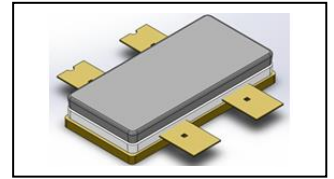




## 300W, 28V High Power RF LDMOS FETs

### Description

The ITGH09300B4C is a 300W capable, internally matched, **single ended** 28V LDMOS designed for multiple application up to 1GHz, especially ISM and RF Energy at 915/433MHz etc  
It can be configured as Class AB or Class C for CW or pulsed CW



- Typical 433MHz CW Performance (on Innegration fixture with device soldered)

$V_{ds}=28V, V_{gs}=2V$

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
433	54.2	263.3	71	22.32	55.12	325.1	75

- Typical 435-445M CW performance

$V_{ds}=28V, V_{gs}=0V$

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
435	54.47	280.0	78.1	16.18	55.07	321.0	79.1
440	54.02	252.5	79.4	17.12	54.6	288.6	80.3
445	53.46	221.7	80.1	16.33	54.01	251.7	80.9

- Typical 915MHz CW Performance (on Innegration fixture with device soldered)

$V_{ds}=28V, V_{gs}=2V$

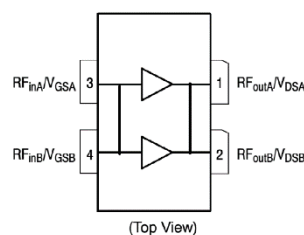
Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
915	54.15	260	69	18.9	55.1	317	73

### Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- 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

Figure 1: Pin Connection definition as single ended

Transparent top view (Backside grounding for source)





**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DSS}$	65	Vdc
Gate--Source Voltage	$V_{GS}$	-10 to +10	Vdc
Operating Voltage	$V_{DD}$	+28	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 Tcase= 25°C, DC Power supply	$R_{\theta JC}$	0.3	°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 ( $V_{GS}=0V$ ; $I_D=100\mu A$ )	$V_{DSS}$	65	-----	-----	V
Zero Gate Voltage Drain Leakage Current ( $V_{DS} = 28 V$ , $V_{GS} = 0 V$ )	$I_{DSS}$	-----	-----	10	$\mu A$
Gate--Source Leakage Current ( $V_{GS} = 6 V$ , $V_{DS} = 0 V$ )	$I_{GSS}$	-----	-----	1	$\mu A$
Gate Threshold Voltage ( $V_{DS} = 28V$ , $I_D = 600 \mu A$ )	$V_{GS(th)}$	-----	1.75	-----	V
Gate Quiescent Voltage ( $V_{DD} = 28V$ , $I_{DQ} = 500 mA$ , Measured in Functional Test)	$V_{GS(Q)}$		2.5		V

**Load Mismatch (In Innogrator Test Fixture, 50 ohm system):**  $V_{DD} = 28 Vdc$ ,  $I_{DQ} = 100 mA$ ,  $f = 915MHz$

VSWR 10:1 at 300W pulse CW Output Power	No Device Degradation
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### 433MHz

