MD405

GaAs PIN diode limiter 3…25 GHz

- frequency range 3…25 GHz
- insertion loss <1.5 dB
- output RF Power <18 dBm
- integrated DC blocking capacitors

Applications

- communications
- radars
- test & measurement equipment

The MD405 is a wideband passive dual-stage limiter designed with AlGaAs/GaAs PIN diode technology capable to protect sensitive components of the Rx/Tx circuits against high power incident signals. The MD405 does not require DC bias and provides a low insertion loss in a small form factor. The MD405 is compatible with conventional die attach methods which make it ideal for MCM and hybrid microcircuit applications.

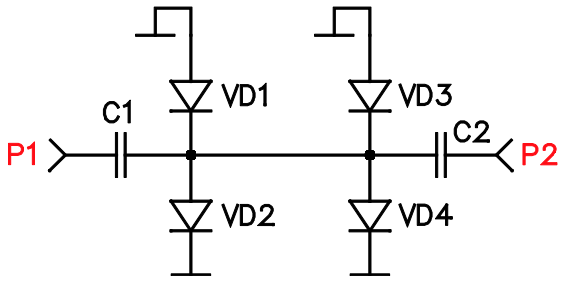
Electrical specifications (T = 25 °C)

Symbol	Parameter	Min.	Typ.	Max.	Unit
ΔF	Frequency Range	3	—	25	GHz
IL_{ON}	Insertion Loss	—	—	1,5	dB
RL	Return Loss	—	—	10	dB
P_{OUT}	Output RF Power	—	—	+18	dBm

Absolute maximum ratings

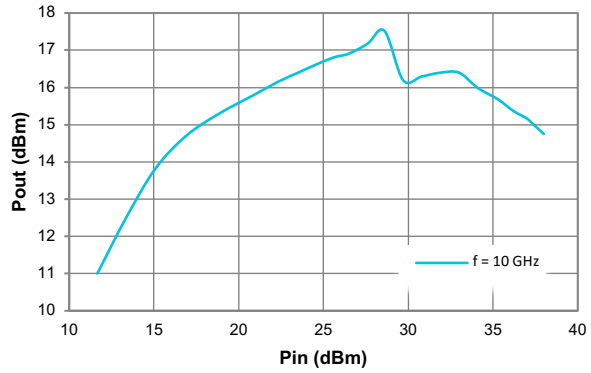
Parameter	Value	Unit
Incident RF Power (CW)	+37	dBm
Operating Temperature	−40…+85	°C
Storage Temperature	−60…+150	°C

MMIC circuit schematic

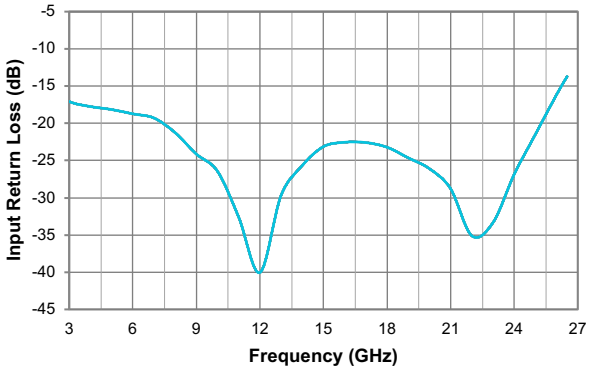


Typical characteristics (T = 25 °C)

