

MK0560VP LDMOS TRANSISTOR

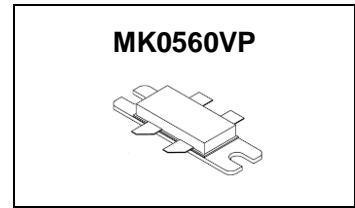
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Preliminary Datasheet V1.0

550W, 50V High Power RF LDMOS FETs

Description

The MK0560VP is a 550-watt capable, high performance, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 0.6 GHz.

It is featured for high power and high ruggedness, suitable for Industrial, Scientific and Medical application, as well as FM radio, VHF TV and Aerospace applications.



- Typical performance(on 1.6-30MHz wideband test fixture with device soldered)

Signal: pulse CW, pulse width:100us, duty cycle:10%,Vgs=3.25V,Vds=50V,Idq=100mA

| Freq(MHz) | Pin(dBm) | Psat(dBm) | Psat(W) | IDS(A) | Gain(dB) | η (%) |
|-----------|----------|-----------|---------|--------|----------|------------|
| 1.6 | 29 | 56.8 | 479 | 1.63 | 27.8 | 62 |
| 5 | 27 | 56.9 | 490 | 1.488 | 29.9 | 70 |
| 10 | 26.6 | 56.7 | 468 | 1.436 | 30.1 | 70 |
| 15 | 29.6 | 56.7 | 468 | 1.416 | 27.1 | 71 |
| 20 | 33.2 | 56.9 | 490 | 1.455 | 23.7 | 72 |
| 25 | 33.1 | 56.7 | 468 | 1.449 | 23.6 | 69 |
| 30 | 32.8 | 56.7 | 468 | 1.47 | 23.9 | 68 |

Signal: CW Vgs=3.25V,Vds=50V, Idq=100mA

| Freq(MHz) | Pin(dBm) | Psat(dBm) | Psat(W) | IDS(A) | Gain(dB) | η (%) |
|-----------|----------|-----------|---------|--------|----------|------------|
| 10 | 29.7 | 56.9 | 490 | 13.6 | 27.2 | 72 |
| 20 | 33.6 | 56.8 | 479 | 13.4 | 23.2 | 71 |
| 30 | 34.8 | 56.8 | 479 | 13.7 | 22 | 70 |

Features

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

Suitable Applications

- 30-88MHz (Ground communication)
- 54-88MHz (TV VHF I)
- 88-108MHz (FM)
- 160-230MHz (TV VHF III)
- 136-174MHz (Commercial ground communication)
- Laser Exciter
- Synchrotron
- MRI
- Plasma generator
- Weather Radar

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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 $T_C = 85^\circ\text{C}$, $P_{out} = 500\text{W CW}$, | $R_{\theta JC}$ | TBD | °C/W |

Table 3. ESD Protection Characteristics

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

Table 4. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---------------|-----|------|-----|------------------|
| DC Characteristics | | | | | |
| Drain-Source Voltage $V_{GS} = 0$, $I_{DS} = 1.0\text{mA}$ | $V_{(BR)DSS}$ | | 122 | | V |
| Zero Gate Voltage Drain Leakage Current ($V_{DS} = 50\text{V}$, $V_{GS} = 0\text{V}$) | I_{DSS} | — | — | 1 | μA |
| Gate—Source Leakage Current ($V_{GS} = 10\text{V}$, $V_{DS} = 0\text{V}$) | I_{GSS} | — | — | 1 | μA |
| Gate Threshold Voltage ($V_{DS} = 50\text{V}$, $I_D = 600\mu\text{A}$) | $V_{GS(th)}$ | — | 2.59 | — | V |
| Gate Quiescent Voltage ($V_{DD} = 50\text{V}$, $I_D = 100\text{mA}$, Measured in Functional Test) | $V_{GS(Q)}$ | — | 3.25 | — | V |
| Drain source on state resistance ($V_{DS} = 0.1\text{V}$, $V_{GS} = 10\text{V}$) Each section side of device measured | $R_{ds(on)}$ | | 189 | | $\text{m}\Omega$ |
| Common Source Input Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$) Each section side of device measured | C_{ISS} | | 158 | | pF |
| Common Source Output Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$) Each section side of device measured | C_{OSS} | | 46.8 | | pF |
| Common Source Feedback Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$) Each section side of device measured | C_{RSS} | | 1.24 | | pF |

