



## 1800-2000MHz, 250W, 28V High Power RF LDMOS FETs

### Description

The ITCH20250C2 is a 250-watt, internally matched LDMOS FET, designed for multicarrier WCDMA/PCS/DCS/LTE base station and ISM applications with frequencies from 1800 to 2000MHz. It Can be used in Class AB/B and Class C for all typical cellular base station modulation formats.



•Typical Performance (On Innegration fixture with device soldered):

VDD = 28 Volts, IDQ = 800 mA, Pulse CW, Pulse Width=20 us, Duty cycle=10% .

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1805	53.9	245.5	46.9	15.24	55.04	319.3	51.1
1842.5	53.57	227.6	47.4	15.62	54.75	298.7	52.1
1880	53.06	202.4	47.4	15.94	54.31	269.6	52.3

•Typical WCDMA 1 carrier Performance (On Test Fixture with device soldered):

VDD=28Volts, IDQ = 1600 mA,

Freq (MHz)	Pout (dBm)	CCDF (dB)	Ppeak (dBm)	Ppeak (W)	ACPR (dBc)	Gain (dB)	Efficiency (%)
1805	46.02	8.44	54.46	279.1	-32.2	16.9	23.4
1843	46.01	8.30	54.31	269.7	-34.3	17.3	24.2
1880	46.01	8.04	54.06	254.5	-34.5	17.6	25.6

### 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 <sub>DSS</sub>	70	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-10 to +10	Vdc
Operating Voltage	V <sub>DD</sub>	+32	Vdc
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Case Operating Temperature	T <sub>c</sub>	+150	°C
Operating Junction Temperature	T <sub>j</sub>	+225	°C

**Table 2. Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T <sub>C</sub> = 85°C, T <sub>J</sub> =200°C, DC test	R <sub>θJC</sub>	0.27	°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 <sub>GS</sub> =0V; I <sub>D</sub> =1mA)	V <sub>DSS</sub>	65	70		V
Zero Gate Voltage Drain Leakage Current (V <sub>DS</sub> = 28 V, V <sub>GS</sub> = 0 V)	I <sub>DSS</sub>			10	μA
Gate--Source Leakage Current (V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0 V)	I <sub>GSS</sub>			1	μA
Gate Threshold Voltage (V <sub>DS</sub> = 28V, I <sub>D</sub> = 600 uA)	V <sub>GS(th)</sub>		1.8		V
Gate Quiescent Voltage (V <sub>DD</sub> = 28 V, I <sub>DQ</sub> = 1600 mA, Measured in Functional Test)	V <sub>GS(Q)</sub>	2.3	2.8	3.3	V

**Functional Tests (On Innogrations demo, 50 ohm system)** :V<sub>DD</sub> = 28 Vdc, I<sub>DQ</sub> = 800 mA, f = 1805MHz, Pulse CW, Pulse Width=20 us, Duty cycle=10% .

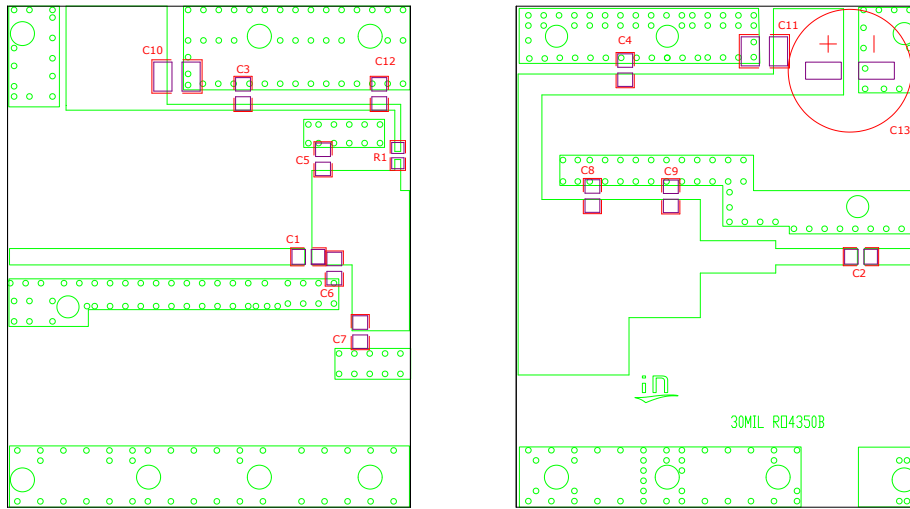
Power Gain @P1dB	G <sub>p</sub>		15		dB
1 dB Compression Point	P <sub>-1dB</sub>		240		W
3dB Compression Point	P <sub>-3dB</sub>		300		W
Drain Efficiency@P3dB	η <sub>p</sub>		50		%
Input Return Loss	IRL		-7		dB