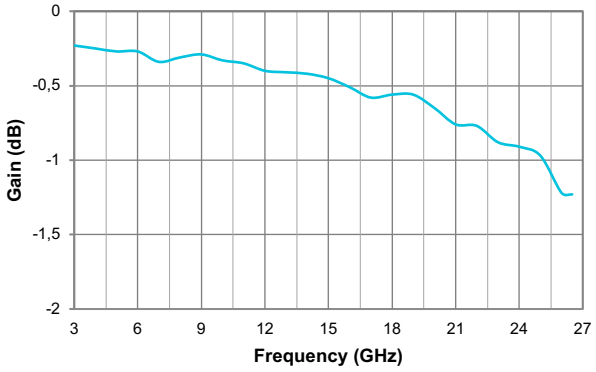
Pout



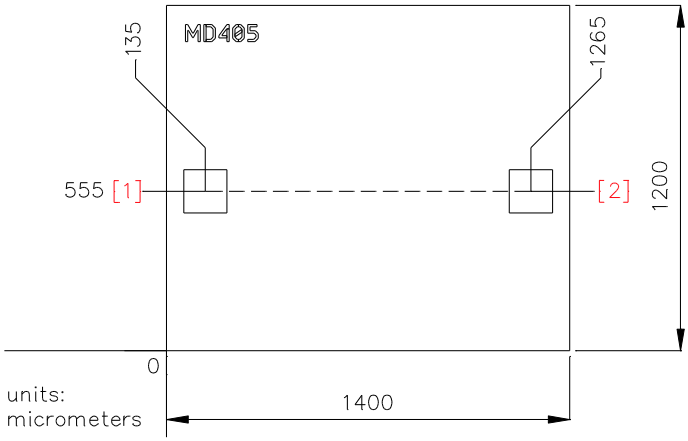
Input Return Loss



Transmission Loss



Mechanical data



— All specified dimensions are valid before wafer dicing. Assume following tolerances: –30…–40 µm for chip size dimensions, 0…–40 µm for bond pad location distances.
— Die thickness is 100±5 µm.

Pad number	Port	Description
1	P1	RF input / output
2	P2	RF output / input

Application notes

Mounting
The chip is back-metallized and can be die mounted with AuSn eutectic preforms or with electrically conductive epoxy. The mounting surface should be clean and flat. The 50 Ohm microstrip transmission lines on 0.127mm thick alumina thin film substrates are recommended for bringing RF to and from the chip (Figure 1). One way to accomplish this is to attach the 0.102 mm thick die to a 0.150 mm thick molybdenum heat spreader (molytab) which is then attached to the ground plane (Figure 2). Microstrip substrates should be located as close to the die as possible in order to minimize bond wire length. Typical die-to-substrate spacing is 0.1mm.

Wire Bonding
Bond pad metallization: gold. Thermo-compression or thermo-sonic bonding techniques may be used to attach bonding wires, foil stripe or ribbon to bond pads. The length of connections should be as short as possible to obtain the best microwave performance.

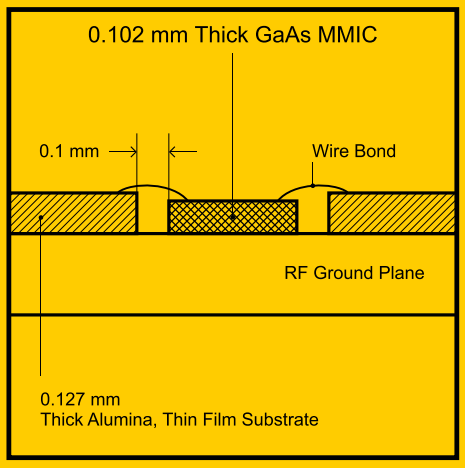


Figure 1.

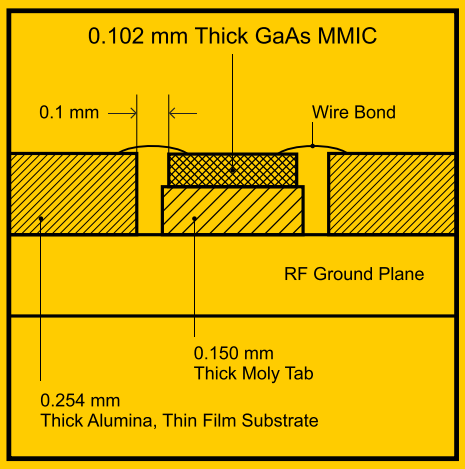


Figure 2.

Recommended ESD Management

This device is susceptible to electrostatic and mechanical damage. Dies are supplied in antistatic containers, which should be opened in cleanroom conditions at an appropriately grounded antistatic workstation. Devices need careful handling using correctly designed collets, vacuum pickups or, with care, sharp tweezers.