Figure 1 Efficiency and power gain as function of Pout at Vds=28V and 24V

Signal: Pulse width 20us, duty cycle 10% , Vgs= 2.24V, Vdd= 28V, Idq=5mA

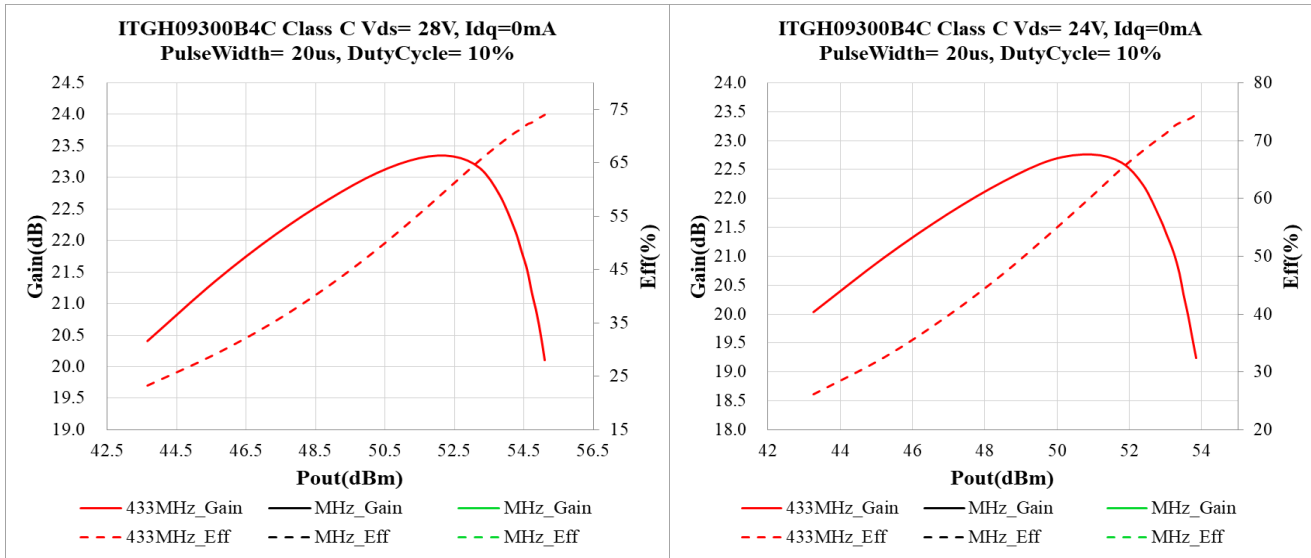


Figure 3: Network analyzer output, S11 and S21

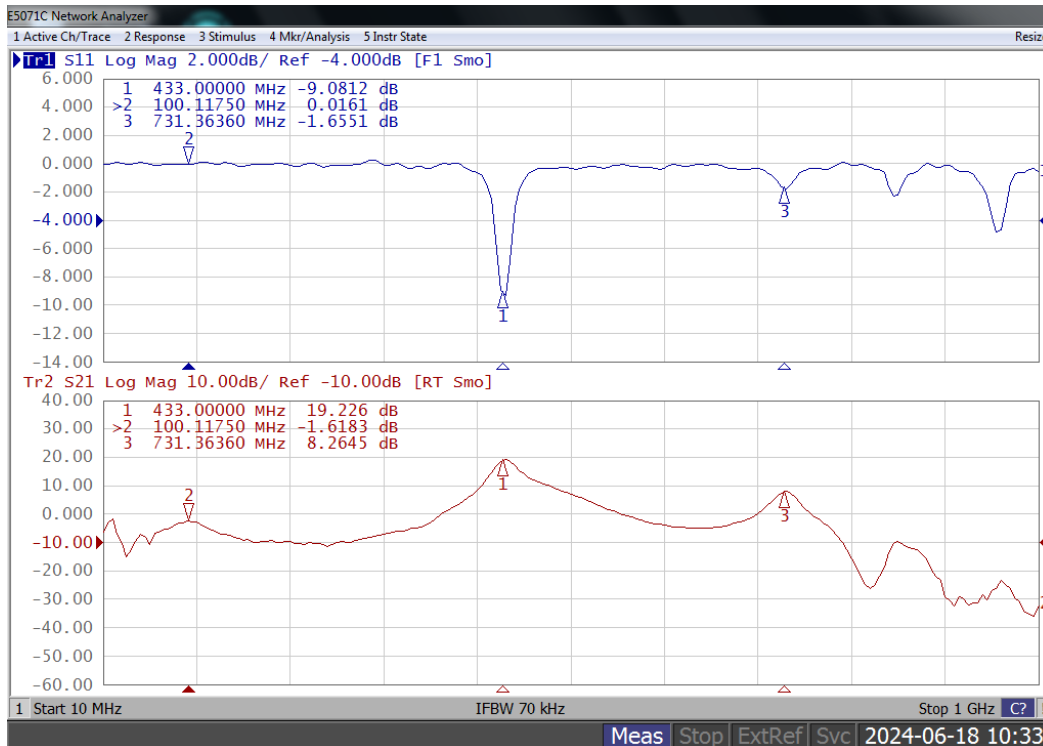


Figure 4: Layout picture (original Gerber file upon request)

