

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

3



ELECTRICAL CHARACTERISTICS (T = +25°C)

CHARACTERISTICS Tcase = +25°C						BIAS					
FREQUENCY RANGE GHz					CASE	Vop V		Iop mA		Po 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	900	1 200	20		
		AH802	94	W3(5)		4	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, (T_c), 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

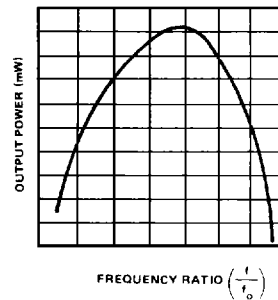
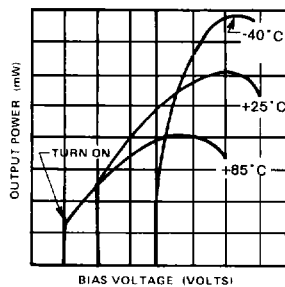
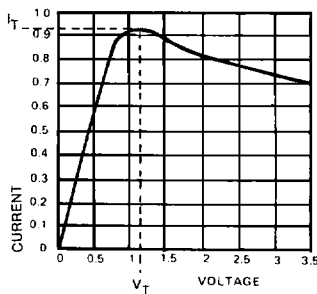
C = a proportionally constant

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 $\approx 180^\circ\text{C}$.

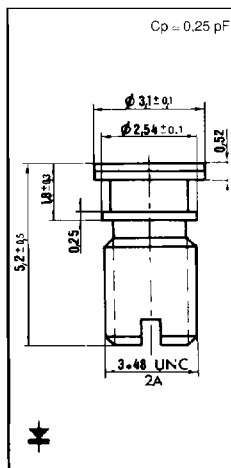
3

TYPICAL PERFORMANCE CURVES

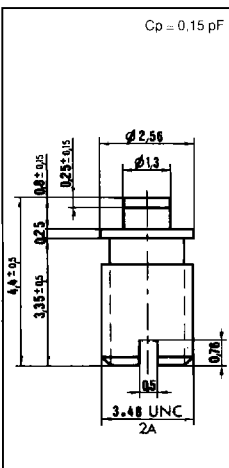


PACKAGES

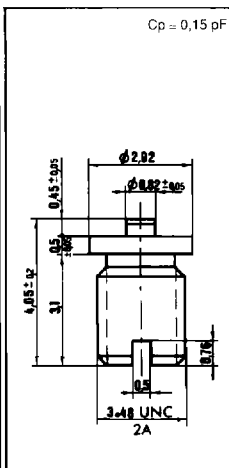
W1



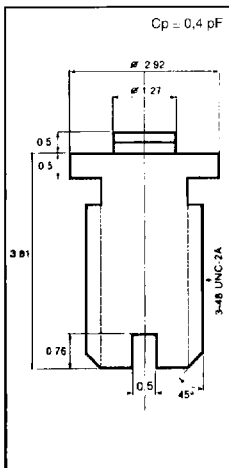
W2



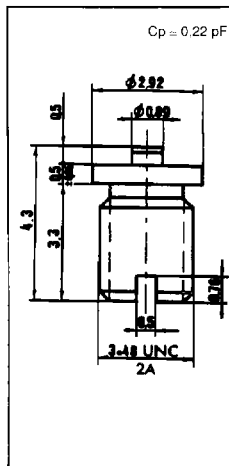
W3



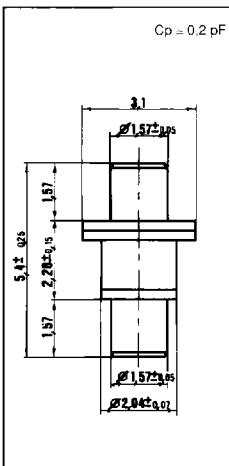
W4



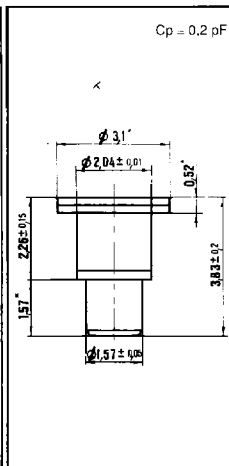
1
W5



2
F27d



3
F60



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

5

6

7

