



## GaN HEMT 28V, 5.8GHz 8W, RF Power Transistor

### Description

The GTAH58008C6 is a 8W GaN HEMT, designed for ISM/RF Energy application around 5.8GHz  
The transistor is available in a highly cost effective 10\*6mm, surface mount, QFN package with 100% production test to ensure the quality and consistency.  
It can be used in CW, Pulse and any other modulation modes.

### GTAH58008C6



- Typical Class AB RF Performance with device soldered through high density and plated grounding vias  
CW, Vds=28V, Idq=20mA

| Freq<br>(MHz) | P1dB<br>(dBm) | P1dB<br>(W) | P1dB<br>Eff (%) | P1dB<br>Gain (dB) | P3dB<br>(dBm) | P3dB<br>(W) | P3dB<br>Eff (%) |
|---------------|---------------|-------------|-----------------|-------------------|---------------|-------------|-----------------|
| 5100          | 39.64         | 9.20        | 51.86           | 14.50             | 40.92         | 12.36       | 56.86           |
| 5200          | 39.57         | 9.05        | 53.55           | 15.11             | 40.76         | 11.91       | 57.61           |
| 5300          | 39.49         | 8.89        | 54.52           | 15.45             | 40.48         | 11.17       | 56.91           |
| 5400          | 39.24         | 8.40        | 54.66           | 15.84             | 40.12         | 10.27       | 55.38           |
| 5500          | 39.07         | 8.07        | 54.54           | 16.03             | 40.04         | 10.10       | 56.57           |
| 5600          | 39.02         | 7.97        | 56.11           | 16.33             | 40.20         | 10.47       | 61.18           |
| 5700          | 38.84         | 7.66        | 57.85           | 16.57             | 39.97         | 9.94        | 62.05           |
| 5800          | 38.57         | 7.20        | 57.05           | 16.14             | 39.67         | 9.26        | 60.35           |
| 5900          | 38.51         | 7.09        | 54.14           | 14.95             | 39.49         | 8.89        | 56.67           |

### Applications

- C band power amplifier
- ISM/RF Energy power amplifier

### Important Note: Proper Biasing Sequence for GaN HEMT Transistors

#### Turning the device ON

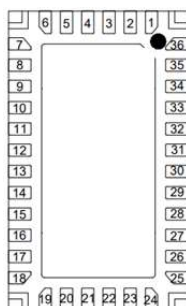
1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

#### Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically -5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)



| Pin No.                    | Symbol     | Description  |
|----------------------------|------------|--|
| 8,9,10,11                  | RF IN/Vgs  | RF Input, Vgs bias   |
| 32,33,34,35                | RF OUT/VDD | RFOutput, Drain bias   |
| Rest Pins and Package Base | GND        | DC/RF Ground. Must be soldered directly to heatsink or copper coin for CW application. |



**Table 1. Maximum Ratings**

| Rating                         | Symbol    | Value       | Unit |
|--------------------------------|-----------|-------------|------|
| Drain--Source Voltage          | $V_{DS}$  | +150        | Vdc  |
| Gate--Source Voltage           | $V_{GS}$  | -8 to +0.5  | Vdc  |
| Operating Voltage              | $V_{DD}$  | 36          | Vdc  |
| Maximum gate current           | $I_{gs}$  | 2           | mA   |
| Storage Temperature Range      | $T_{stg}$ | -65 to +150 | °C   |
| Case Operating Temperature     | $T_C$     | +150        | °C   |
| Operating Junction Temperature | $T_J$     | +225        | °C   |

**Table 2. Thermal Characteristics**

| Characteristic  | Symbol          | Value | Unit  |
|---|-----------------|-------|-------|
| Thermal Resistance, Junction to Case by FEA<br>$T_C = 85^\circ\text{C}$ , at $P_{diss} = 7\text{W}$ | $R_{\theta JC}$ | 10    | °C /W |

