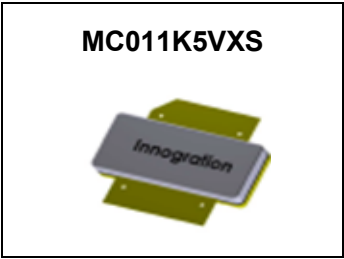


## 1500W, 50V High Power RF LDMOS Single ended FETs

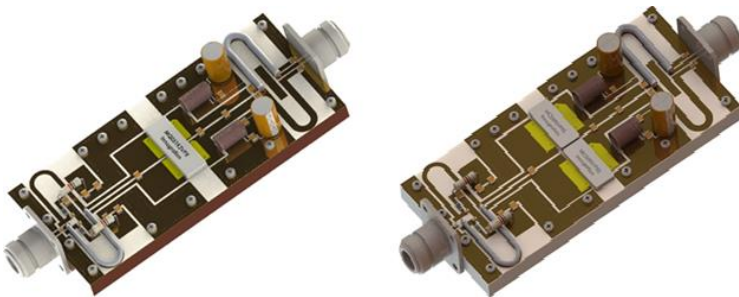


### Description

The MC011K5VXS itself is a 1500watt capable, high performance, unmatched single ended and earless LDMOS FET. **It can simplify the circuit without the use of sizable balun or transformer Within very narrow band or at fixed single frequency**

**It is also recommended to use paired MC011K5VXS to enable industry leading RF power up to 3000W at 50V, for ISM applications within frequencies HF to 150MHz.** Compared to equivalent dual-path packaged device, it offers better thermal management and easier maintenance, while maintaining the same size.

Demonstration of paired MC011K5VXS(right) Vs single dual-path device(left) mounted on the same design as below



- Typical performance at 13.56MHz with single MC011K5VXS  
 $V_{DS}=50V, I_{DQ}=100mA, CW$

Vds	Pin(dBm)	Pout(W)	IDS(A)	Gain(dB)	Eff(%)
50	42	1600	42	20	77

- Typical performance at 13.56MHz with **2\*MC011K5VXS**  
 $V_{DS}=50V, I_{DQ}=200mA, CW$

Vds	Pin(dBm)	Pout(W)	IDS(A)	Gain(dB)	Eff(%)
50	38.6	2900	75	26	77

- Typical performance(on 108MHz narrow band application board with **2\*MC011K5VXS** devices soldered)  
 $V_{DS}=50V, I_{DQ}=1000mA, Pulsed CW, 10\% \text{ duty cycle}, 100\mu s \text{ pulse width}$

Vds	Pin(dBm)	Pout(W)	IDS(A)	Gain(dB)	Eff(%)
50	48.4	3150	9.35	16.6	76

### 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)
- 136-174MHz (Commercial ground communication)
- Laser Exciter
- Synchrotron
- MRI
- Plasma generator
- Weather Radar

# MC011K5VXS LDMOS TRANSISTORS

Document Number: MC011K5VXS  
Preliminary Datasheet V2.0

**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DS}$	+140	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
Transient thermal impedance from junction to case $T_j = 85^\circ\text{C}$ ; $t_p = 100\ \mu\text{s}$ ; Duty cycle = 10 %	Zth	0.026	°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
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**DC Characteristics (per half section)**

Drain-Source Voltage $V_{GS}=0, I_{DS}=1.0\text{mA}$	$V_{(BR)DSS}$		140		V
Zero Gate Voltage Drain Leakage Current ( $V_{DS} = 75\text{V}, V_{GS} = 0\text{V}$ )	$I_{DSS}$	---	---	1	$\mu\text{A}$
Zero Gate Voltage Drain Leakage Current ( $V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$ )	$I_{DSS}$	---	---	1	$\mu\text{A}$
Gate--Source Leakage Current ( $V_{GS} = 10\text{V}, V_{DS} = 0\text{V}$ )	$I_{GSS}$	---	---	1	$\mu\text{A}$
Gate Threshold Voltage ( $V_{DS} = 50\text{V}, I_D = 600\ \mu\text{A}$ )	$V_{GS(th)}$	---	2.0	---	V
Gate Quiescent Voltage ( $V_{DD} = 50\text{V}, I_D = 500\text{mA}$ , Measured in Functional Test)	$V_{GS(Q)}$	---	3.1	---	V

**Load Mismatch (In Innogration Test Fixture, 50 ohm system):**  $V_{DD} = 50\text{Vdc}$ ,  $I_{DQ} = 1000\text{mA}$ ,  $f = 100\text{MHz}$ , pulse width:100us, duty

cycle:10%, 2 piece of MC011K5VXS combined

65: 1, at 3000W Pulsed CW Output Power	No Device Degradation
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## 108MHz/2 pcs in form of Balun

