NUP3105L, SZNUP3105L

Dual Line CAN Bus Protector

The SZ/NUP3105L has been designed to protect the CAN transceiver in high−speed and fault tolerant networks from ESD and other harmful transient voltage events. This device provides bidirectional protection for each data line with a single compact SOT−23 package, giving the system designer a low cost option for improving system reliability and meeting stringent EMI requirements.

Features

- 350 W Peak Power Dissipation per Line (8 x 20 μsec Waveform)
- Low Reverse Leakage Current (< 100 nA)
- Low Capacitance High−Speed CAN Data Rates
- IEC Compatibility: − IEC 61000−4−2 (ESD): Level 4
  − IEC 61000−4−4 (EFT): 50 A – 5/50 ns
  − IEC 61000−4−5 (Lighting) 8.0 A (8/20 μs)
- 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 Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

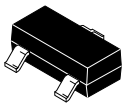
Applications

- Industrial Control Networks
  - Smart Distribution Systems (SDS®)
  - DeviceNet™
- Automotive Networks
  - Low and High−Speed CAN
  - Fault Tolerant CAN
  - Trucks

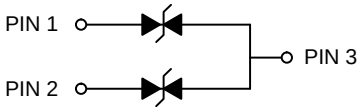
ON Semiconductor®

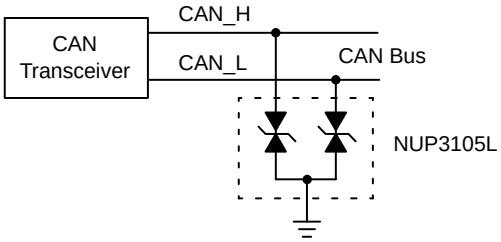
http://onsemi.com

SOT−23
DUAL BIDIRECTIONAL VOLTAGE SUPPRESSOR
350 W PEAK POWER

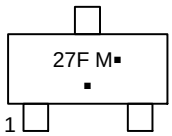


SOT−23
CASE 318
STYLE 27





MARKING DIAGRAM



27F = Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 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)	 350	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) Machine Model (MM) IEC 61000−4−2 Specification (Contact)	8.0 400 30	kV V 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)	−	−	32	V
V_{BR}	Breakdown Voltage	I_T = 1 mA (Note 3)	35.6	−	−	V
I_R	Reverse Leakage Current	V_{RWM} = 32 V	−	−	100	nA
V_C	Clamping Voltage	I_{PP} = 5 A (8 x 20 μs Waveform) (Note 4)	−	−	59	V
V_C	Clamping Voltage	I_{PP} = 8 A (8 x 20 μs Waveform) (Note 4)	−	−	66	V
I_{PP}	Maximum Peak Pulse Current	8 x 20 μs Waveform (Note 4)	−	−	8.0	A
CJ	Capacitance	V_R = 0 V, f = 1 MHz (Line to GND)	−	−	30	pF

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.

TYPICAL PERFORMANCE CURVES

(T_J = 25°C unless otherwise noted)

