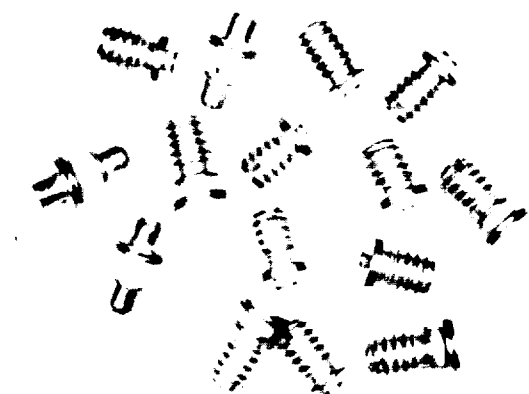


# Gunn Diodes

## Features

- Spot Frequency
- Choice of Package Styles
- Range of Microwave Power Outputs
- Specific Types for Low Cost
- Commercial Applications
- High Reliability
- Special Screening to Customer Requirements Available



## Description

Gunn devices are solid state components which are used to generate energy at microwave frequencies from a DC power input.

Alpha Gunn diodes are produced from epitaxial gallium arsenide grown in Alpha's own in-house epitaxy facility. This sheet describes both the performance of low power, low cost devices suitable for high volume commercial applications as well as high power diodes. Devices for the lowest power applications are produced in a nonflip configuration; that is with the active layer uppermost in the package, requiring the heat sink to be biased as the anode. A flip device construction is used

for the higher power diodes in which the active layer is bonded close to the package heat sink for optimum thermal performance. Such devices require the heat sink to be biased as the cathode.

The tables below list standard device types with performance data applicable to their operation in Alpha critically coupled test cavities. To accommodate alternative requirements, special devices may also be manufactured and tested against other specifications in customer supplied cavities. Please inquire.

## Low Power Anode Heat Sink Gunn Diodes

**CW Gunn Diodes, X-Band, 8.2-12.4 GHz  
Anode Heat Sink Package 023-001**

Type	CW Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
DGB8081	5	40	8
DGB8181	10	80	8
DGB8281	20	110	8
DGB8381	30	140	8

**Pulsed Gunn Diodes, X-Band, 8.2-12.4 GHz  
Anode Heat Sink Package 023-001**

Type	CW Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
DGB7081	5		
DGB7181	10	70 -120	8 -12
DGB7281	20		
DGB7381	30		

# Gunn Diodes

## Low Power Anode Heat Sink Gunn Diodes(cont'd)

**CW Gunn Diodes, Ku-Band, 12.4-18.0 GHz  
Anode Heat Sink Package 023-001**

Type	CW Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
DGB8031	5	40	8
DGB8131	10	95	7
DGB8231	20	125	7

**Pulsed Gunn Diodes, Ku-Band, 12.4-18.0 GHz  
Anode Heat Sink Package 023-001**

Type	Peak Power (mW)	Peak Operating Current (mA)	Peak Operating Voltage (Volts)
DGB7031	5		
DGB7131	10	70 -120	7 -10
DGB7231	20		

**CW Gunn Diodes, K-Band, 18-26.5 GHz  
Anode Heat Sink Package 023-001**

Type	CW Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
DGB8091	5	70	5
DGB8191	10	110	5
DGB8291	20	175	5

**Pulsed Gunn Diodes, K-Band, 18-26.5 GHz  
Anode Heat Sink Package 023-001**

Type	Peak Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
DGB7091	5		
DGB7191	10	70 -120	7 -10
DGB7291	20		

**CW Gunn Diodes, 26.5-60 GHz  
Anode Heat Sink Package 315-001**

Type	Frequency Range (GHz)	CW Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
DGB8054	26.5-40	5	100	4
DGB8154	26.5-40	10	175	4
DGB8064	40-60	5	140	3
DGB8164	40-60	10	250	3

**Pulsed Gunn Diodes, 26.5-60 GHz  
Anode Heat Sink Package 315-001**

Type	Peak Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
DGB7054	5	100-175	4-8
DGB7154	10	100-175	4-8
DGB7064	5	140-250	3-7
DGB7164	10	140-250	3-7

**Surface Mounted Gunn Diodes, 5.0-36.5 GHz  
Anode Heat Sink Suggested Package 315-001**

Type	CW Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
Custom Design For Each Application	5	120	4-8

