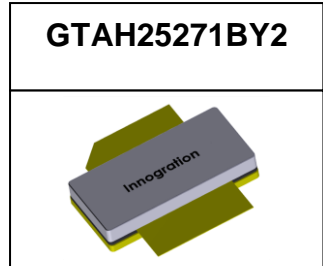




GaN HEMT 28V, 2450MHz 270W, RF Power Transistor

Description

The GTAH25271BY2 is a 270W GaN HEMT, designed for ISM/RF Energy application within 2.4-2.5GHz. It can be used in CW, Pulse and any other modulation modes. There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.



- Typical Class AB RF Performance with device soldered
Vds=28V, Vgs=-3V, CW

| Freq(MHz) | Pin(dBm) | Psat(dBm) | Psat(W) | Gain(dB) | Eff(%) |
|-----------|----------|-----------|---------|----------|--------|
| 2400 | 37.8 | 55.41 | 347.54 | 17.61 | 70.11 |
| 2420 | 38.15 | 55.24 | 334.20 | 17.09 | 70.04 |
| 2440 | 38.44 | 55.08 | 322.11 | 16.64 | 71.45 |
| 2450 | 38 | 54.84 | 304.79 | 16.84 | 71.33 |
| 2475 | 37.6 | 54.63 | 290.40 | 17.03 | 71.63 |
| 2500 | 37.6 | 54.41 | 276.06 | 16.81 | 71.50 |

Recommended driver: ITEH38007P3 (LDMOS)

Applications

- S 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

Table 1. Maximum Ratings

| Rating | Symbol | Value | Unit |
|--------------------------------|------------------|-------------|------|
| Drain--Source Voltage | V _{DSS} | +150 | Vdc |
| Gate--Source Voltage | V _{GS} | -8 to +0.5 | Vdc |
| Operating Voltage | V _{DD} | 30 | Vdc |
| Maximum gate current | I _{gs} | 73.5 | 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 | R _{θJC} | 0.6 | °C /W |



$T_C = 85^\circ\text{C}$, at $P_{diss} = 140\text{W}$

Table 3. Electrical Characteristics (TA = 25°C unless otherwise noted)

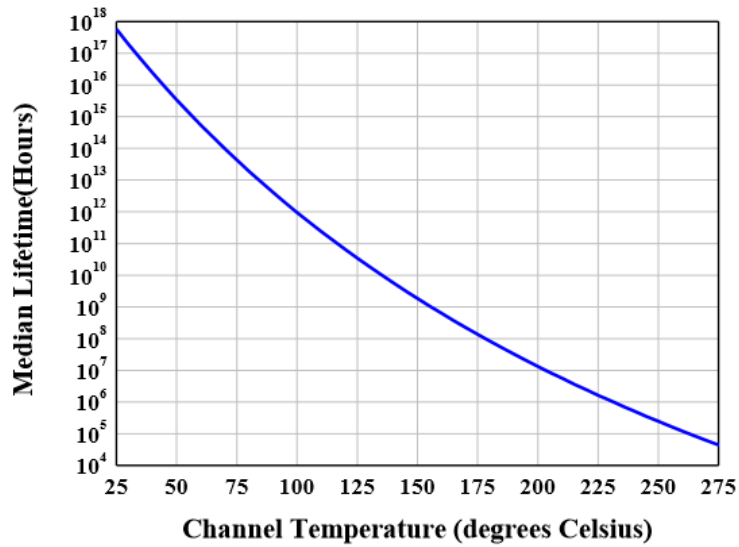
DC Characteristics (measured on wafer prior to packaging)

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------------|---|--------------|-----|------|-----|------|
| Drain-Source Breakdown Voltage | $V_{GS} = -8\text{V}$; $I_{DS} = 73.5\text{mA}$ | V_{DSS} | | 200 | | V |
| Gate Threshold Voltage | $V_{DS} = 10\text{V}$, $I_D = 73.5\text{mA}$ | $V_{GS(th)}$ | -4 | | -2 | V |
| Gate Quiescent Voltage | $V_{DS} = 28\text{V}$, $I_{DS} = 1000\text{mA}$, Measured in Functional Test | $V_{GS(Q)}$ | | -2.4 | | V |

