

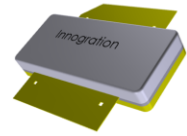


## 915MHz, 450W, 40V High Power RF LDMOS FETs

### Description

The ITDE10450C2 is a 450-watt, internally matched LDMOS FET, designed for ISM applications including RF Energy at 915MHz. It Can be used in Class AB/B and Class C configuration, supporting both CW and pulsed signal

**In typical application using 2\*ITDE10450C2 in parallel, it can deliver more than 900W CW with high efficiency, see its standalone application report**

**ITDE10450C2**

•Typical Performance using single **ITDE10450C2** (On Innegration fixture with device soldered):

VDD = 40 Volts, IDQ = 50 mA, CW signal

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	IDS(A)	Gain(dB)	EFF(%)
915	40	56.7	470	16.7	16.7	70.0%

### Features

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

**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DS}$	95	Vdc
Gate--Source Voltage	$V_{GS}$	-10 to +10	Vdc
Operating Voltage	$V_{DD}$	+42	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 $T_C = 85^\circ\text{C}$ , $T_J = 200^\circ\text{C}$ , DC test	$R_{\theta JC}$	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
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#### DC Characteristics (per half section)

Drain-Source Breakdown Voltage ( $V_{GS} = 0\text{V}$ ; $I_D = 100\mu\text{A}$ )	$V_{DSS}$	95	—	—	V
Zero Gate Voltage Drain Leakage Current ( $V_{DS} = 40\text{V}$ , $V_{GS} = 0\text{V}$ )	$I_{DSS}$	—	—	10	$\mu\text{A}$



Gate--Source Leakage Current ( $V_{GS} = 6\text{ V}$ , $V_{DS} = 0\text{ V}$ )	$I_{GSS}$	-----	-----	1	$\mu\text{A}$
Gate Threshold Voltage ( $V_{DS} = 40\text{ V}$ , $I_D = 600\text{ }\mu\text{A}$ )	$V_{GS(th)}$	-----	2.0	-----	V
Gate Quiescent Voltage ( $V_{DD} = 40\text{ V}$ , $I_{DQ} = 100\text{ mA}$ , Measured in Functional Test)	$V_{GS(Q)}$	2.1	2.62	3.1	V

**Functional Tests (On Innogrations Test Fixture, 50 ohm system) :**  $V_{DD} = 40\text{ Vdc}$ ,  $I_{DQ} = 50\text{ mA}$ ,  $f = 915\text{ MHz}$ ,  $P_{in} = 40\text{ dBm}$  CW Signal Measurements.

Power Gain	$G_p$	-----	16.5	-----	dB
Drain Efficiency @ $P_{OUT}$	$\eta_D$	-----	70	-----	%
Output Power	$P_{out}$	-----	450	-----	W
Input Return Loss	IRL	-----	-7	-----	dB

**Load Mismatch (In Innogrations Test Fixture, 50 ohm system):**  $V_{DD} = 40\text{ Vdc}$ ,  $I_{DQ} = 50\text{ mA}$ ,  $f = 915\text{ MHz}$

VSWR 10:1 at 450W Output Power at all Phase Angles, pulsed CW, 100us, 10%	No Device Degradation
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## Reference Circuit of Test Fixture Assembly Diagram 1\*ITDE10450C2

