

# 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 it's 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	$V_{RWM}$	$V_{BR}$	$I_R@$ $V_R = V_{RWM}$	$C@$ $V_R = 2\text{ V}$	$\Delta^\circ\text{C}$ $0\text{ V} - V_{RWM}$
	(V)	(V)	( $\mu\text{A}$ )	(pF)	(pF)
NP0080TAT1G	8	9.5	0.5	13	4
NP0120TAT1G	12	12.5	0.5	13	3

### SURGE/ESD RATINGS

Waveform	8x20 $\mu\text{s}$	ESD Air	ESD Contact
Value	50 A	15 kV	6 kV



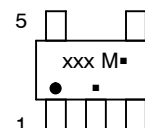
ON Semiconductor®

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TSOP-5  
TA SUFFIX  
CASE 483

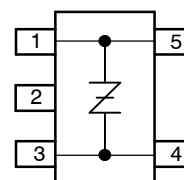
### MARKING DIAGRAM



xxx = Specific Device Code  
(NPxxx0TAT1G)  
M = 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
$V_{RWM}$	<b>Repetitive peak off-state voltage:</b> Rated maximum (peak) continuous voltage that may be applied in the off-state condition	NP0080TAT1G		$\pm 8$	V
		NP0120TAT1G		$\pm 12$	
$V_{BR1}$	<b>Breakdown Voltage:</b> 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		
$V_{(BO)}$	<b>Breakover Voltage:</b> The maximum voltage across the device in or at the breakover region. Measured at $I_{(BO)} = 800 \text{ mA}$	NP0080TAT1G		20	V
		NP0120TAT1G		30	
$I_R$	<b>Off-state Current:</b> The dc value of current that results from the application of the off-state voltage			0.5	$\mu\text{A}$
$I_H$	<b>Holding Current:</b> The minimum current required to maintain the device in the on-state.		50		mA
$C_o$	<b>Off-State Capacitance:</b> $f = 1.0 \text{ MHz}$ , $V_d = 1.0 \text{ Vrms}$ , $V_D = -2 \text{ Vdc}$	NP0080TAT1G		13	pF
		NP0120TAT1G		13	
$\Delta C_1$	<b><math>\Delta</math> Capacitance:</b> $f = 1.0 \text{ MHz}$ , $V_d = 1.0 \text{ Vrms}$ , $V_D =  0 \text{ V} - V_{rwm} $	NP0080TAT1G	4		pF
		NP0120TAT1G	3		
IPPS	<b>Peak Pulse Current:</b> 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	<b>Electrostatic Discharge (CONTACT):</b> Rated maximum value of ESD per IEC-61000-4-2	NP0080TAT1G	8		kV
		NP0120TAT1G	6		
	<b>Electrostatic Discharge (AIR):</b> Rated maximum value of ESD per IEC-61000-4-2		15		
$T_{STG}$	<b>Storage Temperature Range</b>		-55	+150	$^\circ\text{C}$
$T_J$	<b>Operating Junction Temperature Range</b>		-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

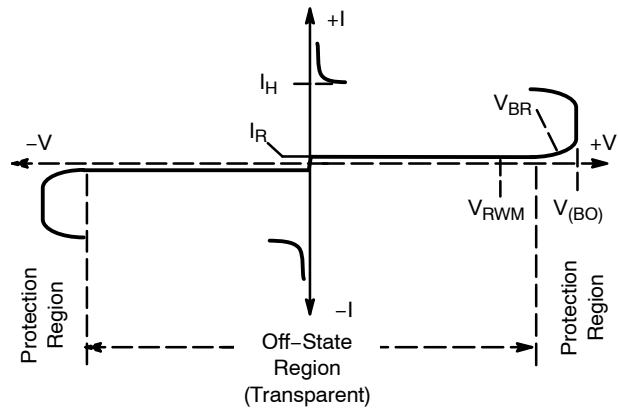


Figure 1.

### 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.

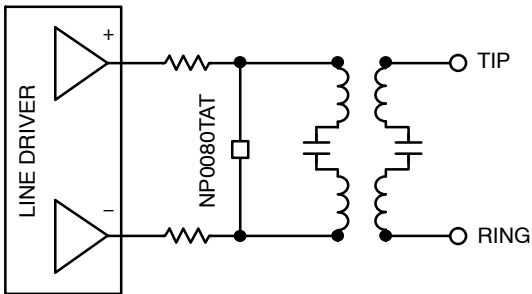


Figure 2.

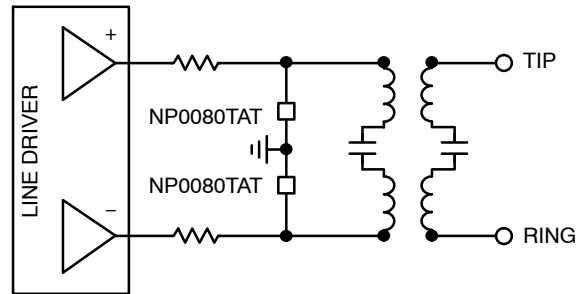


Figure 3.