### Reference Circuit of Test Fixture (108MHz Power Amplifier)

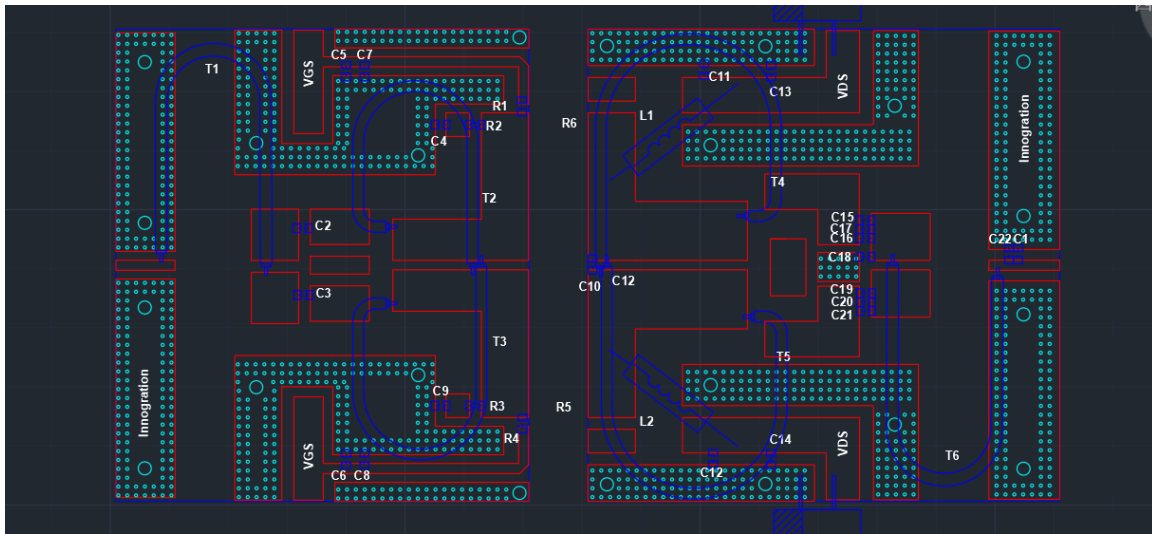
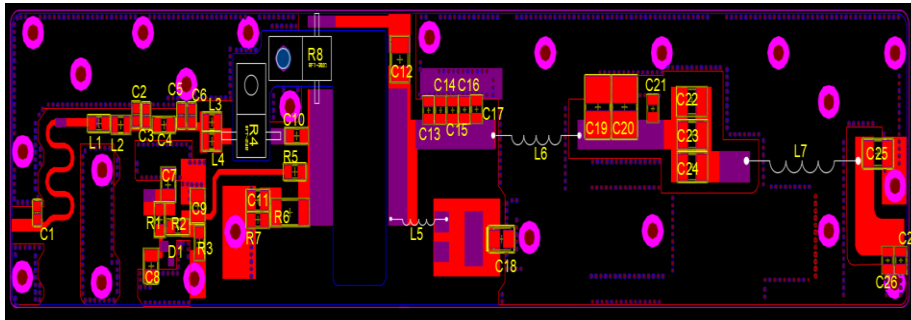


Table 5. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1	8.2pF/MQ101111	
C2,C3	220pF/MQ301111	
C4,C5,C6,C9,C13,C14	10uF/1210	
C7,C8,C11,C12	10nF/1210	
C10	68pF/MQ101111	
C15,C16,C17,C19,C20,C21	390pF/MQ101111	
C18	27pF/MQ301111	/
C22	9.1pF/MQ101111	/
R1,R4	360 Ω/1206	/
R2,R3	100 Ω/1206	/
T1	50 Ohm,180mm	SFF-50-1.5
T2,T3	25 Ohm,180mm	SFF-25-1.5
T4,T5	12.5 Ohm,120mm	SFF-12.5-3
T6	50 Ohm,150mm	SFF-50-3
L1,L2	2.5mm wire,7turns, φ =5mm	DIY

