

# CONTROL DEVICES

T-07-15

## HIGH VOLTAGE NIP DIODES

### DESCRIPTION

The GC4500 series are high voltage, high power (anode base) NIP diodes. These double diffused, high resistivity silicon devices are passivated with silicon dioxide for high stability and reliability and have been proven by thousands of device hours in high reliability systems.

These devices can withstand storage temperatures from  $-65^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$  and will operate over the range from  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ . All devices meet or exceed military environmental specifications of MIL-S-19500.

The NIP diode is used when negative bias current is available for forward conduction and will operate typically with  $-50\text{ mA}$  bias. Breakdown voltages are available up to 900 volts. These diodes have somewhat faster speeds as compared with similar PIN diodes.

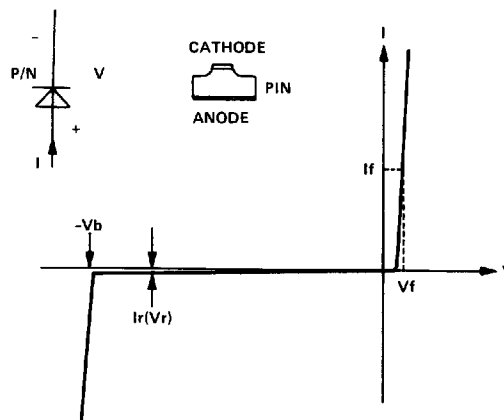
### APPLICATIONS

The GC4500 series can be used in RF circuits as an on/off element, as a switch or as a current controlled resistor in attenuators extending over the frequency range from UHF through Ku band.

Switch applications include medium high power switches (ECM systems), TR or lobing switches, channel or antenna selection switches (telecommunications), duplexers (radar) and digital phase shifters (phase arrays).

The GC4500 series are also used as active limiters for low to moderate RF power levels.

Attenuator type applications include amplitude modulators, AGC attenuators, power levelers and level set attenuators.



### ELECTRICAL SPECIFICATIONS

MODEL NUMBER	BREAKDOWN VOLTAGE ( $I_R = 10\mu\text{A MAX}$ ) VB (MIN)	JUNCTION CAPACITANCE <sup>1</sup> C <sub>J-50</sub> (MAX)	SERIES RESISTANCE <sup>2</sup> (100mA, 1 GHz) R <sub>S100</sub> (MAX)	CARRIER LIFETIME ( $I_R = 6\text{mA}$ , $I_F = 10\text{mA}$ ) T <sub>L</sub> (TYP)	THERMAL RESISTANCE $\theta_{JC}$ (MAX)
GC4510	100 VOLTS	0.10 pF	1.0 OHMS	1.5 $\mu\text{SEC}$	39°C/W
GC4511	100	0.25	0.6	1.5	25
GC4512	100	0.50	0.5	1.5	20
GC4513 <sup>3</sup>	100	0.75	0.4	1.5	10
GC4530	300	0.10	1.5	2.0	50
GC4531	300	0.25	1.2	2.0	30
GC4532	300	0.50	1.0	2.0	20
GC4533 <sup>3</sup>	300	0.75	0.8	2.0	15
GC4590	700	0.10	1.5	5.0	30
GC4591	700	0.25	1.2	5.0	25
GC4592	700	0.50	1.0	5.0	20
GC4593 <sup>3</sup>	700	0.75	0.8	5.0	10

#### NOTES:

- CAPACITANCE IS MEASURED AT 1 MHz AND -50 VOLTS
- RESISTANCE IS MEASURED USING TRANSMISSION LOSS TECHNIQUES.
- THESE DEVICES ARE NOT AVAILABLE IN ALL THE PACKAGE STYLES. PLEASE CONSULT THE FACTORY FOR SPECIFIC CASE STYLES OFFERED.

The tabulated specifications above are for case style 30, which is standard.

