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# DO-15 NP Series

Preferred Devices

## Thyristor Surge Protectors

### High Voltage Bidirectional

NP Series Thyristor Surge Protector Devices (TSPD) protect telecommunication circuits such as central office, access, and customer premises equipment from overvoltage conditions. These are bidirectional devices so they are able to have functionality of 2 devices in one package, saving valuable space on board layout.

These devices will act as a crowbar when overvoltage occurs and will divert the energy away from circuit or device that is being protected.

Use of the NP Series in equipment will help meet various regulatory requirements including: IEC 61000-4-5, IEC 60950, TIA-968-A, EN 60950, UL 1950.

#### ELECTRICAL PARAMETERS

Device	V <sub>DRM</sub>	V <sub>(BO)</sub>	V <sub>T</sub>	I <sub>DRM</sub>	I <sub>(BO)</sub>	I <sub>T</sub>	I <sub>H</sub>
	V	V	V	μA	mA	A	mA
NP1100GxRLG	90	130	4	5	800	1.0	150
NP1300GxRLG	120	160	4	5	800	1.0	150
NP1500GxRLG	140	180	4	5	800	1.0	150
NP1800GxRLG	170	220	4	5	800	1.0	150
NP2300GxRLG	190	260	4	5	800	1.0	150
NP2600GxRLG	220	300	4	5	800	1.0	150
NP3100GxRLG	275	350	4	5	800	1.0	150
NP3500GxRLG	320	400	4	5	800	1.0	150

G = indicates leadfree, RoHS compliant

#### SURGE DATA RATINGS(Nominal Values)

Specification	Waveform		x = series ratings		Unit
	Voltage μs	Current μs	A	B	
TIA-968-A	10x560	10x560	50	100	A(pk)
GR-1089-CORE	10x1000	10x1000	50	80	

\* Recognized Components



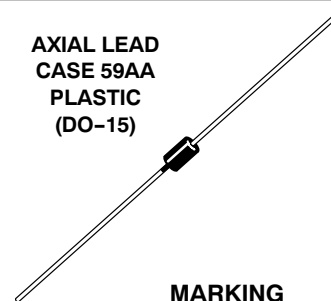
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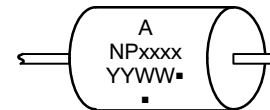
### BIDIRECTIONAL AXIAL LEAD THYRISTOR 110 – 350 VOLTS



AXIAL LEAD  
CASE 59AA  
PLASTIC  
(DO-15)



#### MARKING DIAGRAM



A = Assembly Location  
 NPxxxx = Device Number  
 xxx = (See Table Page 3)  
 YY = Year  
 WW = Work Week  
 ■ = Pb-Free Package  
 (Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

**Preferred** devices are recommended choices for future use and best overall value.

## DO-15 NP Series

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

Characteristics (Note 1)	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both Polarities) NP1100GxRLG NP1300GxRLG NP1500GxRLG NP1800GxRLG NP2300GxRLG NP2600GxRLG NP3100GxRLG NP3500GxRLG	$V_{(BO)}$			130 160 180 220 260 300 350 400	V
Off-State Voltage (Both Polarities) NP1100GxRLG NP1300GxRLG NP1500GxRLG NP1800GxRLG NP2300GxRLG NP2600GxRLG NP3100GxRLG NP3500GxRLG	$V_{DRM}$	90 120 140 170 190 220 275 320			V
Off State Current ( $V_{D1} = 50\text{ V}$ ) Both Polarities ( $V_{D2} = V_{DRM}$ ) Both Polarities	$I_{DRM1}$ $I_{DRM2}$			2.0 5.0	$\mu\text{A}$ $\mu\text{A}$
Holding Current (Both Polarities) (Note 4) $V_S = 500\text{ V}$ ; $I_T = 2.2\text{ A}$	$I_H$	150	250	-	mA
On-State Voltage $I_T = 1.0\text{ A(pk)}$ ( $PW = 300\ \mu\text{Sec}$ , $DC = 2\%$ )	$V_T$	-	-	4.0	V
Maximum Non-Repetitive Rate of Change of On-State Current (Note 1) (Haefely test method, $1.0\text{ pk} < 100\text{ A}$ )	$di/dt$	-	-	500	$\text{A}/\mu\text{Sec}$
Critical Rate of Rise of Off-State Voltage (Linear Waveform, $V_D = 0.8 V_{DRM}$ , $T_J = 25^\circ\text{C}$ )	$dv/dt$	5.0	-	-	$\text{kV}/\mu\text{Sec}$

### CAPACITANCE

Characteristics	Symbol	Typ		Unit
		A	B	
( $f = 1.0\text{ MHz}$ , $1.0\text{ V}_{\text{rms}}$ , $2\text{ Vdc}$ bias) NP1100GxRLG NP1300GxRLG NP1500GxRLG NP1800GxRLG NP2300GxRLG NP2600GxRLG NP3100GxRLG NP3500GxRLG	$C_o$	70 60 60 60 40 40 40 40	125 100 100 100 60 60 60 60	pF

1. Electrical parameters are based on pulsed test methods.
2.  $di/dt$  must not be exceeded of a maximum of  $100\text{ A}/\mu\text{Sec}$  in this application.
3. Measured under pulsed conditions to reduce heating
4. Allow cooling before testing second polarity.

