voltage                                                                               | $V_{EB}$       | -5            | Vdc                      |
| Collector Current - Continuous                                                                     | $I_C$          | -2            | Adc                      |
| Collector Current - Peak                                                                           | $I_{CM}$       | -3            | Adc                      |
| Base Current                                                                                       | $I_B$          | -0.4          | Adc                      |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$          | $P_D$          | 15<br>0.1     | W<br>W/ $^\circ\text{C}$ |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$ (Note 1)<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.68<br>0.011 | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                                | $T_J, T_{stg}$ | -65 to +150   | $^\circ\text{C}$         |
| ESD - Human Body Model                                                                             | HBM            | 3B            | V                        |
| ESD - Machine Model                                                                                | MM             | C             | V                        |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

#### THERMAL CHARACTERISTICS

| Characteristic                                                         | Symbol                             | Max        | Unit               |
|------------------------------------------------------------------------|------------------------------------|------------|--------------------|
| Thermal Resistance<br>Junction-to-Case<br>Junction-to-Ambient (Note 2) | $R_{\theta JC}$<br>$R_{\theta JA}$ | 10<br>89.3 | $^\circ\text{C/W}$ |

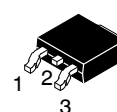
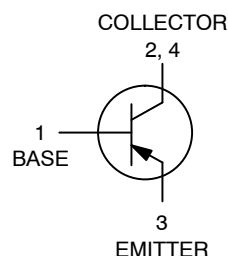
2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.



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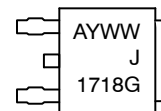
<http://onsemi.com>

### SILICON POWER TRANSISTORS 2 AMPERES 50 VOLTS 15 WATTS



DPAK  
CASE 369C  
STYLE 1

#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Device

#### ORDERING INFORMATION

| Device        | Package           | Shipping†          |
|---------------|-------------------|--------------------|
| NJD1718T4G    | DPAK<br>(Pb-Free) | 2500 / Tape & Reel |
| NJVNJD1718T4G | DPAK<br>(Pb-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 Specifications Brochure, BRD8011/D.

# NJD1718, NJVNJD1718

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                         |            |     |  |      |      |
|-----------------------------------------------------------------------------------------|------------|-----|--|------|------|
| Collector-Emitter Breakdown Voltage (Note 3)<br>( $I_C = -10\text{ mAdc}$ , $I_B = 0$ ) | $BV_{CEO}$ | -50 |  | -    | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = -50\text{ Vdc}$ , $I_E = 0$ )                   | $I_{CBO}$  | -   |  | -100 | nAdc |
| Emitter Cutoff Current ( $V_{BE} = -5\text{ Vdc}$ , $I_C = 0$ )                         | $I_{EBO}$  | -   |  | -100 | nAdc |

### ON CHARACTERISTICS

|                                                                                                                                        |               |          |      |          |     |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|------|----------|-----|
| DC Current Gain (Note 3)<br>( $I_C = -0.5\text{ A}$ , $V_{CE} = 2\text{ V}$ )<br>( $I_C = -1.5\text{ Adc}$ , $V_{CE} = 2\text{ Vdc}$ ) | $h_{FE}$      | 70<br>40 |      | 240<br>- | -   |
| Collector-Emitter Saturation Voltage (Note 3)<br>( $I_C = -1\text{ A}$ , $I_B = -0.05\text{ A}$ )                                      | $V_{CE(sat)}$ | -        | -0.2 | -0.5     | Vdc |
| Base-Emitter Saturation Voltage (Note 3)<br>( $I_C = -1\text{ A}$ , $I_B = -0.05\text{ Adc}$ )                                         | $V_{BE(sat)}$ | -        | -    | -1.2     | Vdc |
| Base-Emitter On Voltage (Note 3)<br>( $I_C = -1\text{ Adc}$ , $V_{CE} = -2\text{ Vdc}$ )                                               | $V_{BE(on)}$  | -        | -    | -1.2     | Vdc |