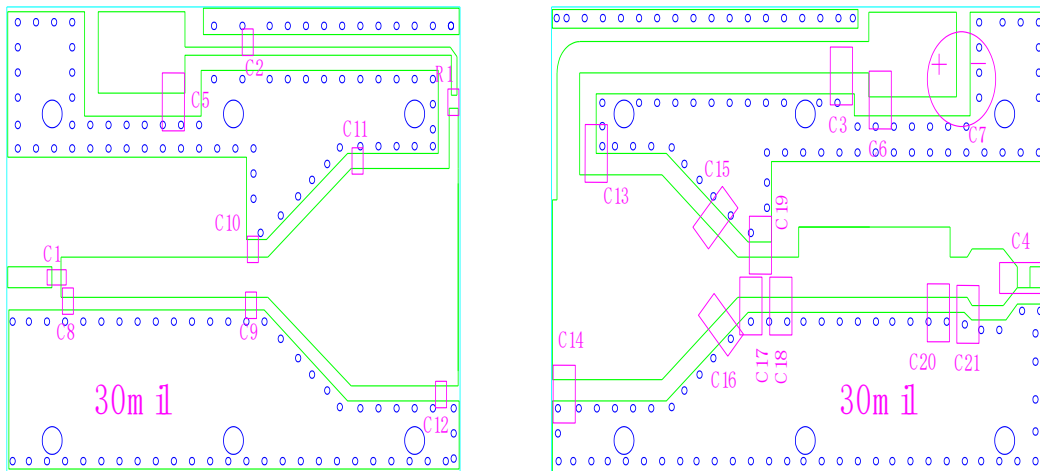


Table 5. List of components

Designator	Comment	Footprint	Quantity
C1	4.7F	0805	1
C2	100 pF	0805	1
C3, C4	100 pF	1210	2
C5, C6	10 uF/100V	1210	2
C7	470 uF/63V		1
R1	10 Ω	0603	1
C8	2.4 pF	0805	1
C9, C12	30 pF	0805	2
C10, C11	20 pF	0805	2
C13	22 pF	1210	1
C14	20 pF	1210	1
C15, C17, C18	12 pF	1210	3
C16, C20	6.8 pF	1210	2
C19	4.3 pF	1210	1
C21	8.2 pF	1210	1



### 915MHz

Figure 5 Efficiency and power gain as function of Pout at Vds=28V

Signal: Pulse width 20us, duty cycle 10% , Vgs= 2.24V, Vdd= 28V,

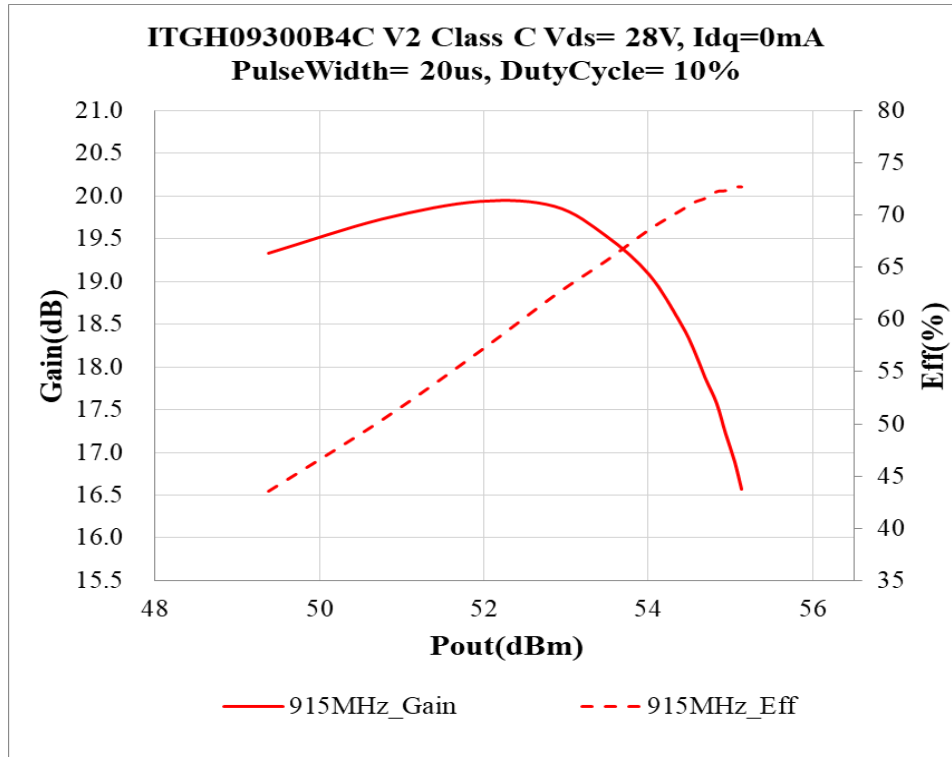


Figure 6: Network analyzer output, S11 and S21



Figure 7: Layout picture (original Gerber file upon request)