**Gunn Diodes for Self-Detect (Autodyne) Applications  
Anode Heat Sink Package 023-001**

Type	Peak Power (mW)	Operating Current (mA)	Operating Voltage (Volts)
Custom Design For Each Application	5	120	4-7

**Notes:**

1. The required operating frequency (or in the case of wide band types, the frequency range) must be specified when ordering. The specification of any unnecessarily wide frequency range will result in unnecessary expenditure.
2. The power output is measured at a single frequency (except for wide band units) in a critically coupled Alpha test cavity at 25°C. Alpha may agree to undertake special testing in a customer cavity if required.
3. The standard catalog range of Alpha Gunn devices are tested under C.W. conditions. For certain pulse applications, alternative device types are available. Consult the factory.
4. Alternative package styles are available and should be requested as specials at the time of ordering.

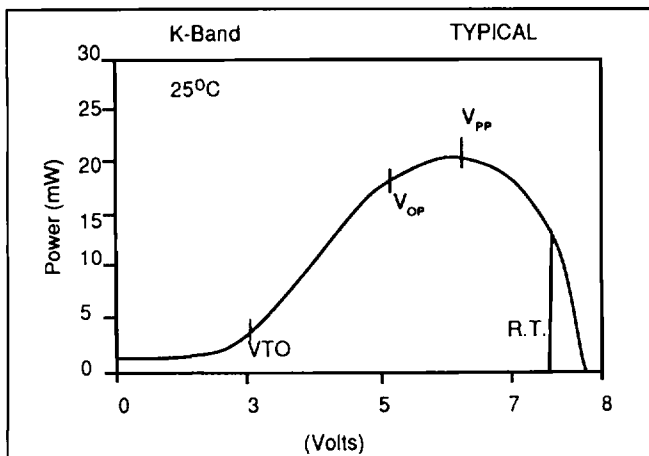
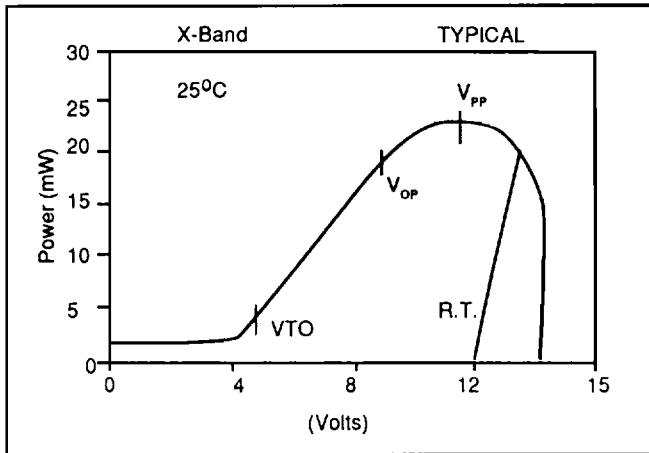
# Gunn Diodes

## Specific Application Notes

Whenever possible the factory urges the customer to supply oscillator cavities and associated hardware for the evaluation and characterization of the proper Gunn material for the designed application. When oscillators are supplied to the factory, all electrical conditions will be guaranteed out of the customer oscillator.

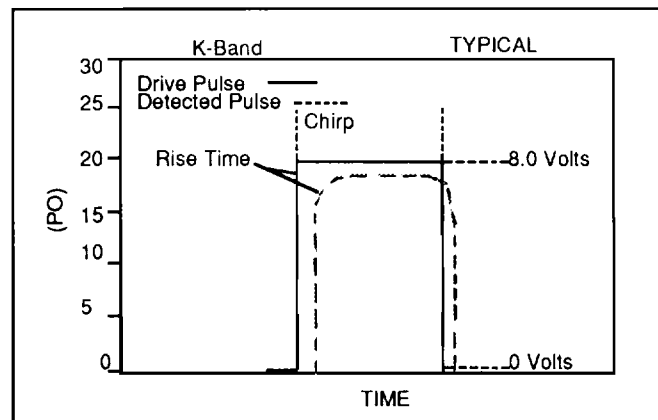
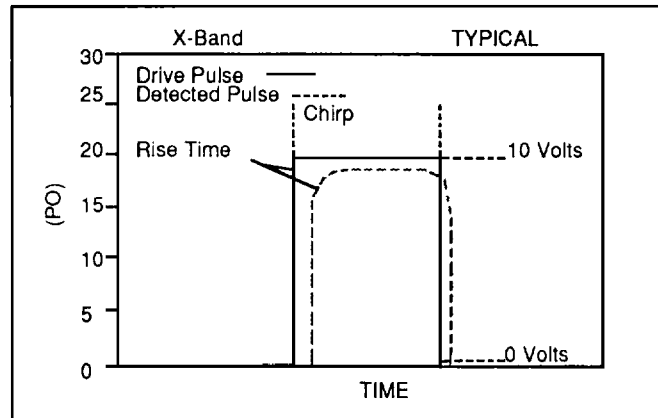
### Standard Tests Performed to Guarantee Performance for CW Operation:

