

# NYC0102BLT1G

## Sensitive Gate Silicon Controlled Rectifiers Reverse Blocking Thyristors

Designed and tested for highly-sensitive triggering in low-power switching applications.

### Features

- High dv/dt
- Gating Current < 200  $\mu$ A
- Miniature SOT-23 Package for High Density PCB
- This is a Halogen-Free Device
- This is a Pb-Free Device

### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

| Rating   | Symbol                                 | Value          | Unit             |
|--|--|----------------|------------------|
| Peak Repetitive Off-State Voltage (Note 1)<br>(R <sub>GK</sub> = 1K, T <sub>J</sub> = -40 to +110°C, Sine Wave, 50 to 60 Hz) | V <sub>DRM</sub> ,<br>V <sub>RRM</sub> | 200            | V                |
| On-State Current RMS<br>(180° Conduction Angle, T <sub>C</sub> = 80°C)   | I <sub>T(RMS)</sub>                    | 0.25           | A                |
| Peak Non-repetitive Surge Current,<br>T <sub>A</sub> = 25°C, (1/2 Cycle, Sine Wave, 60 Hz)                                   | I <sub>TSM</sub>                       | 7.0            | A                |
| Circuit Fusing Considerations (t = 8.3 ms)   | I <sup>2</sup> t                       | 0.2            | A <sup>2</sup> s |
| Forward Peak Gate Power<br>(Pulse Width ≤ 1.0 $\mu$ sec, T <sub>A</sub> = 25°C)  | P <sub>GM</sub>                        | 0.1            | W                |
| Forward Average Gate Power<br>(t = 8.3 msec, T <sub>A</sub> = 25°C)  | P <sub>G(AV)</sub>                     | 0.02           | W                |
| Forward Peak Gate Current<br>(Pulse Width ≤ 20 $\mu$ s, T <sub>A</sub> = 25°C)   | I <sub>FGM</sub>                       | 0.5            | A                |
| Reverse Peak Gate Voltage<br>(Pulse Width ≤ 1.0 $\mu$ s, T <sub>A</sub> = 25°C)  | V <sub>RGM</sub>                       | 8.0            | V                |
| Operating Junction Temperature Range<br>@ Rated V <sub>RRM</sub> and V <sub>DRM</sub>  | T <sub>J</sub>                         | -40 to<br>+125 | °C               |
| Storage Temperature Range  | T <sub>stg</sub>                       | -40 to<br>+150 | °C               |

### THERMAL CHARACTERISTICS

| Characteristic   | Symbol           | Max | Unit |
|--|------------------|-----|------|
| Total Device Dissipation FR-5 Board<br>T <sub>A</sub> = 25°C | P <sub>D</sub>   | 225 | mW   |
| Thermal Resistance, Junction-to-Ambient                      | R <sub>θJA</sub> | 380 | °C/W |

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.

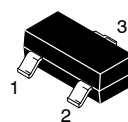
1. V<sub>DRM</sub> and V<sub>RRM</sub> for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



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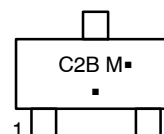
<http://onsemi.com>

## 0.25 AMP, 200 VOLT SCRs



SOT-23  
CASE 318  
STYLE 8

### MARKING DIAGRAM



C2B = Specific Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

### PIN ASSIGNMENT

|   |         |
|---|---------|
| 1 | Cathode |
| 2 | Gate    |
| 3 | Anode   |

### ORDERING INFORMATION

| Device       | Package             | Shipping†        |
|--------------|---------------------|------------------|
| NYC0102BLT1G | SOT-23<br>(Pb-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 Specifications Brochure, BRD8011/D.