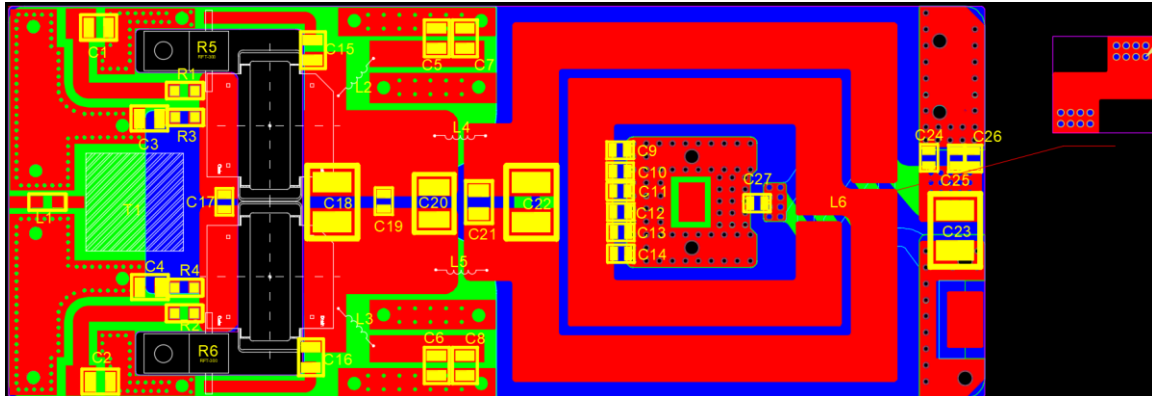
## 13.56MHz/1pcs single ended



**Table 6. Test Circuit Component Designations and Values**

Component	Description	Suggested Manufacturer
C1	200pF MQ300805	
C2,C3,C5,C6	82pF MQ300805	
C4,C10	10nF 0805	TDK
C7	100pF MQ301111	
C8,C9,C11,C18	10uF 1210	TDK
C12	270pF MQ301111	
C13	820pF MQ101111	
C14	300pF MQ101111	
C15	390pF MQ101111	
C16,C25,C27	100pF MQ101111	
C17	910pF MQ101111	
C19	820pF MQ102525	
C20	750pF MQ102525	
C21	150pF MQ101111	
C22,C23,C24	10nF 1812	
C26	47pF MQ101111	
R1,R2	10K $\Omega$ 1206	/
R3	6.8K $\Omega$ 1206	/
R4	2dB	TYT
R5	RFT-300 $\Omega$	TYT
L1	560nH/1008	/
L2	220nH/1008	/
L3,L4	680nH/1008	/
L5	Wire diameter 2mm,inner diameter 8mm 6turns	DIY
L6	Copper strip,2mm wide,inner diameter 10mm 3turns	DIY
L7	Copper strip,2mm wide,inner diameter 8mm 6turns	DIY
D1	LM4040BIM3-10.0/NOPB	/

## 13.56MHz/2 pcs in form of Balun

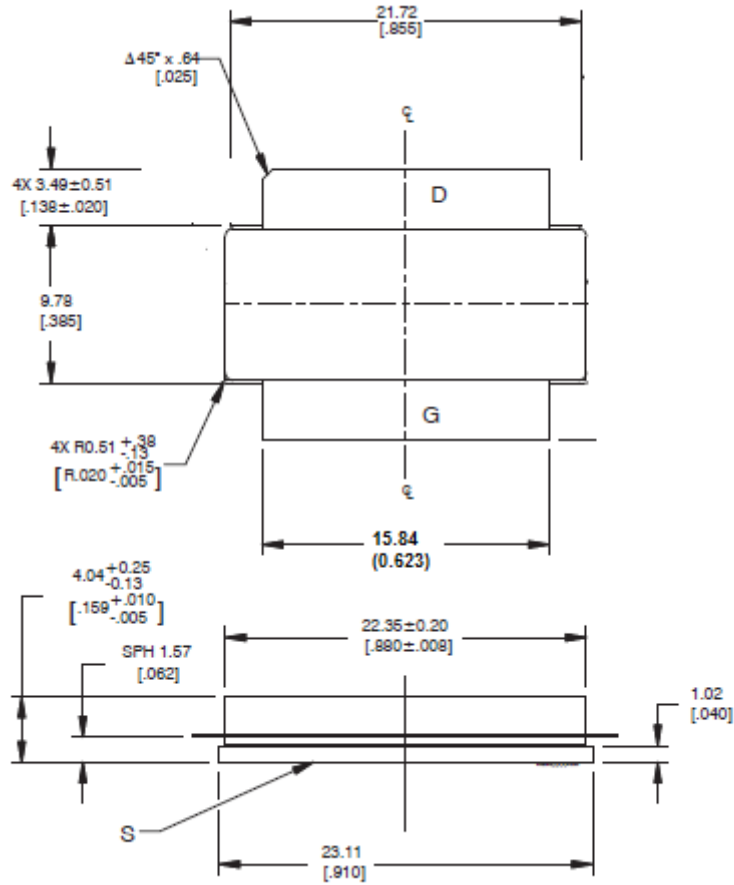


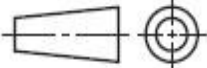
**Table 7. Test Circuit Component Designations and Values**

Component	Description	Suggested Manufacturer
C1~C8	10uF 1210	TDK
C9~C14	2.2uF 1812	TDK
C15,C16	330pF MQ101111	
C17	750pF MQ101111	
C18	2700pF MQ103838	
C19	30pF MQ101111	
C20	470pF MQ102525	
C21	820pF MQ102525	
C22	3300pF MQ103838	
C23	30pF DLC3838	DLC
C24	75pF MQ101111	
C25	56pF MQ101111	
C26	22pF MQ101111	
C27	150pF MQ101111	
R1,R2	360 Ω 1206	/

## Package Outline

Flangeless ceramic package;



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-C2					09/27/2018

# MC011K5VXS LDMOS TRANSISTORS

Document Number: MC011K5VXS  
Preliminary Datasheet V2.0

## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2025/11/14	Rev 1.0	Advanced datasheet with push pull 108MHz performance
2026/3/13	Rev 2.0	Single ended and push pull at 13.56MHz performance added

Application data based on SYX-25-48/HL-26-08/09

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