

T-07-15

# CONTROL DEVICES

## HIGH SPEED PIN DIODES

### DESCRIPTION

The GC4200 series are high speed (cathode base) PIN diodes made with high resistivity epitaxial silicon material. These diodes 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  $-65^{\circ}$  to  $+200^{\circ}\text{C}$  and will operate over the range from  $-55^{\circ}$  to  $+150^{\circ}\text{C}$ . All devices meet or exceed military environmental specifications of MIL-S-19500. The GC4200 series will operate with as little as  $+10$  mA forward bias.

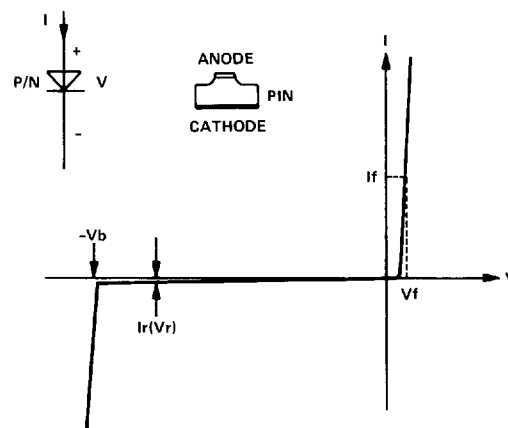
### APPLICATIONS

The GC4200 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 high speed switches (ECM systems), TR switches, channel or antenna selection switches (telecommunications), duplexers (radar) and digital phase shifters (phased arrays).

The GC4200 series are also used as passive and 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

 $T_A = 25^{\circ}\text{C}$ 

MODEL NUMBER	BREAKDOWN VOLTAGE ( $I_R = 10\mu\text{A MAX.}$ ) $V_B$ (MIN.)	JUNCTION CAPACITANCE <sup>1</sup> $C_{J-10}$ (MAX.)	SERIES RESISTANCE <sup>2</sup> (20mA, 1 GHz) $R_{S20}$ (MAX.)	CARRIER LIFETIME ( $I_R = 6\text{mA}, I_F = 10\text{mA}$ ) $T_L$ (TYP.)	THERMAL RESISTANCE $\theta_{JC}$ (MAX.)
GC4271	70 VOLTS	0.10 pF	1.0 OHMS	60 NS	70°C/W
GC4272	70	0.20	0.8	60	70
GC4273	70	0.30	0.7	60	60
GC4274	70	0.40	0.6	60	50
GC4275	70	0.50	0.5	60	40
GC4210	100	0.06	1.5	100	80
GC4211	100	0.10	1.0	100	70
GC4212	100	0.20	0.75	100	70
GC4213	100	0.30	0.6	100	60
GC4214	100	0.40	0.5	100	50
GC4215	100	0.50	0.35	100	40
GC4220	250	0.06	2.5	400	80
GC4221	250	0.10	2.0	400	70
GC4222	250	0.20	1.5	400	70
GC4223	250	0.30	1.0	400	60
GC4224	250	0.40	0.8	400	50
GC4225	250	0.50	0.6	400	40

#### NOTES:

- CAPACITANCE IS MEASURED AT 1 MHz AND -10 VOLTS.
- RESISTANCE IS MEASURED USING TRANSMISSION LOSS TECHNIQUES.
- THIS SERIES OF DEVICES IS AVAILABLE IN STANDARD CASE STYLES 00, 15, 30, 35 AND 85.

The tabulated specifications above are for the style 30 package. Diodes may also be available in other case styles.

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 diodes (NIP) and higher voltage PIN and NIP diodes are also available. (See data sheets for GC4300, GC4400 and GC4500 series respectively.)