1. Voltage Turn-On (V.T.O).
2. Power-Out ( $P_{OUT}$ ) at the Operating Voltage ( $V_{OP}$ ). (Can also be measured as Rectified Current)
3. Operating Current ( $I_{OP}$ ) at the  $V_{OP}$  Point.
4. Voltage Power Peak ( $V_{PP}$ ).
5. Retrace (R.T.).
6. Desired Operating Frequency ( $F_{OP}$ ) at the  $V_{OP}$ .



### Standard Tests Performed to Guarantee Performance for Pulsed Operation:

1. Power-Out ( $P_O$ ) (Also measured as Voltage Across Detector)
2. Chirp - frequency change from the Leading Edge to the Trailing Edge of the Pulse.
3. Voltage Noise ( $V_N$ ) if required.
4. Spectrum if required.
5. Operating Frequency ( $F_{OP}$ )
6. Duty cycle and pulse width in  $\mu$ sec.



Whenever possible the customer should attempt to supply answers to the following questions to enable the factory to select the correct diode for the application:

1. What is the application?
2. What is the operating frequency (CTR freq.)?
3. What is the required bandwidth around the center frequency ( $\pm 25$  mhz)?
4. Is frequency pushing required ( $\Delta f/\Delta V$ )?
5. Is frequency drift over temperature critical ( $\Delta f/\Delta T$ )?
6. Is power variation over temperature critical ( $\Delta P/\Delta T$ )?
7. Is there a cavity available for the factory to use?
8. Are there any current limitations?
9. Are there any voltage limitations?

# Gunn Diodes

## High Power Cathode Heat Sink Gunn Diodes

### C.W. Gunn Diodes, C-Band 5-8.2 GHz

Electrical Characteristics		Power (mW)					
		20	50	100	200	300	400
Operating Current (mA)	Max.	150	200	300	500	700	900
Operating Voltage (V)	Max.	12	12	12	12	12	12
Outline Number		Part Number	Part Number	Part Number	Part Number	Part Number	Part Number
023-001		DGB8211	DGB8311	DGB8411	DGB8511		
158-001		DGB8212	DGB8312	DGB8412	DGB8512	DGB8612	DGB8712
188-001		DGB8213	DGB8313	DGB8413	DGB8513	DGB8613	DGB8713
305-001		DGB8215	DGB8315	DGB8415	DGB8515	DGB8615	DGB8715
315-001		DGB8214	DGB8314	DGB8414	DGB8514	DGB8614	DGB8714

### C.W. Gunn Diodes, C-Band 5-8.2 GHz

Electrical Characteristics		Power (mW)			
		500	600	700	800
Operating Current (mA)	Max.	1100	1250	1450	1650
Operating Voltage (V)	Max.	12	12	12	12
Outline Number		Part Number	Part Number	Part Number	Part Number
158-001		DGB8812	DGB8912	DGB8012	DGB8112
188-001		DGB8813	DGB8913	DGB8013	DGB8113

### C.W. Fullband Gunn Diodes, C-Band 5-8.2 GHz

Electrical Characteristics		Power (mW)				
		20	50	100	200	300
Operating Current (mA)	Max.	250	350	500	900	1200
Operating Voltage (V)	Min.	9	9	9	9	9
	Max.	17	17	17	17	17
Outline Number		Part Number	Part Number	Part Number	Part Number	Part Number
023-001		DGB9211	DGB9311	DGB9411	DGB9511	
158-001		DGB9212	DGB9312	DGB9412	DGB9512	DGB9612
188-001		DGB9213	DGB9313	DGB9413	DGB9513	DGB9613
305-001		DGB9215	DGB9315	DGB9415	DGB9515	DGB9615
315-001		DGB9214	DGB9314	DGB9414	DGB9514	DGB9614