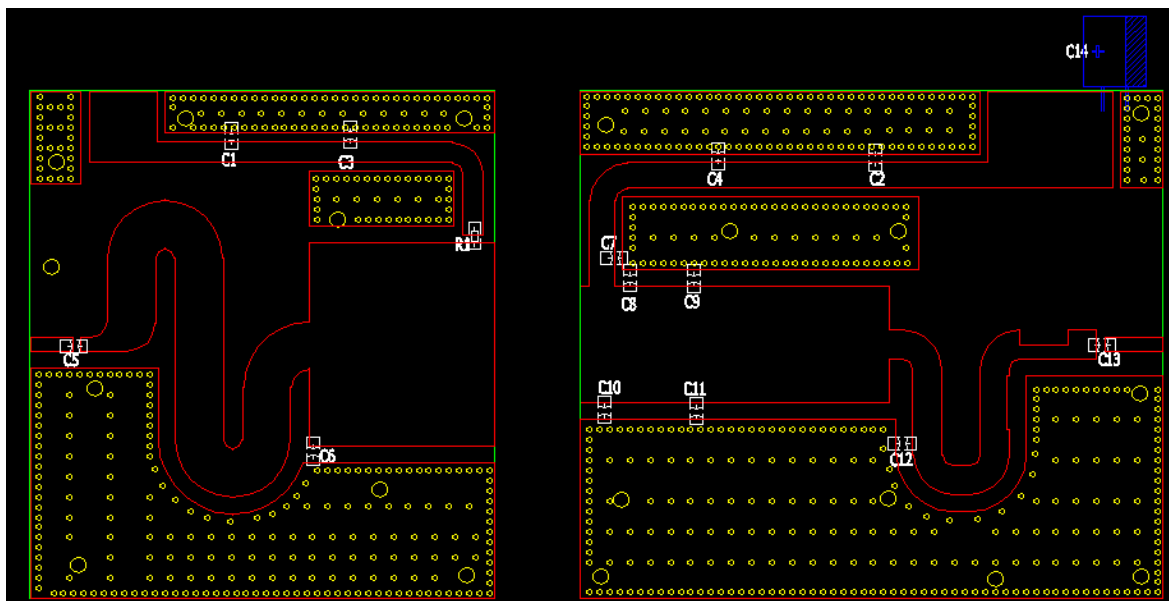


Figure 1. Test Circuit Component Layout

Table 1. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1,C2	10Uf	10Uf/100V
C3,C4,C5	56Pf	MQ101111
C6	7.5Pf	MQ101111
C14	2000Uf/63V	Electrolytic Capacitor
R1	10 $\Omega$	Chip Resistor
C7	9.1Pf	MQ101111
C8	12Pf	MQ101111
C9	8.2Pf	MQ101111
C10	11Pf	MQ101111
C11	10Pf	MQ101111
C12	0.5Pf	MQ101111
C13	47Pf	MCM-1-300V-D-470J
PCB	30mil Rogers 4350B	



## TYPICAL CHARACTERISTICS

Figure 2. Drain Efficiency and Power Gain as Function of CW Output Power

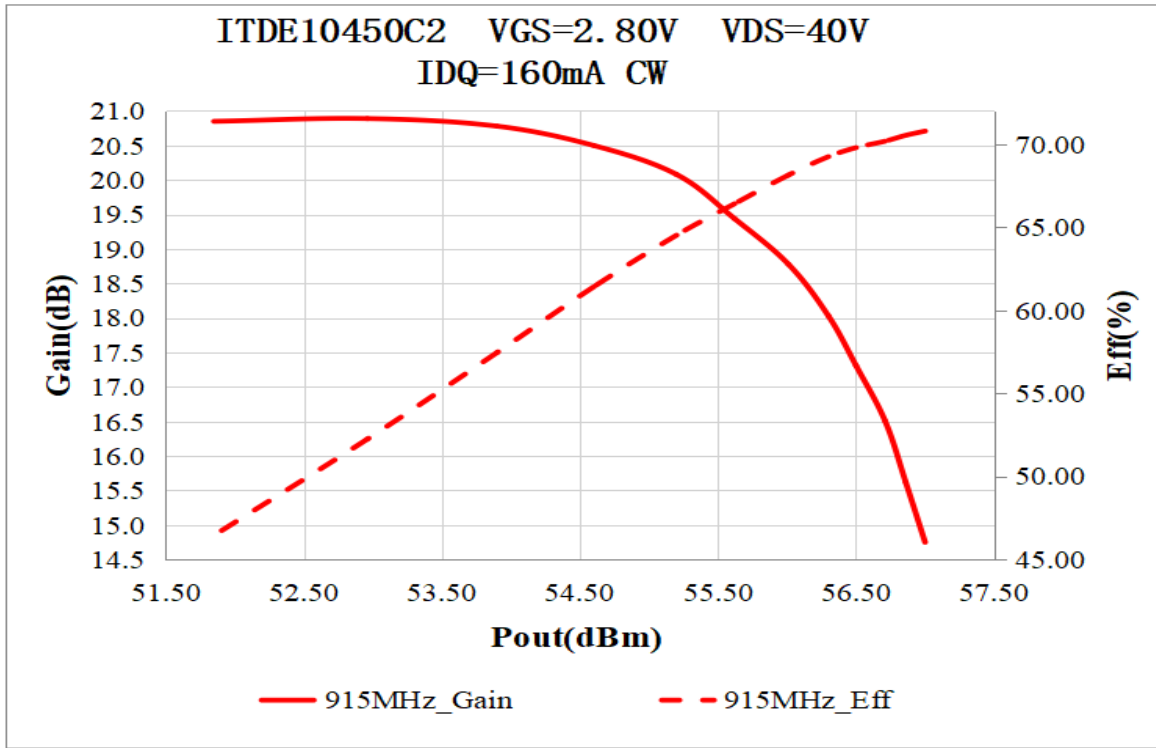
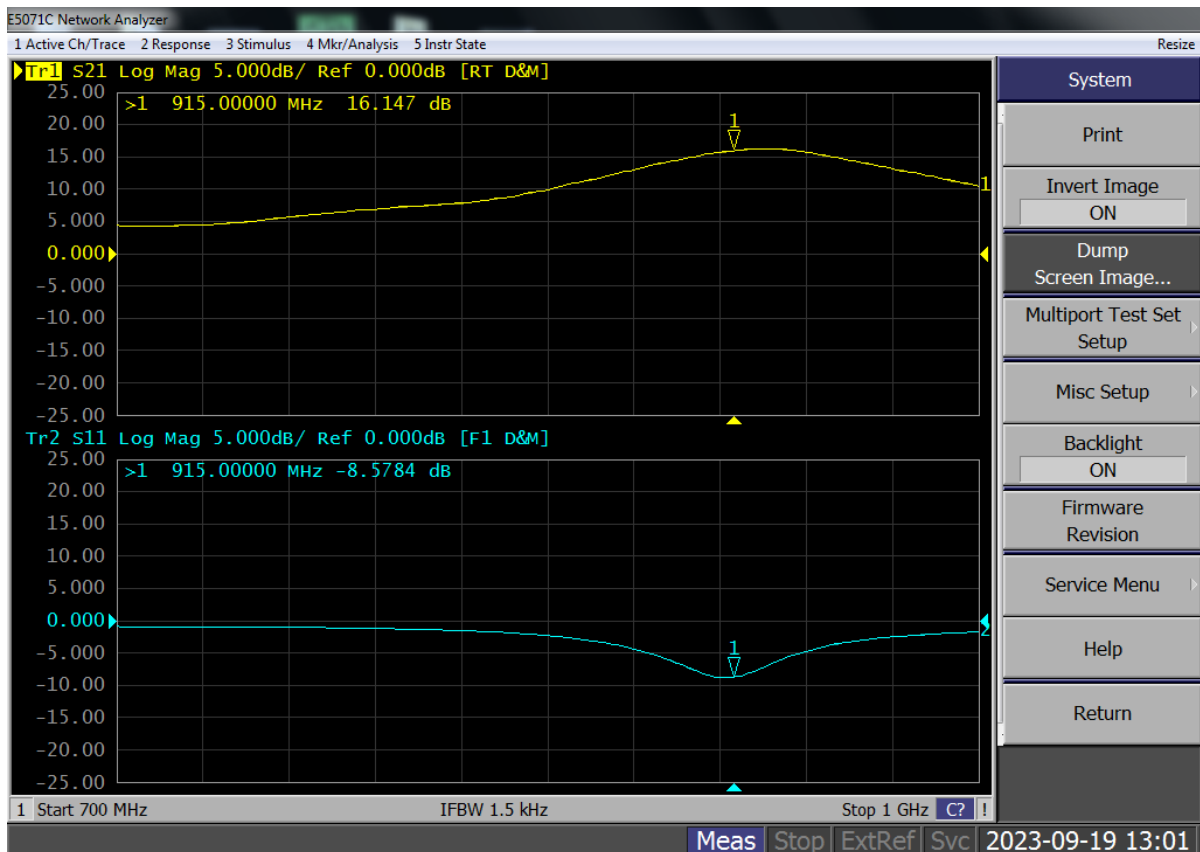


