

DC1250/70/80 Series

HIGH POWER MICROWAVE GUNN DIODES

The DC1250 Series are gallium arsenide bulk effect devices for the generation of CW microwave power in the range 4GHz to 18GHz depending on the cavity and diodes used. A screw base outline is available under the series type DC1280.

Similarly the DC1275 diode housed in low parasitic outline 86, generates CW microwave power in the range 18 to 26GHz.

A separate data sheet is available for low power diodes and millimetric standard and graded gap diodes.

FEATURES

- Low cost
- High reliability
- Output power in excess of 500mW at 12GHz
- Output power in excess of 300mW at 18GHz
- Output power in excess of 200mW at 26GHz
- Custom devices available

LIMITING CONDITIONS OF USE

V_O Operating Voltage DC1253, DC1283 DC1251, DC1281 DC1252, DC1282 DC1275	16V Max. 10V Max. 8V Max. 8V Max.	see Note 1 - - -
V_R Reverse Voltage, i.e. top flange negative	1V Max.	-
T_O Operating Temperature Range (stud)	-20° to +70°C	see Notes 2, 8
T_{stg} Storage Temperature Range	-55° to +150°C	-

TYPICAL ELECTRICAL CHARACTERISTICS at $T_{amb} = 25^{\circ}\text{C}$

Type Number	Outline Note 4	Frequency Band (GHz) Note 3	Minimum Output Power (mW) Note 5	Typical Operating Voltages (Volts) Notes 1, 6	Typical Operating Current (mA) Note 7
DC1251F	00	8-12	50	10.0	300
DC1251G	00	8-12	100	10.0	400
DC1251H	00	8-12	200	10.0	800
DC1251J	00	8-12	300	10.0	1200
DC1251K	00	8-12	400	10.0	1600
DC1251L	00	8-12	500	10.0	2000
DC1252F	00	12-18	50	6.5	400
DC1252G	00	12-18	100	6.5	400
DC1252H	00	12-18	200	6.5	900
DC1252J	00	12-18	300	6.5	1300
DC1253F	00	4-8	50	14.0	400
DC1253G	00	4-8	100	14.0	600
DC1253H	00	4-8	200	14.0	900
DC1275F	86	18-26	50	6.0	500
DC1275G	86	18-26	100	6.0	700
DC1275H	86	18-26	200	6.0	1000
DC1281F	40	8-12	50	10.0	200
DC1281G	40	8-12	100	10.0	400
DC1281H	40	8-12	200	10.0	800
DC1281H	40	8-12	300	10.0	1200
DC1282F	40	12-18	50	6.5	400
DC1282G	40	12-18	100	6.5	600
DC1282H	40	12-18	200	6.5	900
DC1288F	40	4-8	50	14.0	400
DC1283G	40	4-8	100	14.0	600
DC1283H	40	4-8	200	14.0	900

NOTES:

1. The recommended drive circuit is indicated in Fig. 1. Most commercial low impedance constant voltage supplies are suitable.
2. Diodes for wider temperature ranges can be supplied to special order.
3. The standard test frequency within the three lower frequency bands are 6.0, 9.5 and 15.0GHz respectively. The required operating frequency within the higher bands must be specified when ordering.
4. The package parasitics are:
0.2pF and 0.6nH for outline 00, 0.35pF and 0.5nH for outline 40, 0.22pF and 0.16nH for outline 86.
5. Tested in a half wavelength low Q coaxial cavity. The output power will be less for an oscillator with a higher loaded Q and varactor tuning will further reduce the available power.

Diodes can be tested in other agreed cavities to special order.

A separate data sheet covers low power diodes under the series type numbers DC1200 and DC1230.

NOTES (continued)

6. The variation of output and frequency with operating voltage is shown in Fig. 2 for typical X band diode. The variation of output power with frequency can be reduced by use of voltage tracking as shown in Fig. 3.
7. The power supply must be capable of supplying the saturation current as indicated in Fig. 4. A value of 1.5 times the operating current as a maximum power supply rating should give an adequate margin.
8. Typical variation of frequency and power with temperature is shown in Fig. 5. An adequate heat sink must be provided so that the rated stud temperature is not exceeded.

In a high Q cavity, the temperature coefficient of frequency is almost directly dependent on cavity expansion. In an uncompensated waveguide cavity with a Q of about 200 the temperature will depend initially on the relative change of the match of the diode to the cavity but a reduction of up to 3dB can be expected at +70°C.

