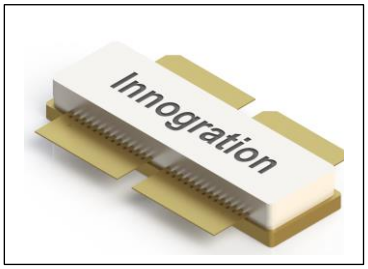
500W, 28V High Power RF LDMOS FETs



Description

The ITGH09500D4C is a 500W capable, internally matched, **single ended**，28V LDMOS

Designed for multiple application up to 1GHz, especially ISM at 433MHz/915M etc

It can be configured as Class AB or Class C mainly for pulsed CW

Please notice both leads at input and output are internally connected

•Typical 915MHz Pulsed CW Performance (on Innogration fixture with device soldered)

Vds=28V, Vgs=1.7V, 100us/10%

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
915	56.3	426.4	65.6	18.18	57.1	513.0	67.5

Vds=30V, Vgs=1.7V, 100us/10%

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
915	56.84	483.3	64.6	18.49	57.62	577.6	66.3

Recommended driver: ITEH09015C6

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

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}	+30	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 Tcase= 25°C, DC Power supply	RθJC	0.18	°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)

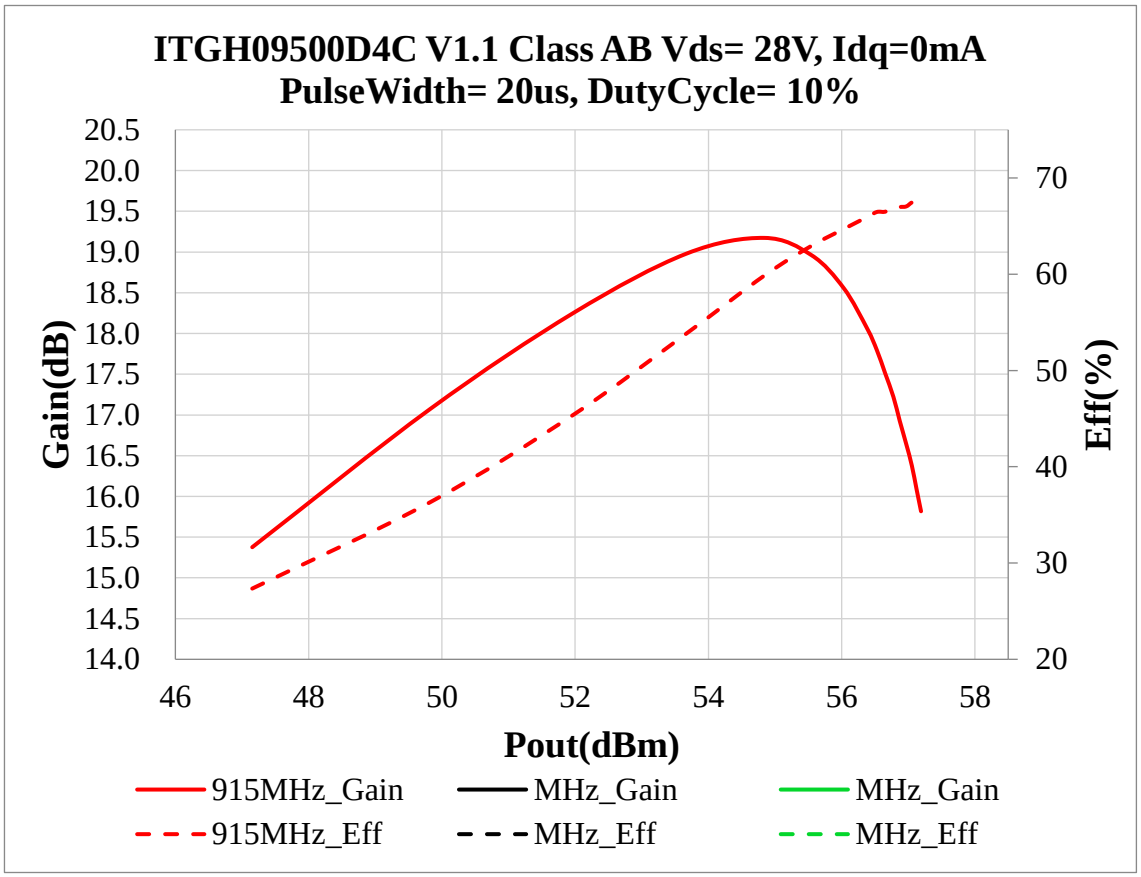
Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics					
Drain-Source Breakdown Voltage (V_{GS}=0V; I_D=100uA)	V_{DSS}	65	——	——	V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 28 V, V_{GS} = 0 V)	I_{DSS}	——	——	10	μA
Gate--Source Leakage Current (V_{GS} = 6 V, V_{DS} = 0 V)	I_{GSS}	——	——	1	μA
Gate Threshold Voltage (V_{DS} = 28V, I_D = 600 uA)	$V_{GS(th)}$	——	1.77	——	V
Gate Quiescent Voltage (V_{DD} = 28V, I_{DQ} = 500 mA, Measured in Functional Test)	$V_{GS(Q)}$		2.5		V