# NYC0102BLT1G

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

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

### OFF CHARACTERISTICS

|  |                  |                        |   |   |     |    |
|--|------------------|------------------------|---|---|-----|----|
| Peak Repetitive Forward Blocking Current<br>(V <sub>DRM</sub> = 200 V, R <sub>GK</sub> = 1 kΩ) | I <sub>DRM</sub> | T <sub>C</sub> = 25°C  | - | - | 1.0 | μA |
|  |                  | T <sub>C</sub> = 125°C | - | - | 100 | μA |
| Peak Repetitive Reverse Blocking Current<br>(V <sub>DRM</sub> = 200 V, R <sub>GK</sub> = 1 kΩ) | I <sub>RRM</sub> | T <sub>C</sub> = 25°C  | - | - | 1.0 | μA |
|  |                  | T <sub>C</sub> = 125°C | - | - | 100 | μA |

### ON CHARACTERISTICS

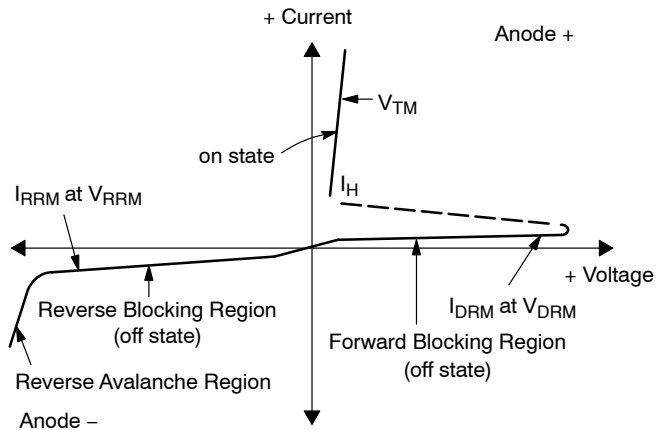
|   |                 |     |   |     |    |
|---|-----------------|-----|---|-----|----|
| Peak Forward On-State Voltage<br>(I <sub>TM</sub> = 0.4 A, t <sub>p</sub> < 1 ms, T <sub>C</sub> = 25°C)          | V <sub>TM</sub> | -   | - | 1.7 | V  |
| Gate Trigger Current<br>(V <sub>D</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>C</sub> = 25°C)                    | I <sub>GT</sub> | -   | - | 200 | μA |
| Gate Trigger Voltage<br>(V <sub>D</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>C</sub> = 25°C)                    | V <sub>GT</sub> | -   | - | 0.8 | V  |
| Holding Current<br>(I <sub>T</sub> = 50 mA, R <sub>GK</sub> = 1 kΩ, T <sub>C</sub> = 25°C)                        | I <sub>H</sub>  | -   | - | 6.0 | mA |
| Gate Non-Trigger Voltage<br>(V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3 kΩ, T <sub>C</sub> = 125°C) | V <sub>GD</sub> | 0.1 | - | -   | V  |
| Latching Current<br>(I <sub>G</sub> = 1.0 mA, R <sub>GK</sub> = 1 kΩ, T <sub>C</sub> = 25°C)                      | I <sub>L</sub>  | -   | - | 7.0 | mA |
| Gate Reverse Voltage<br>(I <sub>RG</sub> = 10 μA)   | V <sub>RG</sub> | 8.0 | - | -   | V  |

### DYNAMIC CHARACTERISTICS

|  |       |     |   |    |      |
|--|-------|-----|---|----|------|
| Critical Rate of Rise of Off-State Voltage<br>(R <sub>GK</sub> = 1 kΩ, T <sub>C</sub> = 125°C)   | dv/dt | 200 | - | -  | V/μs |
| Critical Rate of Rise of On-State Current<br>(I <sub>G</sub> = 2xI <sub>GT</sub> 60 Hz, t <sub>r</sub> < 100 ns, T <sub>J</sub> = 125°C) | di/dt | -   | - | 50 | A/μs |