### DYNAMIC CHARACTERISTICS

|                                                                                                                                   |           |   |     |   |     |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------|---|-----|---|-----|
| Current-Gain – Bandwidth Product (Note 4)<br>( $I_C = -500\text{ mAdc}$ , $V_{CE} = -2\text{ Vdc}$ , $f_{test} = 10\text{ MHz}$ ) | $f_T$     | - | 80  | - | MHz |
| Output Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 0.1\text{ MHz}$ )                                             | $C_{ob}$  | - | 33  | - | pF  |
| Switching Timers<br>$V_{CC} = -30\text{ V}$ , $I_C = -1\text{ A}$                                                                 | $t_{ON}$  | - | 55  | - | ns  |
|                                                                                                                                   | $t_{STG}$ | - | 320 | - |     |
|                                                                                                                                   | $t_f$     | - | 40  | - |     |

3. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\approx 2\%$ .

4.  $f_T = |h_{fe}| \cdot f_{test}$ .

TYPICAL CHARACTERISTICS

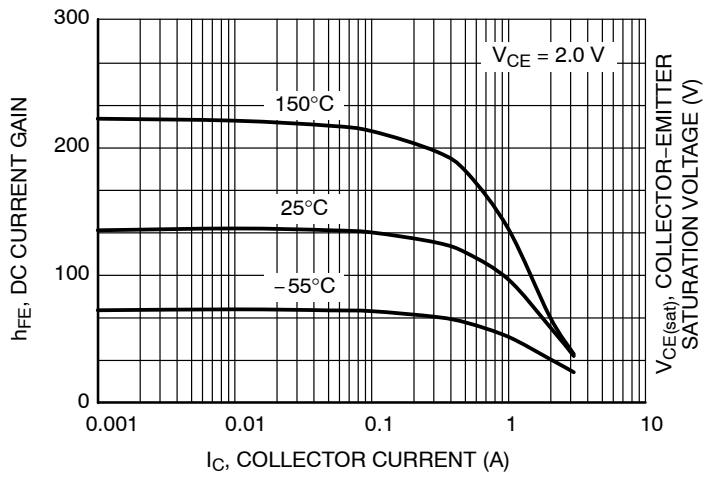


Figure 1. DC Current Gain