**Table 3. Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

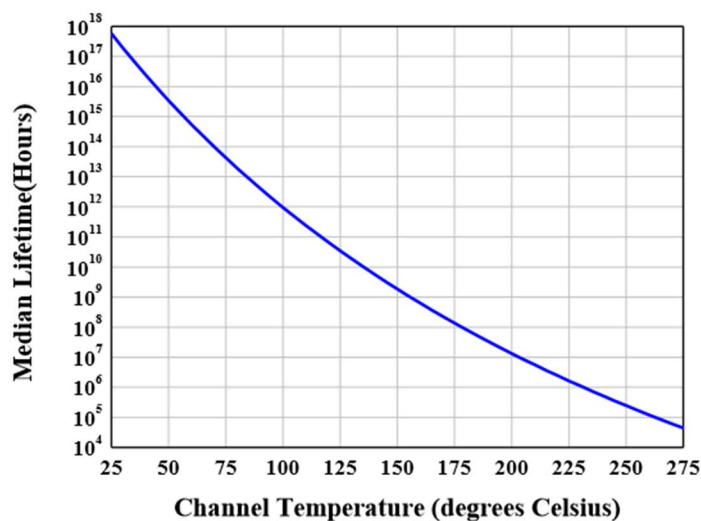
**DC Characteristics (main path, measured on wafer prior to packaging)**

| Characteristic                 | Conditions  | Symbol       | Min | Typ  | Max | Unit |
|--------------------------------|---|--------------|-----|------|-----|------|
| Drain-Source Breakdown Voltage | $V_{GS} = -8\text{V}$ ; $I_{DS} = 2\text{mA}$                                   | $V_{DSS}$    |     | 200  |     | V    |
| Gate Threshold Voltage         | $V_{DS} = 10\text{V}$ , $I_D = 2\text{mA}$                                      | $V_{GS(th)}$ | -4  |      | -2  | V    |
| Gate Quiescent Voltage         | $V_{DS} = 28\text{V}$ , $I_{DS} = 20\text{mA}$ ,<br>Measured in Functional Test | $V_{GS(Q)}$  |     | -2.6 |     | V    |

**Ruggedness Characteristics**

| Characteristic           | Conditions   | Symbol | Min | Typ  | Max | Unit |
|--------------------------|--|--------|-----|------|-----|------|
| Load mismatch capability | 5.8GHz, $P_{out} = 8\text{W}$ Pulsed CW<br>All phase,<br>No device damages | VSWR   |     | 10:1 |     |      |