**Load Mismatch (On Innogrations Test Fixture, 50 ohm system):** V<sub>DD</sub> = 28 Vdc, I<sub>DQ</sub> = 800mA, f = 1805 MHz

VSWR 10:1 at 250W pulse CW Output Power	No Device Degradation
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**Reference Circuit of Test Fixture Assembly Diagram**

RO4350B, 20mil, Layout file upon request



**Figure 1. Test Circuit Component Layout**

**Table 1. Test Circuit Component Designations and Values**

Designator	Comment	Footprint	Quantity
C1, C2, C3, C4	27pF	0805	4
C5, C9	0.5 pF	0805	2
C6, C7, C8	2.0pF	0805	3
C10, C11	10uF/100V	1210	2
C12	1.0pF	0805	1
C13	100uF/63V		1
R1	10ohm	0603	1

**TYPICAL CHARACTERISTICS**

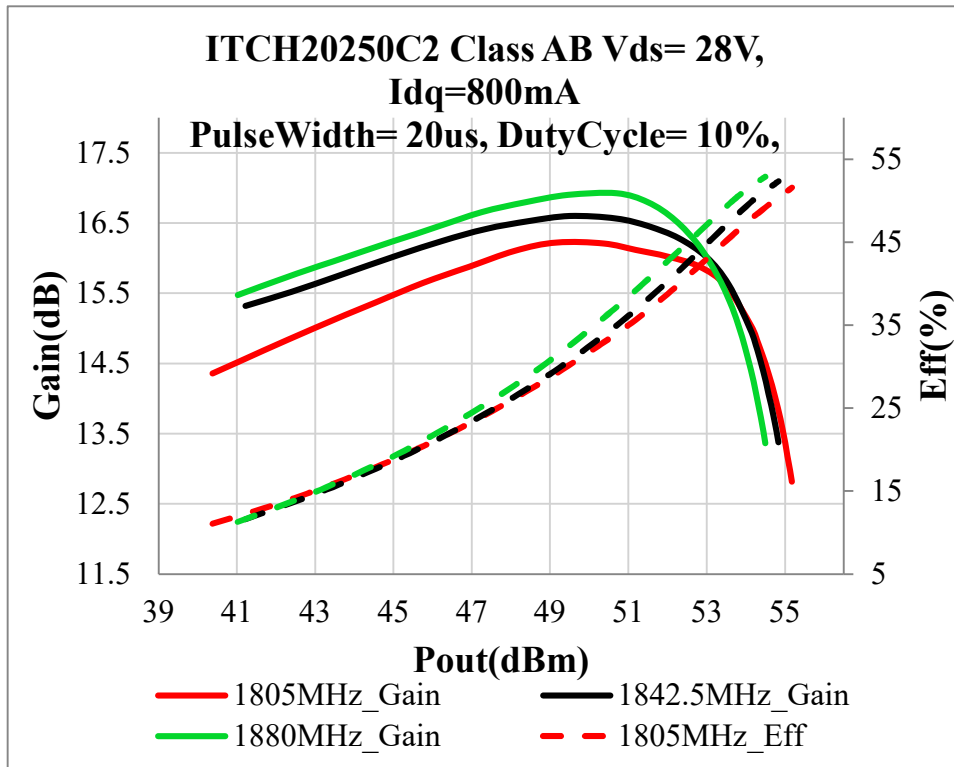


Figure 2. Power gain and drain efficiency as function of Pulse output power (1805-1880MHz)