Figure 3. Network analyzer output S11/S21

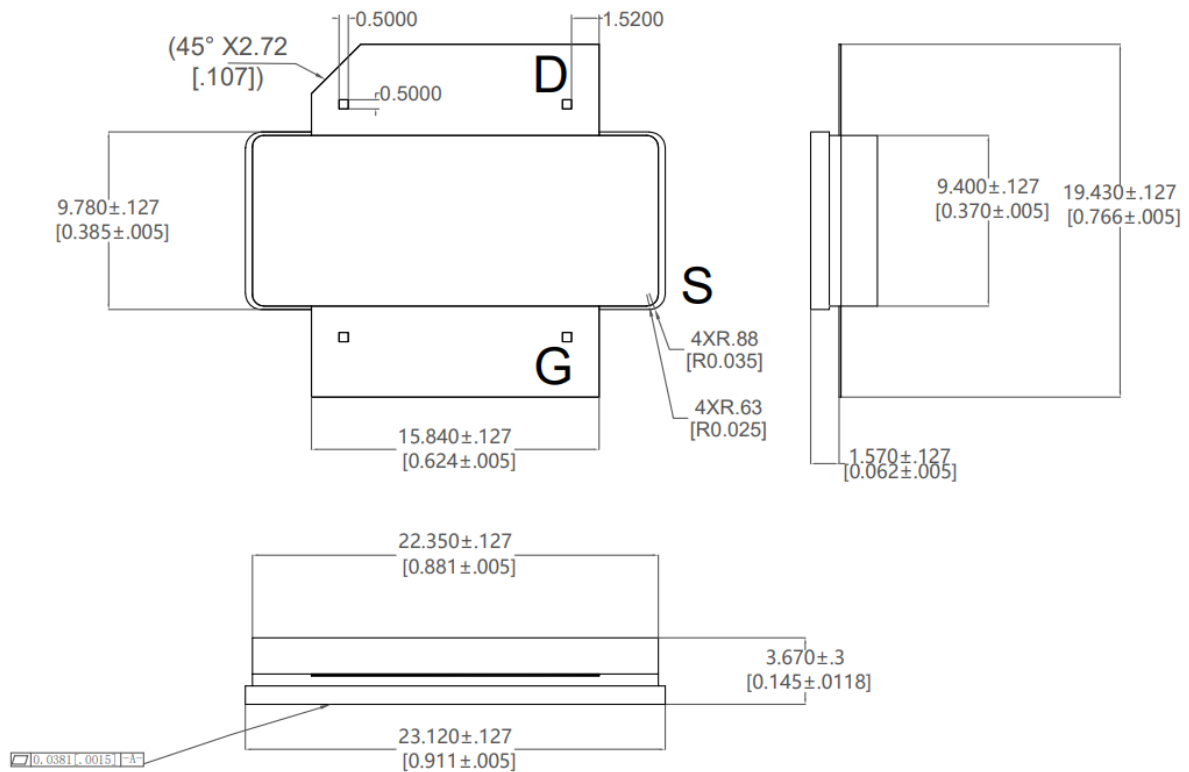




## Package Outline

Flangeless ceramic package;

### INP-688-2-EL (C2)



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



## Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2022/1/12	Rev 1.0	Preliminary Datasheet
2023/9/19	Rev 1.1	Add single device application data
2023/10/20	Rev 1.2	Modify the error of thermal resistor and product rating on page 1 and 2
2025/2/16	Rev 1.3	Update according to improvement of 2 pcs combination
2025/4/24	Rev 1.4	Delete 2 pcs combination result and present by another newer test report

Application data based on JF-21-14/TC-23-60, LSM-25-02

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