## Voltage Current Characteristic of SCR

| Symbol           | Parameter                                 |
|------------------|---|
| V <sub>DRM</sub> | Peak Repetitive Off State Forward Voltage |
| I <sub>DRM</sub> | Peak Forward Blocking Current             |
| V <sub>RRM</sub> | Peak Repetitive Off State Reverse Voltage |
| I <sub>RRM</sub> | Peak Reverse Blocking Current             |
| V <sub>TM</sub>  | Peak on State Voltage                     |
| I <sub>H</sub>   | Holding Current                           |



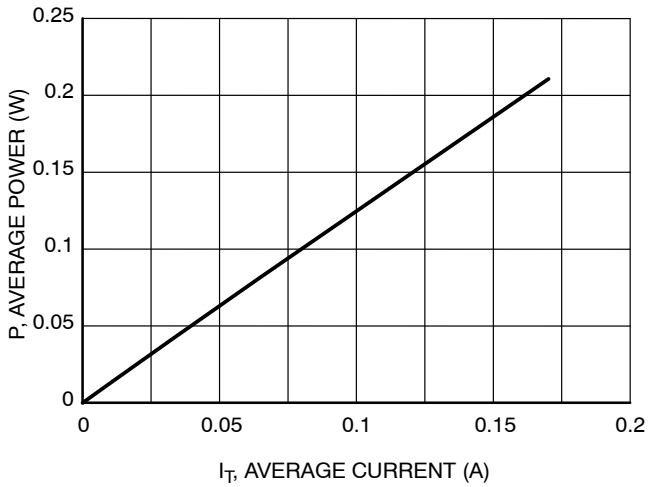


Figure 1. Maximum Average Power vs. Average Current

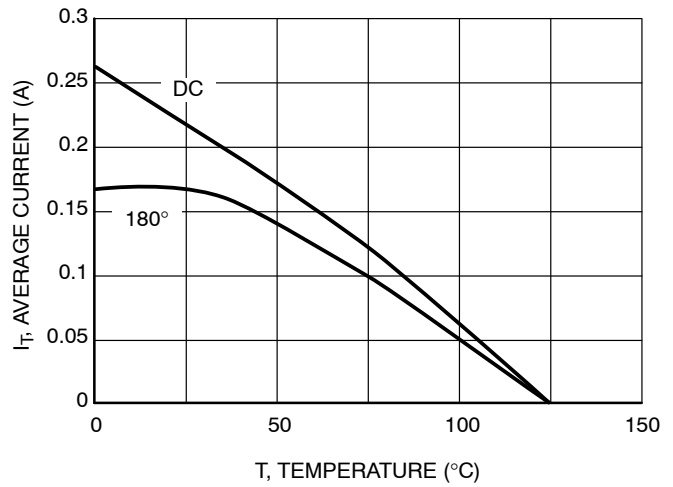


Figure 2. Current Derating

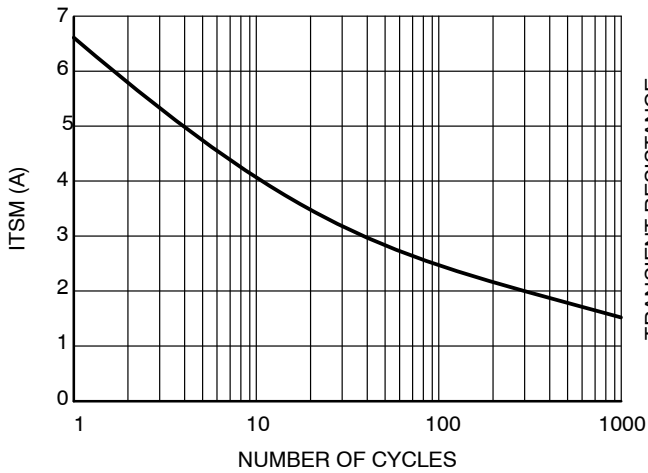


Figure 3. Surge Current ITSM vs. Number of Cycles

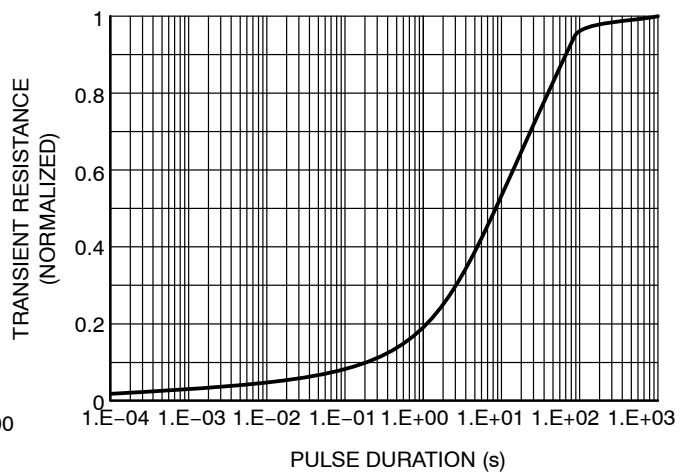


Figure 4. Thermal Response

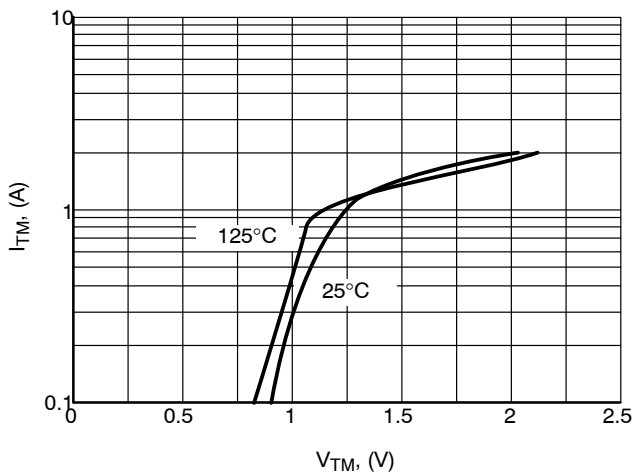


Figure 5. ON-State Characteristics

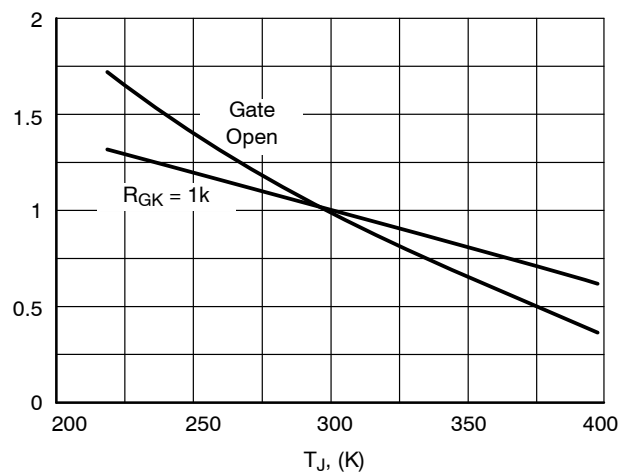
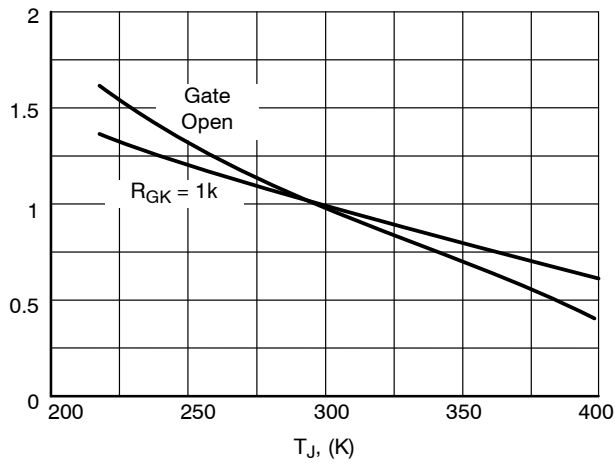
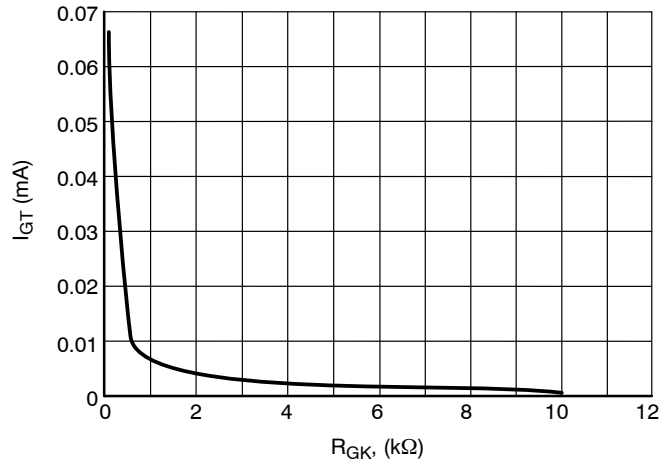


