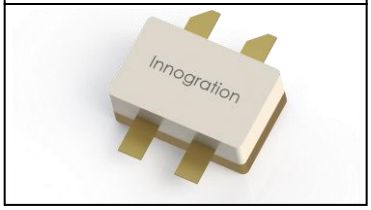
# GaN HEMT 28V C band 65W, RF Power Transistor

**XTAH75065G4**




## Description

The XTAH75065G4 is a 65W internally matched, C band GaN HEMT, designed up to 7.5GHz, especially 5G NR or LTE application, as well as either Pulse or CW application. There is no guarantee of performance when this part is used in applications designed Outside of these frequencies. **Please notice that both leads at input and output are internally connected to make it as single ended configuration**

- Typical 5.8-6.6GHz RF performance (on narrow band fixture with device soldered)

$V_{DD}$=28V $I_{DQ}$=100mA, CW

| Freq (MHz) | P1dB (W) | P1dB Eff (%) | P1dB Gain (dB) | P3dB (dBm) | P3dB (W) | P3dB Eff (%) |
|---|---|---|---|---|---|---|
| 5850 | 49.3 | 43.6 | 9.66 | 48.46 | 70.2 | 48.5 |
| 5950 | 49.6 | 43.5 | 10.03 | 48.58 | 72.2 | 48.9 |
| 6050 | 51.0 | 45.1 | 10.44 | 48.67 | 73.6 | 50.5 |
| 6150 | 48.5 | 44.2 | 10.48 | 48.52 | 71.0 | 49.9 |
| 6250 | 46.9 | 44.7 | 10.44 | 48.36 | 68.6 | 50.2 |
| 6350 | 44.7 | 45.6 | 10.43 | 48.12 | 64.9 | 51.0 |
| 6450 | 42.5 | 43.4 | 10.13 | 47.96 | 62.5 | 49.0 |
| 6550 | 41.6 | 42.8 | 9.76 | 47.8 | 60.3 | 47.6 |
| 6650 | 41.8 | 43.5 | 9.64 | 47.84 | 60.9 | 48.7 |

- Typical 6.9-7.4GHz RF performance (on broadband fixture with device soldered)

$V_{DD}$=28V $I_{DQ}$=100mA, CW

| Freq (MHz) | P1dB (W) | P1dB Eff (%) | P1dB Gain (dB) | P3dB (dBm) | P3dB (W) | P3dB Eff (%) |
|---|---|---|---|---|---|---|
| 6900 | 47.3 | 38.1 | 10.09 | 48.14 | 65.2 | 41.8 |
| 7000 | 49.0 | 40.0 | 10.24 | 48.22 | 66.4 | 43.3 |
| 7100 | 49.6 | 42.0 | 10.39 | 48.25 | 66.9 | 45.4 |
| 7200 | 47.4 | 42.0 | 10.32 | 47.95 | 62.4 | 44.8 |
| 7300 | 47.6 | 42.2 | 10.16 | 47.91 | 61.8 | 44.9 |
| 7400 | 49.3 | 43.8 | 10.4 | 48.03 | 63.5 | 46.4 |

Recommended driver: XTAH78020C6

## Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

## 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 (28V)
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

**Table 1. Maximum Ratings**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain--Source Voltage | $V_{DSS}$ | 150 | Vdc |
| Gate--Source Voltage | $V_{GS}$ | -10,+2 | Vdc |
| Operating Voltage | $V_{DD}$ | 36 | Vdc |
| Maximum Forward Gate Current @ TC = 25°C | Igmax | 16 | mA |
| Storage Temperature Range | Tstg | -65 to +150 | °C |
| Case Operating Temperature | $T_C$ | +150 | °C |
| Operating Junction Temperature(See note 1) | $T_J$ | +225 | °C |

**Table 2. Thermal Characteristics**

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Case<br>$T_C$= 85°C, RF CW operation | RθJC | 1.6 | C/W |

**Table 3. Electrical Characteristics** ($T_C$ = 25℃ unless otherwise noted)

**DC Characteristics**

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$=-8V; $I_{DS}$=16mA | $V_{DSS}$ | 150 | | | V |
| Gate Threshold Voltage | $V_{DS}$ = 28V, $I_D$ =16mA | $V_{GS}$(th) | -4 | | -2 | V |
| Gate Quiescent Voltage | $V_{DS}$ =28V, $I_{DS}$=100mA, Measured in Functional Test | $V_{GS(Q)}$ | | -2.6 | | V |