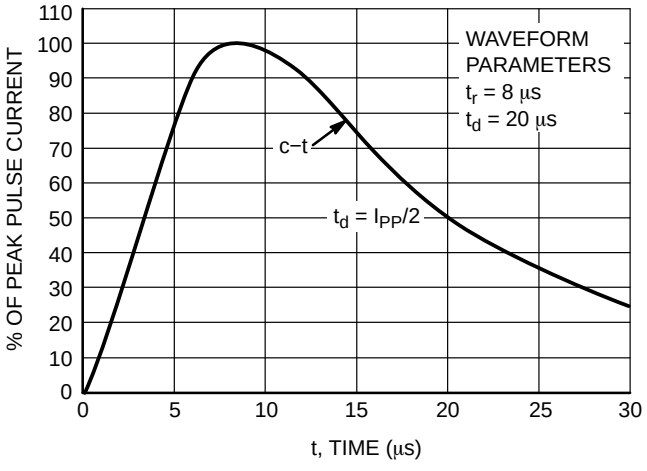


Figure 1. Pulse Waveform, 8 × 20 μs

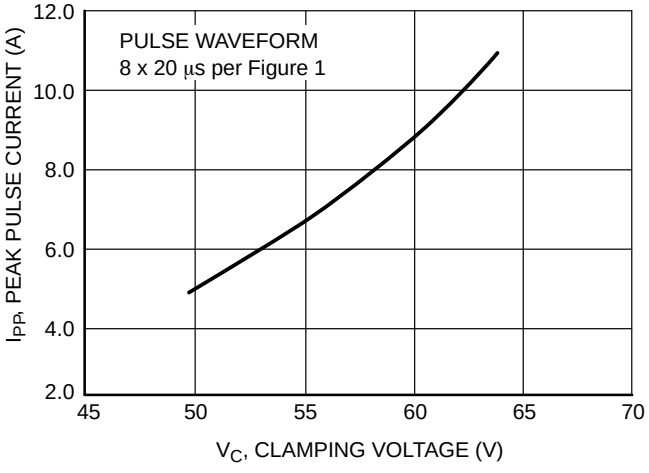


Figure 2. Clamping Voltage vs Peak Pulse Current

TVS Diode Protection Circuit

TVS diodes provide protection to a transceiver by clamping a surge voltage to a safe level. TVS diodes have high impedance below and low impedance above their breakdown voltage. A TVS Zener diode has its junction optimized to absorb the high peak energy of a transient event, while a standard Zener diode is designed and specified to clamp a steady state voltage.

Figure 3 provides an example of a dual bidirectional TVS diode array that can be used for protection with the high−speed CAN network. The bidirectional array is created from four identical Zener TVS diodes. The clamping voltage of the composite device is equal to the breakdown voltage of the diode that is reversed biased, plus the diode drop of the second diode that is forwarded biased.

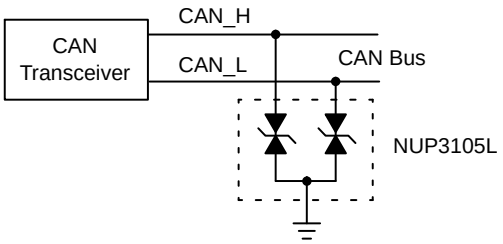


Figure 3. High−Speed and Fault Tolerant CAN TVS Protection Circuit

ORDERING INFORMATION

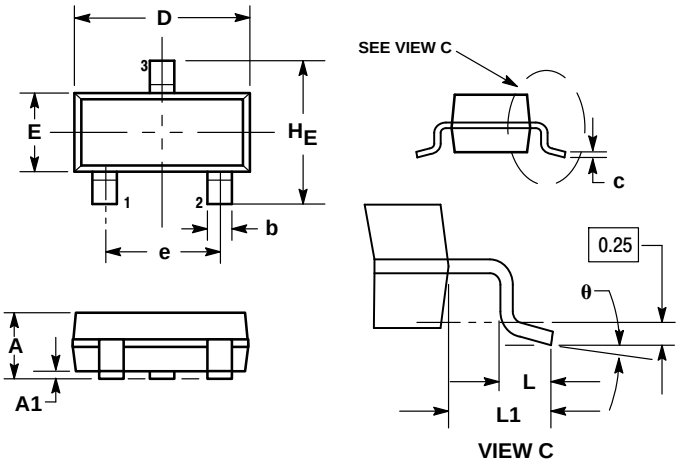
Device	Package	Shipping†
NUP3105LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SZNUP3105LT1G*	SOT−23 (Pb−Free)	3,000 / Tape & Reel
NUP3105LT3G	SOT−23 (Pb−Free)	10,000 / Tape & Reel
SZNUP3105LT3G*	SOT−23 (Pb−Free)	10,000 / Tape & Reel

†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.

*SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AP

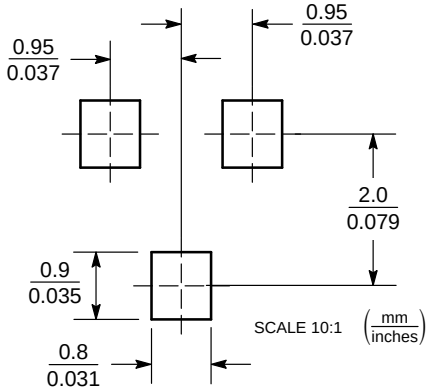


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	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
H_E	2.10	2.40	2.64	0.083	0.094	0.104
θ	0°	−−−	10°	0°	−−−	10°

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

SOLDERING FOOTPRINT



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