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

VSWR 10:1 at 500W pulse CW Output Power	No Device Degradation

915MHz

Figure 1 Efficiency and power gain as function of Pout at Vds=28V/30V



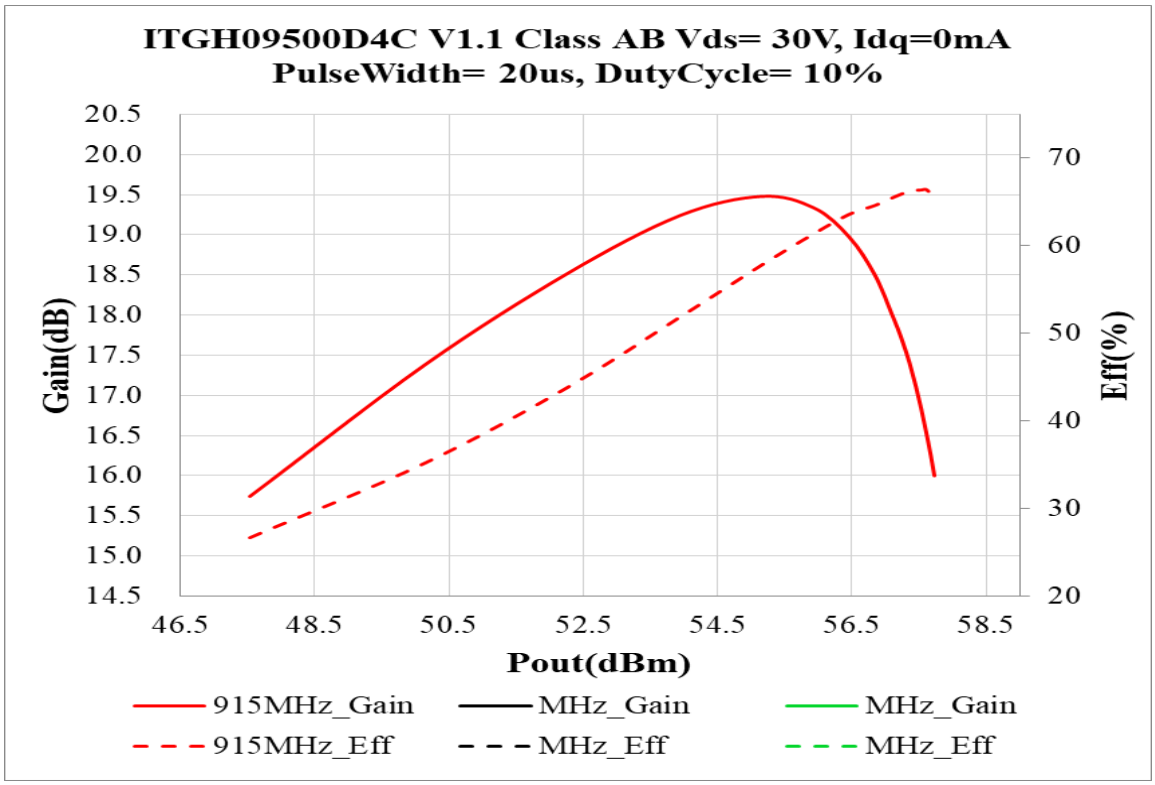


Figure 2: Network analyzer output, S11 and S21, Idq=500mA

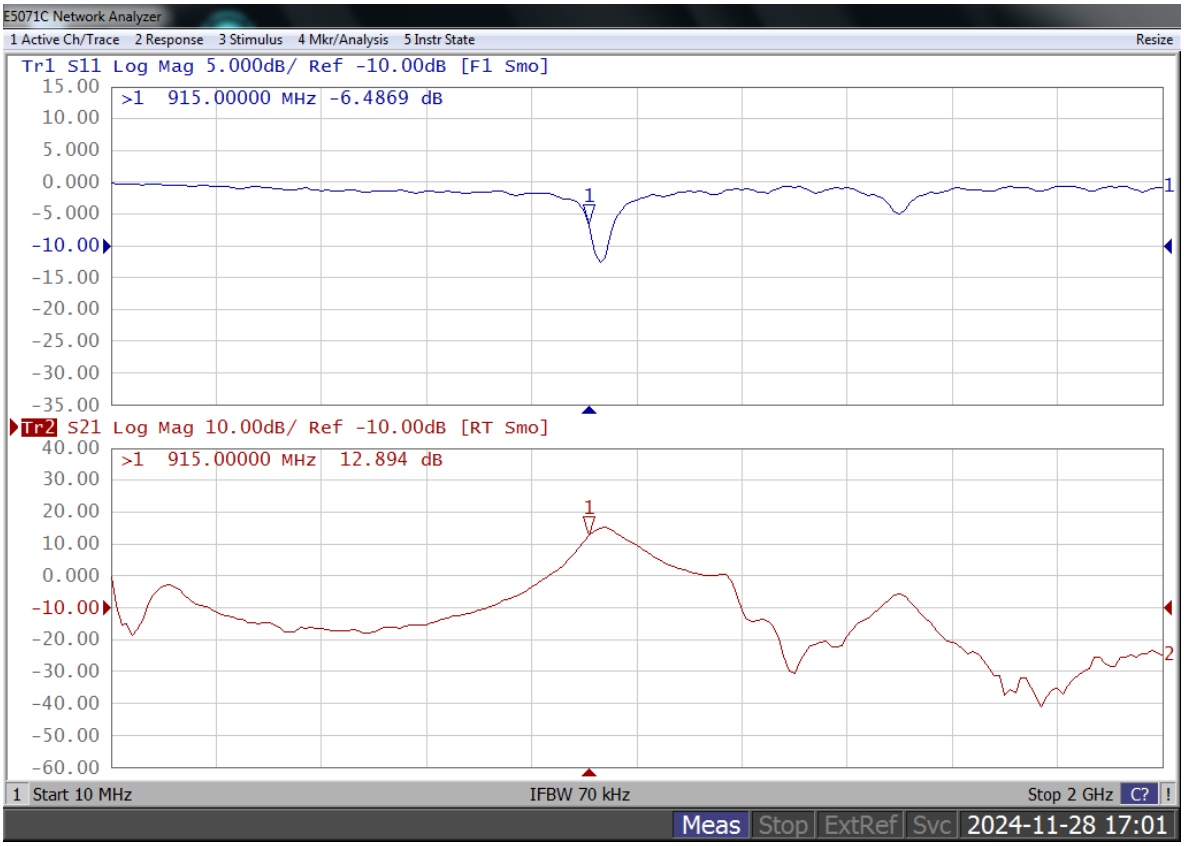
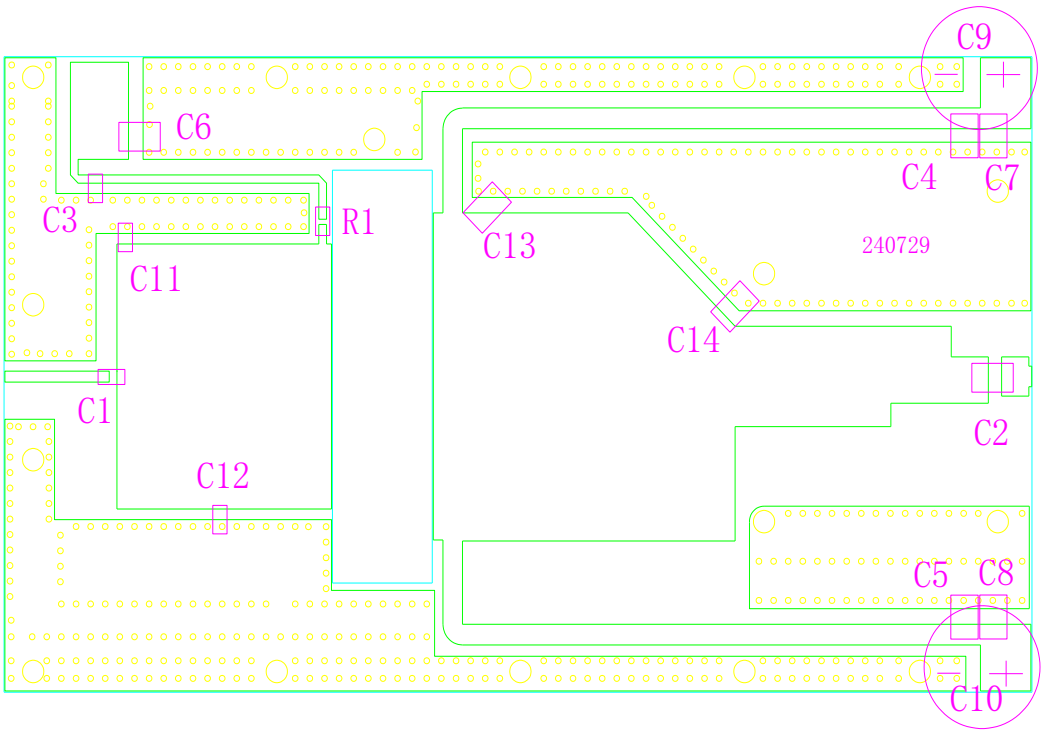


