



2110MHz-2170MHz, 120W, 28V High Power RF LDMOS FETs

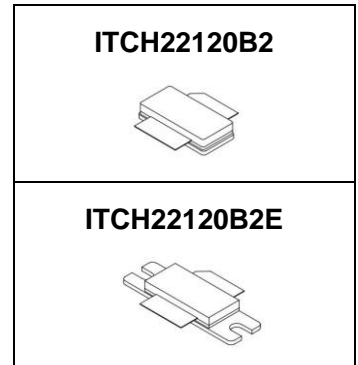
Description

The ITCH22120B2 is a 120-watt, internally matched LDMOS FET, designed for multicarrier WCDMA/PCS/DCS/LTE base station and ISM applications with frequencies from 2000 to 2200 MHz. It Can be used in Class AB/B and Class C for all typical cellular base station modulation formats.

•Typical Performance (On Innegration fixture with device soldered):

VDD = 28 Volts, I_{DQ} = 780 mA, Pulse CW, Pulse Width=10 us, Duty cycle=12% .

| Frequency | G _p (dB) | P _{-1dB} (dBm) | η _D @P ₋₁ (%) | P _{-3dB} (dBm) | η _D @P ₋₃ (%) |
|-----------|---------------------|-------------------------|-------------------------------------|-------------------------|-------------------------------------|
| 2110 MHz | 18.9 | 50.8 | 53.8 | 51.8 | 56.9 |
| 2140 MHz | 18.8 | 50.5 | 52.4 | 51.6 | 56.3 |
| 2170 MHz | 18.5 | 50.3 | 50.7 | 51.5 | 54.3 |



Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Internally Matched for Ease of Use
- Excellent thermal stability, low HCI drift
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Pb-free, RoHS-compliant

Table 1. Maximum Ratings

| Rating | Symbol | Value | Unit |
|--------------------------------|------------------|-------------|------|
| Drain--Source Voltage | V _{DSS} | 70 | Vdc |
| Gate--Source Voltage | V _{GS} | -10 to +10 | Vdc |
| Operating Voltage | V _{DD} | +32 | Vdc |
| 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 T _C = 85°C, T _J =200°C, DC test | R _{θJC} | 0.45 | °C/W |

Table 3. ESD Protection Characteristics

| Test Methodology | Class |
|-------------------------------------|---------|
| Human Body Model (per JESD22--A114) | Class 2 |

Table 4. Electrical Characteristics (TA = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

DC Characteristics

| | | | | | |
|--|------------------|----|----|--|---|
| Drain-Source Breakdown Voltage (V _{GS} =0V; I _D =1mA) | V _{DSS} | 65 | 70 | | V |
|--|------------------|----|----|--|---|



| | | | | | |
|--|--------------|-----|-----|-----|---------------|
| Zero Gate Voltage Drain Leakage Current ($V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$) | I_{DSS} | | | 10 | μA |
| Gate--Source Leakage Current ($V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$) | I_{GSS} | | | 1 | μA |
| Gate Threshold Voltage ($V_{DS} = 28\text{ V}$, $I_D = 600\text{ uA}$) | $V_{GS(th)}$ | | 1.8 | | V |
| Gate Quiescent Voltage ($V_{DD} = 28\text{ V}$, $I_{DQ} = 800\text{ mA}$, Measured in Functional Test) | $V_{GS(Q)}$ | 2.2 | 2.7 | 3.2 | V |

Functional Tests (In Innogrations demo, 50 ohm system) : $V_{DD} = 28\text{ Vdc}$, $I_{DQ} = 780\text{ mA}$, $f = 2110\text{ MHz}$, Pulse CW, Pulse Width=10 us, Duty cycle=12% .

| | | | | | |
|------------------------|------------|-----|------|-----|-----|
| Power Gain | G_p | --- | 18.9 | --- | dB |
| 1 dB Compression Point | P_{-1dB} | --- | 50.8 | --- | dBm |
| 3dB Compression Point | P_{-3dB} | --- | 51.8 | --- | dBm |
| Drain Efficiency@P3dB | η_D | --- | 56.9 | --- | % |
| Input Return Loss | IRL | --- | -7 | --- | dB |

Load Mismatch (In Innogrations Test Fixture, 50 ohm system): $V_{DD} = 28\text{ Vdc}$, $I_{DQ} = 800\text{ mA}$, $f = 2110\text{ MHz}$

| | |
|---|-----------------------|
| VSWR 10:1 at 120W pulse CW Output Power | No Device Degradation |
|---|-----------------------|

