

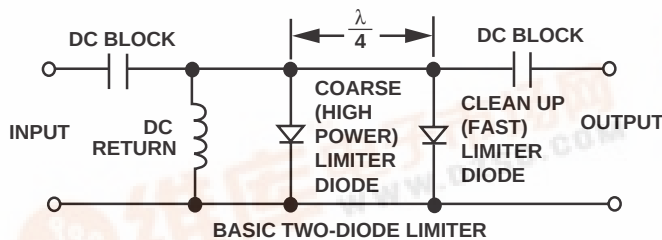
## Control Devices

## LIMITER DIODES

## DESCRIPTION

The GC4700 series diodes are specially processed PIN diodes designed for use in passive or active limiters at frequencies through Ku band.

Twelve categories of devices are offered for flexibility in design of low (lower  $V_B$ , fastest turn-on time), medium and high (highest  $V_B$ , slowest turn-on time) power limiters.



## APPLICATIONS

A diode limiter is a power-sensitive variable attenuator that uses the non-linear properties of the diode to provide an impedance mismatch when sufficient amounts of RF power are incident on the device. The output power is reduced to a level that will not overdrive a receiver, burn out a mixer, etc. For varying input power levels in excess of the diode's threshold level, the limiter's output power tends to remain constant.

A passive limiter is one in which the limiter diodes are "turned on" by the RF signal itself. An active limiter is one in which the limiter diodes are "turned on" primarily by an external bias current typically supplied by a Schottky detector diode which senses the incident signal.

Since limiter diodes are not designed to dissipate large amounts of power, the limiter must reflect or divert the excess incident power back to the source or to another load (i.e. via a circulator, hybrid coupler, etc.).

Limiter diodes may be used in wave guides, coax, microstrip, stripline or other media. Single or cascaded devices may be used, depending on power levels.

CHIP ELECTRICAL PARAMETERS:  $T_A = 25^\circ\text{C}$ 

| MODEL NUMBER | $V_B$<br>MIN (VOLTS)<br>$I_R = 10\mu\text{A}$ | $C_{J0}$<br>TYP<br>(pF) | $C_{J6}$<br>MAX<br>(pF) | TYPICAL<br>$R_S$<br>@ 10 mA<br>(Ohms) | TYPICAL<br>$T_L$<br>(nS) | TYPICAL<br>$\theta_{P1}$<br>( $^\circ\text{C}/\text{W}$ ) | MAXIMUM<br>THERMAL <sup>2</sup><br>RESISTANCE<br>( $^\circ\text{C}/\text{W}$ ) |
|--------------|-----------------------------------------------|-------------------------|-------------------------|---------------------------------------|--------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------|
| GC4701       | 20                                            | 0.20                    | 0.15                    | 1.5                                   | 5                        | 20                                                        | 100                                                                            |
| GC4702       | 20                                            | 0.50                    | 0.30                    | 1.2                                   | 10                       | 12                                                        | 80                                                                             |
| GC4711       | 45                                            | 0.20                    | 0.15                    | 1.5                                   | 10                       | 15                                                        | 80                                                                             |
| GC4712       | 45                                            | 0.50                    | 0.30                    | 1.2                                   | 15                       | 10                                                        | 60                                                                             |
| GC4713       | 45                                            | 0.70                    | 0.50                    | 1.0                                   | 20                       | 6                                                         | 40                                                                             |
| GC4721       | 120                                           | 0.20                    | 0.15                    | 1.5                                   | 50                       | 1.2                                                       | 40                                                                             |
| GC4722       | 120                                           | 0.60                    | 0.30                    | 1.0                                   | 50                       | 0.5                                                       | 20                                                                             |
| GC4723       | 120                                           | 0.80                    | 0.50                    | 0.5                                   | 100                      | 0.3                                                       | 15                                                                             |
| GC4731       | 15                                            | 0.12                    | 0.10                    | 2.0                                   | 5                        | 30                                                        | 120                                                                            |
| GC4732       | 15                                            | 0.20                    | 0.15                    | 1.5                                   | 5                        | 20                                                        | 80                                                                             |
| GC4741       | 30                                            | 0.12                    | 0.10                    | 2.0                                   | 7                        | 20                                                        | 100                                                                            |
| GC4742       | 30                                            | 0.20                    | 0.15                    | 1.5                                   | 7                        | 15                                                        | 70                                                                             |

1) Pulse length 1 microsecond.

2) As measure in style 30 package.



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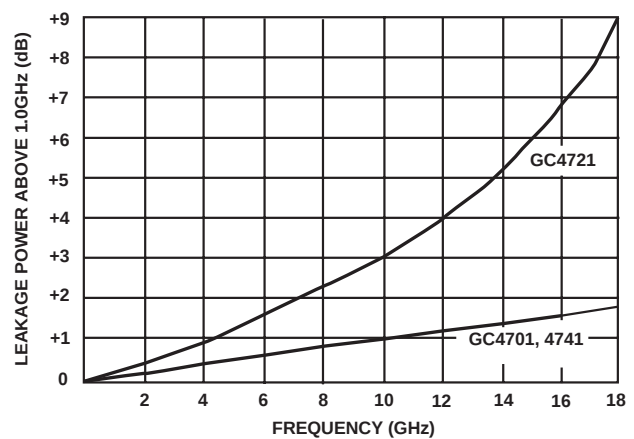
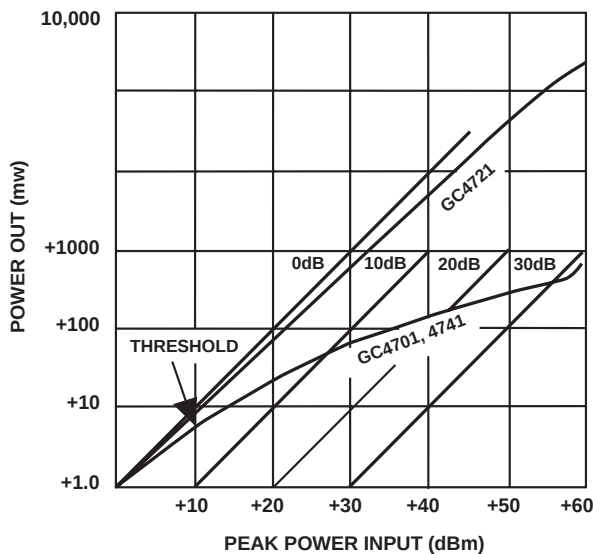
### TYPICAL LIMITER PERFORMANCE RATINGS: $T_A = 25^\circ\text{C}$

| MODEL NUMBER | MAXIMUM PEAK PIN<br>@1.μS (dBm) | TYPICAL LEAKAGE<br>$P_{out}$<br>(dBm) | TYPICAL THRESHOLD<br>(dBm) | TYPICAL INSERTION LOSS<br>(dB) | MAXIMUM CW POWER<br>(Watts) |
|--------------|---------------------------------|---------------------------------------|----------------------------|--------------------------------|-----------------------------|
| GC4701       | +50                             | +22                                   | +10                        | 0.1                            | 2                           |
| GC4702       | +53                             | +24                                   | +10                        | 0.2                            | 3                           |
| GC4711       | +53                             | +27                                   | +15                        | 0.1                            | 3                           |
| GC4712       | +56                             | +29                                   | +15                        | 0.2                            | 4                           |
| GC4713       | +59                             | +31                                   | +15                        | 0.2                            | 5                           |
| GC4721       | +60                             | +39                                   | +20                        | 0.1                            | 5                           |
| GC4722       | +63                             | +41                                   | +20                        | 0.2                            | 10                          |
| GC4723       | +66                             | +44                                   | +20                        | 0.2                            | 15                          |
| GC4731       | +47                             | +19                                   | +7                         | 0.1                            | 2                           |
| GC4732       | +50                             | +22                                   | +7                         | 0.1                            | 3                           |
| GC4741       | +47                             | +24                                   | +12                        | 0.1                            | 3                           |
| GC4742       | +50                             | +27                                   | +12                        | 0.1                            | 4                           |

#### Notes:

1. Available in standard case styles 30, 35, 42 AND 45. When ordering specify the desired case style by adding its number as a suffix to the basic part number. Some other case styles are available on request.

### TYPICAL PERFORMANCE



### RATINGS

Maximum Leakage Current: 0.5μA at 80% of minimum rated breakdown

Operating Temperature: 55°C to +150°C

#### SEMICONDUCTOR OPERATION

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