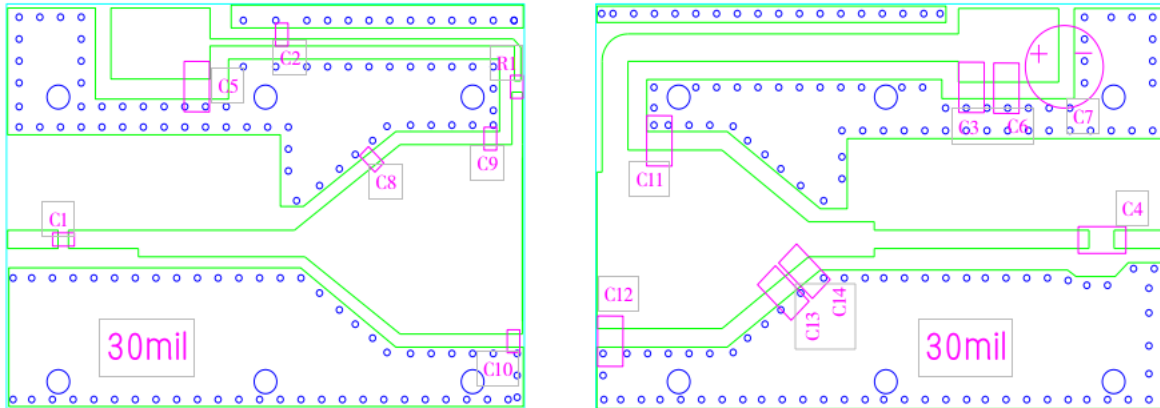


Table 6. List of components

Designator	Comment	Footprint	Quantity
C1, C8	4.7F	0805	2
C2	47 pF	0805	1
C3, C4	47 pF	1210	2
C5, C6	10 uF/100V	1210	2
C7	470 uF/63V		1
R1	10 $\Omega$	0603	1
C9, C10	10 pF	0805	2
C11	12 pF	1210	1
C12, C14	7.5 pF	1210	2
C13	6.8 pF	1210	1