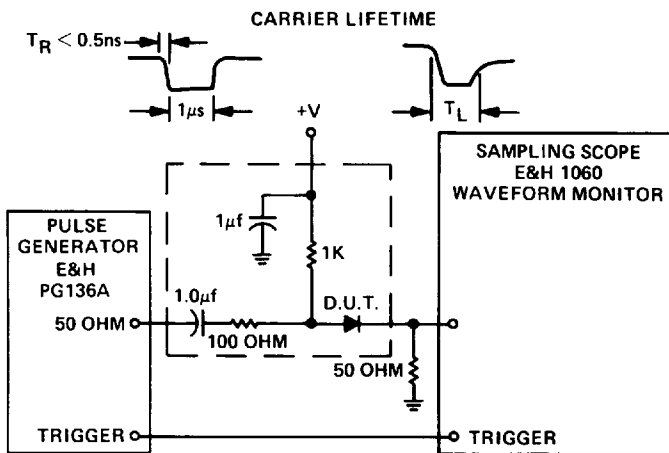
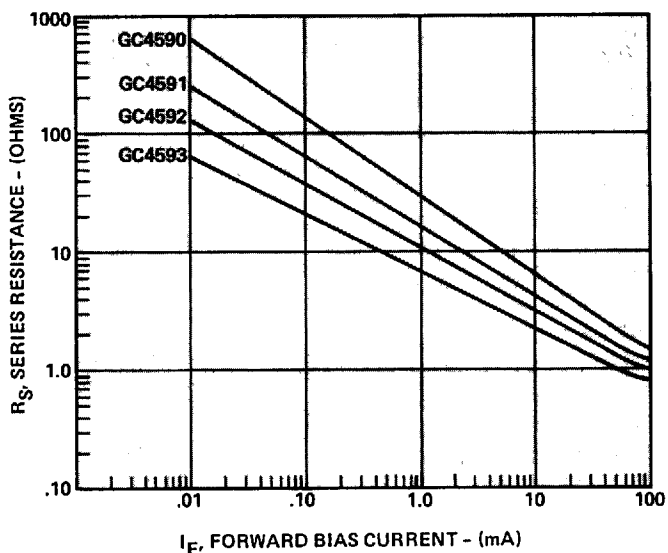
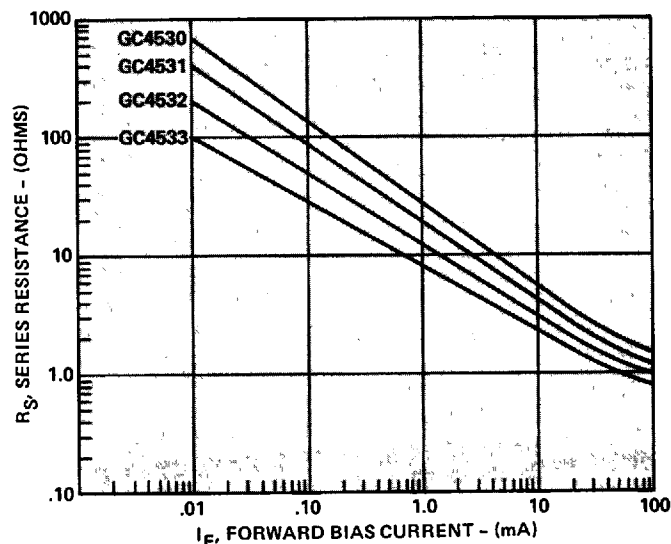
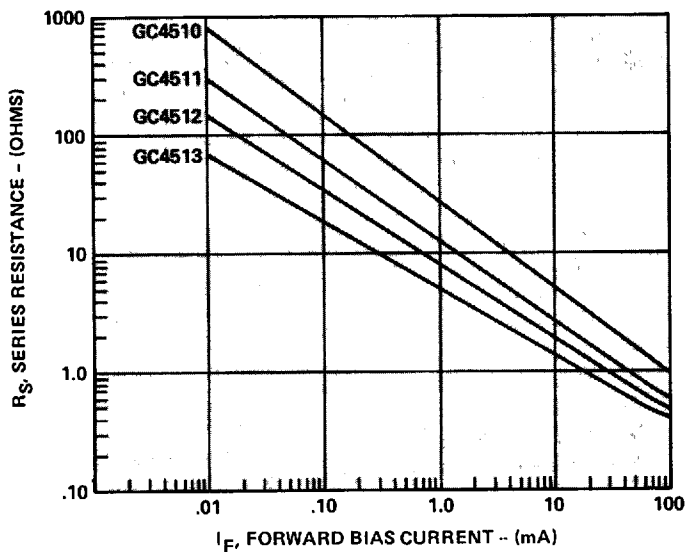
Each type offers a trade off in series resistance, junction capacitance and carrier lifetime; the proper choice of which depends on the end application. Reverse polarity PIN diodes and high voltage NIP and PIN diodes are also available. (See data sheets for GC4200, GC4500 and GC4400 series respectively.)