# Gunn Diodes

## C.W. Gunn Devices, X-Band 8.2-12.4 GHz

Electrical Characteristics		Power (mW)				
		50	100	200	300	400
Operating Current (mA)	Max.	200	300	600	800	1050
Operating Voltage (V)	Max.	10	10	10	10	10
Outline Number		Part Number	Part Number	Part Number	Part Number	Part Number
023-001		DGB8321	DGB8421	DGB8521		
158-001		DGB8322	DGB8422	DGB8522	DGB8622	DGB8722
188-001		DGB8323	DGB8423	DGB8523	DGB8623	DGB8723
315-001		DGB8324	DGB8424	DGB8524	DGB8624	DGB8724
305-001		DGB8325	DGB8425	DGB8525	DGB8625	DGB8725

## C.W. Gunn Devices, X-Band 8.2-12.4 GHz

Electrical Characteristics		Power (mW)			
		500	600	700	800
Operating Current (mA)	Max.	1300	1550	1750	1850
Operating Voltage (V)	Max.	10	10	10	10
Outline Number		Part Number	Part Number	Part Number	Part Number
158-001		DGB8822	DGB8922	DGB8082	DGB8982
188-001		DGB8823	DGB8923	DGB8083	DGB8983

## C.W. Fullband Gunn Devices, X-Band 8.2-12.4 GHz

Electrical Characteristics		Power (mW)				
		20	50	100	200	300
Operating Current (mA)	Max.	300	450	600	1050	1250
Operating Voltage (V)	Min.	7	7	7	7	7
	Max.	14	14	14	14	14
Outline Number		Part Number	Part Number	Part Number	Part Number	Part Number
023-001		DGB9221	DGB9321	DGB9421		
158-001		DGB9222	DGB9322	DGB9422	DGB9522	DGB9622
188-001		DGB9223	DGB9323	DGB9423	DGB9523	DGB9623
315-001		DGB9224	DGB9324	DGB9424	DGB9524	DGB9624
305-001		DGB9225	DGB9325	DGB9425	DGB9525	DGB9625

# Gunn Diodes

## C.W. Gunn Devices, Ku-Band 12.4-18 GHz

Electrical Characteristics		Power (mW)				
		50	100	200	300	400
Operating Current (mA)	Max.	260	400	700	1000	1300
Operating Voltage (V)	Max.	8	8	8	8	8
Outline Number		Part Number	Part Number	Part Number	Part Number	Part Number
023-001		DGB8331	DGB8431	DGB8531		
158-001		DGB8332	DGB8432	DGB8532	DGB8632	DGB8732
188-001		DGB8333	DGB8433	DGB8533	DGB8633	DGB8733
315-001		DGB8334	DGB8434	DGB8534	DGB8634	DGB8734
305-001		DGB8335	DGB8435	DGB8535	DGB8635	DGB8735

## C.W. Gunn Devices, Ku-Band 12.4-18 GHz

Electrical Characteristics		Power (mW)	
		500	600
Operating Current (mA)	Max.	1550	1750
Operating Voltage (V)	Max.	8	8
Outline Number		Part Number	Part Number
158-001		DGB8832	DGB8932
188-001		DGB8833	DGB8933
315-001		DGB8834	DGB8934
305-001		DGB8835	DGB8935

## C.W. Fullband Gunn Devices, Ku-Band 12.4-18 GHz

Electrical Characteristics		Power (mW)			
		20	50	100	200
Operating Current (mA)	Max.	360	360	520	1050
Operating Voltage (V)	Min.	6	6	6	6
	Max.	12	12	12	12
Outline Number		Part Number	Part Number	Part Number	Part Number
315-001		DGB9234	DGB9334	DGB9434	DGB9534
305-001		DGB9235	DGB9335	DGB9435	DGB9535
296-001		DGB9236	DGB9336	DGB9436	

