

NP0080TA Series

Low Capacitance Protector

The NP series of low voltage/low capacitance overvoltage protection devices protect high speed xDSL line drivers and chipsets from both Lightning Surge and ESD events. The devices are designed with a low nominal capacitance as well as extremely low differential capacitance across frequency and voltage. The inherent low off-state leakage current provides superior performance in low voltage high speed applications. These characteristics allow protection of the system without distortion of the high speed data signal.

With its advanced silicon structure the NP product is able to clamp very fast ESD events, and crowbar high energy surge events to help protect sensitive IC's all in a small footprint. The convenient flow thru design minimizes trace routing while maximizing circuit performance.

The NP series of low voltage/low capacitance devices helps designers to comply with the various regulatory standards and recommendations including: GR-1089-CORE, IEC 61000-4-5, ITU K.20/K.21/K.45, IEC 60950,

TIA-968-A, FCC Part 68, EN 60950, UL 1950.

Features

- Low Nominal Capacitance
- Extremely Low Differential Capacitance
- Low Leakage (Transparent)
- High Surge Capability
- Precise Clamping Voltage
- Small Package Size
- Bi-directional Operation
- Flow Thru Layout
- IEC 61000-4-2 Level 4 ESD protection
- These are Pb-Free Devices

Typical Applications

- VDSL, ADSL, Access, Central Office, and Customer Premise modems and gateway IC side line driver chipset protection
- 10/100/1000 Ethernet Protection
- RS-232, RS-485 Transceiver Protection

ELECTRICAL CHARACTERISTICS

Device	V_{RWM}	V_{BR}	$I_R@$ $V_R=V_{RWM}$	$C@$ $V_R = 2 V$	$\Delta^{\circ}C$ $0 V-V_{RWM}$
	(V)	(V)	(μA)	(pF)	(pF)
NP0080TAT1G	8	9.5	0.5	13	4
NP0120TAT1G	12	12.5	0.5	11	3
NP0160TAT1G	16	18	0.5	11	3

SURGE/ESD RATINGS

Waveform	8x20 μA	ESD Air	ESD Contact
Value	50 A	15 kV	8 kV



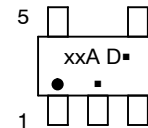
ON Semiconductor®

<http://onsemi.com>



TSOP-5
SN SUFFIX
CASE 483

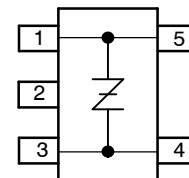
MARKING DIAGRAM



xxA = Specific Device Code
(NP0xx0TAT1G)
D = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

NP0080TA Series

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

Symbol	Rating	Min	Typ	Max	Unit
V_{RWM}	Repetitive peak off-state voltage: Rated maximum (peak) continuous voltage that may be applied in the off-state condition	NP0080TAT1G		± 8	V
		NP0120TAT1G		± 12	
		NP0160TAT1G		± 16	
V_{BR1}	Breakdown Voltage: The minimum voltage across the device in or at the breakdown region. Measured at $I_{BR} = 1 \text{ mA}$	NP0080TAT1G	9.5		V
		NP0120TAT1G	12.5		
		NP0160TAT1G	18		
$V_{(BO)}$	Breakover Voltage: The maximum voltage across the device in or at the breakover region. Measured at $I_{(BO)} = 800 \text{ mA}$	NP0080TAT1G		20	V
		NP0120TAT1G		30	
		NP0160TAT1G		40	
I_R	Off-state Current: The dc value of current that results from the application of the off-state voltage			0.5	μA
I_H	Holding Current: The minimum current required to maintain the device in the on-state.		50		mA
C_o	Off-State Capacitance: $f = 1.0 \text{ MHz}$, $V_d = 1.0 \text{ Vrms}$, $V_D = -2 \text{ Vdc}$	NP0080TAT1G		13	pF
		NP0120TAT1G		11	
		NP0160TAT1G		11	
ΔC_1	Δ Capacitance: $f = 1.0 \text{ MHz}$, $V_d = 1.0 \text{ Vrms}$, $V_D = 0 \text{ V} - V_{rwm} $	NP0080TAT1G		4	pF
		NP0120TAT1G		3	
		NP0160TAT1G		3	
IPPS	Peak Pulse Current: Rated maximum value of peak impulse pulse current that may be applied. $8 \times 20 \mu\text{s}$, IEC-61000-4-5		50		A
ESD	Electrostatic Discharge: Rated maximum value of ESD per IEC-61000-4-2	Contact		8	kV
		Air		15	
T_{STG}	Storage Temperature Range		-55	+150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range		-40	+125	$^\circ\text{C}$

NP0080TA Series

Symbol	Parameter
V_{RWM}	Repetitive peak off-state voltage
V_{BR}	Breakdown voltage
$V_{(BO)}$	Breakover voltage
I_R	Off-state current
I_H	Holding current

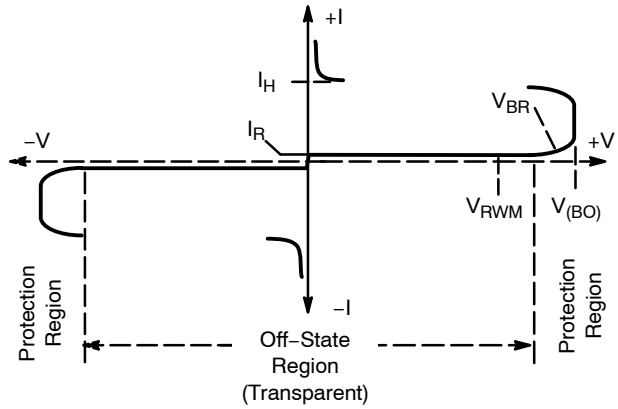


Figure 1.