TYPICAL CHARACTERISTICS

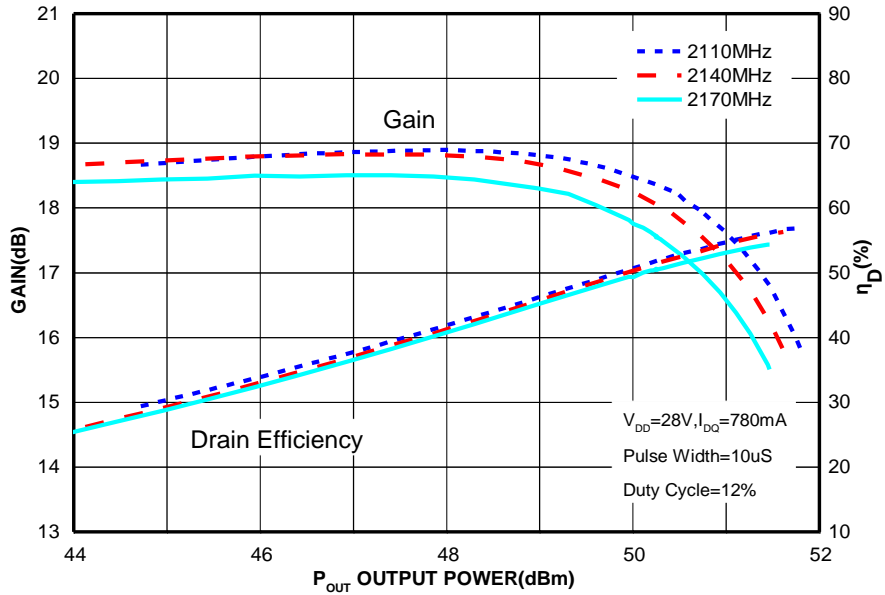


Figure 1. Power gain and drain efficiency as function of Pulse output power

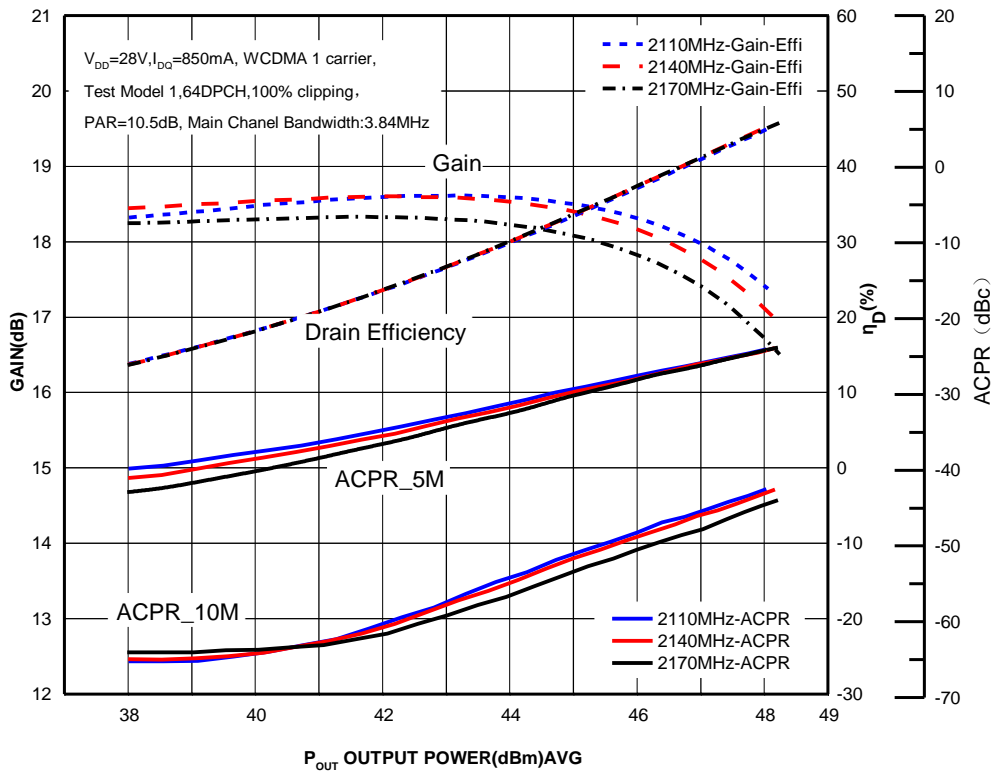
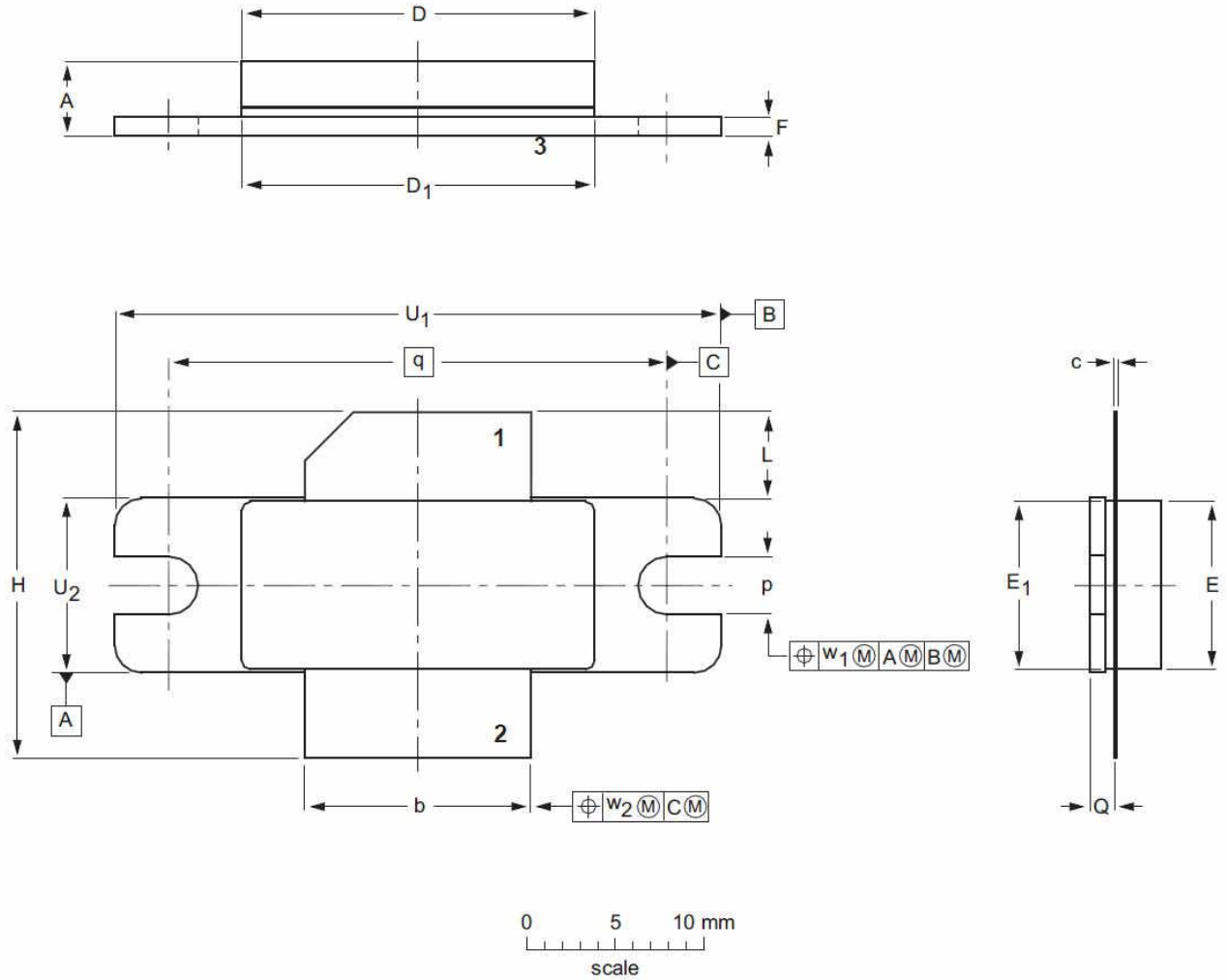


Figure 2. Single-Carrier WCDMA Power gain and drain efficiency and ACPR at 5 MHz and at 10 MHz as function of average output power



Package Outline

Flanged ceramic package; 2 mounting holes; 2 leads (1—DRAIN、2—GATE、3—SOURCE)

