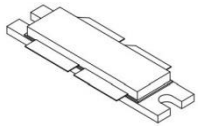
M2Q1041RVP LDMOS TRANSISTOR

Document Number: M2Q1041RVP
Preliminary Datasheet V1.2

400W, HF-1GHz 50V High Power RF LDMOS FETs

M2Q1041RVP



Description

The M2Q1041RVP is a 400W capable, highly rugged, unmatched LDMOS FET, designed for commercial and industrial applications from HF up to 1GHz, supporting both pulse and CW applications.

It is featured for industry leading high power and high ruggedness, suitable for Industrial, Scientific and Medical application, as well as VHF communication, UHF TV and Aerospace applications.

There isn't guarantee when this device is used outside of the band stated above.

- Typical RF performance within 400-700MHz , with device soldered
  (Vgs=3V, Idq=100mA)

Voltage(V)	Signal	Pin(dBm)	Pout(W)	Gain(dB)	Eff(%)
50	Pulse	37	400-500	19-20	55-65
45	CW	38.5	370-450	17-18	55~67

- Typical RF performance within 600-900MHz , with device soldered
  (Vgs=3V, Idq=100mA)

Voltage(V)	Signal	Pin(dBm)	Pout(W)	Gain(dB)	Eff(%)
50	CW	41	400-500	14-15	50-57

- Typical RF performance within 450-520MHz , with device soldered
  (Vgs=3V, Idq=100mA)

Voltage(V)	Signal	Pin(dBm)	Pout(W)	Gain(dB)	Eff(%)
48	CW	38	440-480	18.5-19	62-70

Features

- High breakdown voltage enable high ruggedness
- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- 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}	110	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+55	Vdc
Storage Temperature Range	Tstg	-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 ,Case Temperature	$R_{\theta JC}$	0.3	°C/W

25°C, 350W CW, 45Vdc, I_{DQ} = 100 mA			

Table 3. ESD Protection Characteristics

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics					
Drain-Source Voltage V_{GS}=0V, I_{DS}=1.0mA	$V_{(BR)DSS}$		110		V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 50V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
Gate—Source Leakage Current (V_{GS} = 10 V, V_{DS} = 0 V)	I_{GSS}	——	——	1	μA
Gate Threshold Voltage (V_{DS} = 50V, I_D = 600 μA)	$V_{GS(th)}$	——	2.54	——	V
Gate Quiescent Voltage (V_{DD} = 50 V, I_D = 100 mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.05	——	V

400-700MHz

TYPICAL CHARACTERISTICS

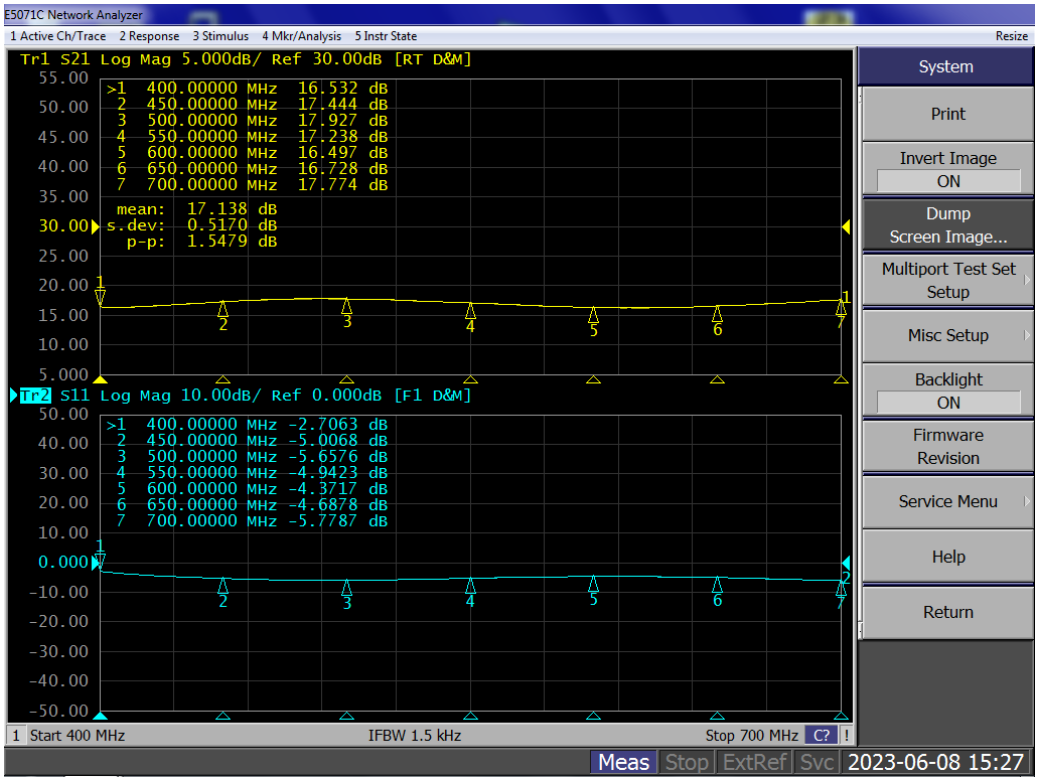
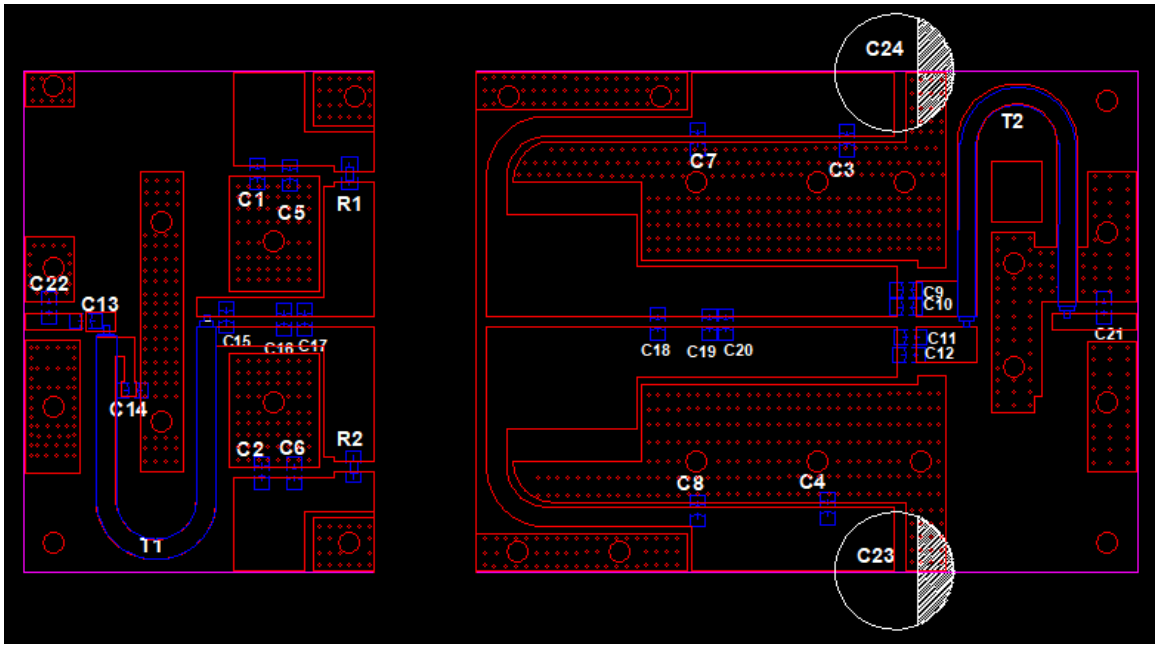


Figure 1: Network analyzer output, S11 (Vds=45V,Idq=510mA)

Reference Circuit of Test Fixture

(Layout file upon request) PCB: Roger 4350B, 30mils



Component	Description	Suggestion
C1~C4	10uF	10uF/100V
C5~C8，C14	100pF	MQ101111
C9~12	24pF	MQ101111
C13	47pF	MQ101111
C15,C19	10pF	MQ101111
C16	4.3pF	MQ101111
C17	24pF	MQ101111
C18	3.6pF	MQ101111
C20,C21	3pF	MQ101111
C22	2pF	MQ101111
C23,C24	2200uF/63V	Electrolyic Capacitor
R1,R2	10Ω	Chip Resistor
T1	25 ohm,55mm	RFSFBU-086-25
T2	35 ohm,55mm	SFF-35-3
PCB	30mil Rogers 4350B	

600-900MHz

TYPICAL CHARACTERISTICS

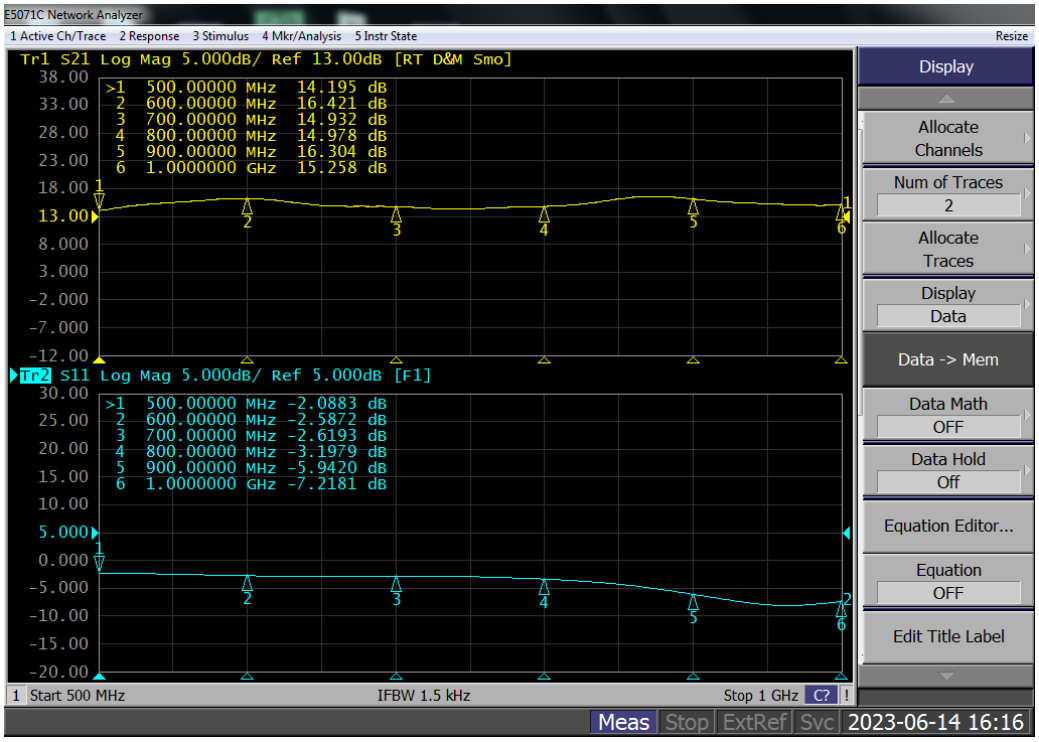
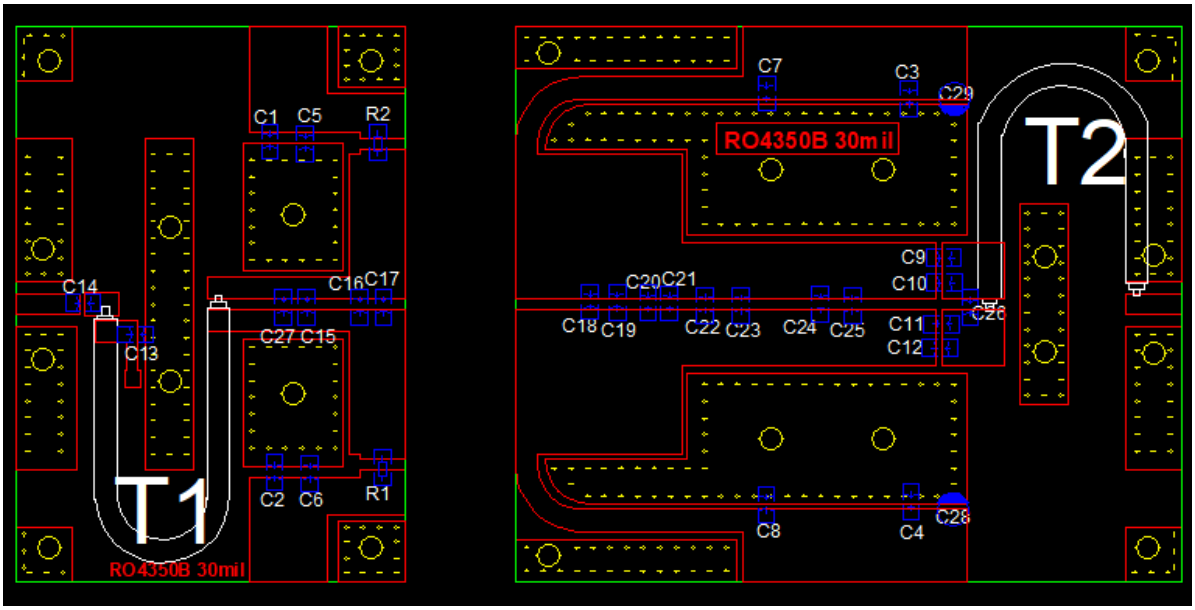


Figure 1: Network analyzer output, S11 (Vds=50V,Idq=600mA)

Reference Circuit of Test Fixture

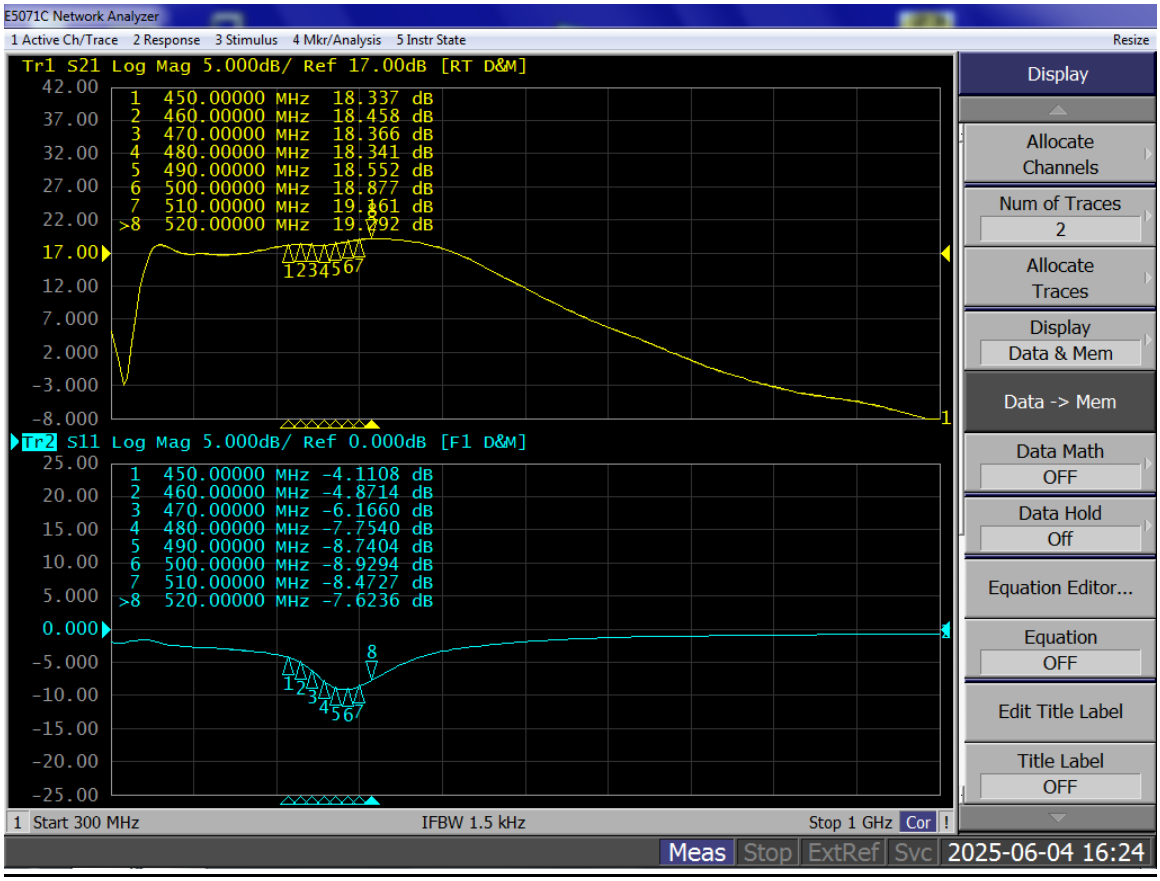
(Layout file upon request) PCB: Roger 4350B, 30mils



Component	Description	Suggestion
C1~C4	10uF	10uF/100V
C5~C8，C13	100pF	MQ101111
C9~12	24pF	MQ101111
C14	47pF	MQ101111
C15,C21	5.6pF	MQ101111
C16,C17,C18	9.1pF	MQ101111
C19	3.3pF+2pF	MQ101111
C20	2.7pF+1pF	MQ101111
C22	3.6pF	MQ101111
C23	2.4pF	MQ101111
C24	2.7pF	MQ101111
C25	5.1pF	MQ101111
C26	0.5pF	MQ101111
C27	6.8pF	MQ101111
C28,C29	4700uF/63V	Electrolyic Capacitor
R1,R2	10Ω	Chip Resistor
T1	25 ohm,55mm	RFSFBU-086-25
T2	35 ohm,70mm	SFF-35-3
PCB	30mil Rogers 4350B	

450-520MHz

TYPICAL CHARACTERISTICS



Reference Circuit of Test Fixture

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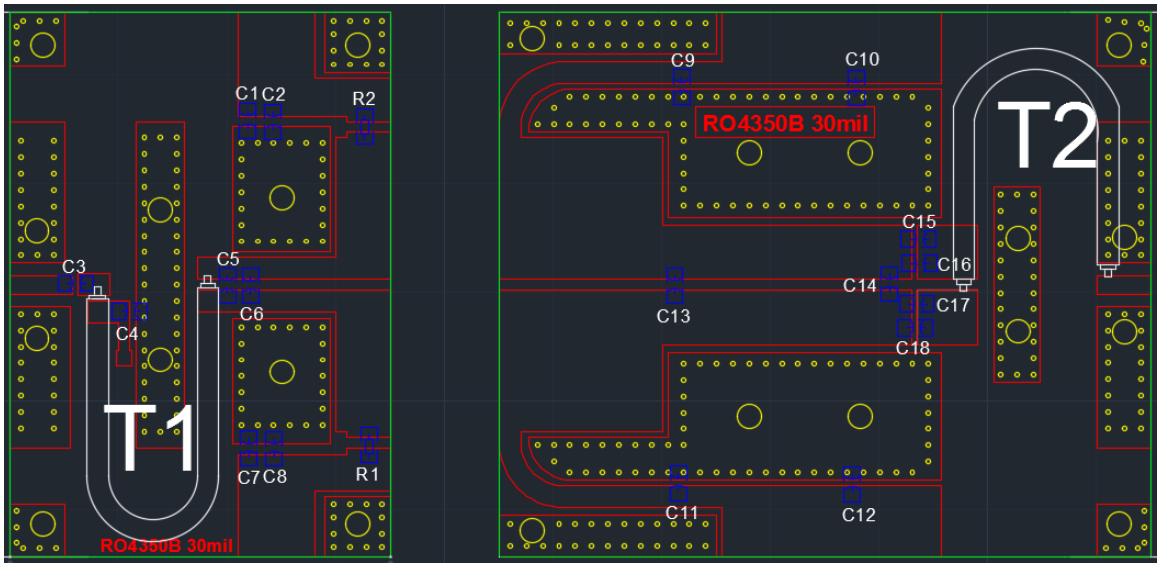
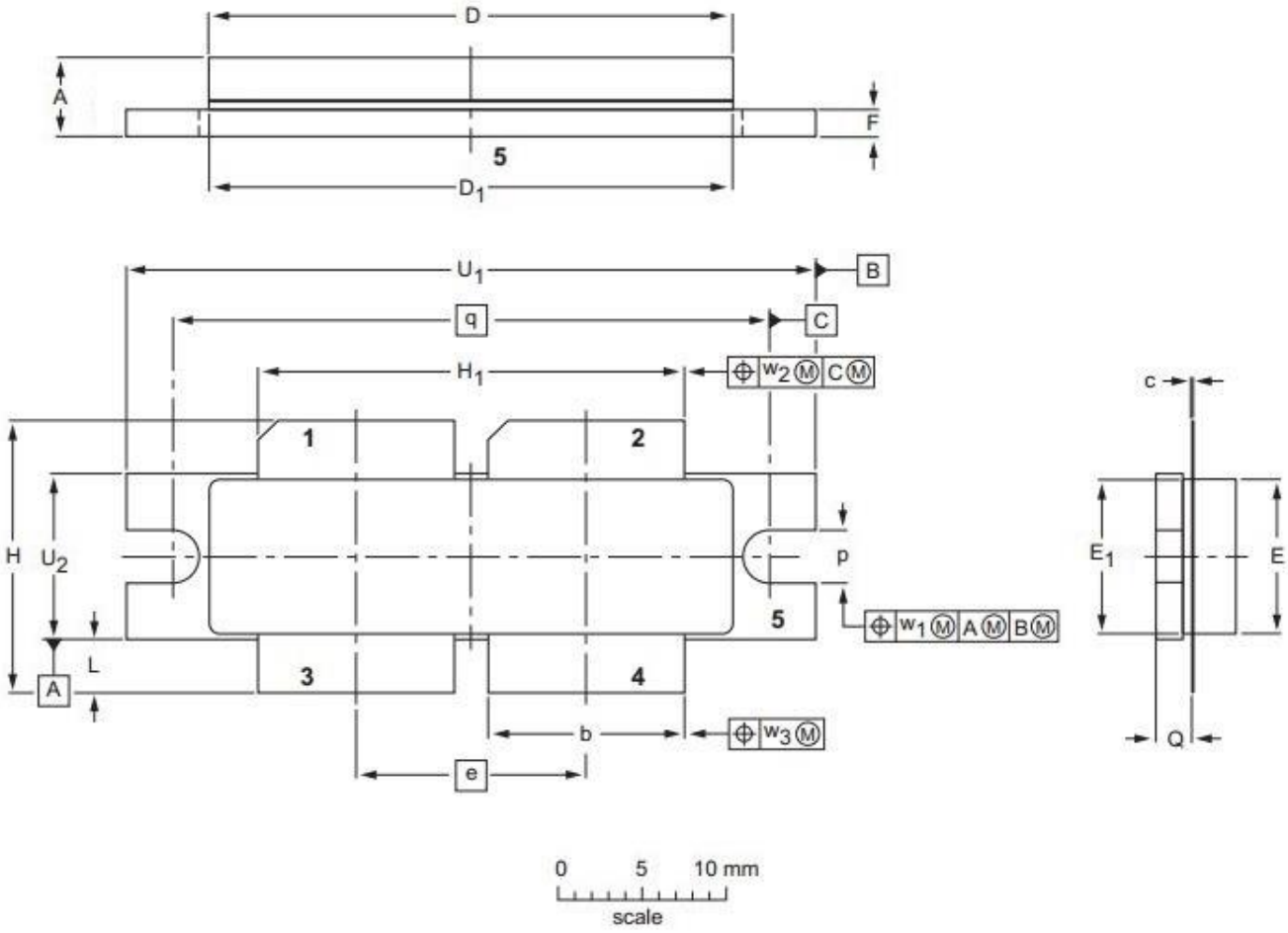


C1,C7,C10,C12	10uF/0805	/
C2,C4,C8,C9,C11	100pF/MQ30111	
C3	91pF/MQ40-0805	
C5	4.7pF/MQ30111	
C6	20pF/MQ30111	
C13,C14	3.6pF/MQ30111	
C15,C16,C17,C18	22pF/MQ30111	
R1,R2	10 Ω	/
T1	25 ohm,55mm	RFSFBU-086-25
T2	25 ohm,55mm	SFF-25-3

Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads（1、2—DRAIN、3、4—GATE、5—SOURCE）



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	W_2
mm	4.7 4.2	11.81 11.56	0.18 0.10	31.55 30.94	31.52 30.96	13.72	9.50 9.30	9.53 9.27	1.75 1.50	17.12 16.10	25.53 25.27	3.48 2.97	3.30 3.05	2.26 2.01	35.56	41.28 41.02	10.29 10.03	0.25	0.51	0.25
inches	0.185 0.165	0.465 0.455	0.007 0.004	1.242 1.218	1.241 1.219	0.540	0.374 0.366	0.375 0.365	0.069 0.059	0.674 0.634	1.005 0.995	0.137 0.117	0.130 0.120	0.089 0.079	1.400	1.625 1.615	0.405 0.395	0.01	0.02	0.01

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-D4E					03/12/2013

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/6/9	Rev 1.0	Preliminary Datasheet
2024/6/3	Rev 1.1	Add 600-900MHz data
2025/6/4	Rev 1.2	Add 450-520MHz data

Application data based on TC-23-35/37,SJJ-25-14

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