DESCRIPTION

The NUP2105 is Dual Line Can Bus Protector, 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.

The NUP2105 is available in SOT-23 package

FEATURES

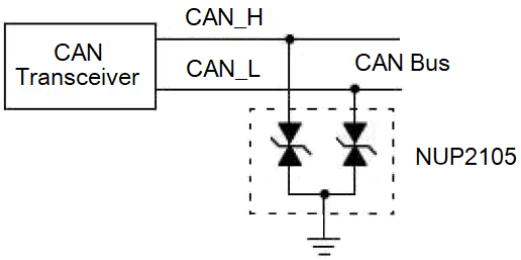
- 350W Peak Power Dissipation per Lin (8x20usec Waveform)
- Low Reverse Leakage Current (<100nA)
- Low Capacitance High-Speed CAN Data Rates
- IEC Compatibility
  -IEC 61000-4-2(ESD): Level 4
  -IEC 61000-4-4 (EFT): 40A – 5/50ns
  -IEC 61000-4-5 (Lighting) 8.0A(8/20us)
- EMI Surge Pulses, 50A(5x50ns)
- Flammability Rating UL 94V-0
- Available in SOT-23 package

ORDERING INFORMATION

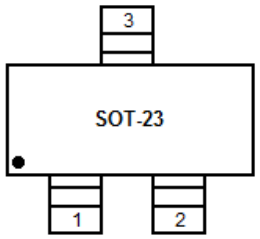
Package Type	Part Number
SOT-23	NUP2105
Note	SPQ: 3,000pcs/Reel
AiT provides all RoHS Compliant Products	

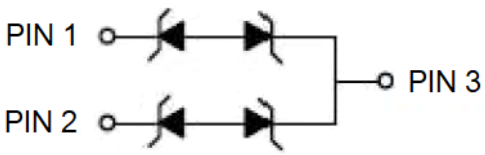
APPLICATION

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



PIN DESCRIPTION





ABSOLUTE MAXIMUM RATINGS

T_J=25°C, unless otherwise specified

P_{PK}, Peak Power Dissipation 8x20us Double Exponential Waveform[NOTE1]	350W
T_J, Operating Junction Temperature Range	-40°C ~125°C
T_J, Storage Temperature Range	-55°C ~150°C
T_L, Lead Solder Temperature (10s)	260°C
ESD, Human Body model (HBM)	16kV
Machine Model (MM)	400V
IEC 61000-4-2 Specification (Contact)	30kV

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reverse Working Voltage	V_{RWM}	NOTE2	24	-	-	V
Breakdown Voltage	V_{BR}	I_T – 1mA[NOTE3]	26.2	-	32	V
Reverse Leakage Current	I_R	V_{RWM} = 24V	-	15	100	nA
Clamping Voltage	V_C	I_{PP} = 5A(8x20us Waveform)[NOTE4]	-	-	40	V
		I_{PP} = 8A(8x20us Waveform)[NOTE4]	-	-	44	
Maximum Peak Pulse Current	I_{PP}	(8x20us Waveform)[NOTE4]	-	-	8.0	A
Capacitance	C_J	V_R = 0V, f =1MHz (Line to GND)	-	-	30	pF

NOTE1: Non−repetitive current pulse per Figure 1.

NOTE2: 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.

NOTE3: V_{BR} is measured at pulse test current I_T.

NOTE4: Pulse waveform per Figure 1.