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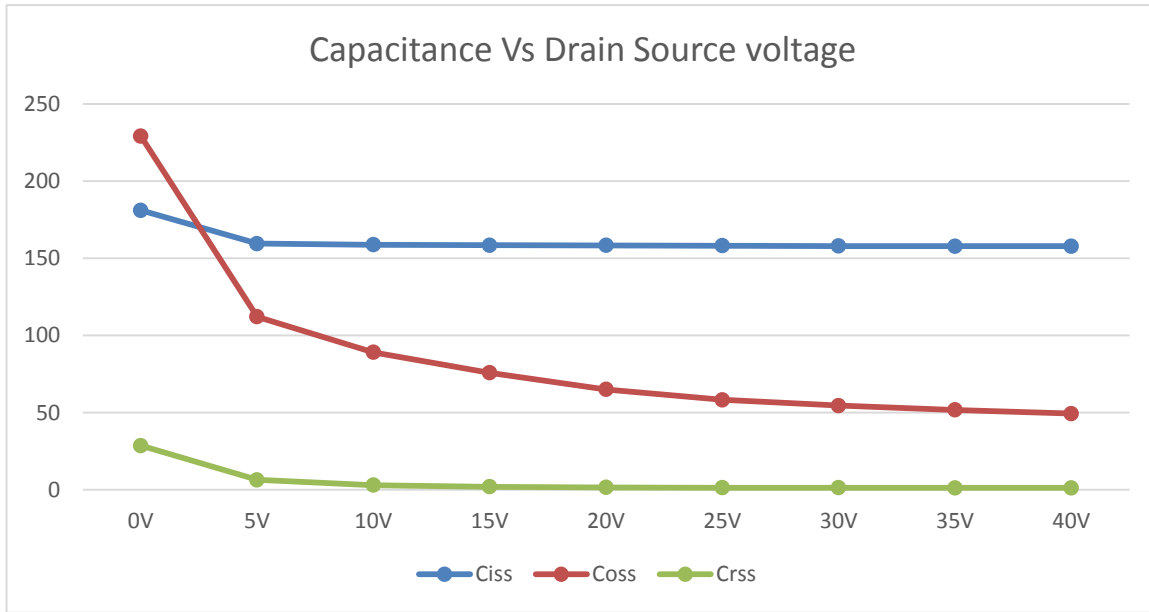
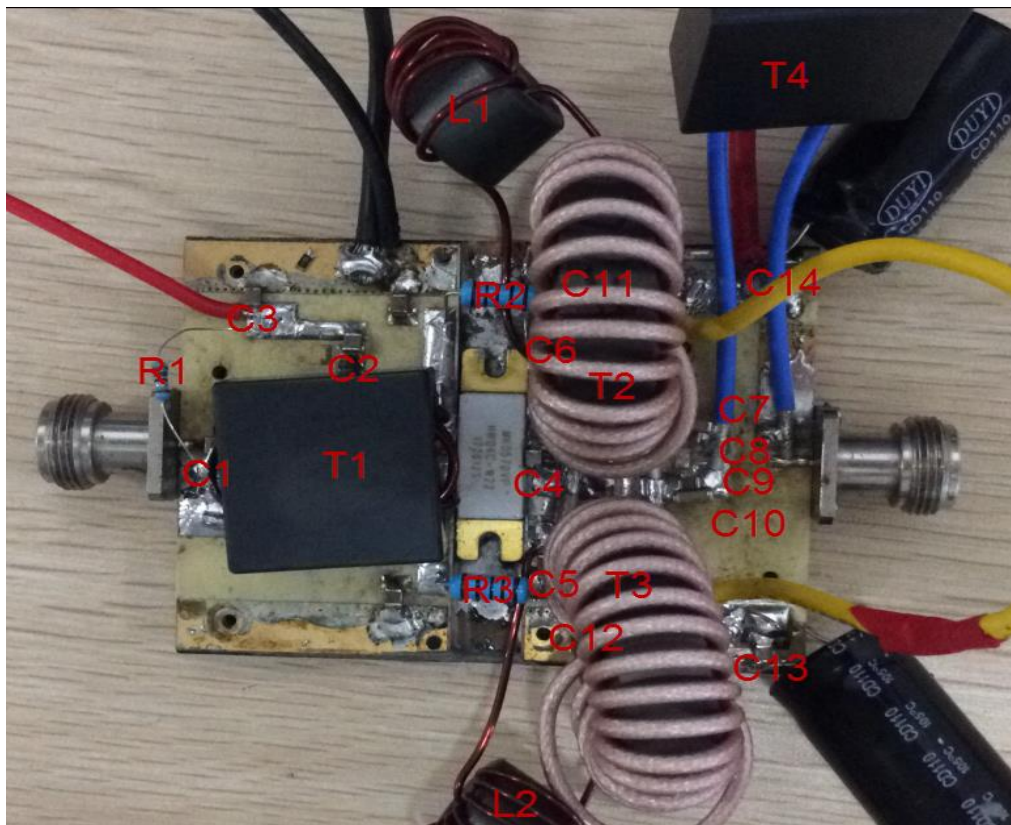