## 5.8-6.6Ghz

# Typical performance

**Figure 2: Power Gain， Efficiency as function of Pout**

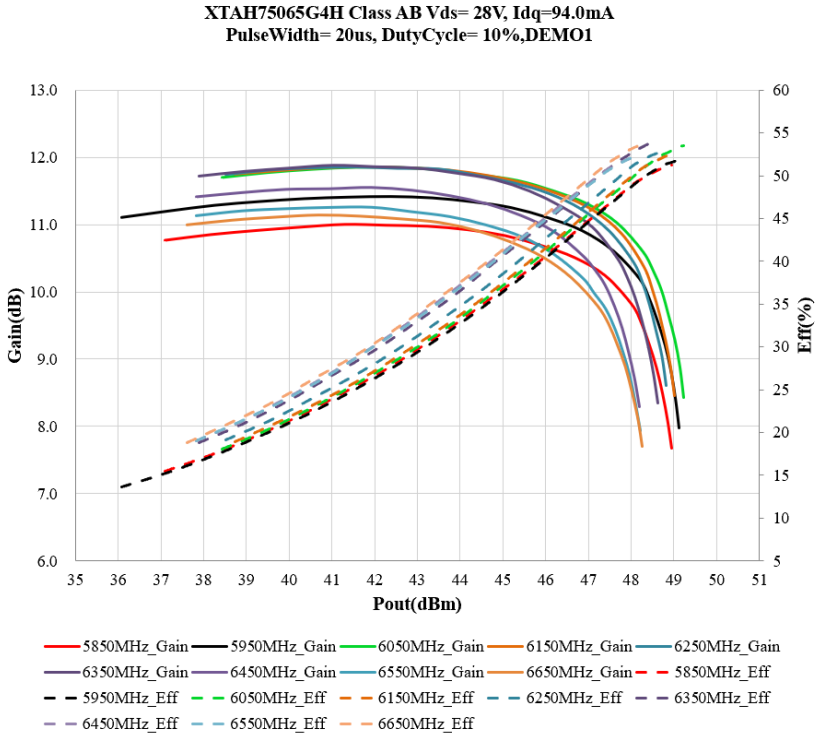
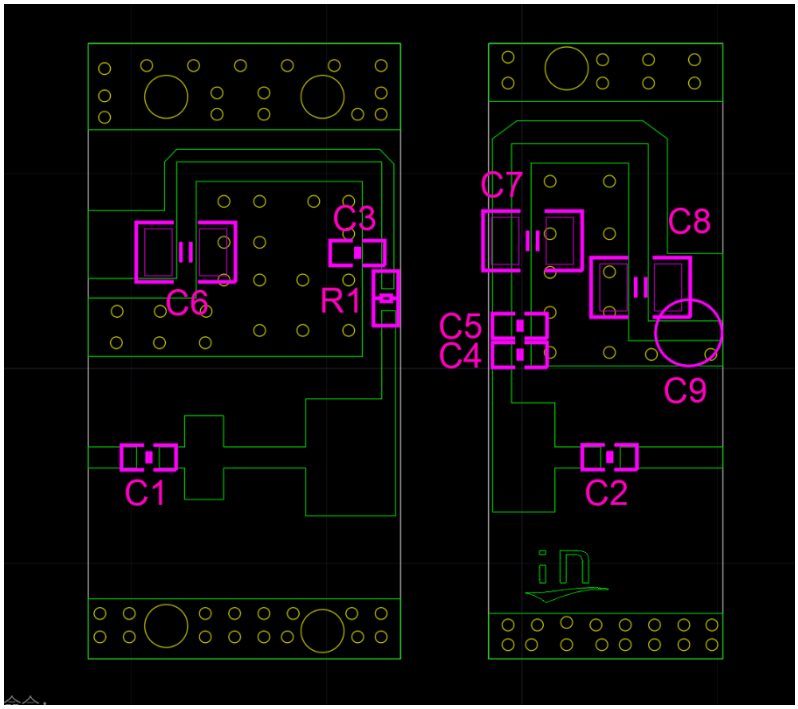