Figure 6. Gate Trigger Current vs.  $T_J$  (Normalized to 25°C)

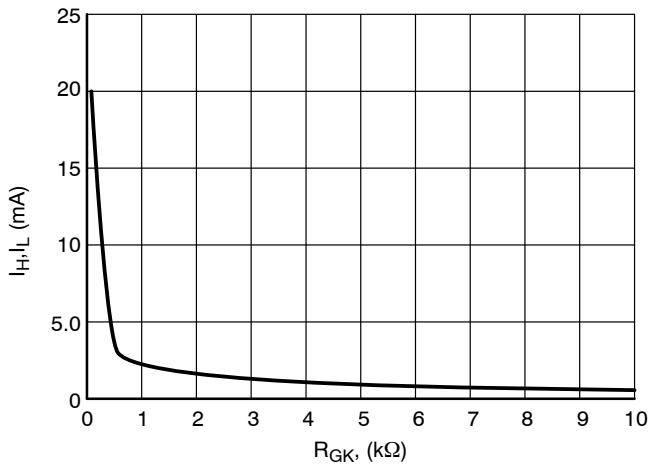
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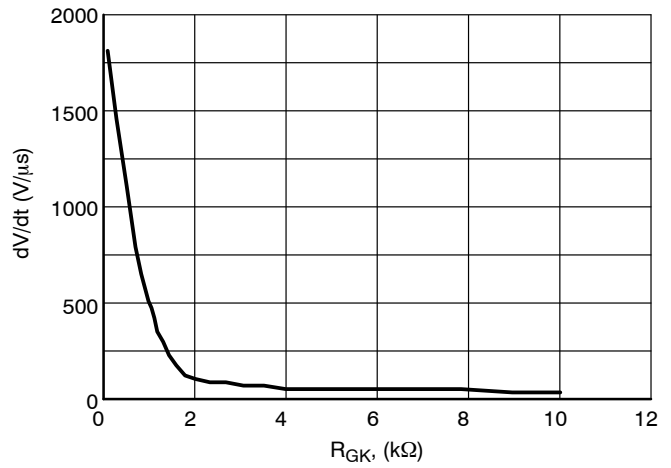
**Figure 7. Gate Trigger Current vs. T<sub>J</sub>  
(Normalized to 25°C)**