TYPICAL CHARACTERISTICS

Figure 1. Pulse Waveform, 8 x 20us

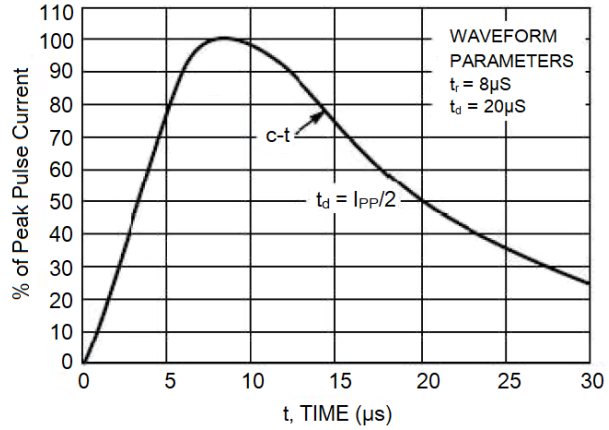


Figure 2. Clamping Voltage vs. Peak Pulse Current

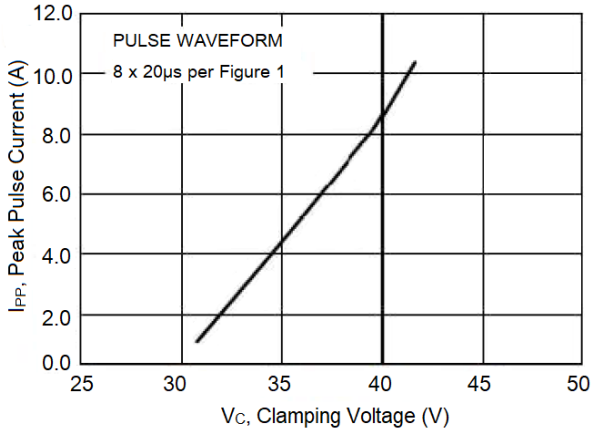


Figure 3. Typical Junction Capacitance vs. Reverse Voltage

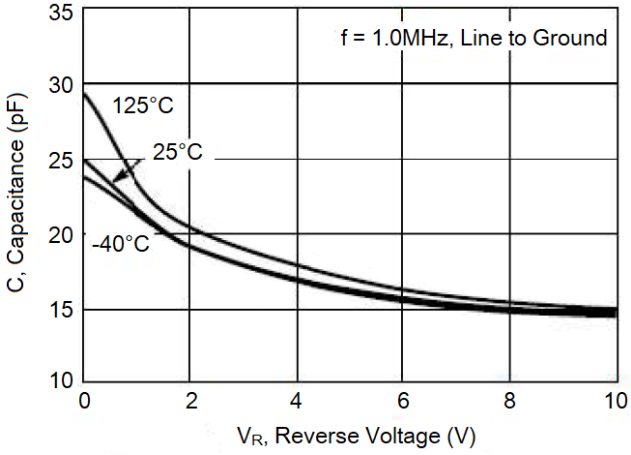


Figure 4. V_{BR} vs. I_T Characteristics

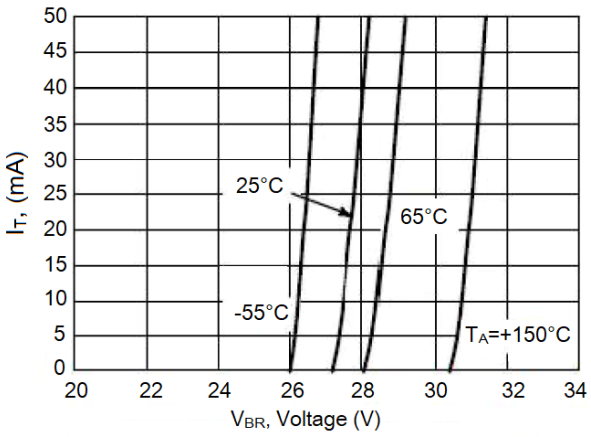


Figure 5. I_R vs. Temperature Characteristics

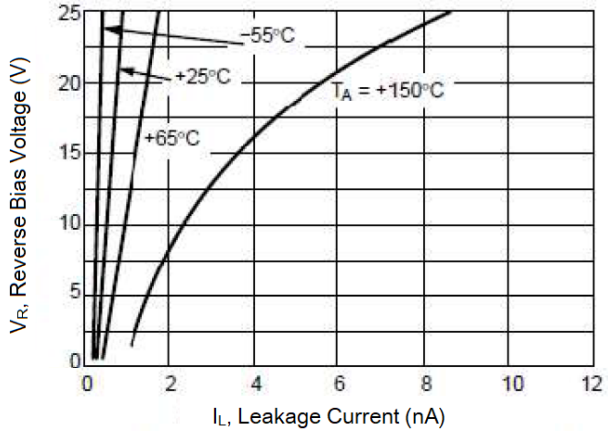
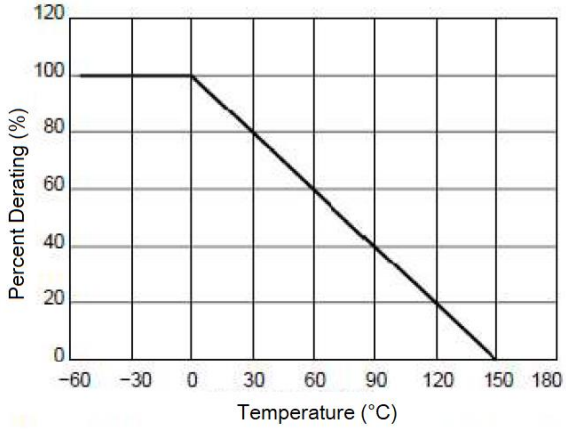


Figure 6. Temperature Power Dissipation Derating



TVS Diode Protection Circuit

TVS diodes provide protection to a transceiver by clamping a surge voltage to a safe level. TVS diode 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 7. provides an example of a dual bidirectional