Starting can become a problem in high Q cavities at low temperatures due to lack of system noise and diodes for this duty need to be supplied to special order.

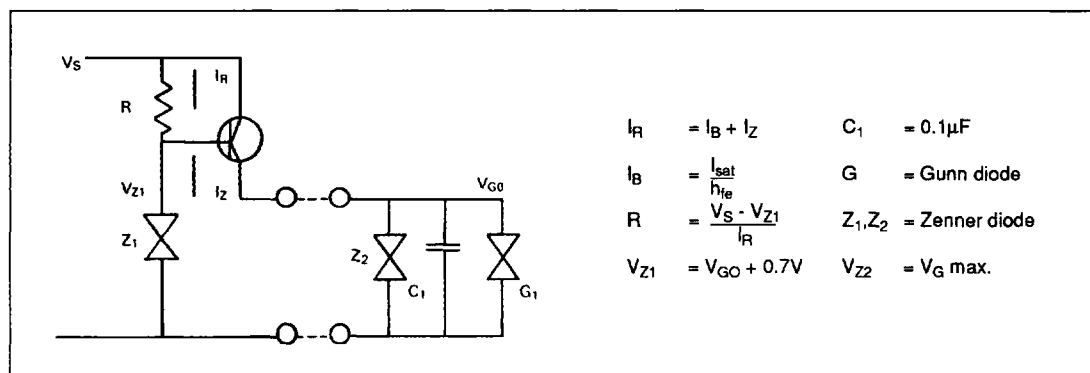


Fig.1 Recommended Gunn Diode Drive Circuit

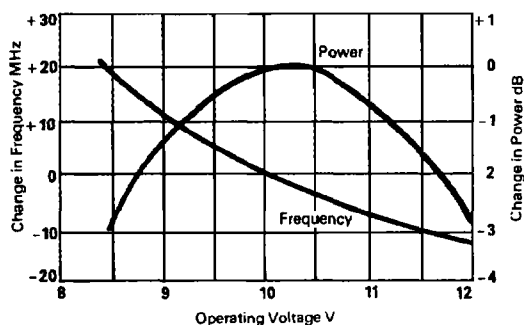


Fig.2 Variation of Output Power and Frequency with Operating Voltage.

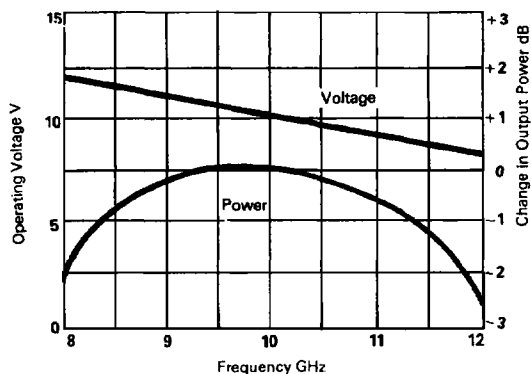


Fig.3 Effect of Voltage Tracking on the Variation of Output Power with Frequency on a Wideband Tunable Waveguide Oscillator.

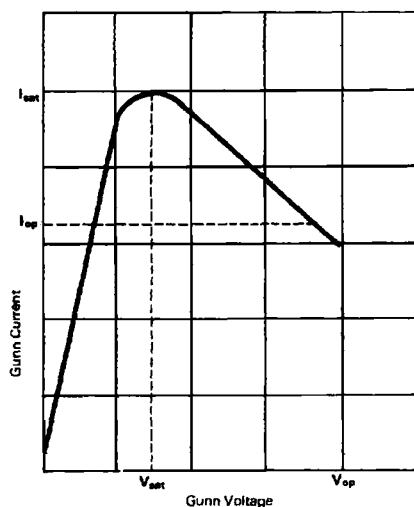


Fig. 4 DC Gunn Characteristic

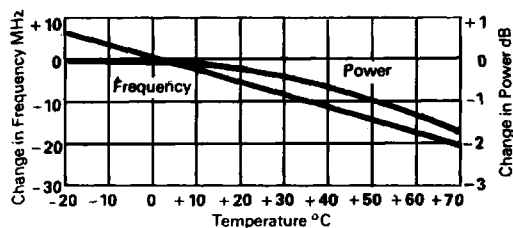


Fig. 5 Variation of Frequency with Temperature.

OUTLINES AND DIMENSIONS

POLARITY

The top flange is positive. The diode will be destroyed if the polarity is reversed. A low impedance constant voltage supply is required.