Figure 3: Layout picture (original Gerber file upon request)



PCB: RO4350B 20mils

Table 5. List of components

Designator	Footprint	Comment	Quantity
C1, C12	0603/0805	6.8 pF	2
C2, C4, C5	1210	56 pF	3
C3	0603/0805	56pF	1
C6, C7, C8	1210	10uF/100V	3
C9, C10		2200uF/63V	2
C11	0603/0805	10 pF	1
C11, C12	0603/0805	10 pF	2
C13	1210	12 pF	1
C14	1210	2.0 pF	1
R1	0603/0805	10Ω	1

Earless Flanged Plastic Air Cavity Package; 4 leads

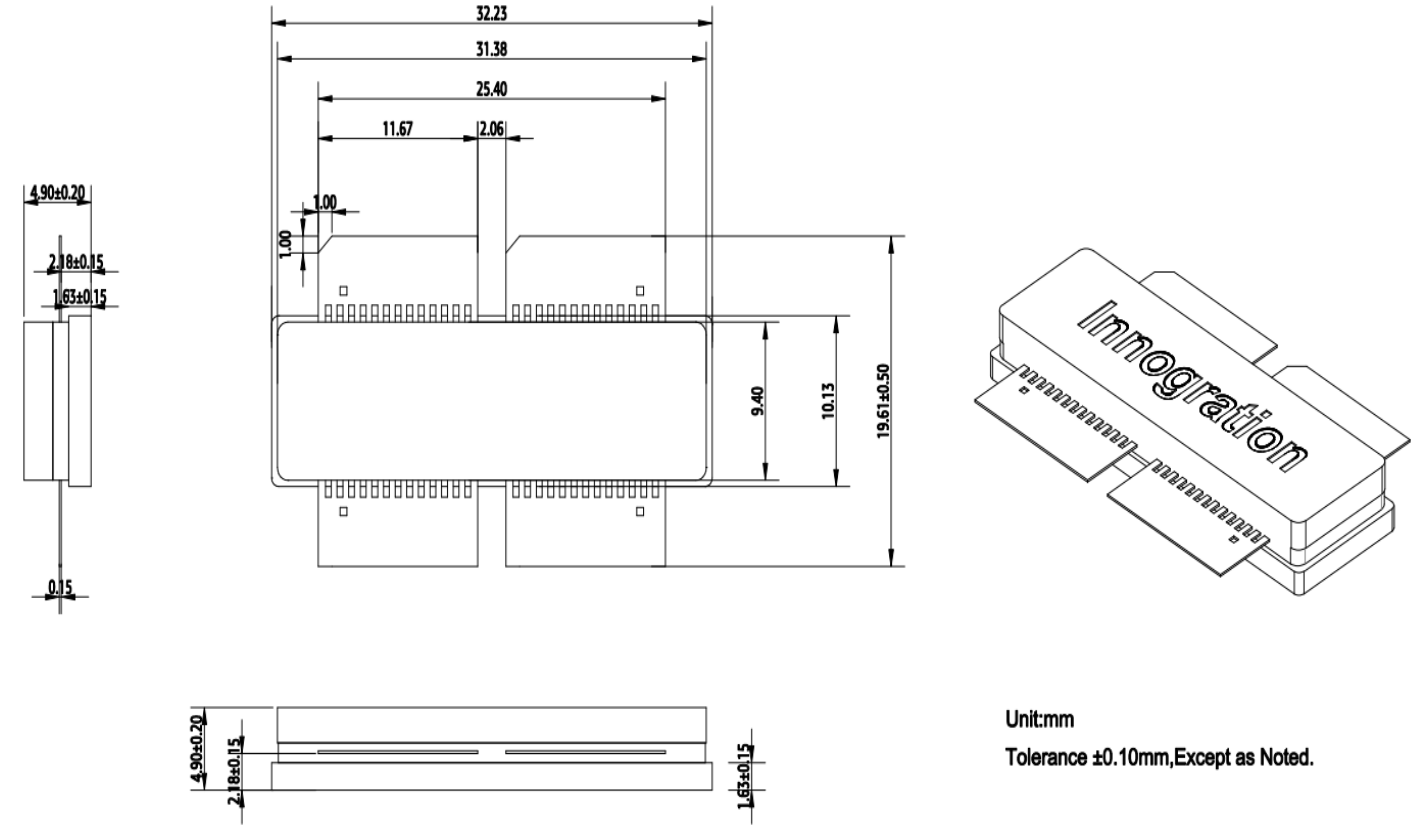


Table 5. Document revision history

Date	Revision	Datasheet Status
2024/11/29	V1	Preliminary Datasheet Creation

Application data based on LSM-24-38

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