Figure 1: 1.6-30MHz wideband test fixture picture



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BOM of 1.6-30MHz test fixture

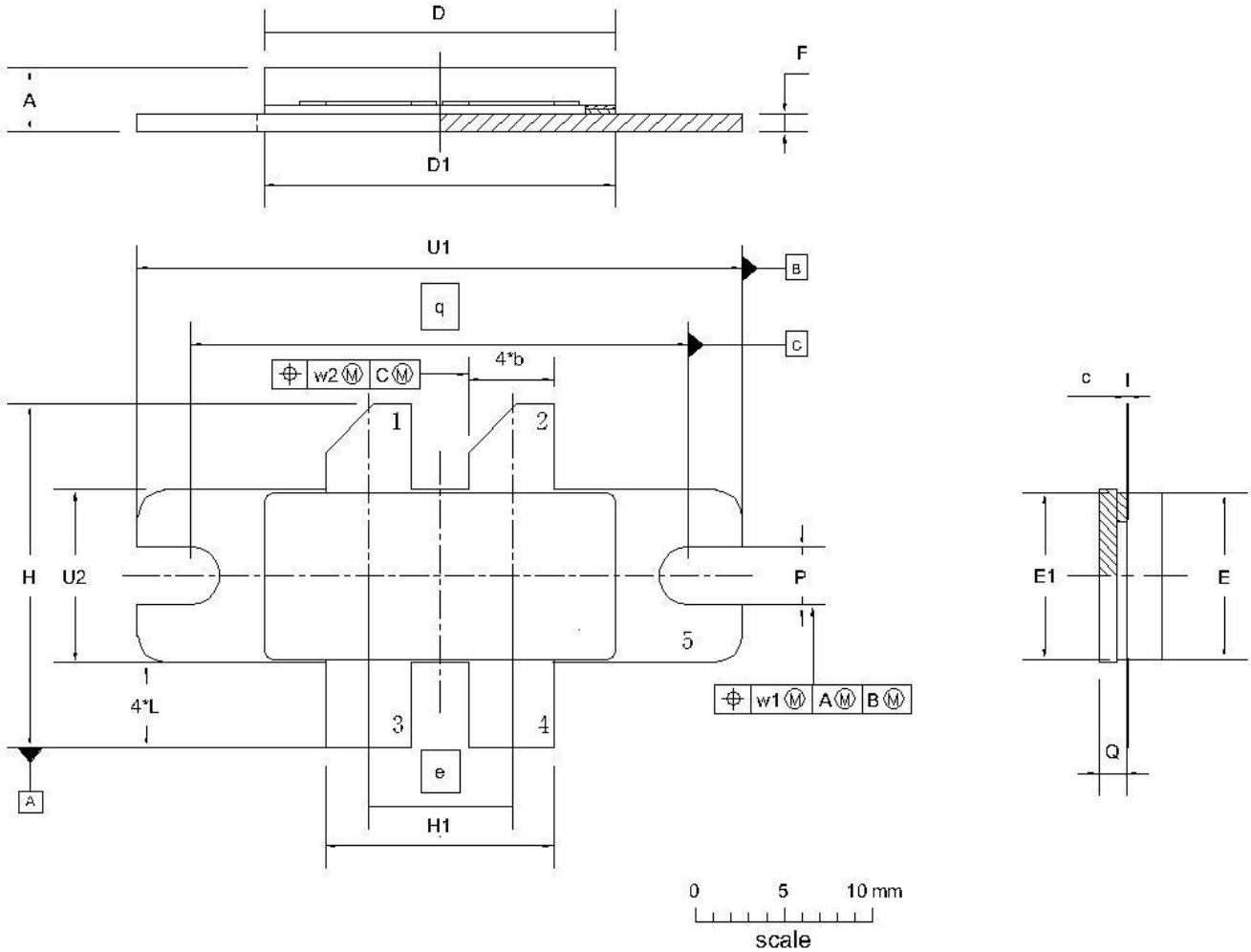
| | | |
|----------------------|---------------------|-----------|
| C1 | 1000PF | ATC100B |
| C2,C8,C9, C11,C12 | 3900PF | ATC800B |
| C3,C13,C14 | 10UF | 10UF/50V |
| C5,C6 | 1UF | 1UF/50V |
| C4 | 100PF | ATC100B |
| C7,C10 | 2.2UF | 2.2UF/50V |
| T1 | 1:04 | No 43 |
| T2,T3 | 17 Ω ,1000mm | No 73 |
| T4 | 50 Ω ,25mm | No 43 |
| L1,L2 | 18 turns | No 43 |
| R1 | 51 Ω | |
| R2,R3 | 1000 Ω | |

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Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads



| UNIT | A | b | C | D | D ₁ | e | E | E ₁ | F | H | H ₁ | L | p | Q | q | U ₁ | U ₂ | W ₁ | W ₂ |
|--------|-------|-------|-------|-------|----------------|------|-------|----------------|-------|-------|----------------|-------|-------|-------|-------|----------------|----------------|----------------|----------------|
| mm | 4.72 | 3.94 | 0.15 | 20.02 | 19.96 | 8.89 | 9.50 | 9.53 | 1.14 | 19.94 | 12.83 | 5.33 | 3.38 | 1.70 | 27.94 | 34.16 | 9.91 | 0.25 | 0.51 |
| | 3.43 | 3.68 | 0.08 | 19.61 | 19.66 | | 9.30 | 9.25 | 0.89 | 18.92 | 12.57 | 4.32 | 3.12 | 1.45 | | 33.91 | 9.65 | | |
| inches | 0.186 | 0.155 | 0.006 | 0.788 | 0.786 | 0.35 | 0.374 | 0.375 | 0.045 | 0.785 | 0.505 | 0.210 | 0.133 | 0.067 | 1.100 | 1.345 | 0.390 | 0.01 | 0.02 |
| | 0.135 | 0.145 | 0.003 | 0.772 | 0.774 | | 0.366 | 0.364 | 0.035 | 0.745 | 0.495 | 0.170 | 0.123 | 0.057 | | 1.335 | 0.380 | | |

| OUTLINE VERSION | REFERENCE | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|-----------|-------|-------|------------------------|------------|
| | IEC | JEDEC | JEITA | | |
| PKG-B4E | | | | | 03/12/2013 |

Revision history

Table 5. Document revision history

| Date | Revision | Datasheet Status |
|-----------|----------|--------------------------------|
| 2017/6/27 | Rev 1.0 | Preliminary Datasheet Creation |
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