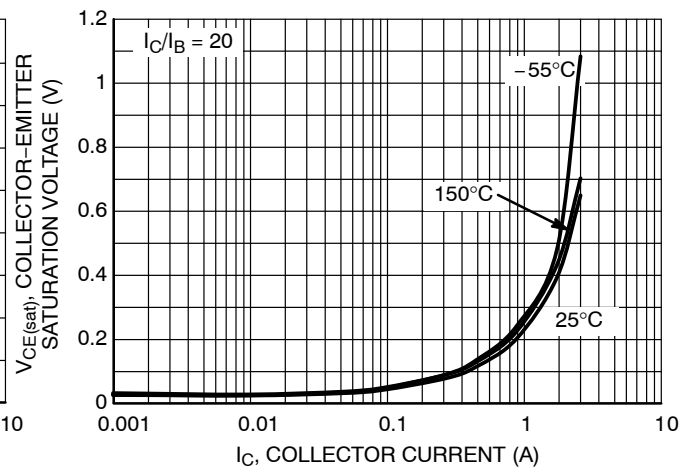


Figure 2. Collector-Emitter Saturation Voltage

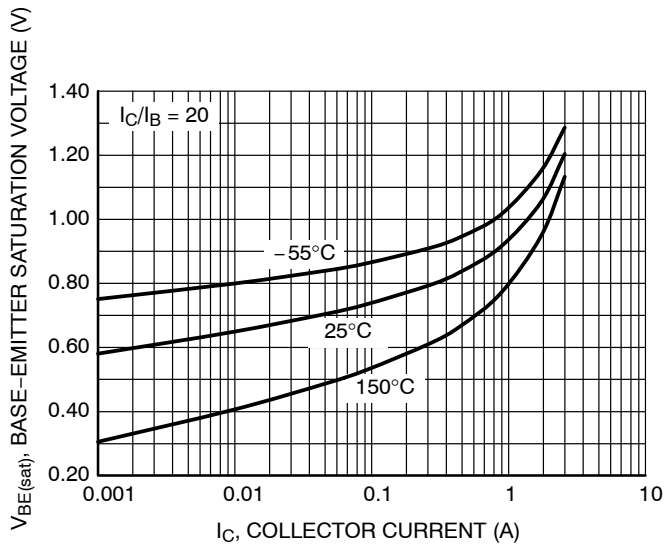


Figure 3. Base-Emitter Saturation Voltage

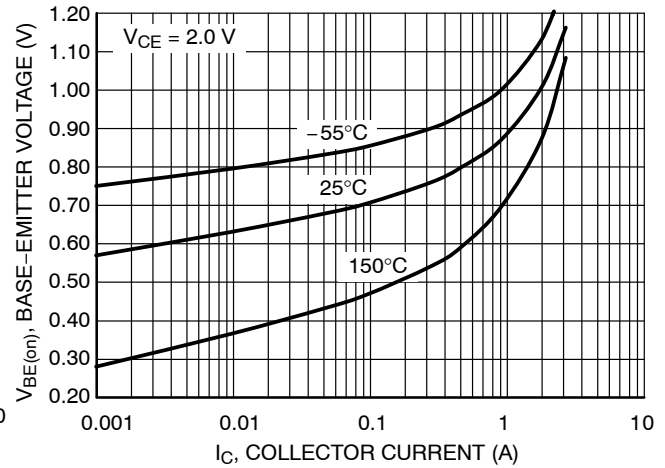


Figure 4. Base-Emitter Voltage

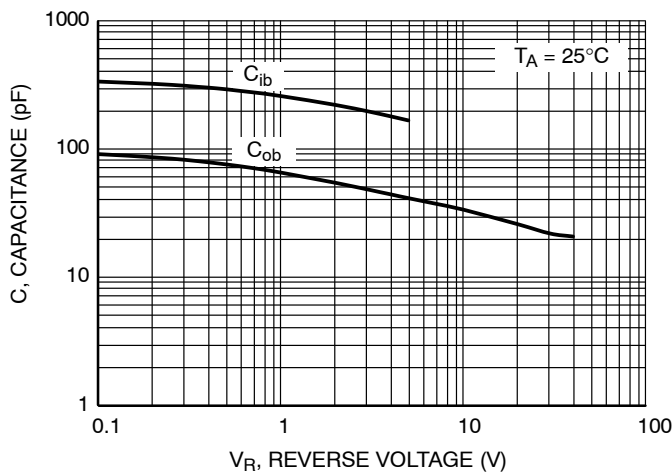


Figure 5. Capacitance

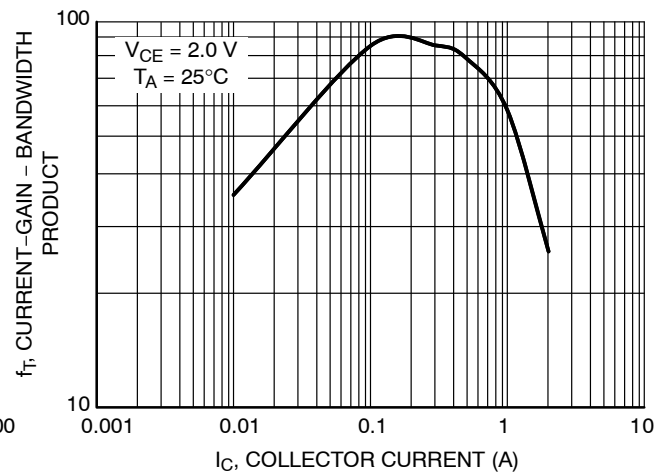


Figure 6. Current-Gain-Bandwidth Product

TYPICAL CHARACTERISTICS

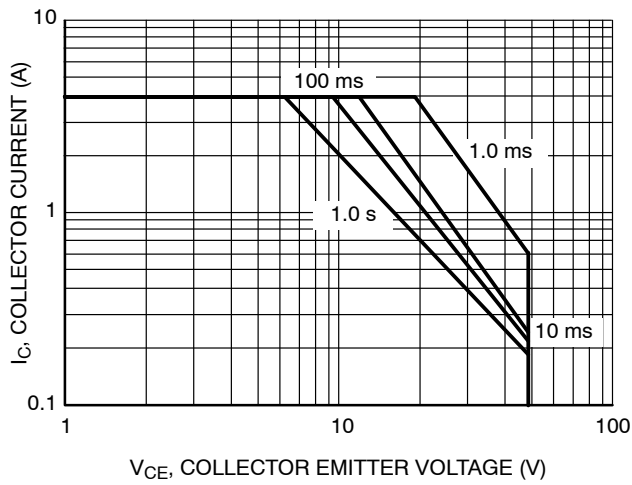


Figure 7. State Operating Area

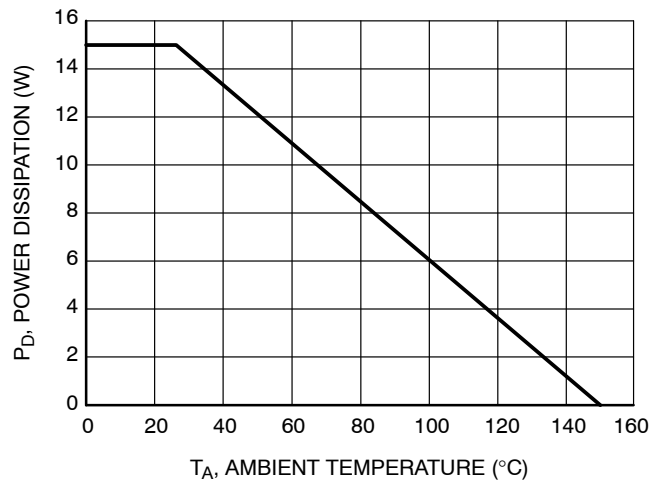


Figure 8. Power Derating

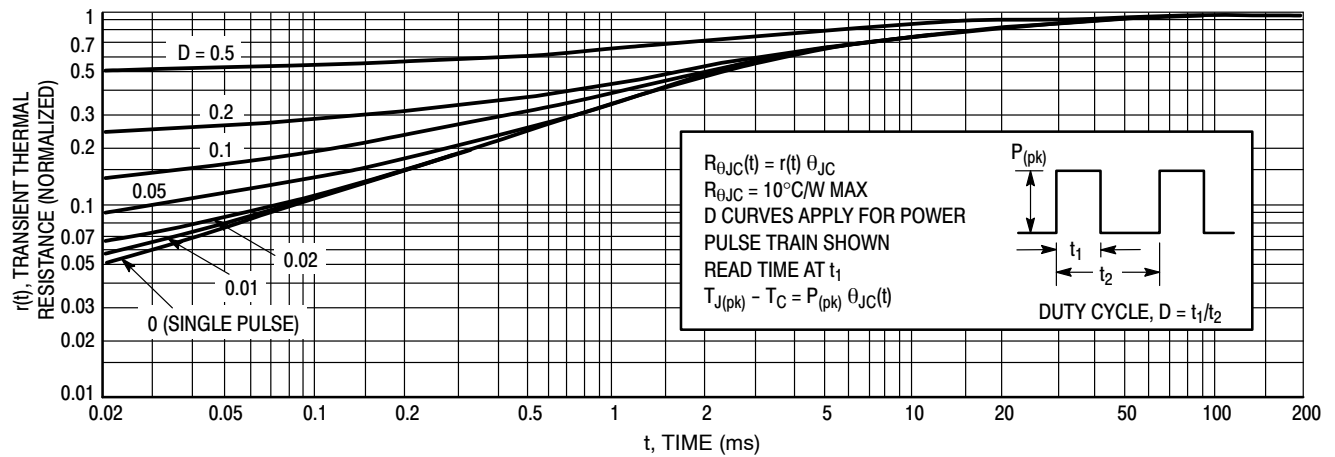
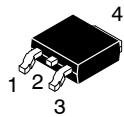