Ruggedness Characteristics

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------|--|--------|-----|------|-----|------|
| Load mismatch capability | 2.5GHz, $P_{out} = 270\text{W}$ Pulsed CW All phase, No device damages | VSWR | | 10:1 | | |

Figure 2: Median Lifetime vs. Channel Temperature





Typical performance

Figure 3: Network analyzer output S11/S21

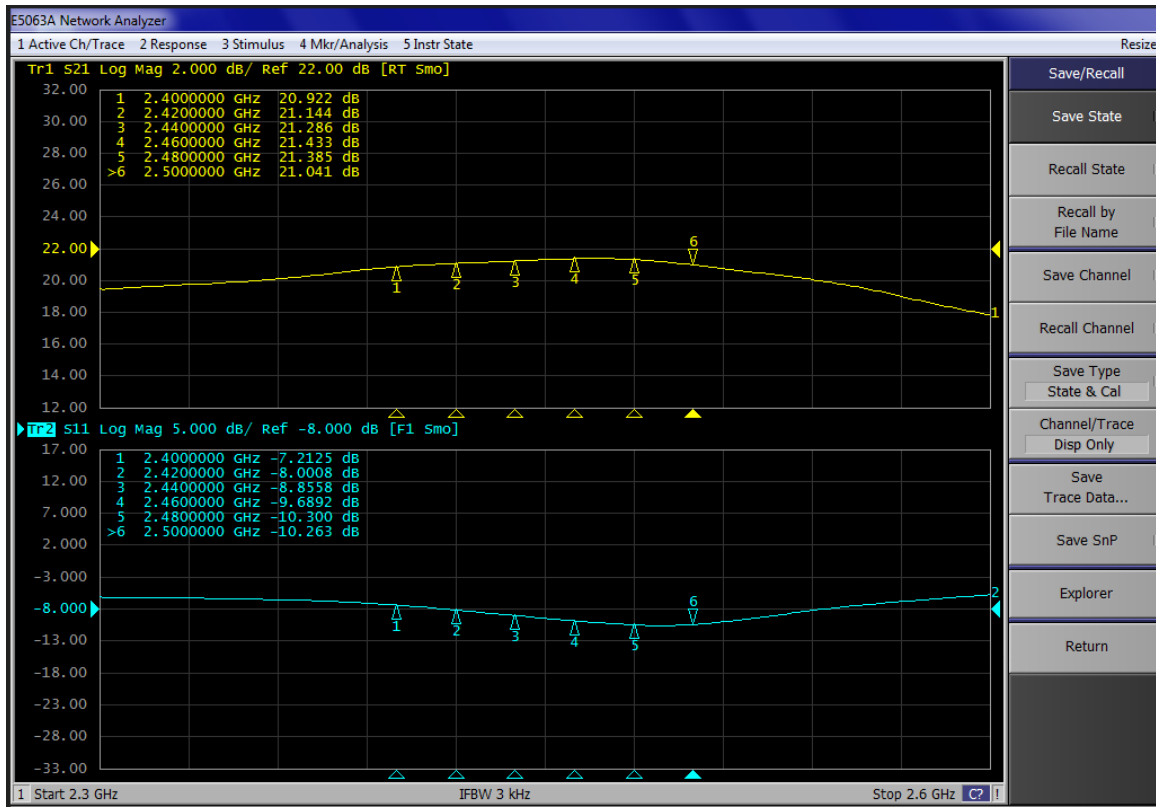


Figure 4: Picture of application board

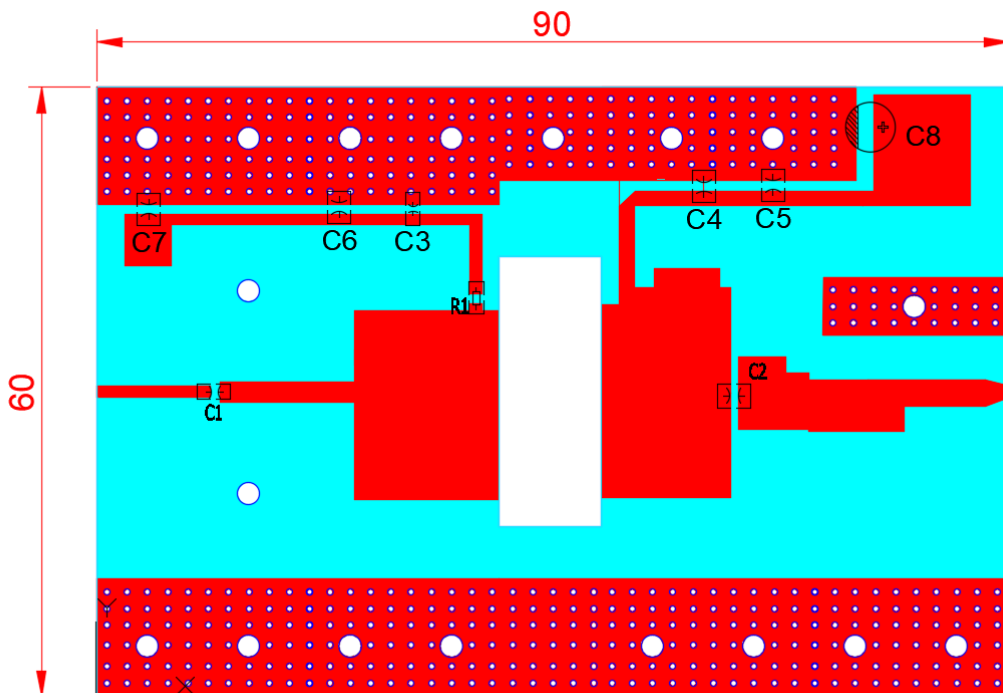




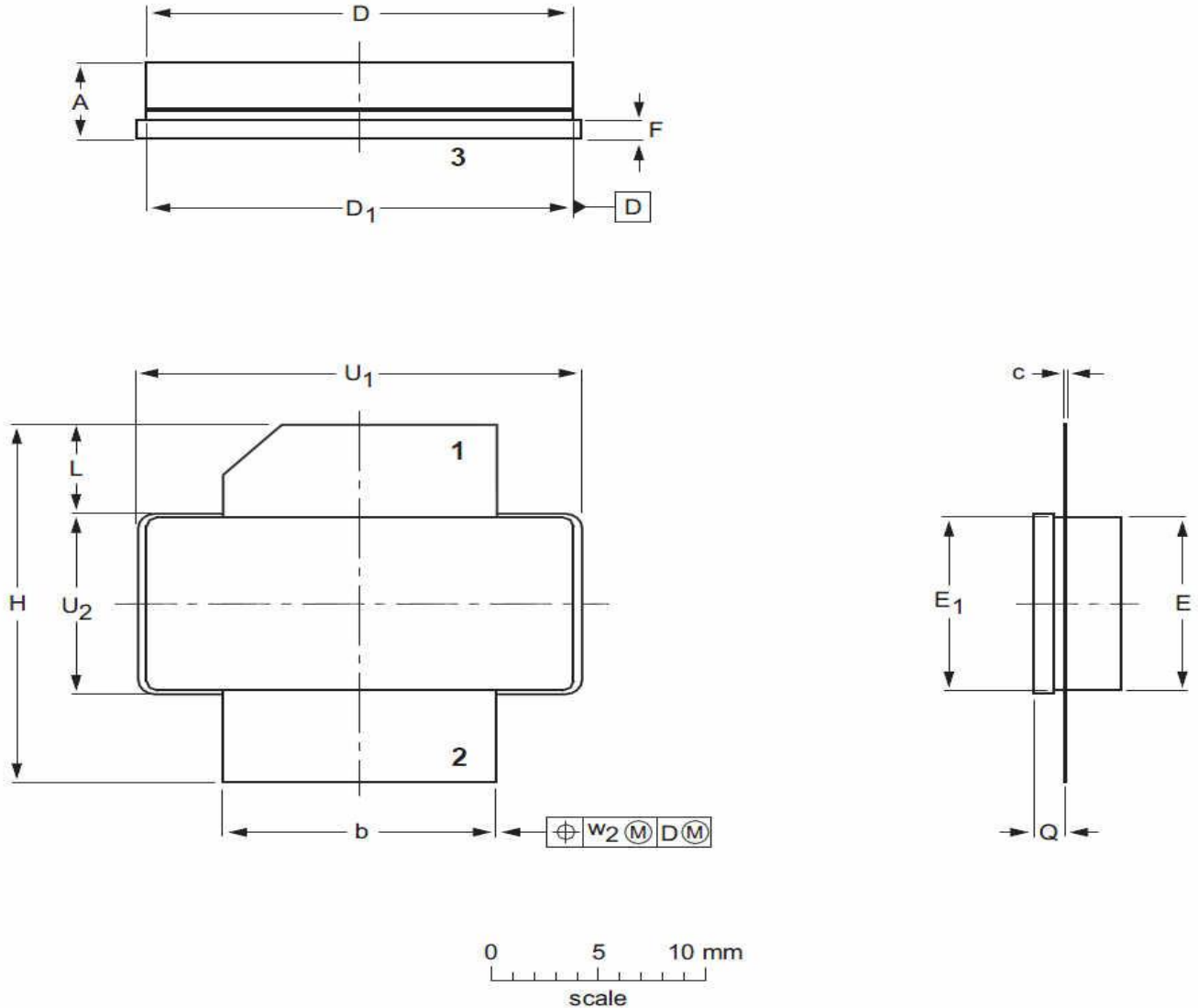
Table 4. Bill of materials of application board (PCB layout upon request)

