



## Transceiver for radio relay station in frequency range 92–95 GHz



### APPLICATION

Transceiver of W-band, **M353005** module, is intended for operation in high-speed radio relay stations with throughput of 100 Mbit/sec. Functionally the transceiver refers to a radio modem for transmission of 100 Mbit/sec data stream (Fast Ethernet) in nets with topology like point-point or with multipoint access and time division of channels (TDMA).

Receiver and transmitter operate at different frequencies that ensures semi duplex mode in radio-relay station. This solution provides throughput of transmission channel 100 Mbit/sec in each direction.

### DESCRIPTION

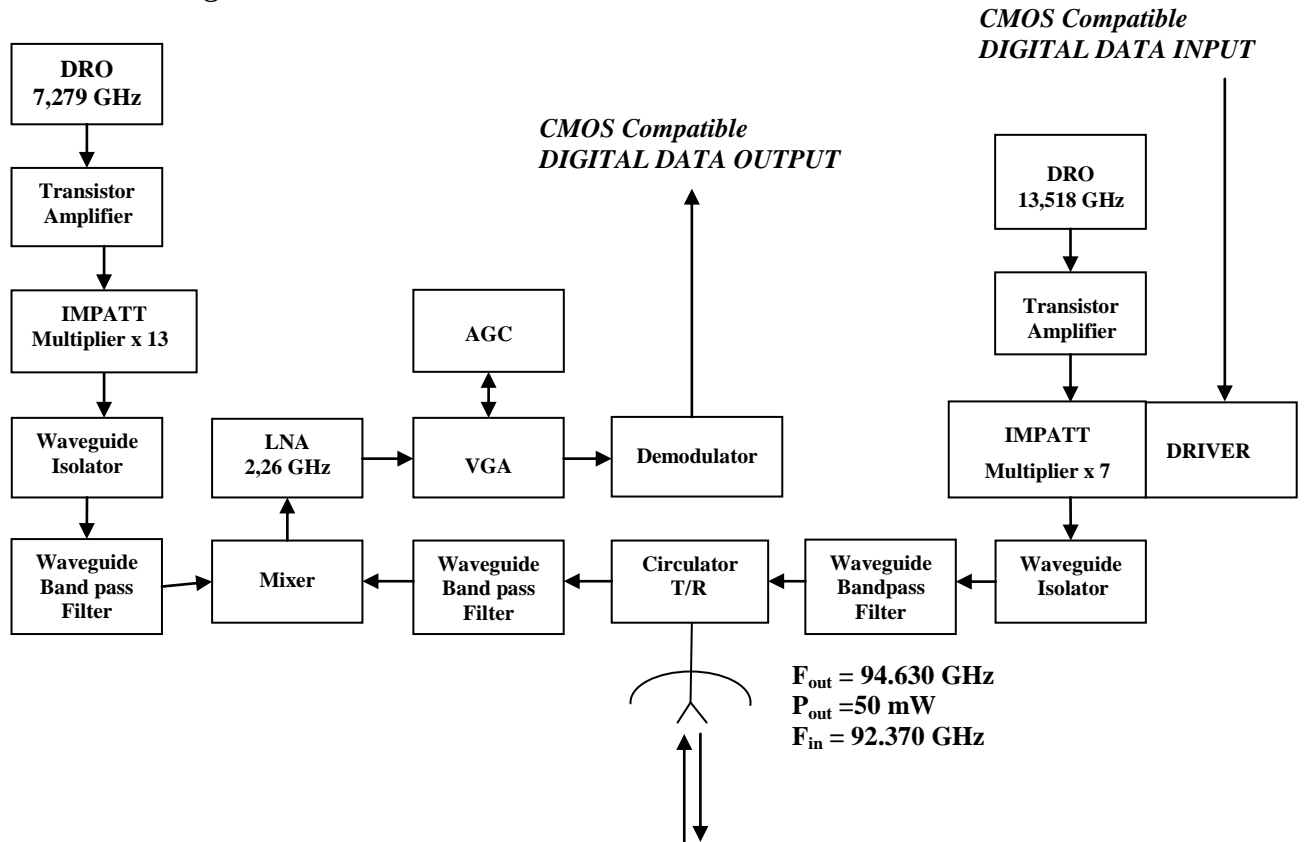
Application of frequency multipliers on silicon IMPATT-diodes, made at RI "Orion", makes it possible to achieve output pulse power more than 50 mW, longer mean time to failure and there is no need for maintenance. Along with it application of active frequency multipliers on IMPATT-diodes makes it possible to simplify essentially the transceiver scheme, since a single device – active frequency multiplier – acts as a carrier of a signal to high frequency and as a modulator and a terminal stage of the transmitter.

The transceiver has terminals of signal checking and controlling for making remote diagnostics of its condition and efficiency. The transceiver is supplied by constant voltage sources of 12, 12 and 24 V with power consumption no more than 24 W.

Overall dimensions are no more than 262 mm in diameter and 65 mm in height.