### 435-445MHz

Figure 8 Efficiency and power gain as function of Pout at Vds=28V

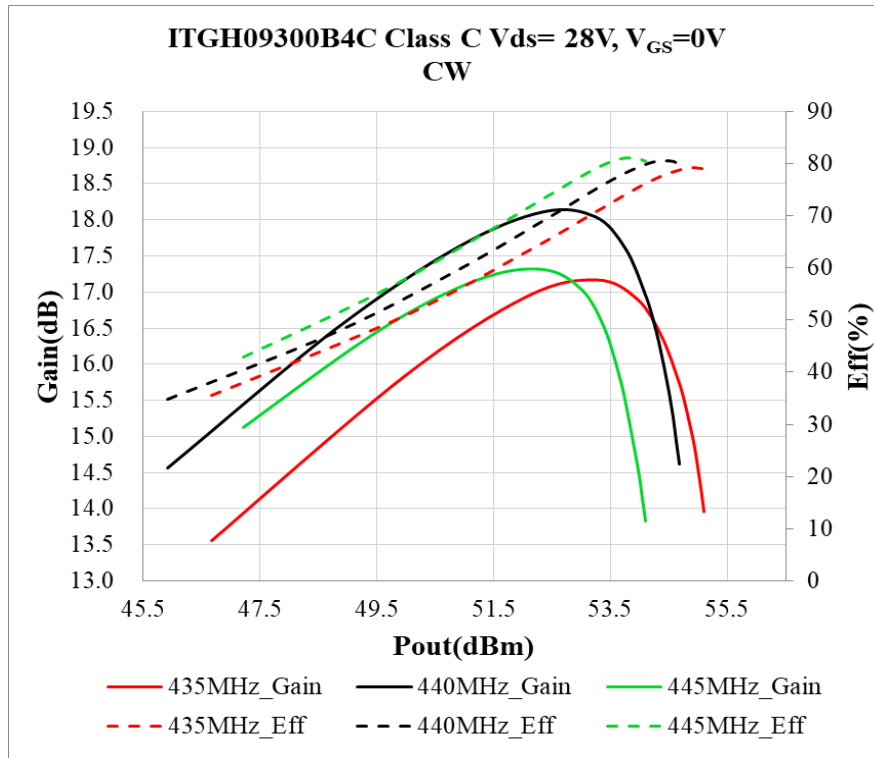


Figure 9: Network analyzer output, S11 and S21

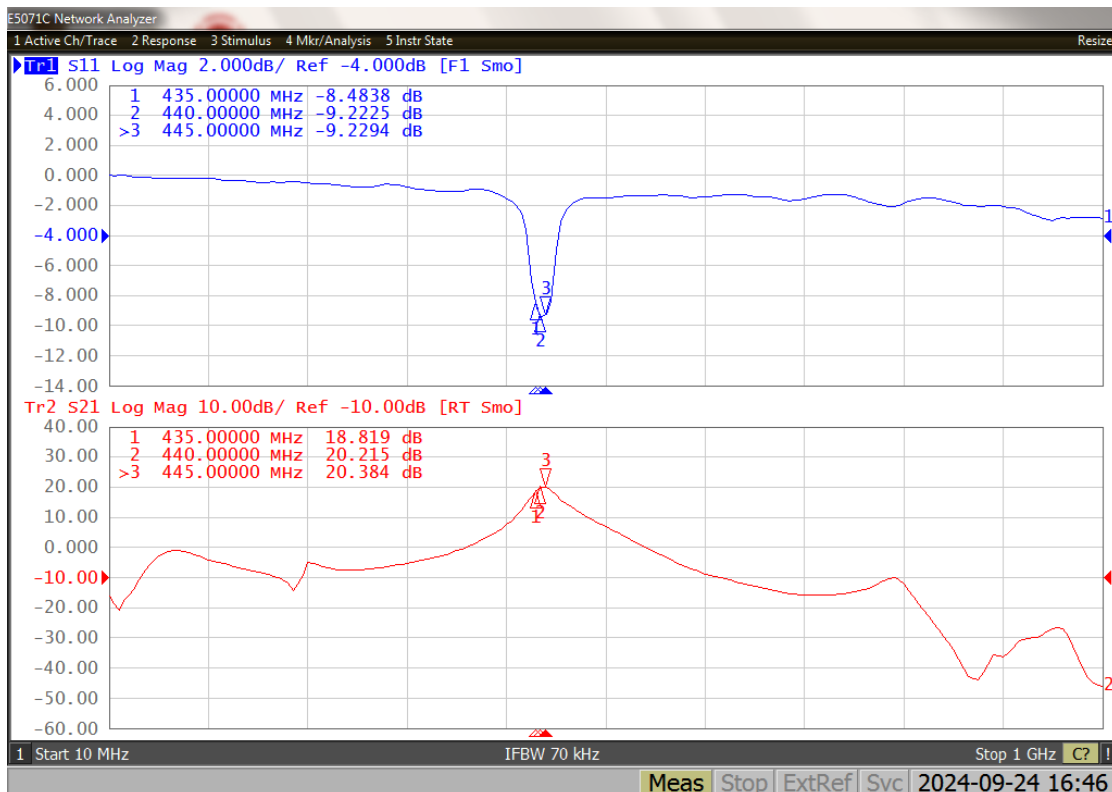


Figure 10: Layout picture (original Gerber file upon request)

