

e2v Transceiver Technology Capability Overview



e2v produces microwave components and sub-systems for commercial, industrial and military applications using quality Management Systems certified to ISO9001:2000 and Automotive ISO/TS16949:2002 standard. The company has in-house Environmental Management Systems certified to ISO 14001:2004 and Environmental Stress Screening capability to MIL STD 883D standards.

The range of e2v microwave components include transceivers for both high-power Pulsed and low-power Frequency Modulated Carrier Wave (FMCW) radars, used in medium and short range applications.

A typical pulsed magnetron transceiver is shown in Figure 1. This compact transceiver operating at 35GHz is capable of transmitting 1.7 kW pulses with a receiver noise figure of 7.0 dB from antenna to IF output. It contains an active limiter to protect the receiver during the Tx pulse. The limiter switches ON in 0.05µs, and recovers in 0.1µs (to -1.0dB) ready to receive, making it ideal for medium range applications.

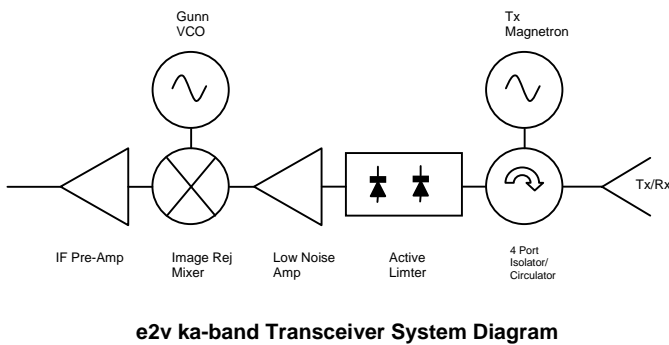
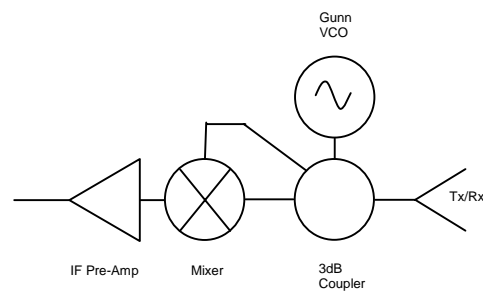


Figure 1 Pulsed Magnetron Head size 110 x 70 x 42mm

A low power version of this system can be produced by replacing the magnetron and limiter with a Pulsed Gunn to produce a short range transceiver.

FMCW systems are commonly used in short range applications to reduce the problem of fast recovery time and the very high speed timing required in short pulse radars.

e2v produces 77GHz transceivers for FMCW systems and a typical transceiver head is shown in Figure 2: this transceiver is used in a commercial application for vehicle and human detection out to approximately 800 meters range. The head is based around a 77GHz Voltage pushed Gunn oscillator and feeds a Quasi Optical lens antenna (not shown).



e2v 77GHz FMCW radar transceiver head

Figure 2 77GHz FMCW Head Size 97x77x35 mm

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e2v also specialise in the integration of microwave sub-systems for use in a military environment. We supply components for air, land and sea environments, which have high levels of integration, low mass, rigid construction, along with fully hermetic welded lid seals. This lends the modules to operation in hostile environments.

An example of this is shown in Figure 3. The e2v X-band Driver Amplifier module, has integrated precision video detector channels for built-in-test of the driver module, and monitoring of the TWT tube within the transmitter sub-system.

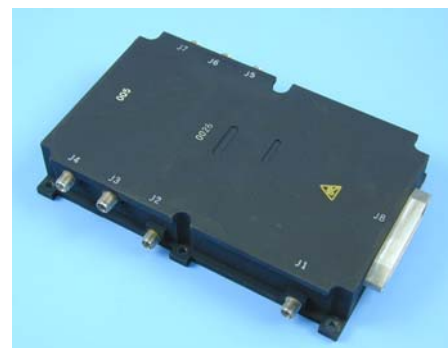
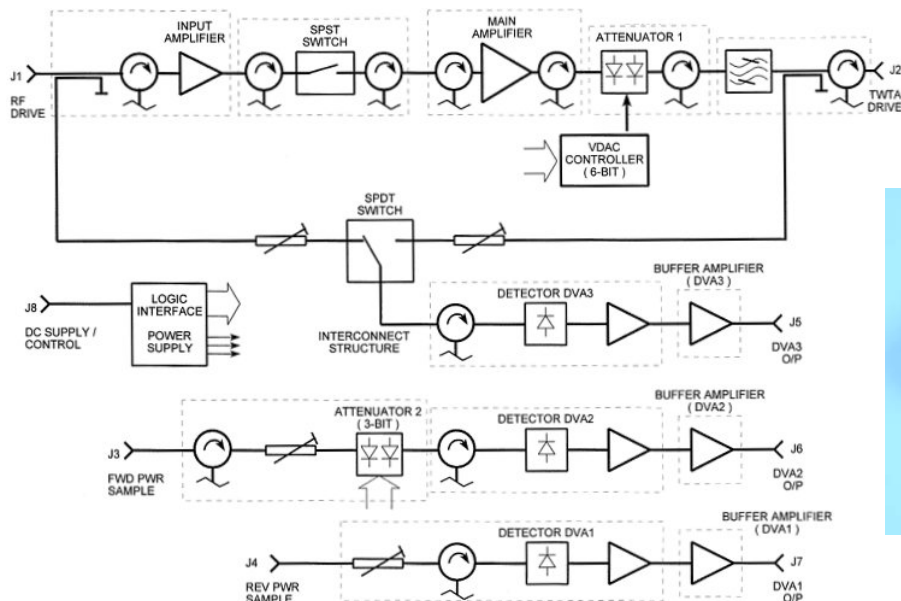


Figure 3 X-Band Driver Amplifier Size 140 x 90 x 25mm

Summary of e2v Facilities

e2v has the in-house capability to design microwave components using a full design software suite. Microwave design is accomplished using software such as HFSS and Microwave Office. Mechanical design is achieved in 3D using AutoCAD Inventor (see example in Figure 4), with further mechanical and thermal analysis carried out using ANSYS finite element modelling.

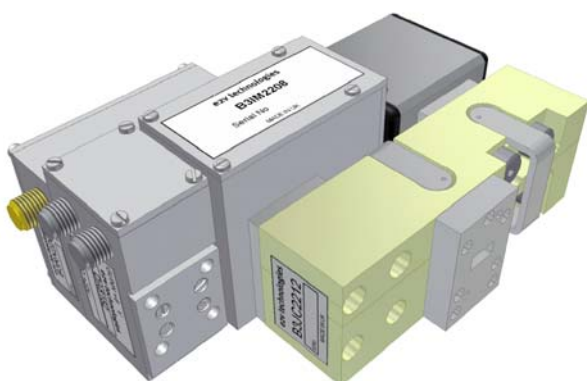


Figure 4 e2v Mechanical Model of ka-band transceiver

e2v manufacture in-house microwave circuits on hard substrates such as Alumina and Quartz and have full thick and thin film manufacturing capability. Design on soft substrates such as RT Duroid 5880 is carried out at e2v, with circuits manufactured by external vendors.

e2v facilities can carry out full microwave and environmental testing, both using manual testing or full Automatic Test Equipment (ATE). The e2v Engineering Development and Manufacture documentation and quality systems are fully externally audited to recognised international Standards.