| Component | Description | Suggestion |
|-----------|--|--|
| C5,C6,C7 | 10uF | 10uF/100V |
| C4, | 15pF(MQ301111) | BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD |
| C1, C3, | 15pF(MQ300805) | BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD |
| C8 | 2200uF/63V | Electrolytic Capacitor |
| R1 | 10 Ω | Chip Resistor |
| C2 | 12pF//MIN02-002CC120J-F | Dubilier - CDE |
| PCB | Rogers TC350, thickness 20 mils, 1oz copper. | |



Package Outline

Earless flanged ceramic package; 2 leads (1—DRAIN, 2—GATE, 3—SOURCE)



| UNIT | A | b | c | D | D ₁ | E | E ₁ | F | H | L | Q | U ₁ | U ₂ | W ₂ |
|--------|-------|-------|-------|-------|----------------|-------|----------------|-------|-------|-------|-------|----------------|----------------|----------------|
| mm | 4.72 | 12.83 | 0.15 | 20.02 | 19.96 | 9.50 | 9.53 | 1.14 | 19.94 | 5.33 | 1.70 | 20.70 | 9.91 | 0.25 |
| | 3.43 | 12.57 | 0.08 | 19.61 | 19.66 | 9.30 | 9.25 | 0.89 | 18.92 | 4.32 | 1.45 | 20.45 | 9.65 | |
| inches | 0.186 | 0.505 | 0.006 | 0.788 | 0.786 | 0.374 | 0.375 | 0.045 | 0.785 | 0.210 | 0.067 | 0.815 | 0.390 | 0.010 |
| | 0.135 | 0.495 | 0.003 | 0.772 | 0.774 | 0.366 | 0.364 | 0.035 | 0.745 | 0.170 | 0.057 | 0.805 | 0.380 | |

| OUTLINE VERSION | REFERENCE | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|-----------|-------|-------|------------------------|------------|
| | IEC | JEDEC | JEITA | | |
| PKG-B2 | | | | | 03/12/2013 |



Revision history

Table 4. Document revision history

| Date | Revision | Datasheet Status |
|------------|----------|--------------------------------|
| 2024/10/12 | V1.0 | Preliminary Datasheet Creation |

Application data based on: YHG-24-17

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