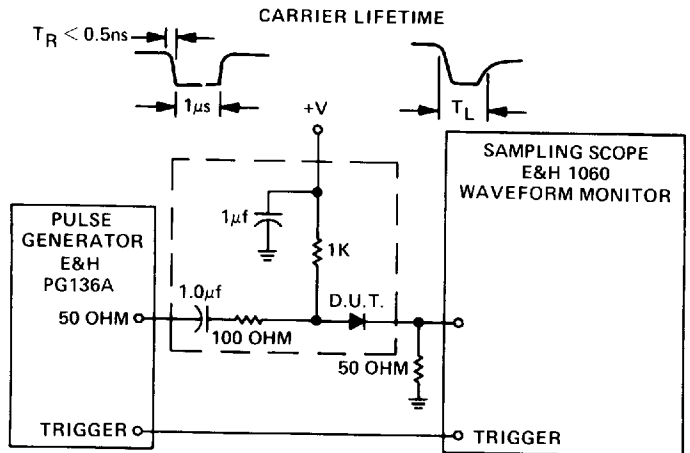
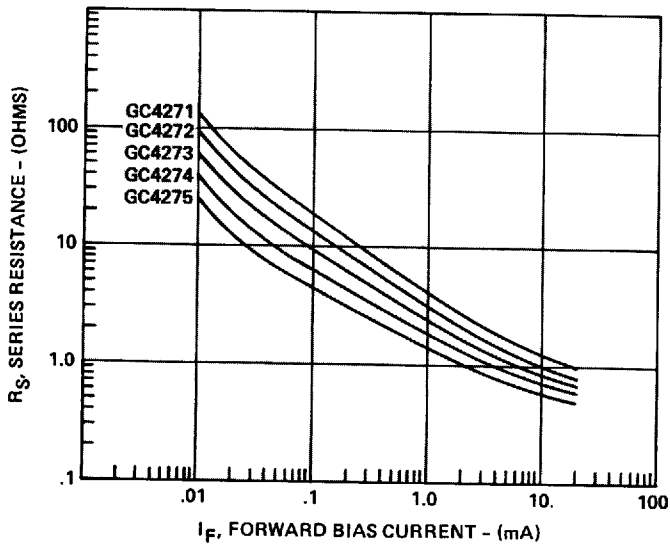
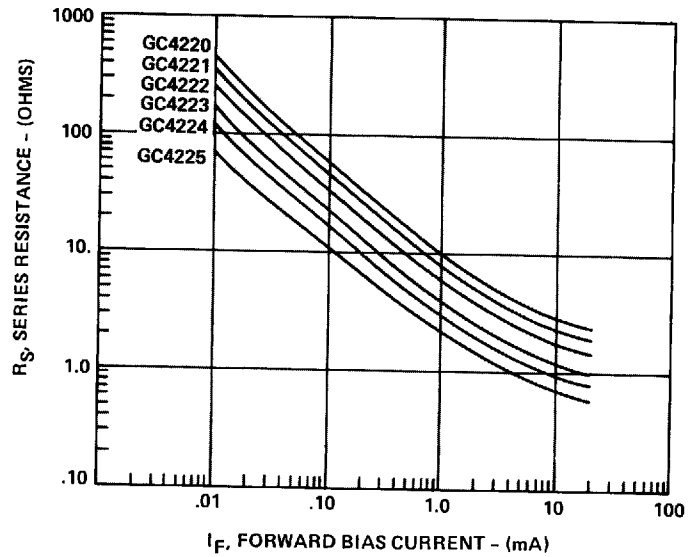
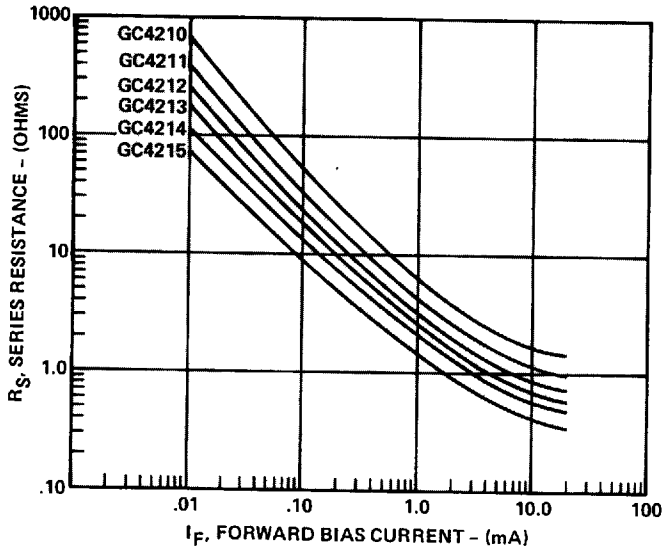
### RATINGS

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

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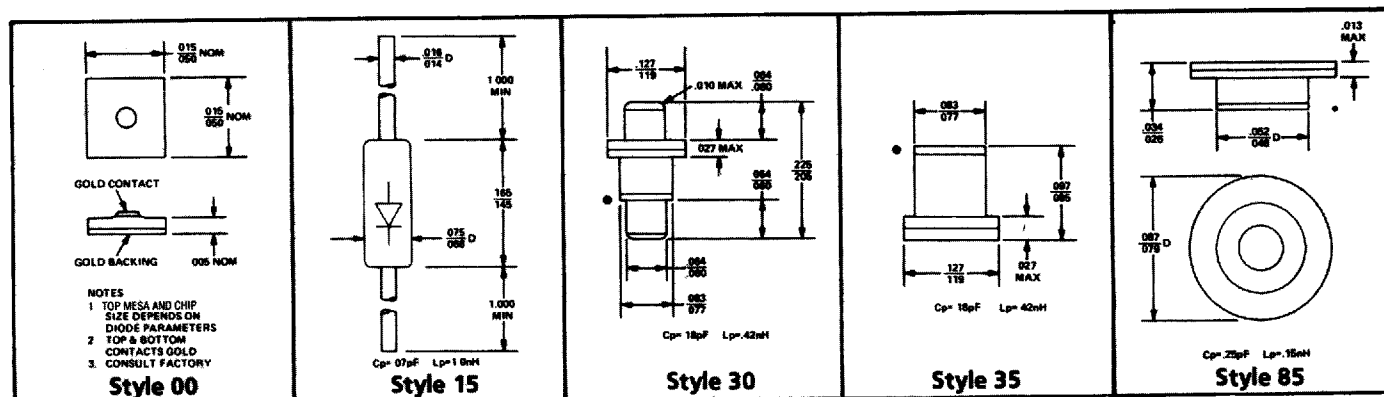
### TYPICAL PERFORMANCE CURVES



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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(•) 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: