# AH365...AH380/AH443...AH802

## GaAs GUNN

POWER GENERATION DIODES

## FEATURES

Operating frequency range 8 to 100GHz
Low noise characteristics from 8 to 100GHz
Case style flexibility : W2, W3, W4, W5, F27d, F60 ...
Emitting power : 10 to 400 mW

## APPLICATIONS

The GUNN diodes are ideally suited for use in low noise sources such as receiving local oscillators at medium power levels, pump oscillators for parametric amplifiers, locking oscillators, low power radar applications and synchronisation and control of power stages driven by IMPATT Diodes.

## DESCRIPTION

These GaAs GUNN diodes, designed to operate through bulk negative resistance effect, feature low FM and AM noise characteristics and accomplish an one-step conversion from DC to microwave energy from a single low voltage supply, thereby eliminating complex circuitry.

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | MIN. | MAX. | UNIT |
|---|---|---|---|---|
| Storage temperature | $T_{stg}$ | -65 | +175 | °C |
| Operating temperature | $T_{op}$ | -40 | +85 | °C |

## ELECTRICAL CHARACTERISTICS (T = +25°C)

| CHARACTERISTICS Tcase = +25°C | | | | | | BIAS | | | | $P_o$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Vop | | Iop | | |
| FREQUENCY RANGE GHz | | | | | CASE | V | | mA | | mW |
| | | | | | | TYP. | MAX. | TYP. | MAX. | MIN. |
| **X Band** | | | | | | | | | | |
| 8-9 | 9-10 | 10-11 | 11-12 | | | | | | | |
| AH443 | AH444 | AH445 | AH446 | | W2(1) | 10 | 14 | 600 | 650 | 100 |
| AH447 | AH448 | AH449 | AH450 | | W2(1) | 10 | 14 | 700 | 850 | 200 |
| AH451 | AH452 | AH453 | AH454 | | W2(1) | 10 | 14 | 900 | 950 | 300 |
| AH455 | AH456 | AH457 | AH458 | | W2(1) | 10 | 14 | 1 000 | 1 150 | 400 |
| **Ku Band** | | | | | | | | | | |
| 12-13.5 | 13.5-15 | 15-16.5 | 16.5-18 | | | | | | | |
| AH479 | AH480 | AH481 | AH482 | | W2(2) | 8 | 12 | 600 | 700 | 100 |
| AH483 | AH484 | AH485 | AH486 | | W2(2) | 8 | 12 | 800 | 900 | 150 |
| AH487 | AH488 | AH489 | AH490 | | W2(2) | 8 | 12 | 800 | 900 | 200 |
| AH491 | AH492 | AH493 | AH494 | | W2(2) | 8 | 12 | 900 | 1 000 | 250 |
| AH495 | AH496 | AH497 | | | W2(2) | 8 | 12 | 1 000 | 1 100 | 300 |
| **K Band** | | | | | | | | | | |
| 18-20 | 20-22 | 22-24 | 25-26 | | | | | | | |
| AH365 | AH366 | AH367 | AH368 | | W2(3) | 6 | 9 | 500 | 650 | 50 |
| AH369 | AH370 | AH371 | AH372 | | W2(3) | 6 | 9 | 750 | 1 000 | 100 |
| AH373 | AH374 | AH375 | AH376 | | W2(3) | 6 | 9 | 800 | 1 000 | 150 |
| AH377 | AH378 | AH379 | AH380 | | W2(3) | 6 | 9 | 800 | 1 000 | 200 |
| **Ka Band** | | | | | | | | | | |
| 26-28 | 28-31 | 31-34 | 34-37 | 37-40 | | | | | | |
| AH601 | AH602 | AH603 | AH604 | AH605 | W3(4) | 5 | 7 | 700 | 800 | 50 |
| AH606 | AH607 | AH608 | AH609 | AH610 | W3(4) | 5 | 7 | 1 000 | 1 200 | 100 |
| AH611 | AH612 | AH613 | AH614 | AH615 | W3(4) | 5 | 7 | 1 200 | 1 400 | 150 |
| AH651 | AH652 | AH653 | AH654 | AH655 | W3(4) | 5 | 7 | 1 200 | 1 400 | 200 |
| **Millimeter** | | | | | | | | | | |
| 40-43 | 43-46 | 46-50 | 50-55 | 55-60 | | | | | | |
| AH616 | AH617 | AH618 | AH619 | AH620 | W3(5) | 4 | 5 | 1 000 | 1 300 | 50 |
| AH621 | AH622 | AH623 | AH624 | | W3(5) | 4 | 5 | 1 000 | 1 300 | 100 |
| | | | | | | | | | | |
| 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | | | | | |
| AH680 | AH681 | AH682 | AH683 | AH684 | AH685 | W3(5) | 4 | 6 | 1 000 | 1 300 | 30 |
| **Millimeter** | | | | | | | | | | |
| | | | AH800 | 94 | | W3(5) | | 5 | 750 | 1 000 | 10 |
| | | | AH801 | 94 | | W3(5) | 4 | 5 | 900 | 1 200 | 20 |
| | | | AH802 | 94 | | W3(5) | 4 | 5 | 1 000 | 1 300 | 30 |

(1) Other cases on request : F27d, F60, W1.
(2) Other cases on request : W4, (F27d, F60, W1).
(3) Other cases on request : W4, (W3, W5).
(4) Other cases on request : W5, (W4, W2).
(5) Other cases on request : W5.

# TECHNICAL DATA

Power is measured into a critically coupled load at a single frequency in the indicated range.

Regulated power supply is essential. No excessive transient voltage must be applied by the power supply, especially during switching on or off. Furthermore the DC power supply must be capable of delivering the diode threshold current which may be 40% higher than the nominal operating current.
If the bias is reversed, the device will be destroyed.