### RATINGS

Operating Temperature	$-55^{\circ}\text{C}$ to $+150^{\circ}\text{C}$
Storage Temperature:	$-65^{\circ}\text{C}$ to $+200^{\circ}\text{C}$
Maximum Leakage Current:	0.5 $\mu\text{A}$ at 80% of minimum rated breakdown

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## HIGH VOLTAGE NIP DIODES TYPICAL PERFORMANCE CURVES

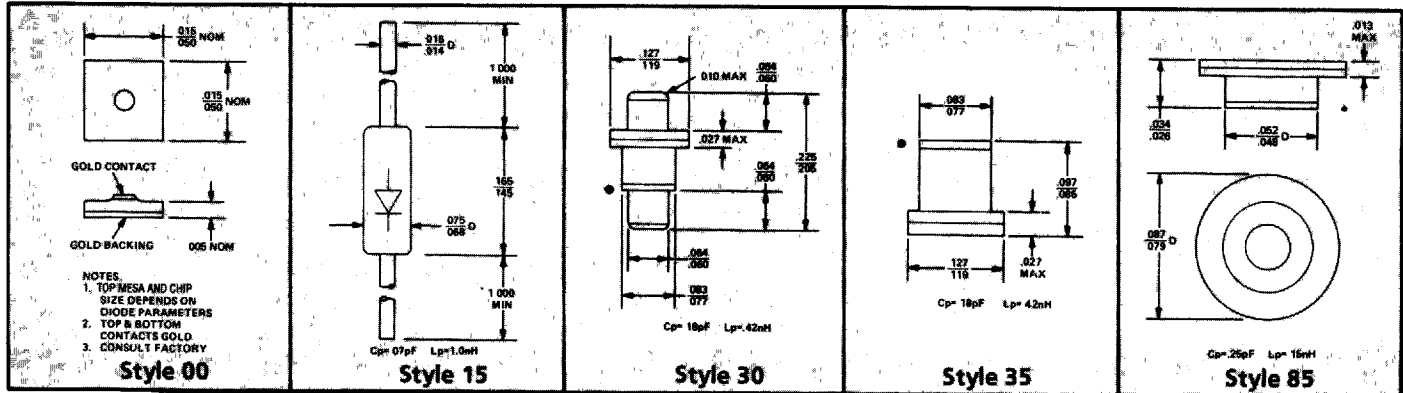


The value of the reverse current ( $I_R$ ) is approximately 6 mA and the forward current ( $I_F$ ) is 1.7  $I_R$ . The input pulse is provided by a pulse generator having a rise time of less than one nanosecond. Lifetime is measured between 50% and 90% points of output pulse as shown.

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## HIGH VOLTAGE NIP DIODES

### PACKAGE STYLES



(•) Heat sink end. Dimensions are in inches.

Note: See Semiconductor Package Outlines sheet for complete outline drawings of all cases.

Other Package Styles Are Available on Request.

The cathode is the heat sink end of each package. Reverse polarity is available at a slightly higher cost.

### ENGINEERING NOTES: