

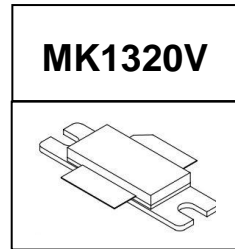


## 350W, 50V High Power RF LDMOS FETs

### Description

The MK1320V is a 350-watt, internally matched LDMOS FETs, designed for applications including cooking, heating and medical with frequencies from 1000 to 1400 MHz.

It can be used for 1300MHz particle accelerator CW application, avionics and L band commercial pulse application.



•Typical Performance (on Innegration fixture with device soldered): Tcase = 25 degree C, Pulse CW signal, 100us 20% duty cycle, DD=50V, Idq=100mA

| Freq(MHz) | P1(dBm) | P3(dBm) | P3(W) | EFF(%)@P3 | Gain (dB)@P1 |
|-----------|---------|---------|-------|-----------|--------------|
| 1300      | 55      | 56      | 400   | 57.5      | 19           |

CW signal, VDD=50V, Idq=100mA

| Freq(MHz) | Pout(W) | Eff(%) | Power Gain(dB) |
|-----------|---------|--------|----------------|
| 1300      | 340     | 53     | 16.7           |

### Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Input internally matched for Ease of Use
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Excellent thermal stability, low HCI drift
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

**Table 1. Maximum Ratings**

| Rating                         | Symbol    | Value       | Unit |
|--------------------------------|-----------|-------------|------|
| Drain--Source Voltage          | $V_{DSS}$ | 125         | Vdc  |
| Gate--Source Voltage           | $V_{GS}$  | -10 to +10  | Vdc  |
| Operating Voltage              | $V_{DD}$  | +55         | 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 (See note 1)<br>Tcase= 85°C, 1300MHz,100us, 20% duty cycle, 50V,<br>Idq=100mA | $Z_{\theta JC}$ | 0.05  | °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 |
|--|---------------------|-----|-----|-----|------|
| <b>DC Characteristics</b>  |                     |     |     |     |      |
| Drain-Source Breakdown Voltage<br>(V <sub>GS</sub> =0V; I <sub>D</sub> =100uA)                           | V <sub>DSS</sub>    |     | 125 | —   | V    |
| Zero Gate Voltage Drain Leakage Current<br>(V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0 V)                | I <sub>DSS</sub>    | —   | —   | 10  | μA   |
| Gate--Source Leakage Current<br>(V <sub>GS</sub> = 6 V, V <sub>DS</sub> = 0 V)                           | I <sub>GSS</sub>    | —   | —   | 1   | μA   |
| Gate Threshold Voltage<br>(V <sub>DS</sub> = 50V, I <sub>D</sub> = 600 uA)                               | V <sub>GS(th)</sub> | —   | 1.6 | —   | V    |
| Gate Quiescent Voltage<br>(V <sub>DD</sub> = 50V, I <sub>DQ</sub> = 100 mA, Measured in Functional Test) | V <sub>GS(Q)</sub>  |     | 2.1 |     | V    |

**Functional Tests (In Innogrations Test Fixture, 50 ohm system)** :V<sub>DD</sub> =50 Vdc, I<sub>DQ</sub> = 100mA, f = 1300 MHz, Pulsed CW Signal Measurements(100us, 10%). Pin=4W

|                       |                  |  |     |  |    |
|-----------------------|------------------|--|-----|--|----|
| Output Power          | P <sub>out</sub> |  | 320 |  | W  |
| Power Gain            | G <sub>p</sub>   |  | 19  |  | dB |
| Drain Efficiency@Pout | η <sub>D</sub>   |  | 55  |  | %  |
| Input Return Loss     | IRL              |  | -7  |  | dB |

**Load Mismatch (In Innogrations Test Fixture, 50 ohm system):** V<sub>DD</sub> = 50Vdc, I<sub>DQ</sub> = 100 mA, f = 1300 MHz

|   |                       |
|---|-----------------------|
| VSWR 10:1 at 320W pulse CW Output Power | No Device Degradation |
|---|-----------------------|

Figure 1: RF Pulsed CW sweep (Vdd=50V, Idq=100maA, 100us, 10%)

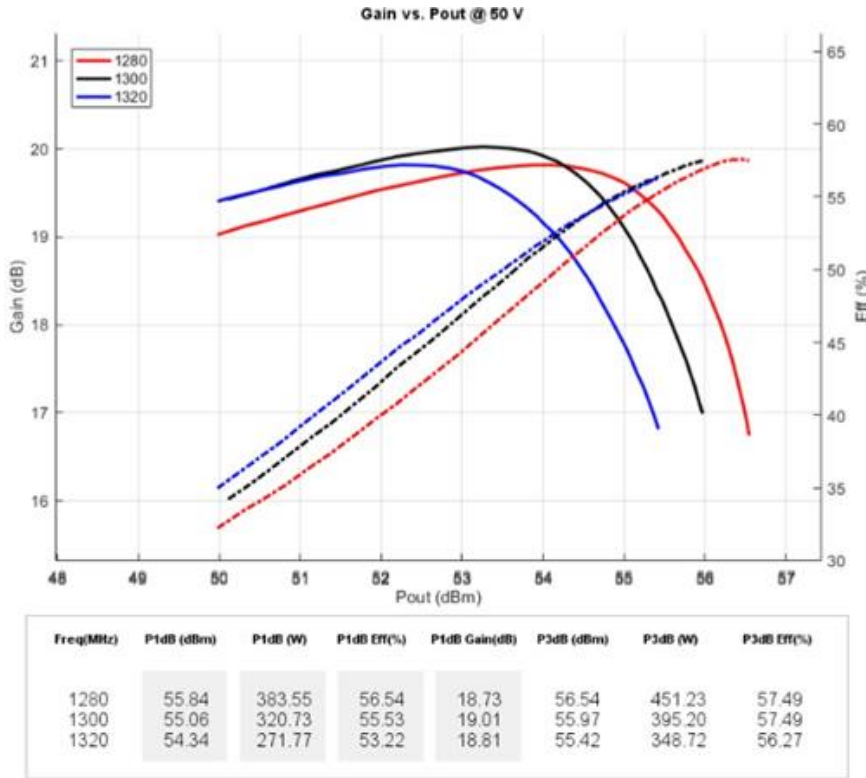
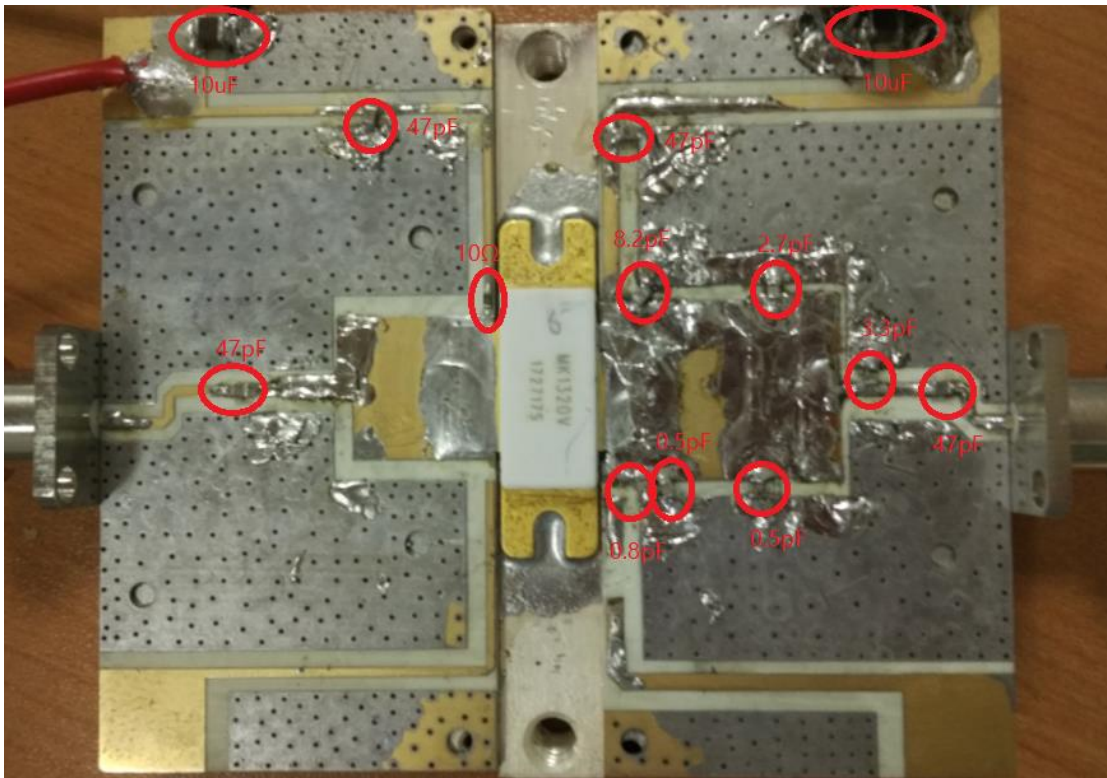