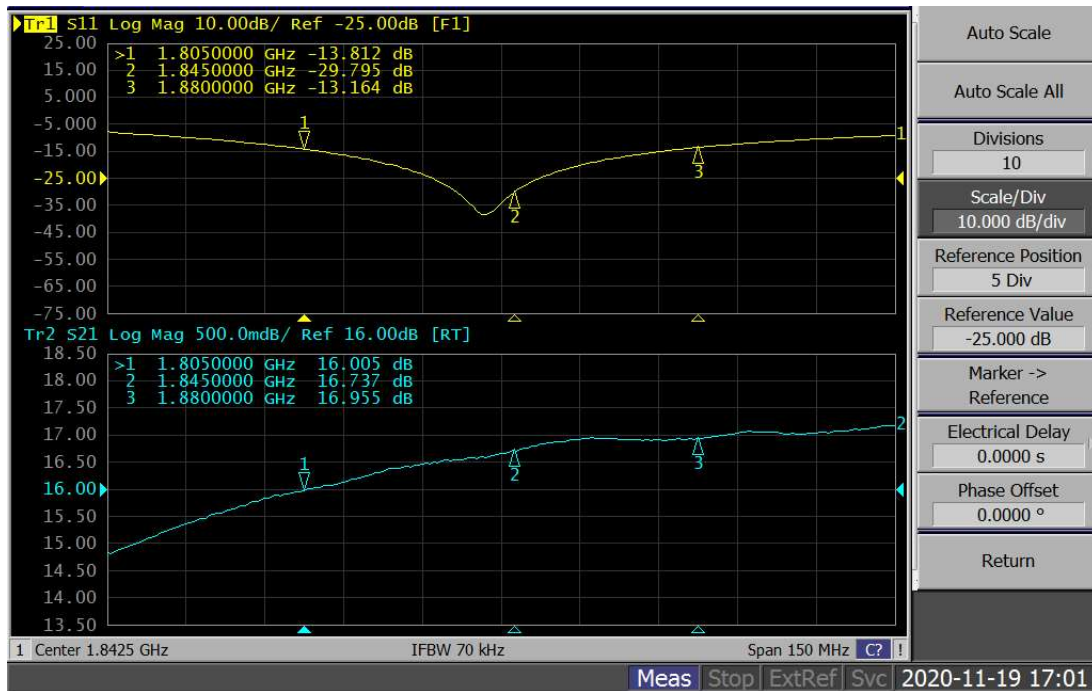
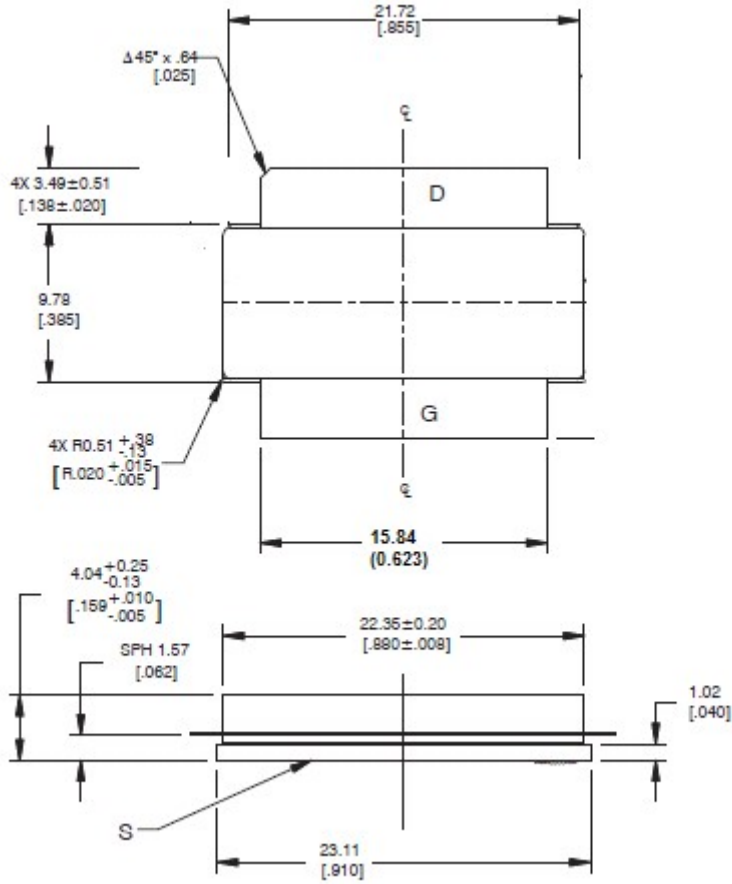


Figure 3. Network analyzer output S11/S21, Idq=1.6A



Package Outline

Flangeless ceramic package;



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
2020/11/20	Rev 1.0	Preliminary Datasheet

Application data based on LSM-20-24

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