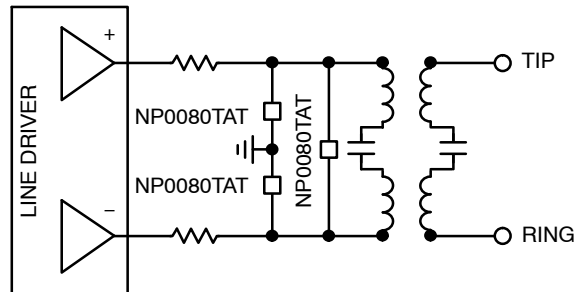
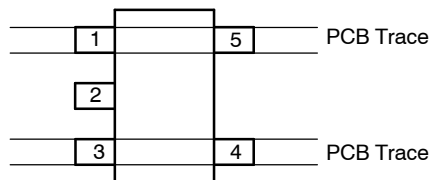


Figure 4.



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

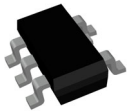
Figure 5. PCB Layout

## NP0080TA Series

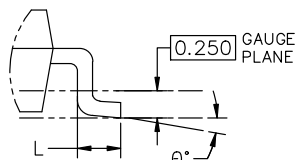
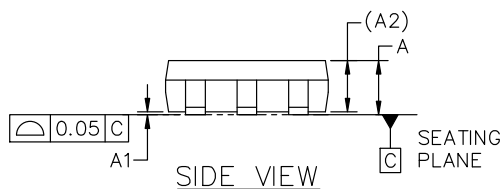
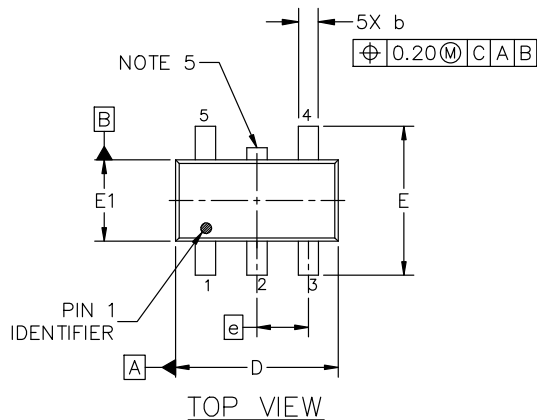
### DEVICE ORDERING INFORMATION

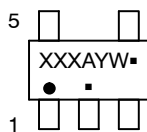
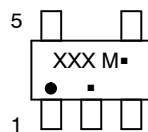
Device	Package	Shipping†
NP0080TAT1G	TSOP-5 (Pb-Free)	3000 / Tape & Reel
NP0120TAT1G	TSOP-5 (Pb-Free)	3000 / Tape & Reel

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


**TSOP-5 3.00x1.50x0.95, 0.95P**  
**CASE 483**  
**ISSUE P**

DATE 01 APR 2024


DETAIL "A"  
SCALE 2:1

**GENERIC**  
**MARKING DIAGRAM\***

**Analog**

**Discrete/Logic**

XXX = Specific Device Code    XXX = Specific Device Code  
A = Assembly Location    M = Date Code  
Y = Year    ■ = Pb-Free Package  
W = Work Week  
■ = Pb-Free Package

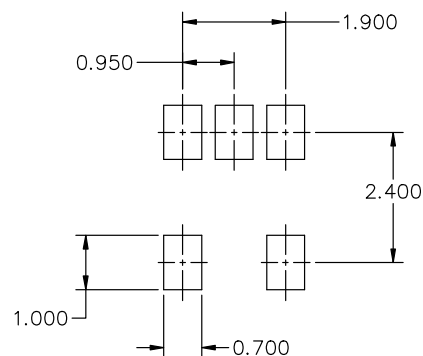
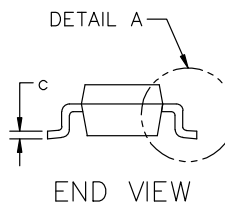
(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

## NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS (ANGLES IN DEGREES).
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OF GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSION D.
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.	NOM.	MAX.
A	0.900	1.000	1.100
A1	0.010	0.055	0.100
A2	0.950 REF.		
b	0.250	0.375	0.500
c	0.100	0.180	0.260
D	2.850	3.000	3.150
E	2.500	2.750	3.000
E1	1.350	1.500	1.650
e	0.950 BSC		
L	0.200	0.400	0.600
θ	0°	5°	10°


**RECOMMENDED MOUNTING FOOTPRINT\***

\* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

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<b>DESCRIPTION:</b>	<b>TSOP-5 3.00x1.50x0.95, 0.95P</b>	<b>PAGE 1 OF 1</b>

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