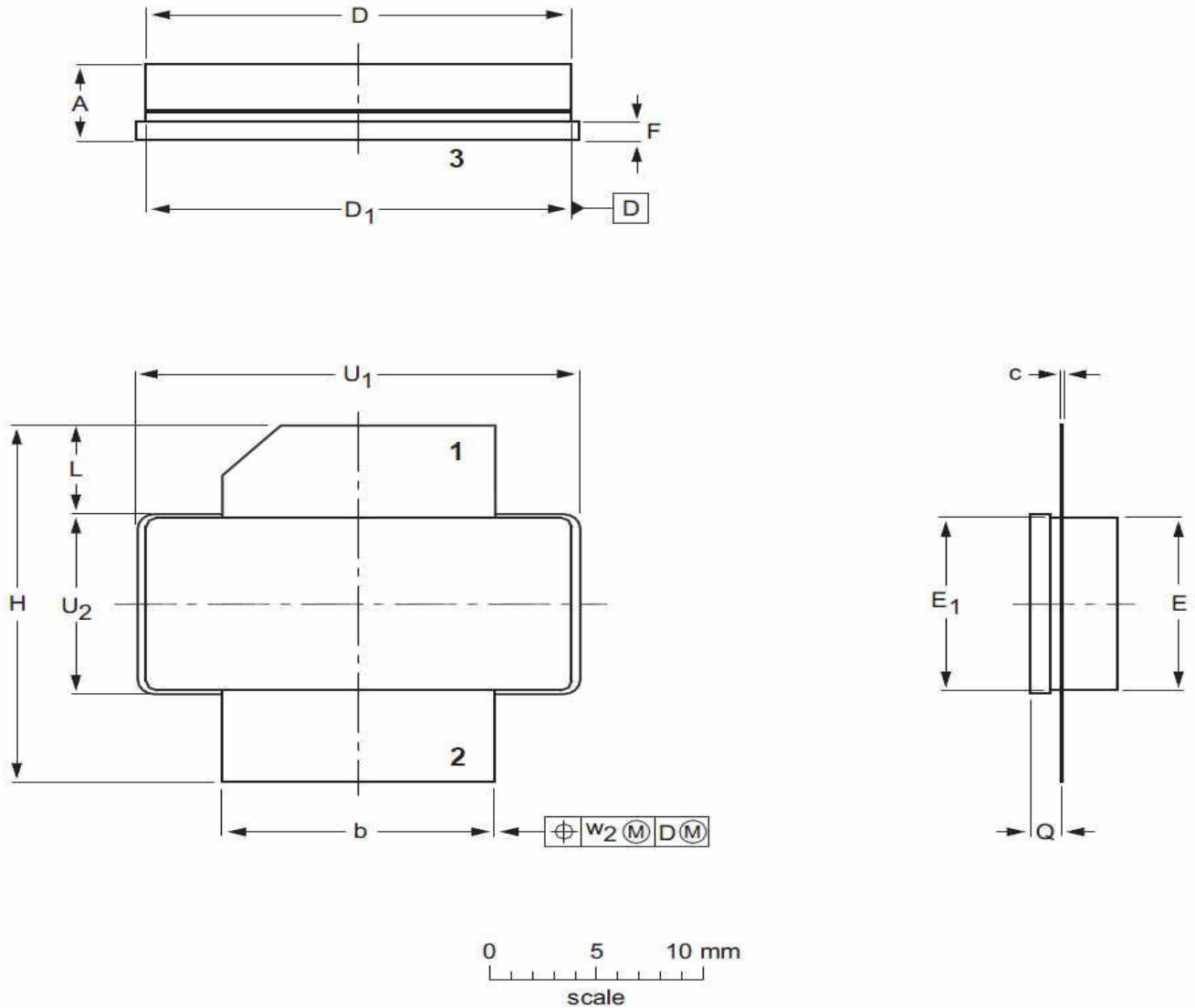


| UNIT | A | b | c | D | D ₁ | E | E ₁ | F | H | L | p | Q | q | U ₁ | U ₂ | W ₁ | W ₂ |
|--------|-------|-------|-------|-------|----------------|-------|----------------|-------|-------|-------|-------|-------|-------|----------------|----------------|----------------|----------------|
| mm | 4.72 | 12.83 | 0.15 | 20.02 | 19.96 | 9.50 | 9.53 | 1.14 | 19.94 | 5.33 | 3.38 | 1.70 | 27.94 | 34.16 | 9.91 | 0.25 | 0.51 |
| | 3.43 | 12.57 | 0.08 | 19.61 | 19.66 | 9.30 | 9.25 | 0.89 | 18.92 | 4.32 | 3.12 | 1.45 | | 33.91 | 9.65 | | |
| inches | 0.186 | 0.505 | 0.006 | 0.788 | 0.786 | 0.374 | 0.375 | 0.045 | 0.785 | 0.210 | 0.133 | 0.067 | 1.100 | 1.345 | 0.390 | 0.01 | 0.02 |
| | 0.135 | 0.495 | 0.003 | 0.772 | 0.774 | 0.366 | 0.364 | 0.035 | 0.745 | 0.170 | 0.123 | 0.057 | | 1.335 | 0.380 | | |

| OUTLINE VERSION | REFERENCE | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|-----------|-------|-------|------------------------|------------|
| | IEC | JEDEC | JEITA | | |
| PKG-B2E | | | | | 03/12/2013 |



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 5. Document revision history

| Date | Revision | Datasheet Status |
|------------|----------|-----------------------|
| 2017/03/27 | Rev 1.0 | Preliminary Datasheet |
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