# DO-15 NP Series

## SURGE RATINGS

Characteristics	Symbol	A	B	Unit
Nominal Pulse				A(pk)
Surge Short Circuit Current Non – Repetitive				
Double Exponential Decay Waveform (Notes 5, 6 and 7)				
10 x 560 $\mu$ Sec	$I_{PPS1}$	50	100	
10 x 1000 $\mu$ Sec	$I_{PPS2}$	50	80	

5. Allow cooling before testing second polarity.
6. Measured under pulse conditions to reduce heating.
7. Nominal values may not represent the maximum capability of a device.

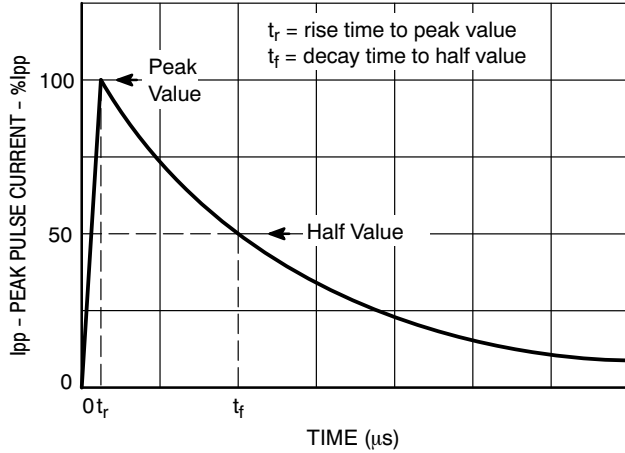


Figure 1. Exponential Decay Pulse Waveform

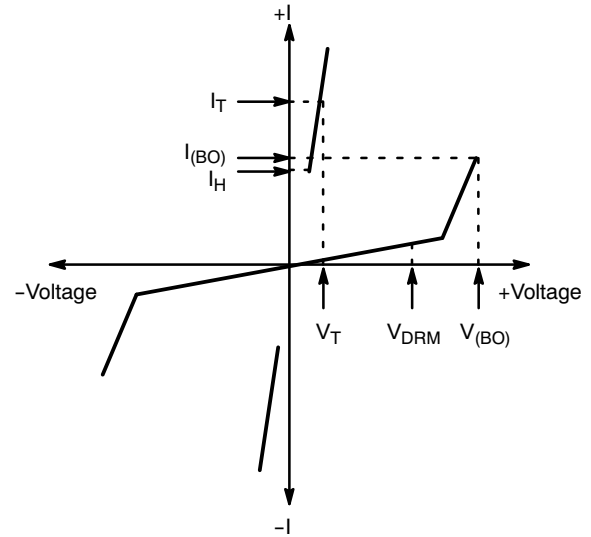


Figure 2. Voltage Current Characteristics of TSPD

Symbol	Parameter
$V_{DRM}$	Peak Off State Voltage
$V_{(BO)}$	Breakover Voltage
$I_{(BO)}$	Breakover Current
$I_H$	Holding Current
$V_T$	On State Voltage
$I_T$	On State Current

## DO-15 NP Series

### ORDERING INFORMATION

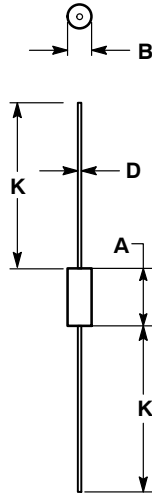
Part Number	Marking	Case	Shipping†
NP1100GARLG	NP110A	Axial Lead (Pb-Free)	5000 / Tape and Reel
NP1100GBRLG	NP110B		
NP1300GARLG	NP130A		
NP1300GBRLG	NP130B		
NP1500GARLG	NP150A		
NP1500GBRLG	NP150B		
NP1800GARLG	NP180A		
NP1800GBRLG	NP180B		
NP2300GARLG	NP230A		
NP2300GBRLG	NP230B		
NP2600GARLG	NP260A		
NP2600GBRLG	NP260B		
NP3100GARLG	NP310A		
NP3100GBRLG	NP310B		
NP3500GARLG	NP350A		
NP3500GBRLG	NP350B		

†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.

# DO-15 NP Series

## PACKAGE DIMENSIONS


### AXIAL LEAD CASE 59AA-01 ISSUE O (DO-15)



#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ALL RULES AND NOTES ASSOCIATED WITH JEDEC DO-41 OUTLINE SHALL APPLY.
4. POLARITY DENOTED BY CATHODE BAND.
5. LEAD DIAMETER NOT CONTROLLED WITHIN F DIMENSION.
6. REPLACES CASE 59-09.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.228	0.299	5.80	7.60
B	0.102	0.142	2.60	3.60
D	0.028	0.034	0.71	0.86
K	1.000	---	25.44	---

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