TVS diode array that can be used for protection with the high-seed CAN network. The bidirectional array is created from four identical Zener TVS diode. 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 based.

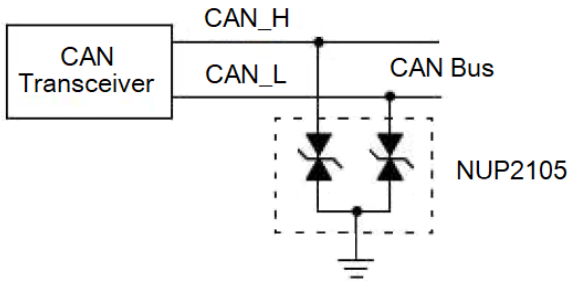
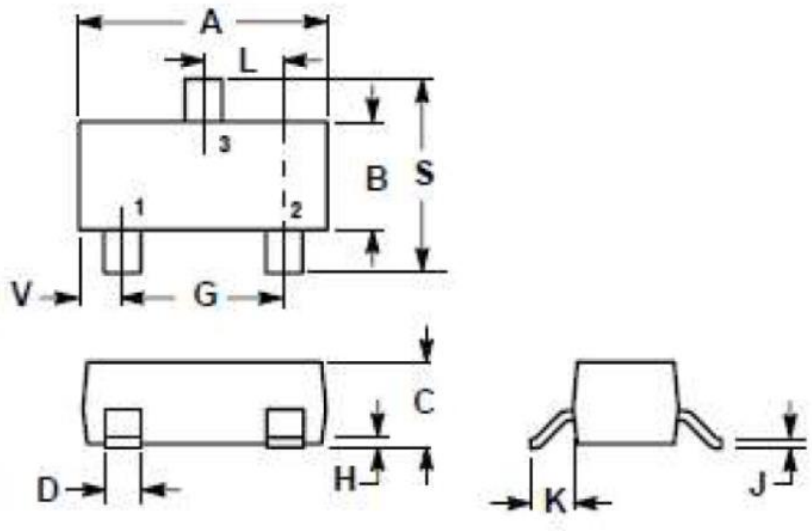


Figure 7. High-Speed and Fault Tolerant CAN TVS Protection Circuit

PACKAGE INFORMATION

Dimension in SOT-23 (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.80	3.04	0.1102	0.1197
B	1.20	1.40	0.0472	0.0551
C	0.89	1.11	0.0350	0.0440
D	0.37	0.50	0.0150	0.0200
G	1.78	2.04	0.0701	0.0807
H	0.013	0.100	0.0005	0.0040
J	0.085	0.177	0.0034	0.0070
K	0.35	0.69	0.0140	0.0285
L	0.89	1.02	0.0350	0.0401
S	2.10	2.64	0.0830	0.1039
V	0.45	0.60	0.0177	0.0236

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