Application Information

The NPXXXXTAT can be used after the isolation transformer as protection for the xDSL line driver. The devices can be configured to protect against both differential and common mode surges and ESD.

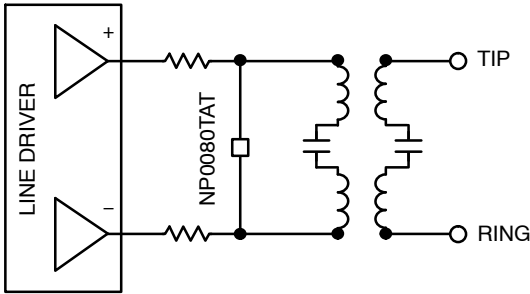


Figure 2.

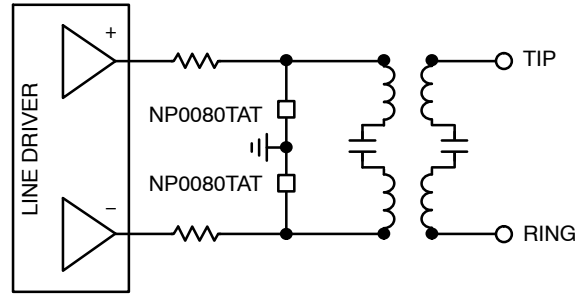


Figure 3.

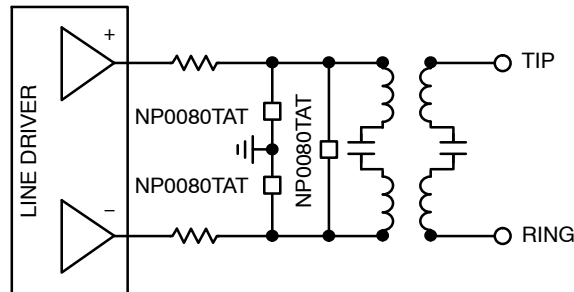
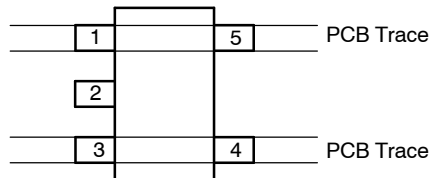


Figure 4.



1. Connect pin 1 to pin 5 on PCB
2. Connect pin 3 to pin 4 on PCB
3. Pin 2 is no connection

Figure 5. PCB Layout

NP0080TA Series

DEVICE ORDERING INFORMATION

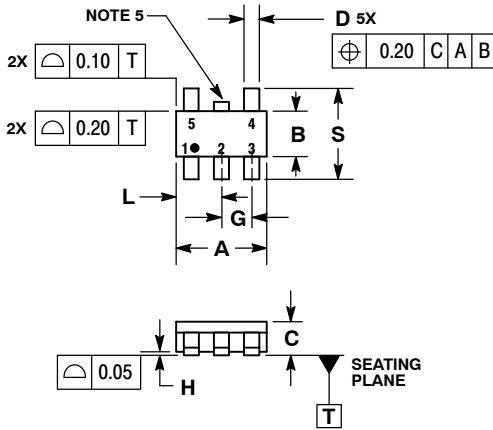
Device	Package	Shipping†
NP0080TAT1G	TSOP-5 (Pb-Free)	3000 / Tape & Reel
NP0120TAT1G	TSOP-5 (Pb-Free)	3000 / Tape & Reel
NP0160TAT1G	TSOP-5 (Pb-Free)	3000 / Tape & Reel

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

NP0080TA Series

PACKAGE DIMENSIONS

TSOP-5 CASE 483-02 ISSUE H

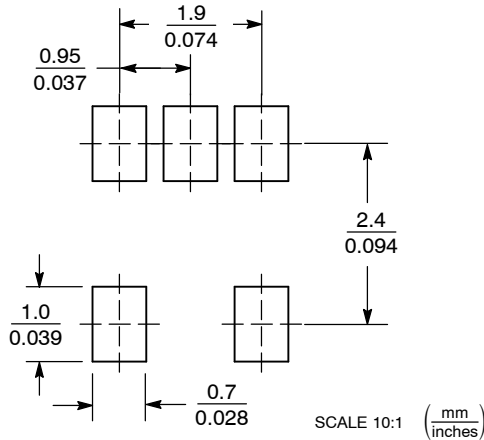


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
5. OPTIONAL CONSTRUCTION: AN ADDITIONAL TRIMMED LEAD IS ALLOWED IN THIS LOCATION. TRIMMED LEAD NOT TO EXTEND MORE THAN 0.2 FROM BODY.

DIM	MILLIMETERS	
	MIN	MAX
A	3.00 BSC	
B	1.50 BSC	
C	0.90	1.10
D	0.25	0.50
G	0.95 BSC	
H	0.01	0.10
J	0.10	0.26
K	0.20	0.60
L	1.25	1.55
M	0°	10°
S	2.50	3.00

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.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative