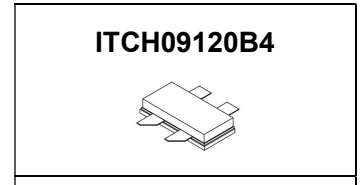




700MHz-1000MHz, 120W, 28V High Power RF LDMOS FETs

Description

The ITCH09120B4 is a 120-watt, internally matched LDMOS FET, designed for multicarrier WCDMA/PCS/DCS/LTE base station and ISM applications with frequencies from 700 to 1000MHz. It can be used as Doherty paired device for all typical cellular base station modulation formats.



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

VdS= 28V, Idq-main=330mA, Vgs-main =2.63V, Vgs-peak =1.3V WCDMA-1C-PAR 10.8							
Freq (MHz)	Pout (dBm)	CCDF (dB)	Ppeak (dBm)	Ppeak (W)	ACPR (dBc)	Gain (dB)	Efficiency (%)
920	43	9.10	52.11	162.7	-30.9	18.3	48.3
940	43	8.61	51.61	144.8	-31.8	18.6	49.6
960	43	8.46	51.45	139.7	-33.3	18.3	51.0

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 _{DSS}	70	Vdc
Gate--Source Voltage	V _{GS}	-10 to +10	Vdc
Operating Voltage	V _{DD}	+32	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°C,Pout=20W	R _{θJC}	0.45	°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 (Main path Section)

Drain-Source Breakdown Voltage (V _{GS} =0V; I _D =1mA)	V _{DSS}	65	70		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} = 10 V, V _{DS} = 0 V)	I _{GSS}			1	μA
Gate Threshold Voltage (V _{DS} = 28V, I _D = 600 uA)	V _{GS(th)}		1.8		V
Gate Quiescent Voltage (V _{DD} = 28 V, I _{DQ} = 330 mA, Measured in Functional Test)	V _{GS(Q)}	2.2	2.6	3.2	V

Functional Tests (On Innogrations doherty demo, 50 ohm system) : V_{DD} = 28 Vdc, I_{DQMAIN} =330 mA, V_{GPEAK}=1.3V, f = 920 MHz, Pulse CW, Pulse Width=20 us, Duty cycle=10%.

Power Gain @ P1dB	G _p		17		dB
1 dB Compression Point	P _{-1dB}		51		dBm
3dB Compression Point	P _{-3dB}		51.5		dBm
Drain Efficiency@P3dB	η _D		60		%
Input Return Loss	IRL		-7		dB

Load Mismatch (On Innogrations Test Fixture, 50 ohm system): V_{DD} = 28 Vdc, I_{DQ} = 330mA, f = 920MHz

VSWR 10:1 at 20W WCDMA 1 Carrier Output Power	No Device Degradation
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Reference Circuit of Test Fixture Assembly Diagram

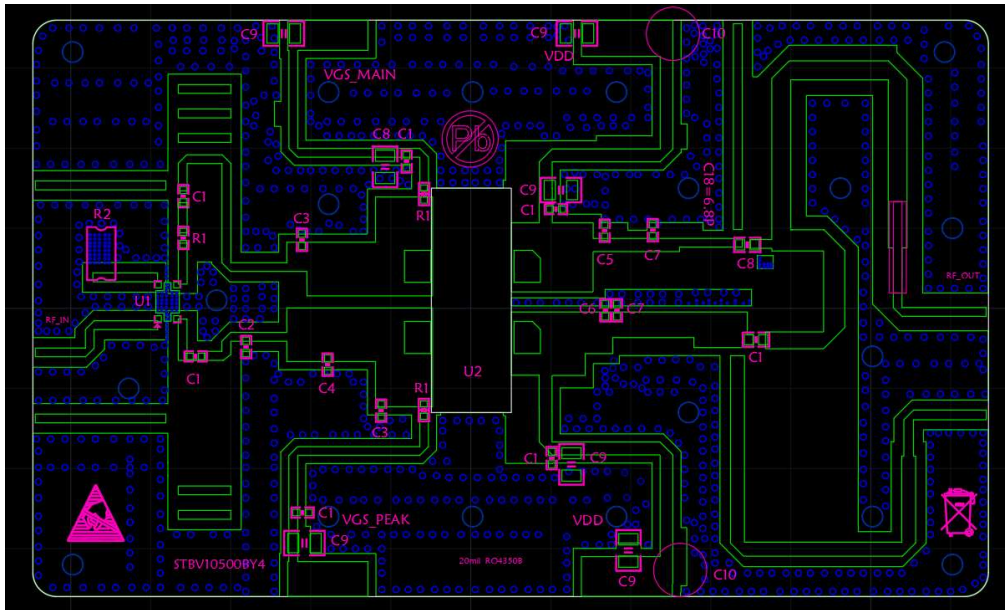


Figure 1. ITCH09120B4 Doherty Test Circuit Component Layout(920MHz~960MHz)

Table 5. Test Circuit Component Designations and Values

Component	Value	Quantity
U1	X3C07F1-02S	1
U2	ITCH09120B4	1
C1	100pF	7
C2	4.3pF	1
C3	8.2pF	2
C4	2pF	1
C5	10pF	1
C6	12pF	1
C7	6.8pF	2
C8	4.7pF	1
C9	10uF/63V	7
C10	470uF/63V	2
R1	10 Ω (0603)	3
R2	50 Ω (1210)	1
PCB	Roger 43050B 20mils	



TYPICAL CHARACTERISTICS

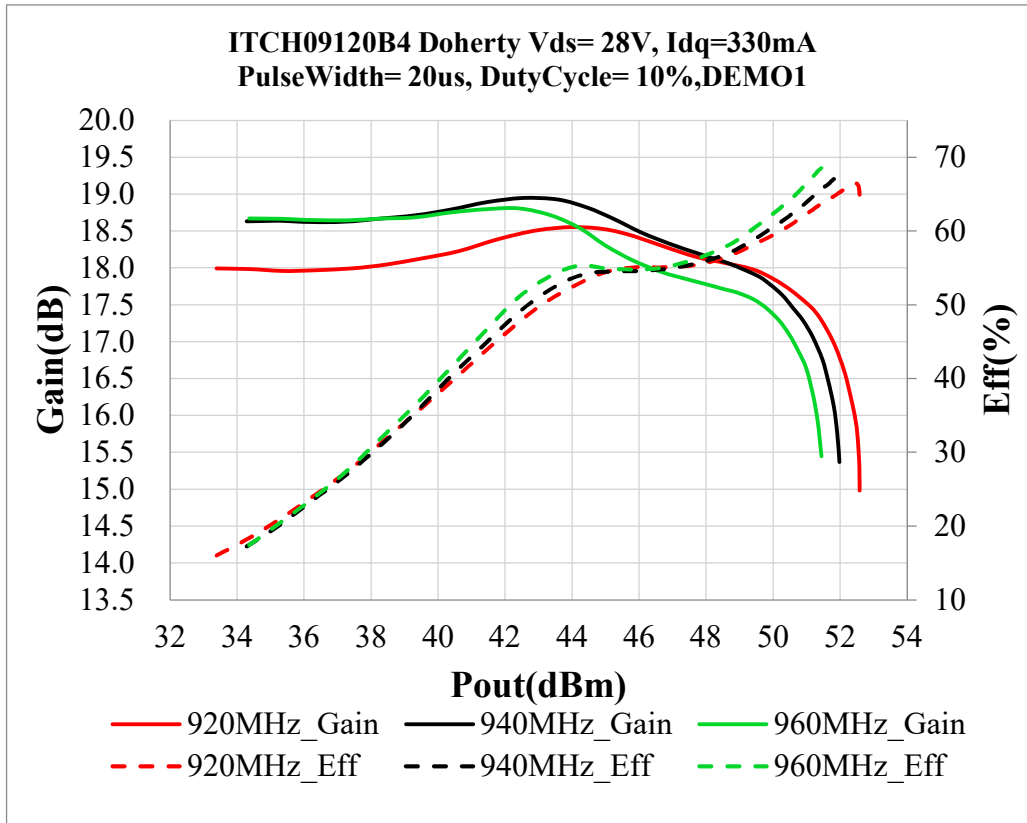


Figure 2. Power gain and drain efficiency as function of pulsed CW Pout

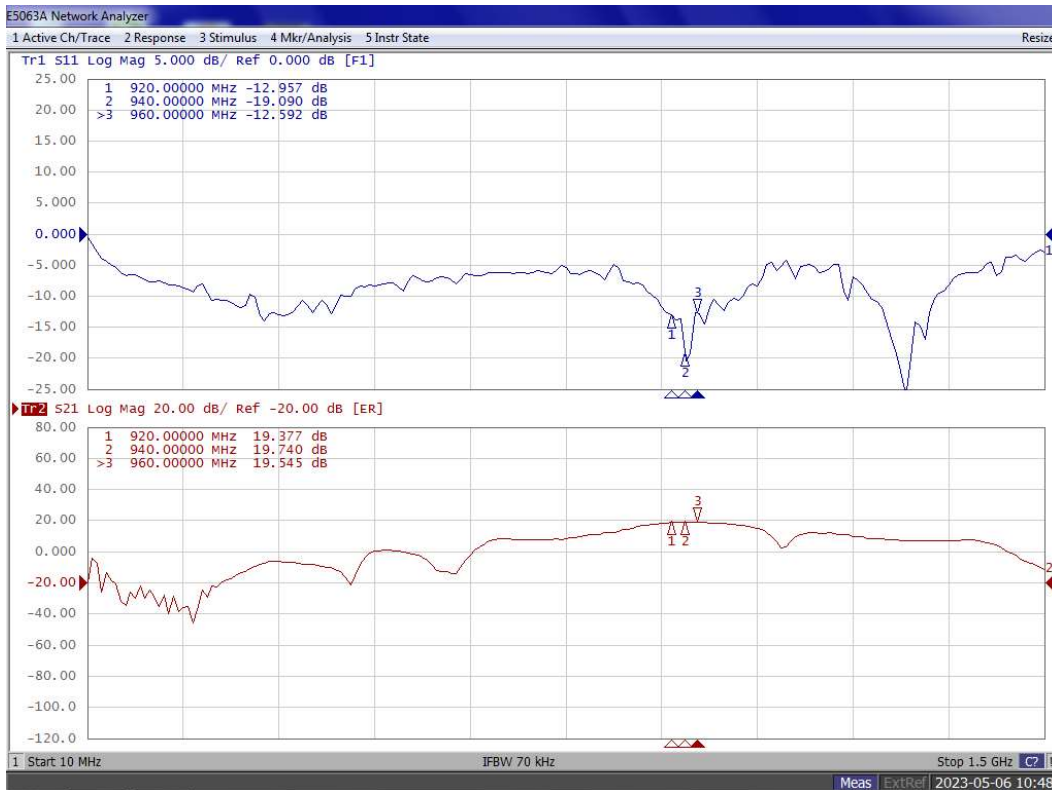
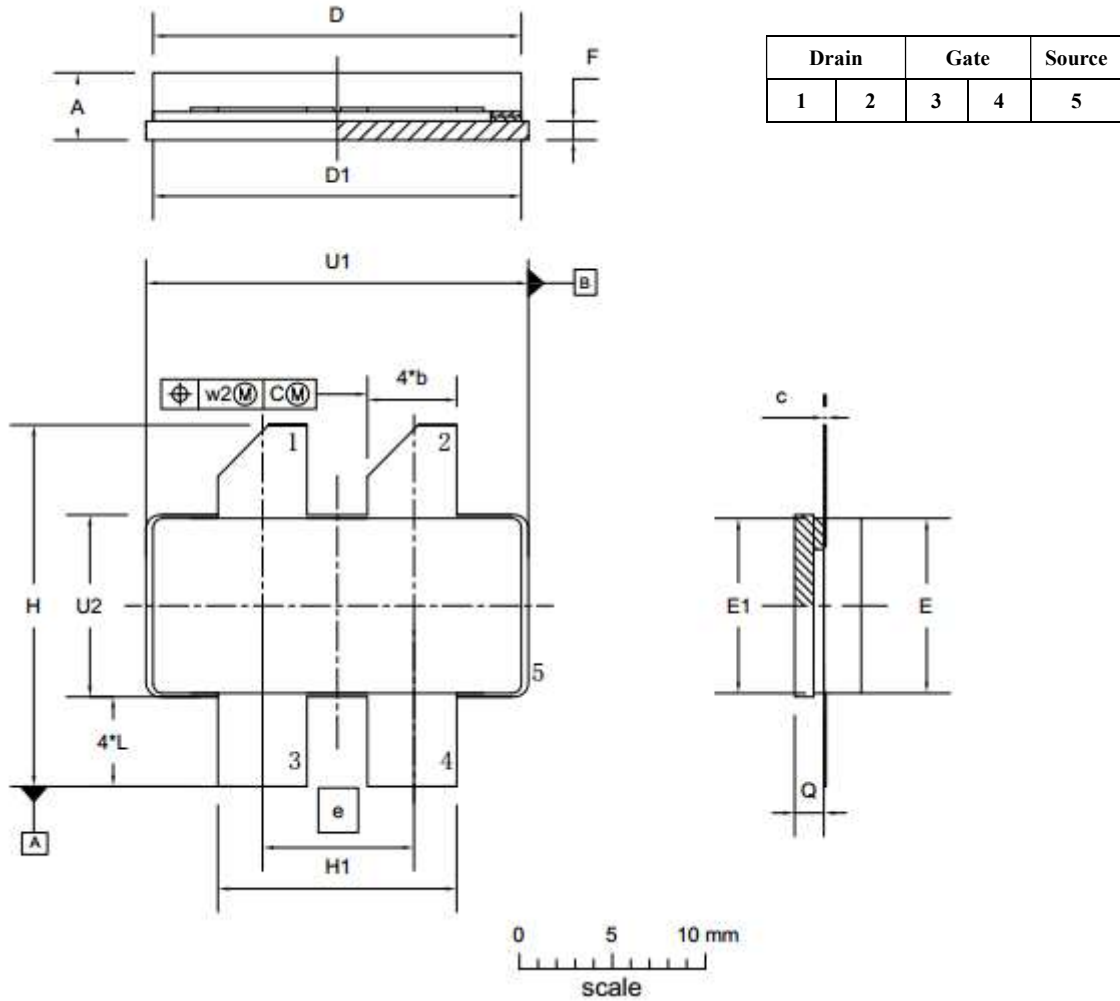


Figure 3. Broadband Frequency Response



Earless Flanged Ceramic Package; 4 leads



UNIT	A	b	c	D	D ₁	e	E	E ₁	F	H	H ₁	L	Q	U ₁	U ₂	W ₁	W ₂
mm	4.72	4.67	0.15	20.02	19.96	7.90	9.50	9.53	1.14	19.94	12.98	5.33	1.70	20.70	9.91	0.25	0.51
	3.43	4.93	0.08	19.61	19.66		9.30	9.25	0.89	18.92	12.73	4.32	1.45	20.45	9.65		
inches	0.186	0.194	0.006	0.788	0.786	0.311	0.374	0.375	0.045	0.785	0.511	0.210	0.067	0.815	0.390	0.01	0.02
	0.135	0.184	0.003	0.772	0.774		0.366	0.364	0.035	0.745	0.501	0.170	0.057	0.805	0.380		

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B4					03/12/2013



Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/5/6	Rev 1.0	Product Datasheet

Application data based on ZYX-23-05

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