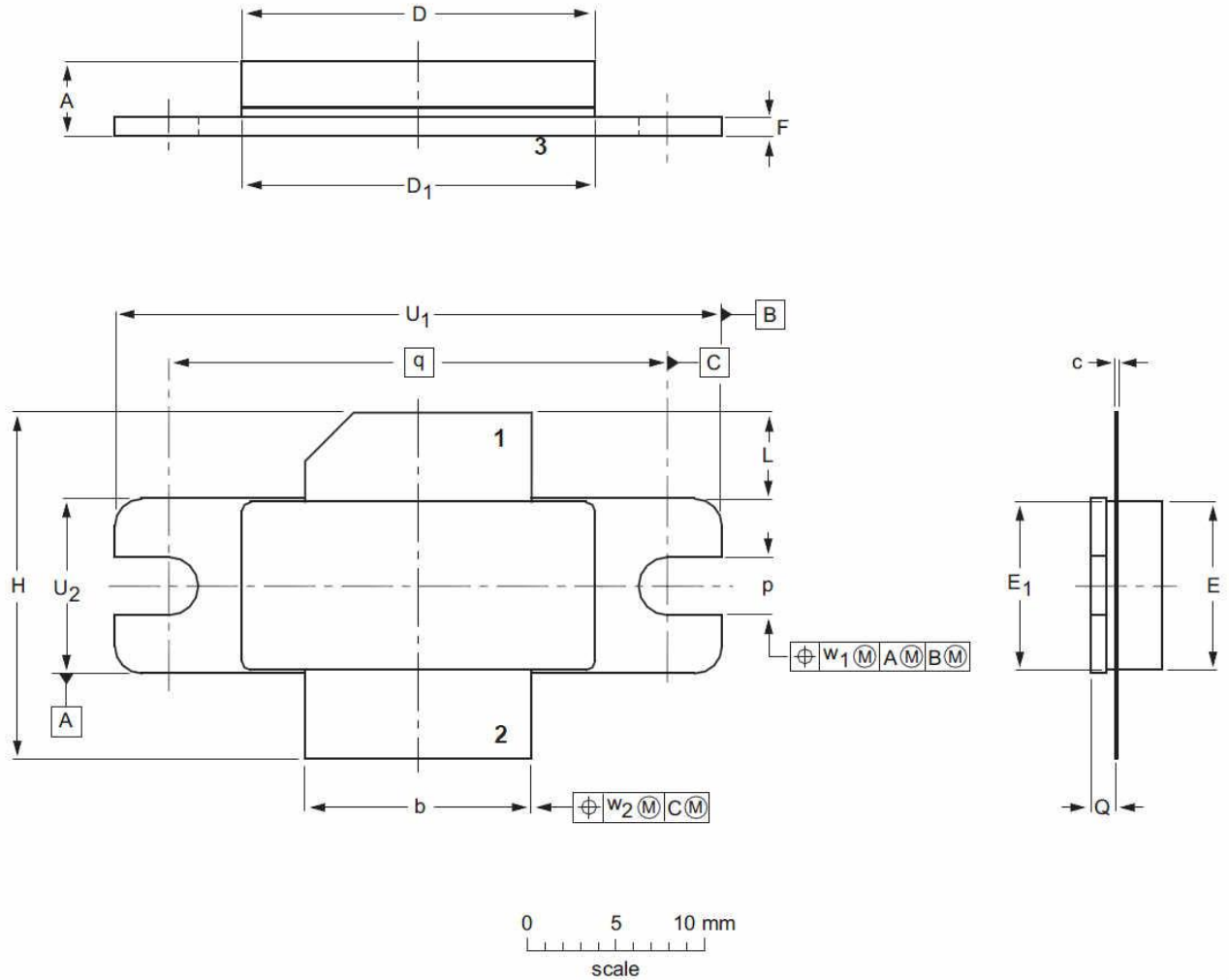
Figure 2: Picture of application fixture





### Package Outline

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



| UNIT   | A     | b     | c     | D     | D <sub>1</sub> | E     | E <sub>1</sub> | F     | H     | L     | p     | Q     | q     | U <sub>1</sub> | U <sub>2</sub> | W <sub>1</sub> | W <sub>2</sub> |
|--------|-------|-------|-------|-------|----------------|-------|----------------|-------|-------|-------|-------|-------|-------|----------------|----------------|----------------|----------------|
| 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 |



## Revision history

Table 5. Document revision history

| Date      | Revision | Datasheet Status               |
|-----------|----------|--------------------------------|
| 2017/3/31 | V1       | Preliminary Datasheet Creation |
| 2017/7/14 | V2       | Modified test data             |

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