AC2001

Millimeter Wave gunn Oscillator Module

Replaces March 1999, version DS5074-2.0

DS5074-3.0 January 2000

Features

- High output power
- Low phase noise performance
- Frequency stability with temperature
- Frequency agility

Applications

- A low noise source for research use
- Autonomous Intelligent Cruise Control systems
- FMCW and Doppler radar systems
- Voltage controlled oscillator

Dynex Semiconductor has developed a low cost, state of the art Millimetre Wave Gunn diode based oscillator module that operates in the 75 to 80 GHz band, with a 1 GHz operational bandwidth.

The initial application of the oscillator is within an automotive product.

The use of Gunn technology provides performance advantages compared to competing technologies.

The Gunn diode is a custom MBE grown GaAs hetrojunction device incorporated into a machined alloy body with an integral custom waveguide 26 flange. The oscillator is a radial mode 2nd harmonic bias tuned design.

For microstrip applications a waveguide to 0.18mm microstrip step transition is available to interface the oscillator to microstrip circuits.

A separate power supply driver PCB can be provided to interface to the Gunn module. This provides over voltage, spike and reverse polarity protection. The driver PCB also allows ease of frequency setting or the application of modulation.

It should be noted that the Gunn diode is easily damaged by voltage transients or reverse bias. It is recommended that the driver circuitry is always used to protect the Gunn diode from potential damage.

Frequency adjustment or modulation of the oscillator is achieved by changing the oscillator bias supply via the driver PCB. The driver PCB provides a control voltage input for this purpose. The voltage limits must be within those specified

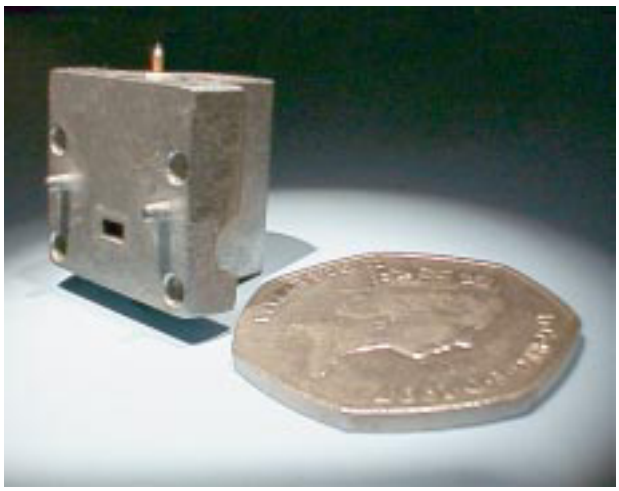


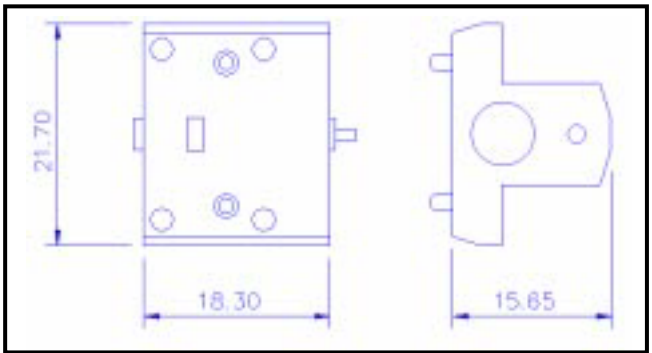
Figure 1 Millimeter Wave Gunn Oscillator Module

It is possible to extend the lower operational temperature range of the oscillator by applying a small DC voltage to the oscillator. This voltage is insufficient to generate any RF power.

The required frequency range must be specified when ordering the parts.

Specification

Potential operating frequency range	75 - 80 GHz
Microwave Output power (@25 C)	+16 dBm min.
SSB Phase Noise (100kHz offset)	-85 dBc/Hz typ.
Operating voltage range	5.0 - 6.5 V
Supply current	750 mA typ.
P/ T (max.)	0.35 mW/• C
F/ T (typ.)	1 - 2 MHz/• C
Voltage pushing	400 - 800 MHz/V
Operational temperature range	-30 C to +85 C
Weight (Oscillator only)	25 g approx.



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Datasheet Annotations:

Dynex Semiconductor annotate datasheets in the top right hard corner of the front page, to indicate product status. The annotations are as follows:-

Target Information: This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

Advance Information: The product design is complete and final characterisation for volume production is well in hand.

No Annotation: The product parameters are fixed and the product is available to datasheet specification.