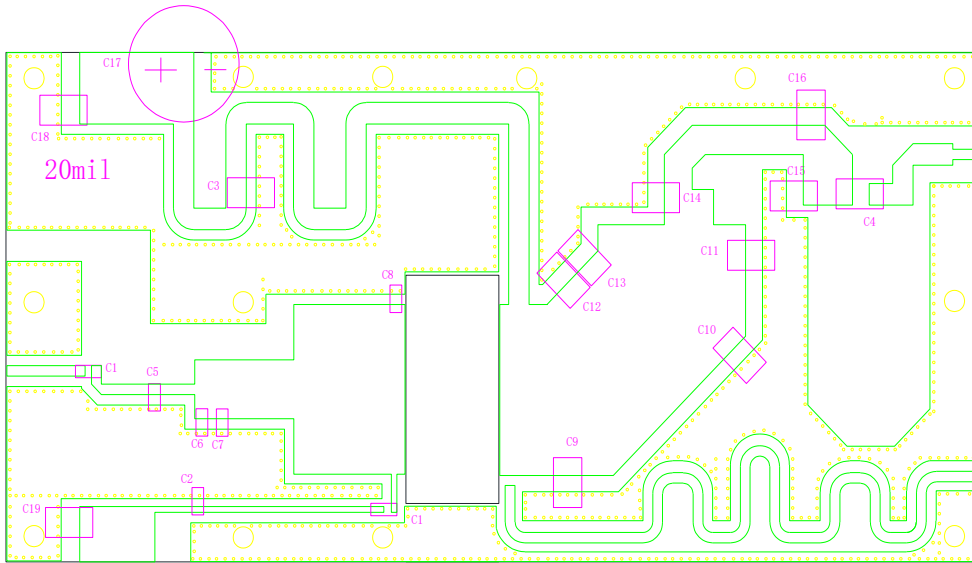


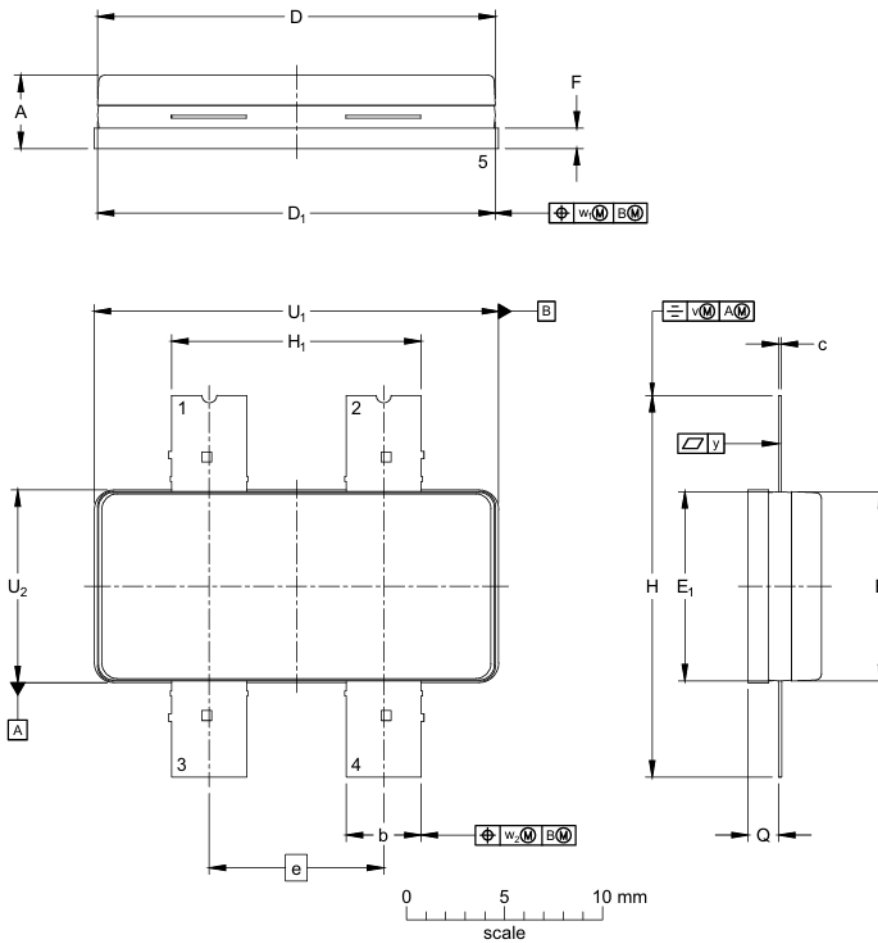
Table 7. List of components

Designator	Comment	Footprint	Quantity
C1	4.7F	0805	1
C2	100 pF	0805	1
C3	150 pF	1210	1
C4	100 pF	1210	1
C5	12 pF	0805	1
C6, C7, C8	30 pF	0805	3
C9	12 pF	1210	1
C10	1.8 pF	1210	1
C11	10 pF	1210	1
C12	3.9 pF	1210	1
C13	8.2 pF	1210	1
C14	6.8 pF	1210	1
C15	15 pF	1210	1
C16	5.1 pF	1210	1
C17	1000 uF/63V	1210	1
C18, C19	10 uF/100V	1210	2
R1	10 Ω	0603	1





Earless Flanged Plastic Air Cavity Package; 4 leads



Dimensions																		
Unit	A	b	c	D	D <sub>1</sub>	E	E <sub>1</sub>	e	F	H	H <sub>1</sub>	Q <sup>(1)</sup>	U <sub>1</sub>	U <sub>2</sub>	v	w <sub>1</sub>	w <sub>2</sub>	y
mm	max	4.01	3.91	0.18	20.42	20.37	9.80	9.75	1.14	19.53	12.83	1.68	20.70	9.91	0.50	0.50	0.50	0.10
	nom							8.89										
	min	3.40	3.71	0.13	20.12	20.17	9.50	9.55	0.94	19.33	12.57	1.45	20.50	9.70				

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/6/18	V1	Preliminary Datasheet Creation
2024/7/25	V1.1	Add 915MHz data
2024/9/24	V1.2	Add 435-445M broadband data in order to present higher efficiency

Application data based on LSM-24-20/25/30

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