# NUP2125, SZNUP2125

# Dual Line CAN Bus Protector

The SZ/NUP2125 has been designed to protect the CAN transceiver from ESD and other harmful transient voltage events. This device provides bidirectional protection for each data line with a single compact SC−70 (SOT−323) package, giving the system designer a low cost option for improving system reliability and meeting stringent EMI requirements.

### Features

- 200 W Peak Power Dissipation per Line (8 x 20 μsec Waveform)
- Diode Capacitance Matching
- Low Reverse Leakage Current (< 100 nA)
- IEC Compatibility: − IEC 61000−4−2 (ESD): Level 4
  − IEC 61000−4−4 (EFT): 50 A – 5/50 ns
  − IEC 61000−4−5 (Lighting) 3.0 A (8/20 μs)
- ISO 7637−1, Nonrepetitive EMI Surge Pulse 2, 8.0 A (1 x 50 μs)
- ISO 7637−3, Repetitive Electrical Fast Transient (EFT) EMI Surge Pulses, 50 A (5 x 50 ns)
- Flammability Rating UL 94 V−0
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These are Pb−Free Devices

### Applications

- Automotive Networks
  - CAN / CAN−FD
  - Low and High−Speed CAN
  - Fault Tolerant CAN

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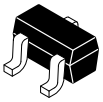
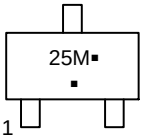
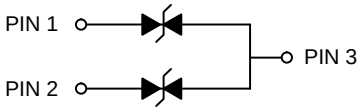
**MARKING DIAGRAM**

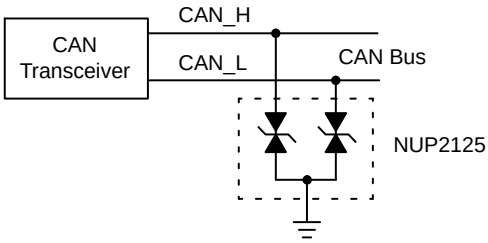


**SC−70**
**CASE 419**
**STYLE 4**




25 = Specific Device Code
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)




### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

**MAXIMUM RATINGS** ($T_J$ = 25°C, unless otherwise specified)

| Symbol | Rating | Value | Unit |
|---|---|---|---|
| PPK | Peak Power Dissipation, 8 x 20 μs Double Exponential Waveform (Note 1) | 200 | W |
| $T_J$ | Operating Junction Temperature Range | −55 to 150 | °C |
| $T_J$ | Storage Temperature Range | −55 to 150 | °C |
| $T_L$ | Lead Solder Temperature (10 s) | 260 | °C |
| ESD | Human Body Model (HBM)<br>Machine Model (MM)<br>IEC 61000−4−2 Specification (Contact) | 8.0<br>1.6<br>30 | kV<br>kV<br>kV |

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.

1. Non−repetitive current pulse per Figure 1.

**ELECTRICAL CHARACTERISTICS** ($T_J$ = 25°C, unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{RWM}$ | Reverse Working Voltage | (Note 2) | 24 | − | − | V |
| $V_{BR}$ | Breakdown Voltage | $I_T$ = 1 mA (Note 3) | 26.2 | − | 32 | V |
| $I_R$ | Reverse Leakage Current | $V_{RWM}$ = 24 V | − | 15 | 100 | nA |
| $V_C$ | Clamping Voltage | $I_{PP}$ = 1 A (8 x 20 μs Waveform) (Note 4) | − | 33.4 | 36.6 | V |
| $V_C$ | Clamping Voltage | $I_{PP}$ = 3 A (8 x 20 μs Waveform) (Note 4) | − | 44 | 50 | V |
| $I_{PP}$ | Maximum Peak Pulse Current | 8 x 20 μs Waveform (Note 4) | − | − | 3.0 | A |
| $C_J$ | Capacitance | $V_R$ = 0 V, f = 1 MHz (Line to GND) | − | − | 10 | pF |
| ΔC | Diode Capacitance Matching | $V_R$ = 0 V, 5 MHz (Note 5) | − | 0.26 | 2 | % |

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.

2. TVS devices are normally selected according to the working peak reverse voltage ($V_{RWM}$), which should be equal or greater than the DC or continuous peak operating voltage level.
3. $V_{BR}$ is measured at pulse test current $I_T$.
4. Pulse waveform per Figure 1.
5. ΔC is the percentage difference between $C_J$ of lines 1 and 2 measured according to the test conditions given in the electrical characteristics table.

**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| NUP2125WTT1G | SC−70<br>(Pb−Free) | 3000 / Tape & Reel |
| SZNUP2125WTT1G | SC−70<br>(Pb−Free) | 3000 / Tape & Reel |
| NUP2125WTT3G | SC−70<br>(Pb−Free) | 10000 / Tape & Reel |
| SZNUP2125WTT3G | SC−70<br>(Pb−Free) | 10000 / 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.