**Figure 3: Picture and Bill of materials of application circuit**

**(Layout Gerber file upon request)**



| Component | Description | Quantity |
|---|---|---|
| U1 | XTAH75065G4H | 1 |
| C1、 C2、C3、 C4 | 1.8pF | 4 |
| C5 | 100pF | 1 |
| C6、 C7、C8 | 10uF/63V | 3 |
| C9 | 470uF/63V | 1 |
| R1 | 10Ω | 1 |

## 6.9-7.4GHz

**Figure 4: Power Gain， Efficiency as function of Pout**

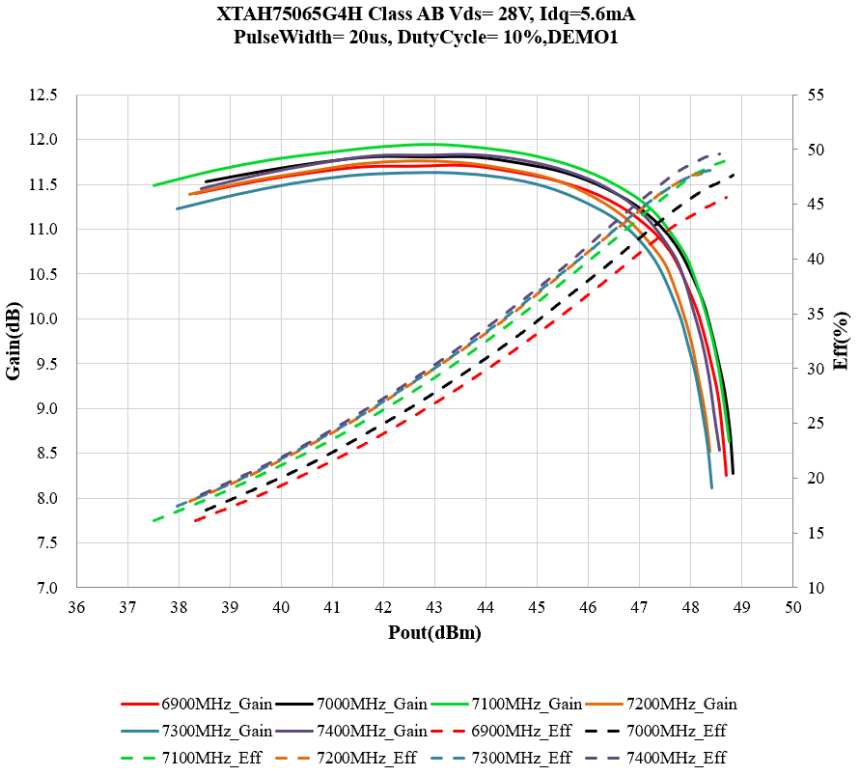
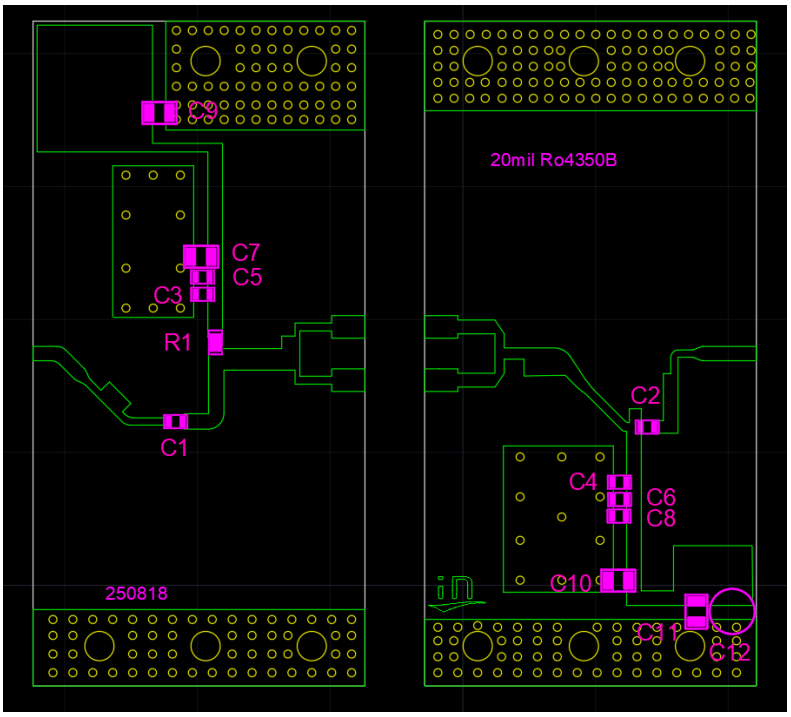