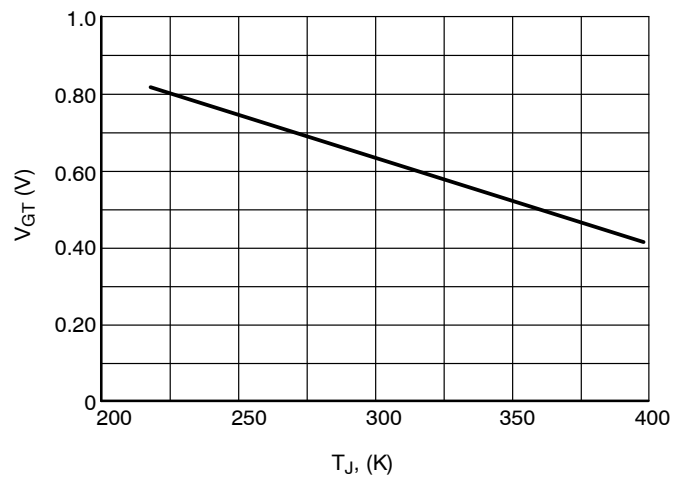
**Figure 8. Gate Trigger Current vs. R<sub>GK</sub>**



**Figure 9. Holding and Latching Current vs. R<sub>GK</sub>**



**Figure 10. dV/dt vs. R<sub>GK</sub>**

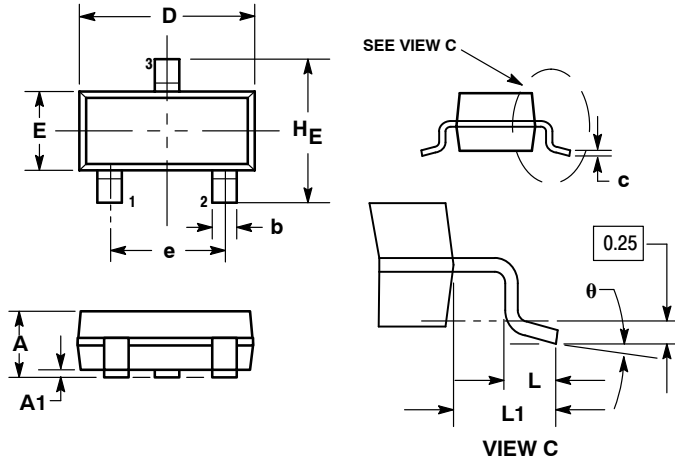


**Figure 11. Gate Triggering Voltage vs. T<sub>J</sub>**

# NYC0102BLT1G

## PACKAGE DIMENSIONS

SOT-23 (TO-236)  
CASE 318-08  
ISSUE AN



NOTES:

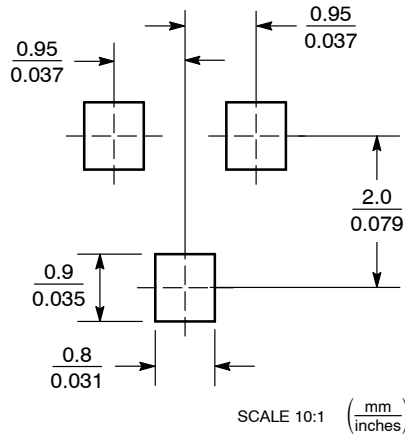
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A   | 0.89        | 1.00 | 1.11 | 0.035  | 0.040 | 0.044 |
| A1  | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b   | 0.37        | 0.44 | 0.50 | 0.015  | 0.018 | 0.020 |
| c   | 0.09        | 0.13 | 0.18 | 0.003  | 0.005 | 0.007 |
| D   | 2.80        | 2.90 | 3.04 | 0.110  | 0.114 | 0.120 |
| E   | 1.20        | 1.30 | 1.40 | 0.047  | 0.051 | 0.055 |
| e   | 1.78        | 1.90 | 2.04 | 0.070  | 0.075 | 0.081 |
| L   | 0.10        | 0.20 | 0.30 | 0.004  | 0.008 | 0.012 |
| L1  | 0.35        | 0.54 | 0.69 | 0.014  | 0.021 | 0.029 |
| HE  | 2.10        | 2.40 | 2.64 | 0.083  | 0.094 | 0.104 |

STYLE 8:

1. ANODE
2. NO CONNECTION
3. CATHODE

### SOLDERING FOOTPRINT\*



\*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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