

Gallium Nitride 100W RF Power Transistor

Description

The NGN50100HC2 is an internally pre-matched single ended 100W GaN HEMT with internal prematching, ideal for power amplifier applications from 4 up to 6GHz. This is a versatile transistor that can be used in a multitude of applications with CW, pulsed or complex modulations.

Applications

- 5G wireless communications, Radar, Satcom, Wideband amplifiers
- Doherty amplifiers



Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|-----------------|-------------|-------|
| Drain--Source Voltage | V_{DSS} | 180 | Vdc |
| Gate--Source Voltage | V_{GS} | -8 to +0.5 | Vdc |
| Operating Voltage | V_{DD} | 55 | Vdc |
| Maximum gate current | I_{GS} | 16 | mA |
| Storage Temperature Range | T_{STG} | -65 to +150 | °C |
| Case Operating Temperature | T_c | +150 | °C |
| Operating Junction Temperature | T_J | +225 | °C |
| Load Mismatch | VSWR | 10:1 | Ψ |
| Thermal Resistance, Junction to Case $T_C=85^{\circ}C$, $P_{DISS}=40W$ Pulsed | $R_{\theta JC}$ | 1.3 | °C /W |

Electrical Characteristics (T = 25°C unless otherwise noted)

DC Characteristics

| Characteristics | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--------------------------------|-------------|------|------|------|------|-------------------------------|
| Drain-Source Breakdown Voltage | V_{DSS} | | 200 | | V | $V_{GS}=-8V$; $I_{DS}=8mA$ |
| Gate Quiescent Voltage | $V_{GS(Q)}$ | | -3.1 | | V | $V_{DS}=50V$, $I_{DS}=100mA$ |

RF Characteristics (Measured in std test fixture, $V_D=48V$, $F=5.0GHz$, $I_{DS}=100mA$, $T=25^{\circ}C$)

| Characteristics | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------|--------------|------|------|------|------|------------|
| Output power | P-1dB | | 90 | | W | |
| Output power | P-3dB | | 110 | | W | |
| Power gain | GP-1dB | | 14 | | dB | |
| Efficiency | η P-3dB | | 57 | | % | |

Performance measured in test fixture tuned for 4.8-5.0 GHz

VDD = 48 Vdc, IDQ = 100mA, Tc=25°C,
Pulsed RF, 100us, duty cycle=10%,

| Freq (MHz) | P-1dB (dBm) | P-1dB (W) | η (%) | Gain (dB) | P-3dB (dBm) | P-3dB (W) | η (%) |
|------------|-------------|-----------|------------|-----------|-------------|-----------|------------|
| 4800 | 49.96 | 99.05 | 54.34 | 13.49 | 50.83 | 121.12 | 58.32 |
| 4900 | 49.95 | 90.93 | 54.65 | 14.26 | 50.66 | 116.49 | 58.66 |
| 5000 | 49.23 | 83.69 | 52.86 | 14.06 | 50.53 | 112.94 | 57.21 |

CW: Pin=38dBm

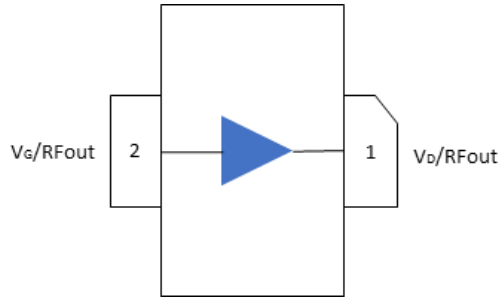
| Freq (MHz) | Psat (dBm) | Psat (W) | Ibs (A) | η (%) |
|------------|------------|----------|---------|------------|
| 4800 | 50.18 | 104.23 | 4.04 | 51.60 |
| 4900 | 50.10 | 102.33 | 3.93 | 52.08 |
| 5000 | 50.12 | 102.80 | 4.00 | 51.40 |

Performance measured in test fixture tuned for 5.3-5.9GHz

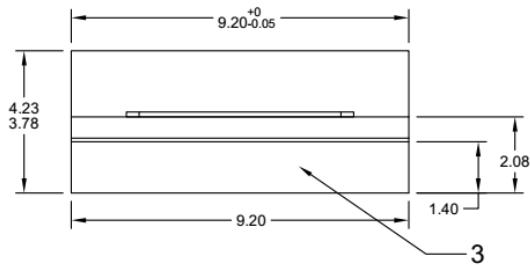
VDD = 48 Vdc, I_{bq} = 100mA, Tc=25°C, Pulse width=100us, duty cycle=10%,

| Freq (MHz) | P-1dB (dBm) | P-1dB (W) | η (%) | Gain (p-1dB) | P-3dB (dBm) | P-3dB (W) | η (%) |
|------------|-------------|-----------|------------|--------------|-------------|-----------|------------|
| 5300 | 48.77 | 75.38 | 51.67 | 13.17 | 49.94 | 98.58 | 55.53 |
| 5400 | 48.87 | 77.14 | 49.94 | 13.78 | 50.27 | 106.43 | 53.95 |
| 5500 | 49.23 | 83.8 | 49.74 | 14.18 | 50.67 | 116.77 | 54.16 |
| 5600 | 49.22 | 83.64 | 49.00 | 13.62 | 50.71 | 117.72 | 54.62 |
| 5700 | 49.05 | 80.3 | 48.58 | 14.43 | 50.64 | 115.91 | 53.57 |
| 5800 | 49.04 | 80.0 | 50.23 | 13.87 | 50.37 | 108.88 | 54.25 |
| 5900 | 48.21 | 66.16 | 49.14 | 13.76 | 49.82 | 95.93 | 54.59 |

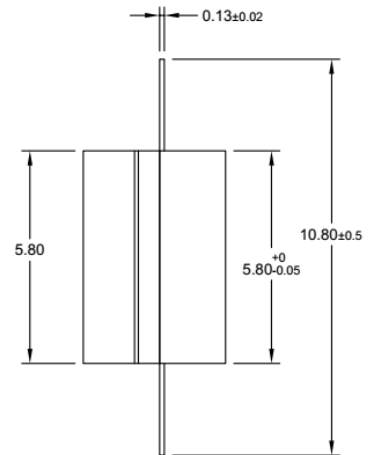
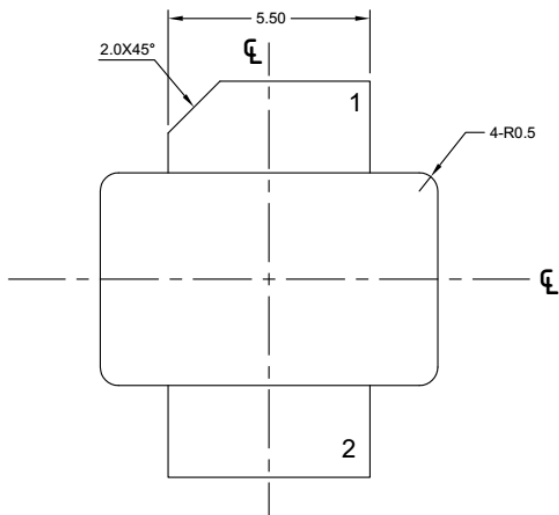
Package pinning



Package Outline Metal-Ceramic Package



| Pin Connection | | |
|----------------|------|--------|
| 1 | 2 | 3 |
| 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 | | |
| C2 | | | | | |