1. Description

- The MA005Q is a limiter fabricated using GaAs PIN MMIC process in a 3mm x 3mm QFN package. The device operates from DC to 20GHz, with an insertion loss of less than 1.3dB, input/output return loss of less than -13dB, a power handling capability of CW 38dBm, and a flat leakage of 15.5dBm. Input and output DC-blocking capacitors are not integrated on-chip.



MA005Q-PDS-F01

Figure 1. MA005Q Functional Block Diagram

2. Applications

- TX/RX Modules

3. Features

- Operating Frequency: DC-20GHz
- Insertion Loss: -1.3dB
- Input/Output Return Loss: -15dB / -13dB
- Power Handling Capability: 38dBm (CW)
- Flat Leakage: 15.5dBm
- Die Size: 3.0 x 3.0 x 0.75mm

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	DC-20GHz	Units
Insertion Loss	-1.3	dB
Input Return Loss	-15	dB
Output Return Loss	-13	dB
Power Handing Capability	38	dBm
Flat Leakage at P_{IN}>20dBm	15.5	dBm

Test condition: CW Test

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5. Recommended Operating Conditions

Table 2. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Temperature Range	-55	25	125	°C
Operating Frequency	DC	-	38	GHz
Maximum Input Power	-	-	38	dBm

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics[1]

Parameter	Symbol	Min.	Typ.	Max.	Units
Operating Frequency	Freq	DC	-	38	GHz
Insertion Loss @ 20GHz	IL	-	-1.3	-	dB
Input Return Loss	RLin	-	-15	-	dB
Output Return Loss	RLout	-	-13	-	dB
Power Handing Capability	Pc	-	38	-	dBm
Flat Leakage	FL	-	15.5	-	dBm

[1]. Test condition: CW Test

7. Typical Performance Curve

■ Small-signal Characteristics Curve

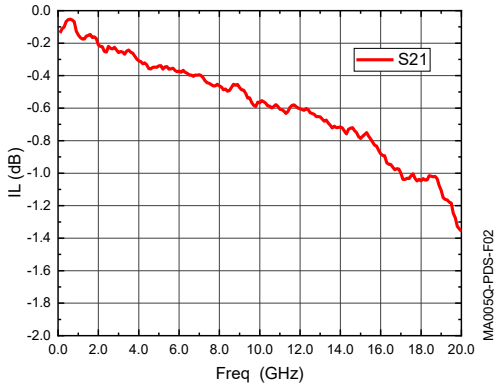


Figure 2. Insertion Loss Characteristics

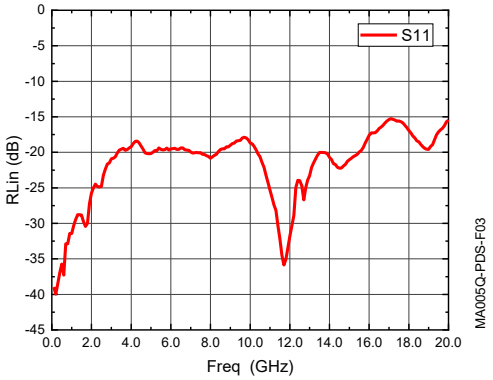


Figure 3. Input Return Loss Characteristics

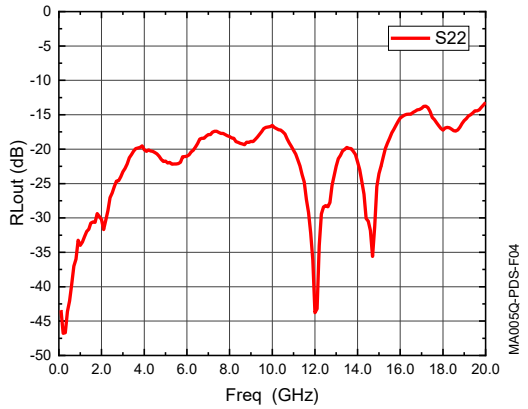


Figure 4. Output Return Loss Characteristics

■ Power Characteristics

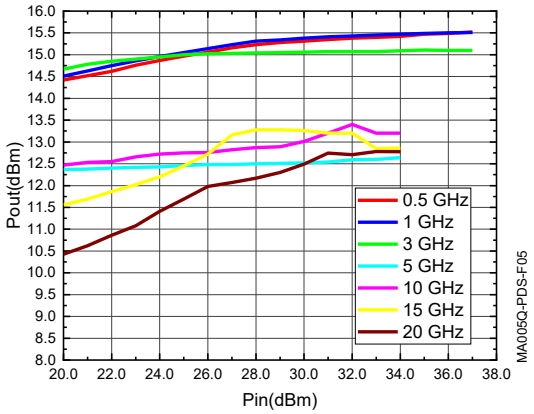
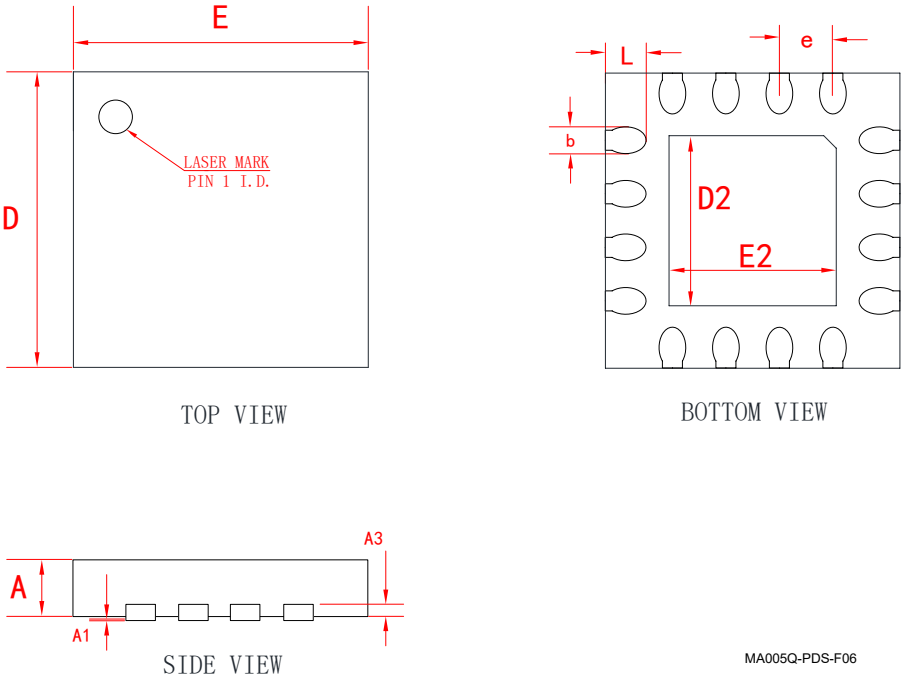