◆ DIODE MOUNTING PROCEDURE

The mount used for the diode must provide an adequate thermal path away from the diode stud. During initial operation, it is always advisable to monitor the diode case temperature, (Tc), by means of a thermocouple placed in the screw driver slot or Hex socket at the base of the diode case. As the bias voltage is slowly increased from zero volts, the case temperature should be monitored to ensure adequate heat sinking. As a rule of thumb, the heat sinking is probably adequate if the threshold current measured in the actual oscillator is more than 95% of the threshold current indicated in the accompanying data sheet. (The threshold current is an inverse function of junction temperature). If the junction is too hot because of an inadequate heat sink, the threshold current will decrease to less than 95% of the quoted value. The current through the diode below the threshold is given by :

$$I = \frac{C}{T^a}$$

I = current
a = constant depending on material (typically 1.0 - 1.3)
T = absolute temperature
C = a proportionally constant

The current flow is very sensitive to junction temperature.
The diode should be securely tightened into a clean, sharply tapped 3 - 48 UNC 2A threaded hole in the mount. A torque of approximately 6 inch-ounces should be used in tightening the diode, in the W1 package, (432 g.cm). As an alternative mounting process the diode may be soldered into the mount, using a minimum of clearance for solder between the diode and the mounting hole. The diode and mount should be degreased and tinned with solder before the insertion of the diode. We recommend use of 60-40 eutectic lead-tin solder with a melting point of ≈ 180°C.

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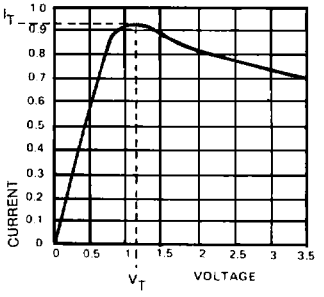
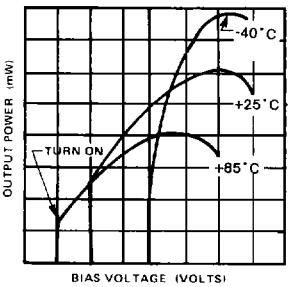
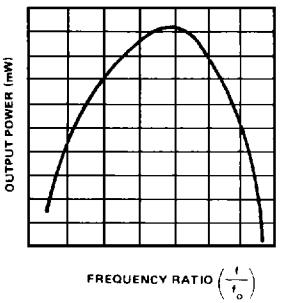
## TYPICAL PERFORMANCE CURVES

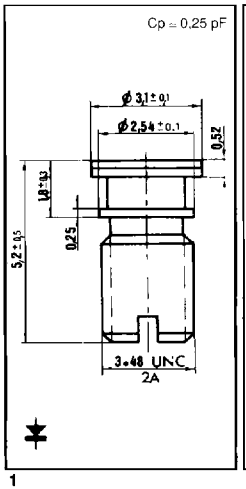


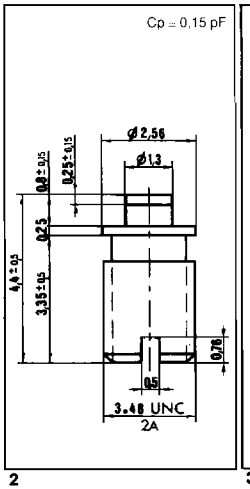
# PACKAGES

**W1**



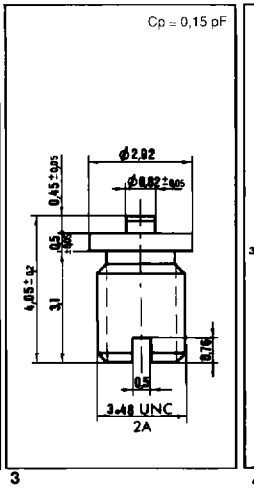

1

**W2**



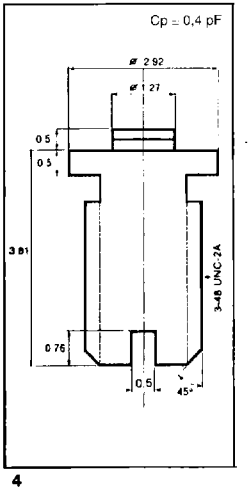

2

**W3**




3

**W4**

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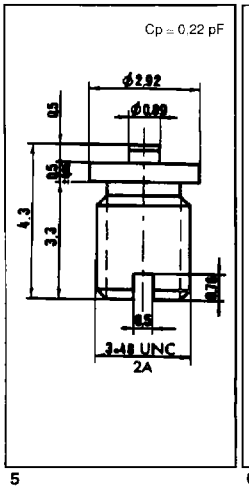
**W5**

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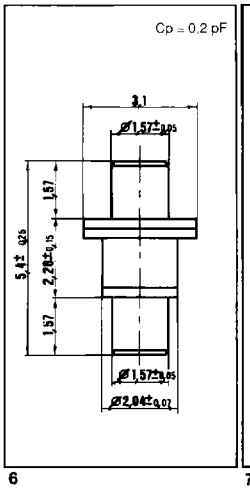
**F27d**

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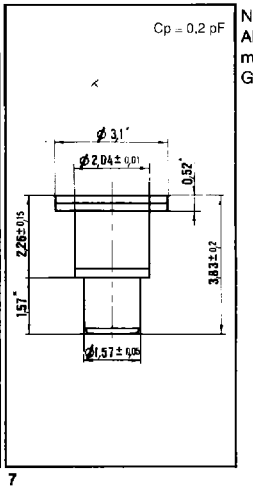
**F60**

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Note :
All dimensions are in millimeter.
General tolerances = ±0.15