Figure 9. Thermal Response

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

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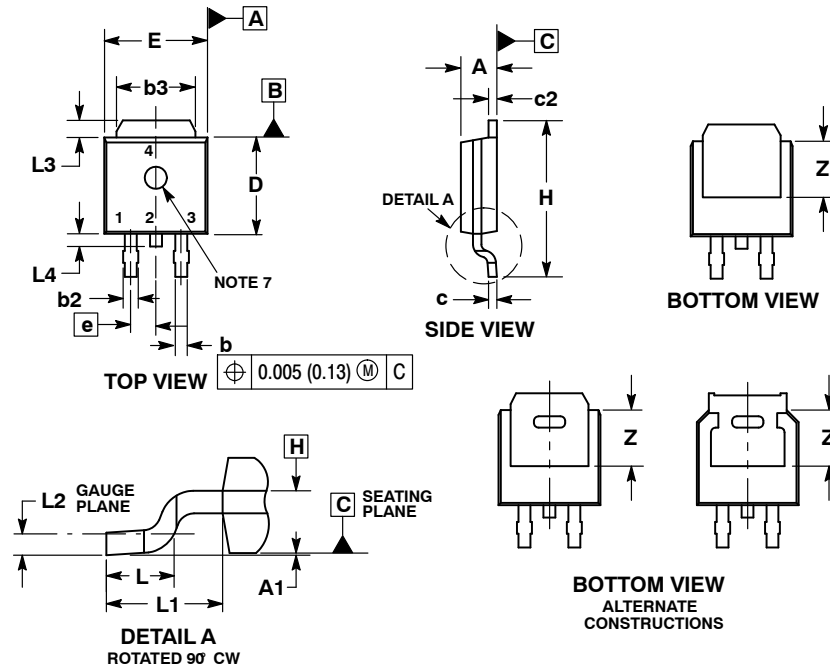
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SCALE 1:1

## DPAK (SINGLE GAUGE) CASE 369C ISSUE F

DATE 21 JUL 2015

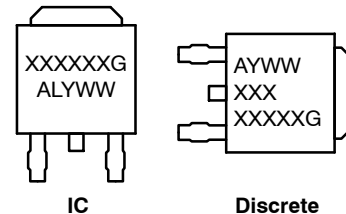


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.086     | 0.094 | 2.18        | 2.38  |
| A1  | 0.000     | 0.005 | 0.00        | 0.13  |
| b   | 0.025     | 0.035 | 0.63        | 0.89  |
| b2  | 0.028     | 0.045 | 0.72        | 1.14  |
| b3  | 0.180     | 0.215 | 4.57        | 5.46  |
| c   | 0.018     | 0.024 | 0.46        | 0.61  |
| c2  | 0.018     | 0.024 | 0.46        | 0.61  |
| D   | 0.235     | 0.245 | 5.97        | 6.22  |
| E   | 0.250     | 0.265 | 6.35        | 6.73  |
| e   | 0.090 BSC |       | 2.29 BSC    |       |
| H   | 0.370     | 0.410 | 9.40        | 10.41 |
| L   | 0.055     | 0.070 | 1.40        | 1.78  |
| L1  | 0.114 REF |       | 2.90 REF    |       |
| L2  | 0.020 BSC |       | 0.51 BSC    |       |
| L3  | 0.035     | 0.050 | 0.89        | 1.27  |
| L4  | ---       | 0.040 | ---         | 1.01  |
| Z   | 0.155     | ---   | 3.93        | ---   |

### GENERIC MARKING DIAGRAM\*

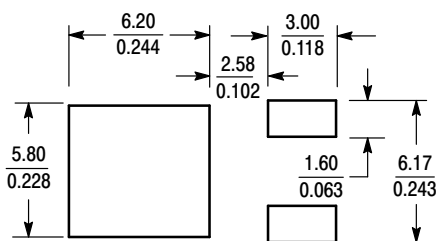


XXXXXX = Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking.

- 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. CATHODE  
2. ANODE  
3. GATE  
4. ANODE
- STYLE 5:**  
PIN 1. GATE  
2. ANODE  
3. CATHODE  
4. ANODE
- STYLE 6:**  
PIN 1. MT1  
2. MT2  
3. GATE  
4. MT2
- STYLE 7:**  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR
- STYLE 8:**  
PIN 1. N/C  
2. CATHODE  
3. ANODE  
4. CATHODE
- STYLE 9:**  
PIN 1. ANODE  
2. CATHODE  
3. RESISTOR ADJUST  
4. CATHODE
- STYLE 10:**  
PIN 1. CATHODE  
2. ANODE  
3. CATHODE  
4. ANODE

### SOLDERING FOOTPRINT\*



SCALE 3:1 (mm inches)

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

|                         |                            |                                                                                                                                                                                     |
|-------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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