Figure 5. Flat Leakage Characteristics

8. Package Outline



- Dimensions shown in micrometre

Figure 6. MA005Q Outline Dimensions

Table 4. Package Outline Dimensions (mm)

COMMON DIMENSIONS(MM)			
REF.	MIN.	NOM.	MAX.
A	0.70	0.75	0.8
A1	0.00	0.02	0.05
A3	0.18	0.20 REF	0.22
D	2.95	3.00	3.05
E	2.95	3.00	3.05
D2	1.60	1.65	1.70
E2	1.60	1.65	1.70
b	0.20	0.25	0.30
L	0.35	0.40	0.45
e	0.50 BSC		

9. Application Circuit

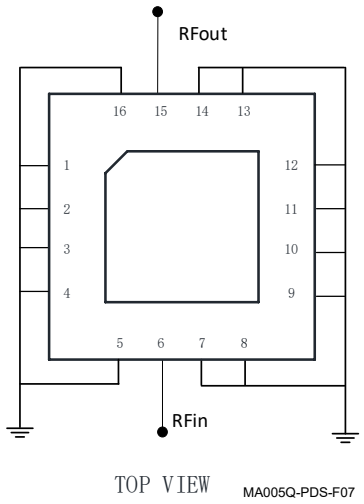


Figure 7. MA005Q Application Circuit

Table 5. PIN Description

PIN	Symbol	Description
6	RFin	RF Input
15	RFout	RF Output
1,2,3,4,5,7,8,9,10,11,12,13,14,16	GND	RF Ground Pin

10. Recommended Solder Temperature Profile

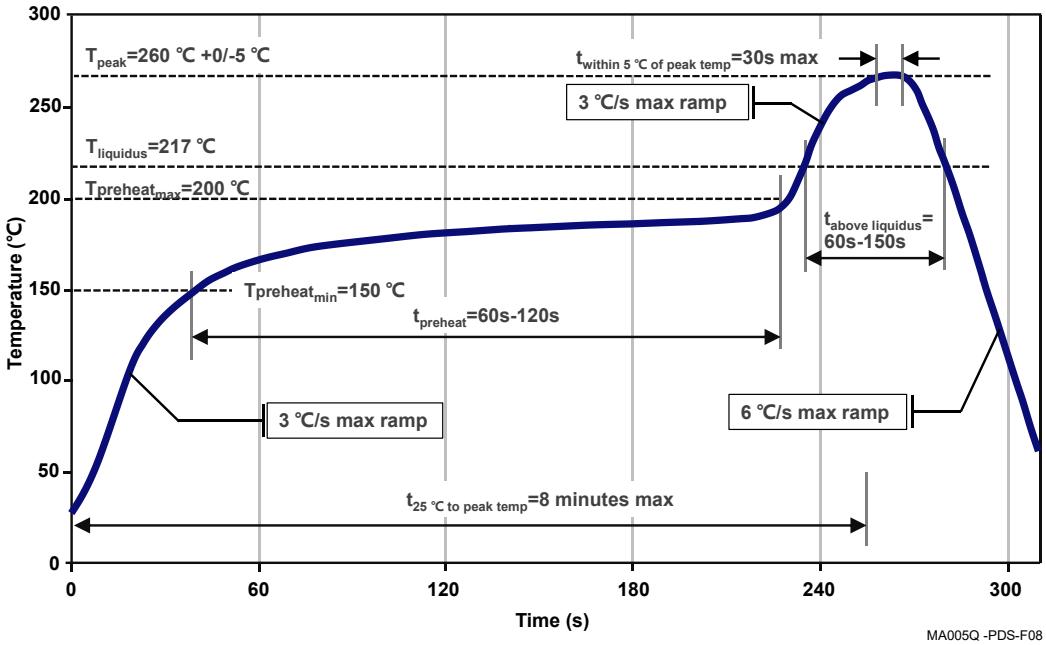


Figure 8. Recommended Solder Temperature Profile

11. Handling Precautions

- **Storage**
  All bare dies ship in either Waffle or Gel Pak, which is an ESD protective container, and then sealed in an ESD protective bag. After opening the sealed ESD protective bag, all dies must be stored in a dry nitrogen environment.
- **Cleanliness**
  Handle the dies in a clean environment. Never use liquid cleaning systems to clean the dies.
- **ESD Caution**
  ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore proper ESD precautions should be taken to avoid performance degradation or loss of functionality.



12. Contact Information

For the latest specifications, additional product information, technical support and sales support, please contact:

- **Email:** RF.support@raytrontek.com
- **Web:** www.raytrontek.com

13. Disclaimer

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