**Figure 2: Median Lifetime vs. Channel Temperature**



## Typical performance

Figure 3: Efficiency and power gain as function of Pout

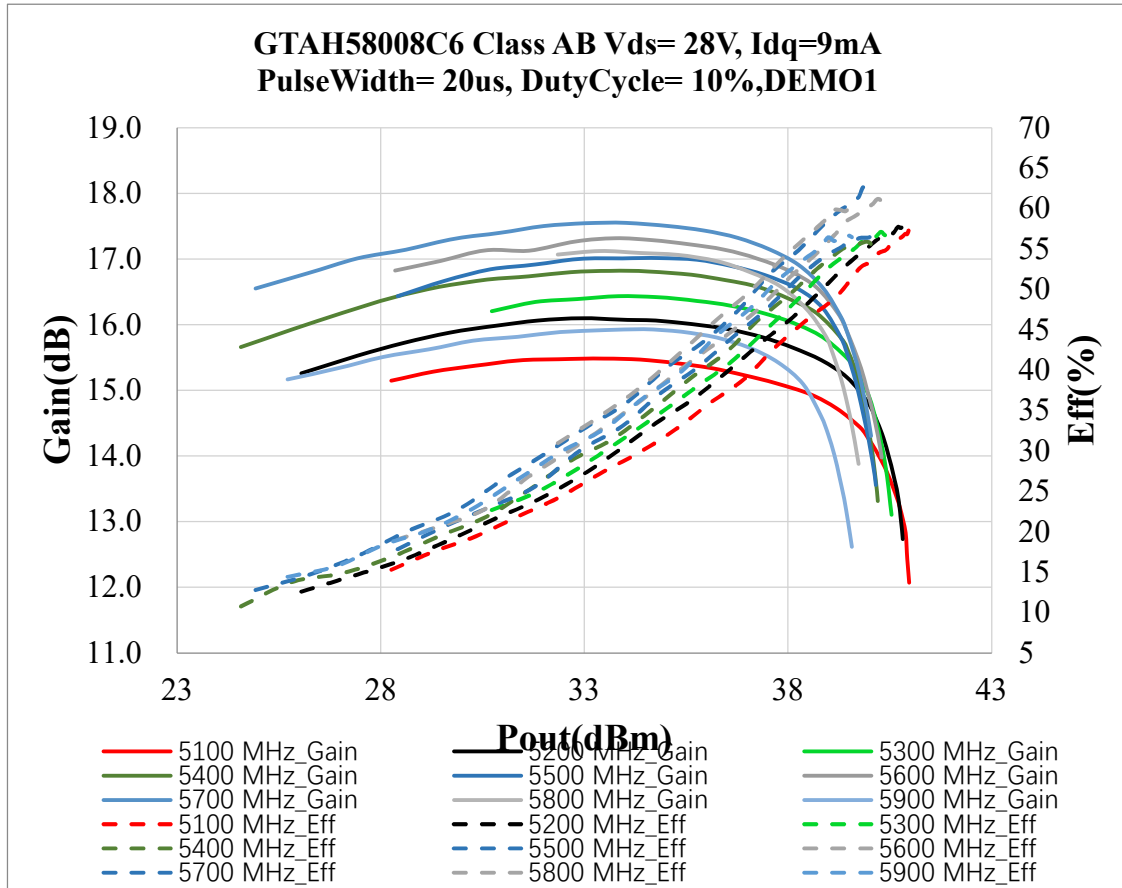


Figure 4: Network analyzer output S11/S21

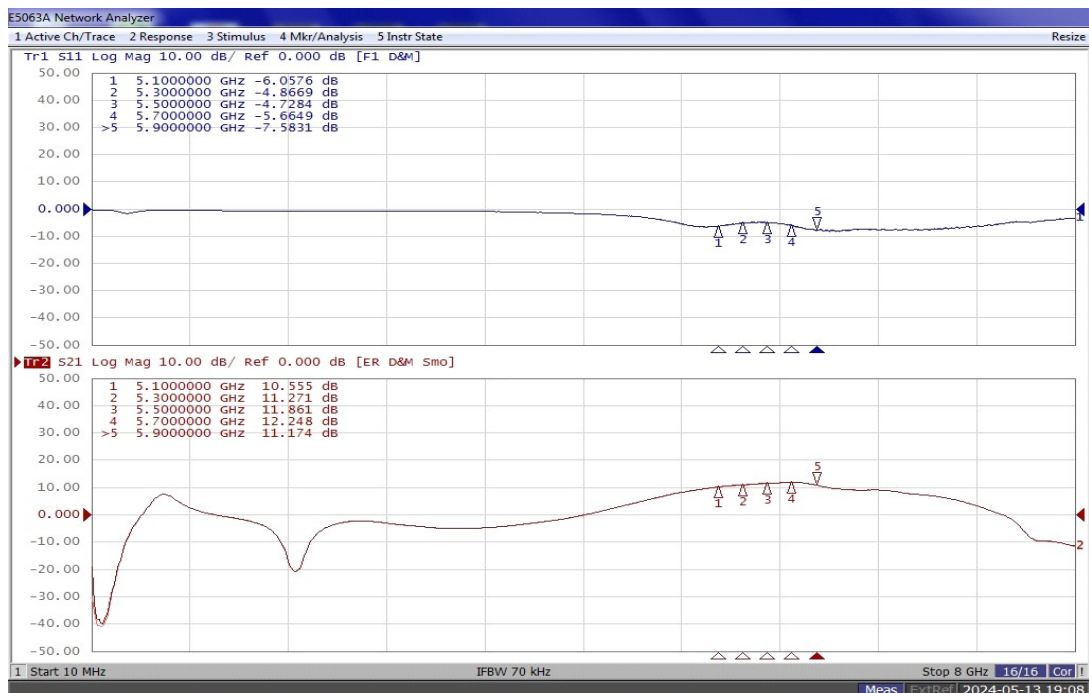




Figure 5: Picture of application board

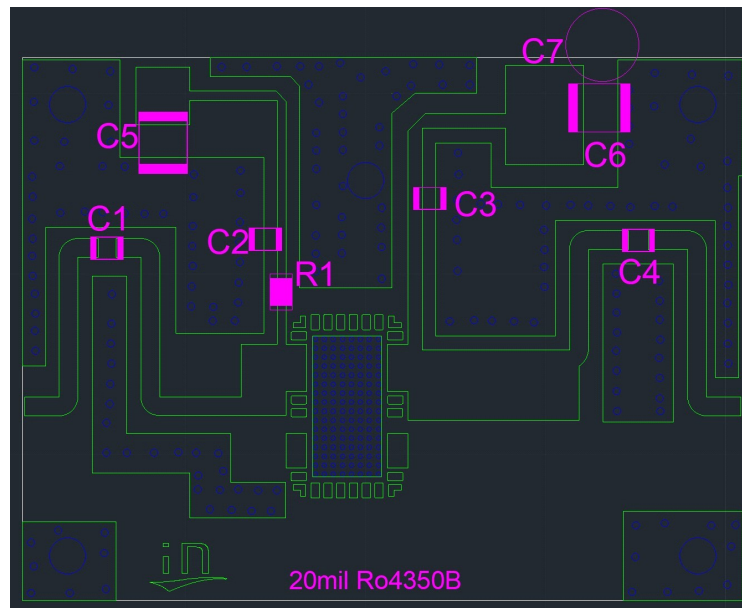
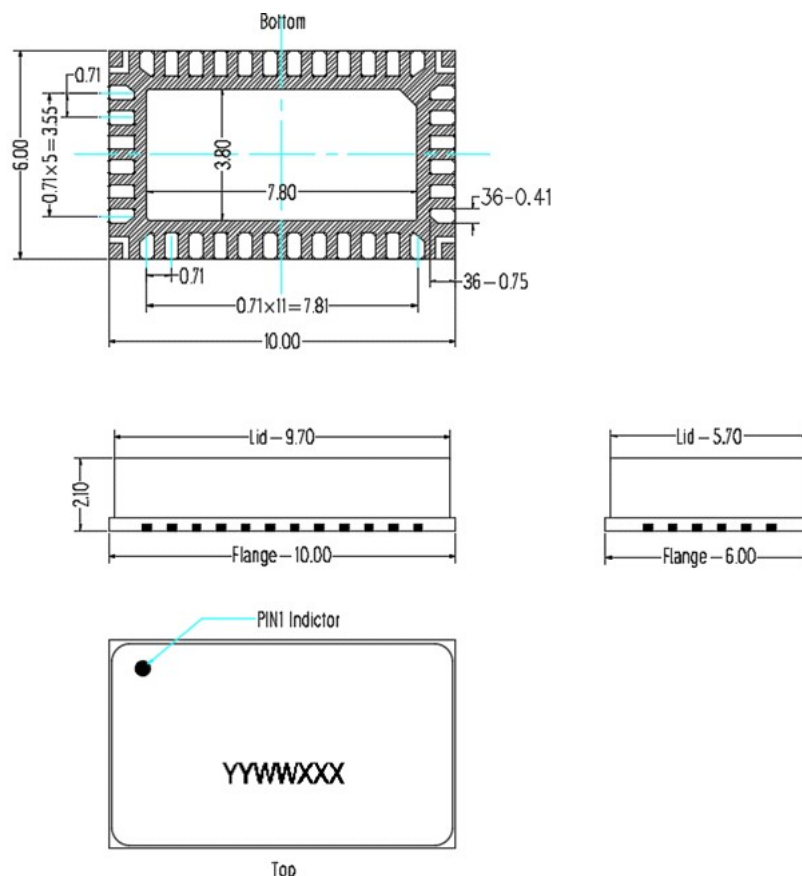


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

| Component   | Value       | Quantity |
|-------------|-------------|----------|
| U1          | GTAH58008C6 | 1        |
| C1、C2、C3、C4 | 3.3pF       | 4        |
| C5、C6       | 10uF/63V    | 2        |
| C7          | 470uF/63V   | 1        |
| R1          | 10Ω         | 1        |
|             |             |          |
|             |             |          |
|             |             |          |



## 10\*6 Plastic Package



### Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are  $\pm 0.2$ mm.

## Revision history

Table 4. Document revision history

| Date      | Revision | Datasheet Status               |
|-----------|----------|--------------------------------|
| 2024/5/14 | V1.0     | Preliminary Datasheet Creation |
|           |          |                                |
|           |          |                                |
|           |          |                                |

Application data based on: CWZ-24-09

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