**Figure 5: Picture and Bill of materials of application circuit**

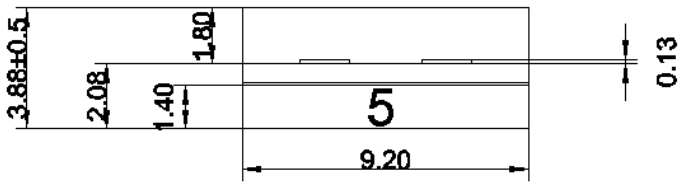
**(Layout Gerber file upon request)**



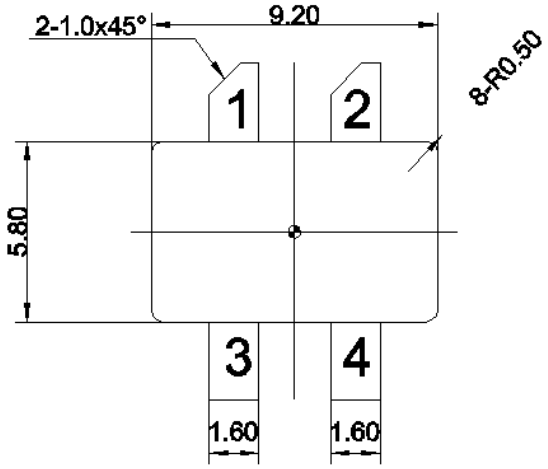

| Component | Description | Quantity |
|---|---|---|
| U1 | XTAH75065G4H | 1 |
| C1、 C2、C3、 C4 | 1.8pF | 4 |
| C5、 C6 | 100pF | 2 |
| C7、C9、C10、C11 | 10uF/63V | 4 |
| C8 | 10nF | 1 |
| C12 | 470uF/63V | 1 |
| R1 | 10 Ω | 1 |

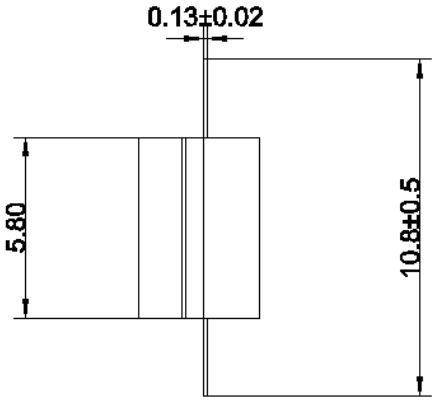
## Package Outline

### Ceramic package; 4 leads




| Pin Connection | | |
|---|---|---|
| 1,2 | 3,4 | 5 |
| Drain | Gate | Source |




Unit:mm
Tolerances(unless specified): x.x ±0.25
x.xx ±0.13

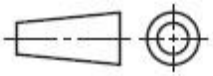
| OUTLINE VERSION | REFERENCE | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | |
| PKG-G4 | | | |  | |

**Figure 1. Package Outline PKG-G4**

# Revision history

**Table 5. Document revision history**

| Date | Revision | Datasheet Status |
|---|---|---|
| **2025/9/2** | **V1.0** | **Preliminary Datasheet Creation** |
| | | |
| | | |
| | | |
| | | |
| | | |

**Application data based on ZYX-25-36/37**

## Notice

Specifications are subject to change without notice. Innogration believes the information within the data sheet to be reliable. Innogration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.
"Typical" parameter is the average values expected by Innogration in quantities and are provided for information purposes only. It can and do vary in different applications and related performance can vary over time. All parameters should be validated by customer's technical experts for each application.
Innogration products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogration product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.
For any concerns or questions related to terms or conditions, please check with Innogration and authorized distributors