# Gunn Diodes

## C.W. Gunn Devices, K-Band 18-26.5 GHz

Electrical Characteristics		Power (mW)				
		50	100	200	300	400
Operating Current (mA)	Max.	300	550	900	1250	1600
Operating Voltage (V)	Max.	6	6	6	6	6
Outline Number		Part Number	Part Number	Part Number	Part Number	Part Number
315-001		DGB8344	DGB8444	DGB8544	DGB8644	DGB8744
305-001		DGB8345	DGB8445	DGB8545	DGB8645	DGB8745
296-001		DGB8346	DGB8446	DGB8546	DGB8646	

## C.W. Fullband Gunn Devices, K-Band 18-26.5 GHz

Electrical Characteristics		Power (mW)			
		20	50	100	200
Operating Current (mA)	Max.	400	600	950	1250
Operating Voltage (V)	Min.	4	4	4	4
	Max.	8	8	8	8
Outline Number		Part Number	Part Number	Part Number	Part Number
315-001		DGB9244	DGB9344	DGB9444	DGB9544
305-001		DGB9245	DGB9345	DGB9445	DGB9545
296-001		DGB9246	DGB9346	DGB9446	DGB9546

# Gunn Diodes

## C.W. Gunn Devices, Ka-Band 26.5-40 GHz

Electrical Characteristics		Power (mW)					
		20	50	100	150	200	250
Operating Current (mA)	Max.	280	380	650	950	1300	1400
Operating Voltage (V)	Max.	5	5	5	5	5	5
Outline Number		Part Number	Part Number	Part Number	Part Number	Part Number	Part Number
315-001		DGB8254	DGB8354	DGB8454	DGB8554	DGB8654	DGB8754
305-001		DGB8255	DGB8355	DGB8455	DGB8555	DGB8655	DGB8755
296-001		DGB8256	DGB8356	DGB8456	DGB8556	DGB8656	DGB8756

## C.W. Fullband Gunn Devices, Ka-Band 26.5-40 GHz

Electrical Characteristics		Power (mW)	
		20	50
Operating Current (mA)	Max.	500	800
Operating Voltage (V)	Min.	4	4
	Max.	7	7
Outline Number		Part Number	Part Number
315-001		DGB9254	DGB9354
305-001		DGB9255	DGB9355
296-001		DGB9256	DGB9356



# Gunn Diodes

## C.W. Gunn Devices For U-Band (40-60 GHz)

Type	Specified Frequency <sup>1</sup> (GHz)	Min.C.W. Output <sup>2,3</sup> (mW)	Operating Current Typical (mA)	Operating Voltage Typical (V)	Heat Sink Polarity <sup>4</sup>	Package Style <sup>4</sup>
DGB8266	40-60	20	400	4	Cathode	296-001
DGB8366	40-60	50	600	4	Cathode	296-001
DGB8466	40-50	75	750	4	Cathode	296-001
DGB8566	40-50	100	950	4	Cathode	296-001
DGB8666	40-50	125	1100	4	Cathode	296-001
DGB8766	40-50	150	1300	4	Cathode	296-001

## C.W. Devices for 40-100 GHz are available. Consult the factory for your specific requirement. For example:

Type	Specified Frequency <sup>1</sup> (GHz)	Min.C.W. Output <sup>2,3</sup> (mW)	Operating Current Typical (mA)	Operating Voltage Typical (V)	Heat Sink Polarity <sup>4</sup>	Package Style <sup>4</sup>
DGB8076	94 GHz	5	600	4	Cathode	296-001
DGB8176	94 GHz	10	750	4	Cathode	296-001
DGB8276	94 GHz	15	900	4	Cathode	296-001
DGB8376	94 GHz	20	950	4	Cathode	296-001

### Notes:

1. The required operating frequency (or in the case of wide band types, the frequency range) must be specified when ordering. The specification of any unnecessarily wide frequency range will result in unnecessary expenditure.
2. The power output is measured at a single frequency (except for wide band units) in a critically coupled Alpha test cavity at 25°C. Alpha may agree to undertake special testing in a customer cavity if required.
3. The standard catalog range of Alpha Gunn devices are tested under C.W. conditions. For certain pulse applications, alternative device types are available. Consult the factory.
4. Alternative package styles are available and should be requested as specials at the time of ordering.