## TYPICAL PERFORMANCE CURVES

($T_J$ = 25°C unless otherwise noted)

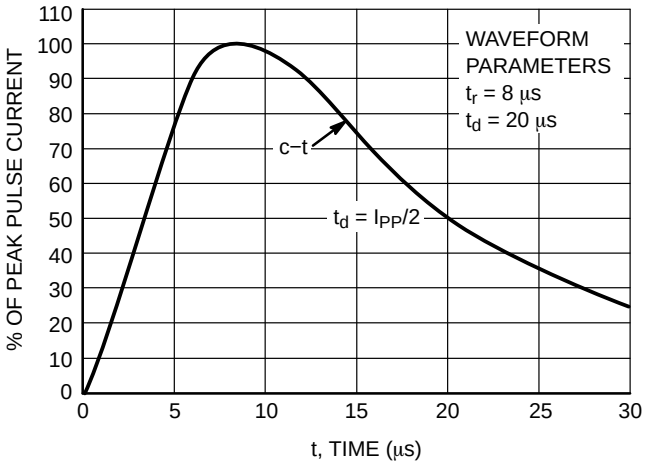



**Figure 1. Pulse Waveform, 8 × 20 μs**

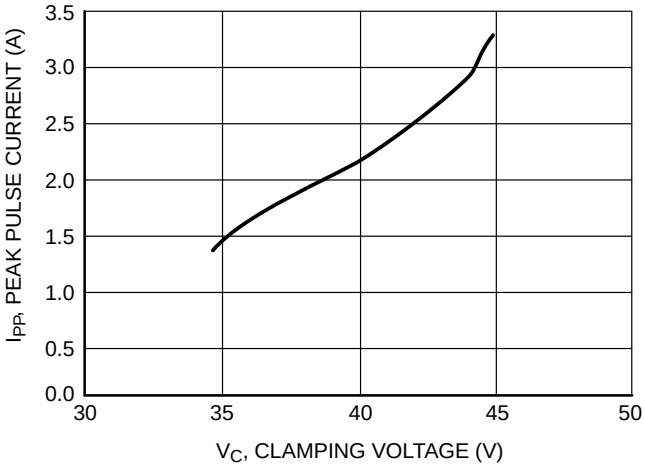



**Figure 2. Clamping Voltage vs Peak Pulse Current**

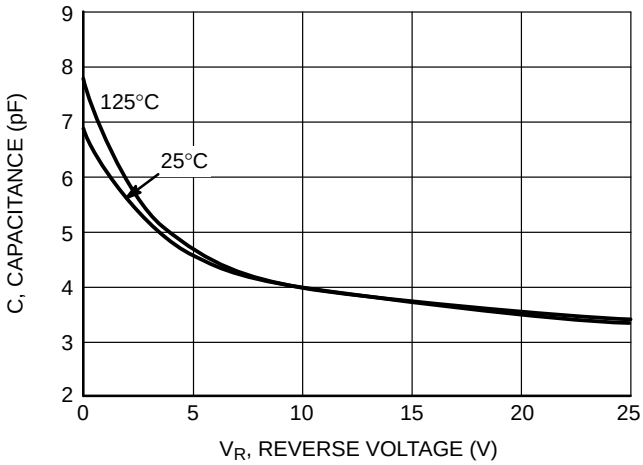



**Figure 3. Typical Junction Capacitance vs Reverse Voltage**

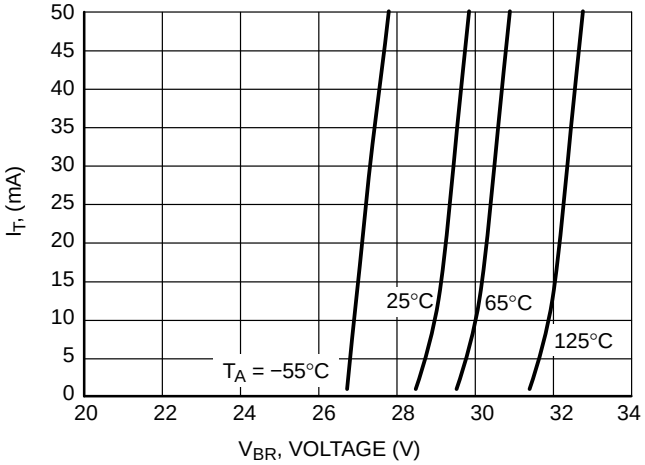



**Figure 4. $V_{BR}$ versus $I_T$ Characteristics**

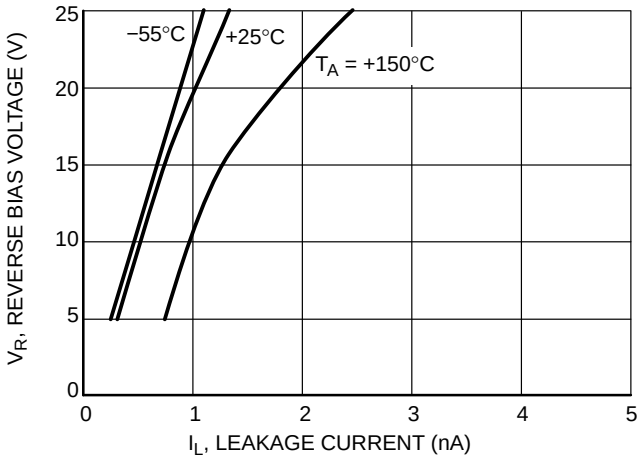



**Figure 5. $I_R$ versus Temperature Characteristics**

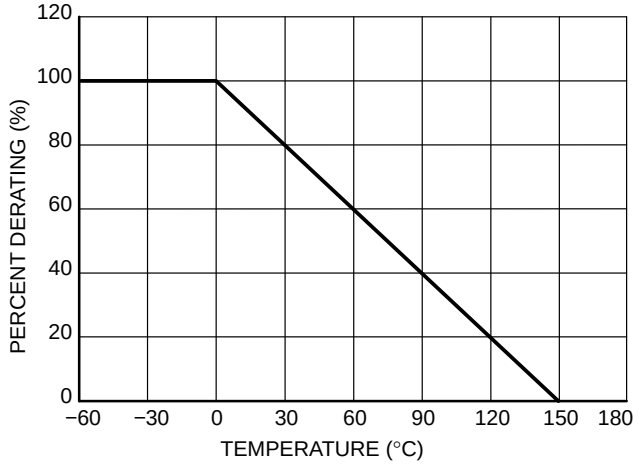
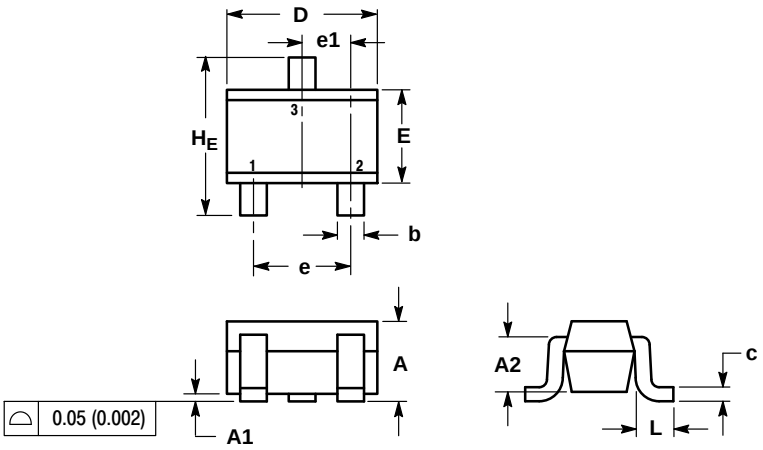



**Figure 6. Temperature Power Dissipation Derating**

## PACKAGE DIMENSIONS

**SC−70 (SOT−323)**
CASE 419−04
ISSUE N

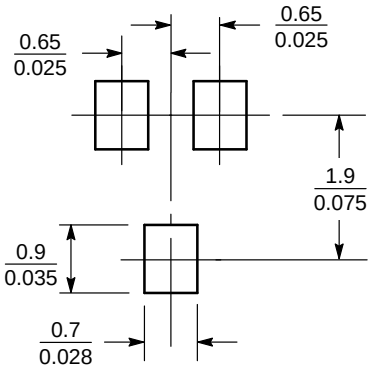



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.90 | 1.00 | 0.032 | 0.035 | 0.040 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A2 | | 0.70 REF | | | 0.028 REF | |
| b | 0.30 | 0.35 | 0.40 | 0.012 | 0.014 | 0.016 |
| c | 0.10 | 0.18 | 0.25 | 0.004 | 0.007 | 0.010 |
| D | 1.80 | 2.10 | 2.20 | 0.071 | 0.083 | 0.087 |
| E | 1.15 | 1.24 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e1 | | 0.65 BSC | | | 0.026 BSC | |
| L | 0.20 | 0.38 | 0.56 | 0.008 | 0.015 | 0.022 |
| $H_E$ | 2.00 | 2.10 | 2.40 | 0.079 | 0.083 | 0.095 |

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

### SOLDERING FOOTPRINT*




SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

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



### PUBLICATION ORDERING INFORMATION

**LITERATURE FULFILLMENT**:
Literature Distribution Center for ON Semiconductor
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**Phone**: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
**Fax**: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
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