#### Structural diagram



#### SPECIFICATION

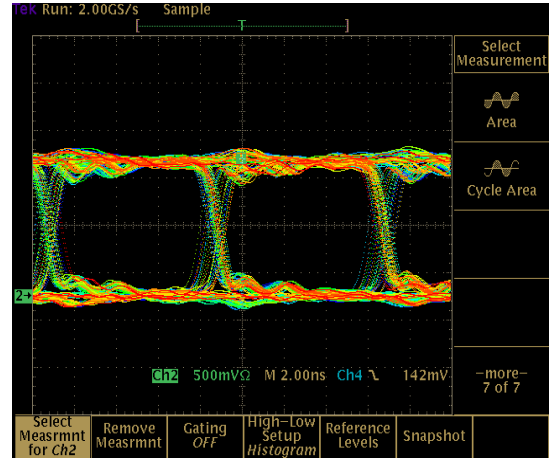
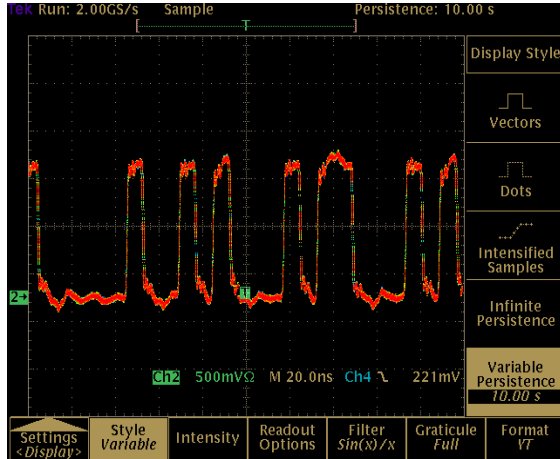
| Parameter, unit of measure   | Typical values  |
|--|-----------------|
| <b>Electrical characteristics of the transceivers</b>  |                 |
| Carrier frequency of transmitter, $F_{\text{transmit}}$ , GHz  |                 |
| M353005- B   | 94.63           |
| M353005- H   | 92.37           |
| Duplex frequency separation, GHz   | 2.260           |
| Microwave output pulse power, mW, not less   | 50              |
| Type of modulation   | AM 100%         |
| Microwave input pulse power corresponding BER <sup>-6</sup> , dB·W   | -90             |
| Maximal microwave operating input pulse power, dB·W  | -45             |
| Microwave limiting input pulse power, dB·W   | -42             |
| Maximum quantity of consecutive bits of one value  | 20              |
| Rated duty cycle   | 2               |
| Jitter of output video pulse on changing code combinations of data signal and deviation from nominal value, nsec | 1.5             |
| Load resistance of informational input, Ohm  | 100 (3.3V CMOS) |



|  |                                |
|--|--------------------------------|
| Load resistance of informational output, Ohm   | 100 (3.3V CMOS)                |
| Type of connecting waveguide flange as to ГОСТ 13317-89 or UG-387/U  |                                |
| <b>Electrical parameters of the transmitter</b>  |                                |
| Relative instability of carrier frequency  | $3 \cdot 10^{-4}$              |
| Frequency pass band of transmitter output filter, GHz  | 1.0                            |
| Radio pulse envelope: deviation of pulse/pause duration (on amplitude levels of 20 % and 80 %) from nominal, nsec, no more | $\pm 1.0$                      |
| jitter, nsec, no more  | $\pm 0.7$                      |
| Level of spurious radiation is ascertained   |                                |
| <b>Electrical parameters of the receiver</b>   |                                |
| Receiver operating frequency, $F_{receiver}$ , GHz   |                                |
| M353005-B  | 92.37                          |
| M353005-H  | 94.63                          |
| Intermediate frequency, $F_{IF}$ , GHz   | 2.260                          |
| LO operating frequency, $F_{LO}$ , GHz   |                                |
| M353005-B  | 94.63                          |
| M353005-H  | 92.37                          |
| Relative instability of LO frequency   | $3 \cdot 10^{-4}$              |
| Through frequency band   | $F_{ПЧ} \pm 0.150$             |
| Frequency pass band of input filter, GHz   | 1,0                            |
| Noise factor, dB, no more  | 11                             |
| Image rejection, dB, not less  | 70                             |
| AGC range, dB  | 50                             |
| Operation /release time of AGC, $\mu$ sec  | 50/100                         |
| <b>Electrical performances of input and output informational signal</b>  |                                |
| Voltage level of logic "0" and "1"   | 3.3 B CMOS                     |
| Duration of front/drop (on a level of 20 % and 80 %), nsec, no more  | 2/2                            |
| Jitter, ns, no more  | $\pm 0.7$                      |
| <b>Power supply</b>  |                                |
| Supply voltage V / Current consumption, mA, no more  | +24/280<br>+12/1300<br>-12/100 |
| Range of operating temperatures of the transceiver   | From +0 to +70                 |
| Weight of the transceiver, kg, no more   | 2.5                            |



#### CHARACTERISTICS



Typical oscillogram (left) of envelope of output radio pulses sequence of the transceiver and typical eye diagram (right) of module, operating in transmission mode of 125 Mbit/sec data (Fast Ethernet), obtained by detecting transceiver output signal.

#### OVERALL DIMENSIONS DRAWING

