



700MHz-1000MHz, 200W, 28V High Power RF LDMOS FETs

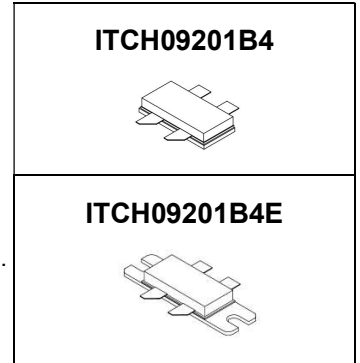
Description

The ITCH09201B4 is a 200-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):

$V_{DD} = 28$ Volts, $I_{DQMAIN} = 700$ mA, $V_{GPEAK} = 1.68$ V, Pulse CW, Pulse Width=20 us, Duty cycle=10% .

Freq (MHz)	P _{-1dB} (dBm)	P _{-3dB} (dBm)	$\eta_D@P_{-3}$ (%)	P _{avg} =44.2dBm WCDMA Signal ⁽¹⁾		
				Gp (dB)	η_D (%)	ACPR _{5M} (dBc)
758	52.18	53.45	65.2	19.7	43.3	-31.4
780	50.1	52.38	59.7	19.3	43.1	-33.6
803	51.02	52.79	64.6	18.6	42.6	-38.9



Note(1) WCDMA signal: 3GPP test model 1; 1 to 64 DPCH; Channel Bandwidth=3.84MHz, PAR =10.5 dB at 0.01 % probability on CCDF.

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 $T_c = 85^\circ\text{C}$, $T_j = 200^\circ\text{C}$, DC test	$R_{\theta JC}$	0.35	°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 (per 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} = 700 mA, Measured in Functional Test)	V _{GS(Q)}	2.2	2.9	3.2	V

Functional Tests (On Innogrations doherty demo, 50 ohm system) : V_{DD} = 28 Vdc, I_{DQMAIN} =700 mA, V_{GPEAK}=1.68V, f = 758 MHz, Pulse CW, Pulse Width=20 us, Duty cycle=10%.

Power Gain @ 25W Output	G _p		19		dB
1 dB Compression Point	P _{-1dB}		52		dBm
3dB Compression Point	P _{-3dB}		53		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} = 700 mA, f = 758 MHz

VSWR 10:1 at 25W WCDMA 1 Carrier Output Power	No Device Degradation
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Reference Circuit of Test Fixture Assembly Diagram

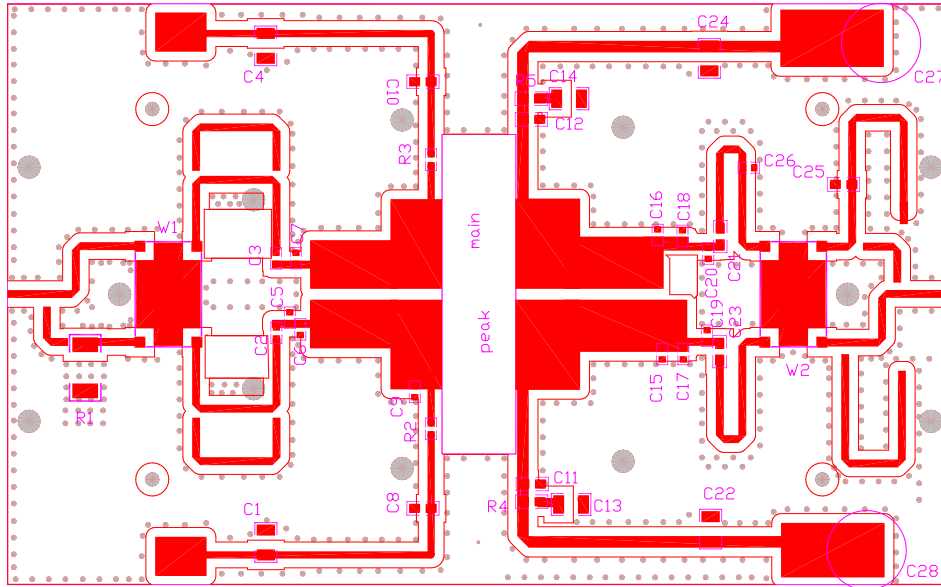


Figure 1. ITCH09201B4 Doherty Test Circuit Component Layout(758MHz~803MHz)

Table 5. Test Circuit Component Designations and Values

Designator	Footprint	Comment	Quantity
C1, C4, C13, C14, C22, C24	1210	10uF/50V	6
C2, C3	0603	68pF	2
C5	0603	10pF	1
C6, C18, C26	0603	2pF	3
C7	0603	12pF	1
C8, C10, C11, C21, C23	0805	68pF	5
C9, C15, C16, C19, C20	0603	6.8pF	5
C12	0805	100pF	1
C17	0603	3.3pF	1
C25	0805	0.5pF	1
R1	2512	51R	1
R2, R3	0603	10R	2
R4, R5	0805	10R	2
W1, W2		HC0650A03	2

TYPICAL CHARACTERISTICS

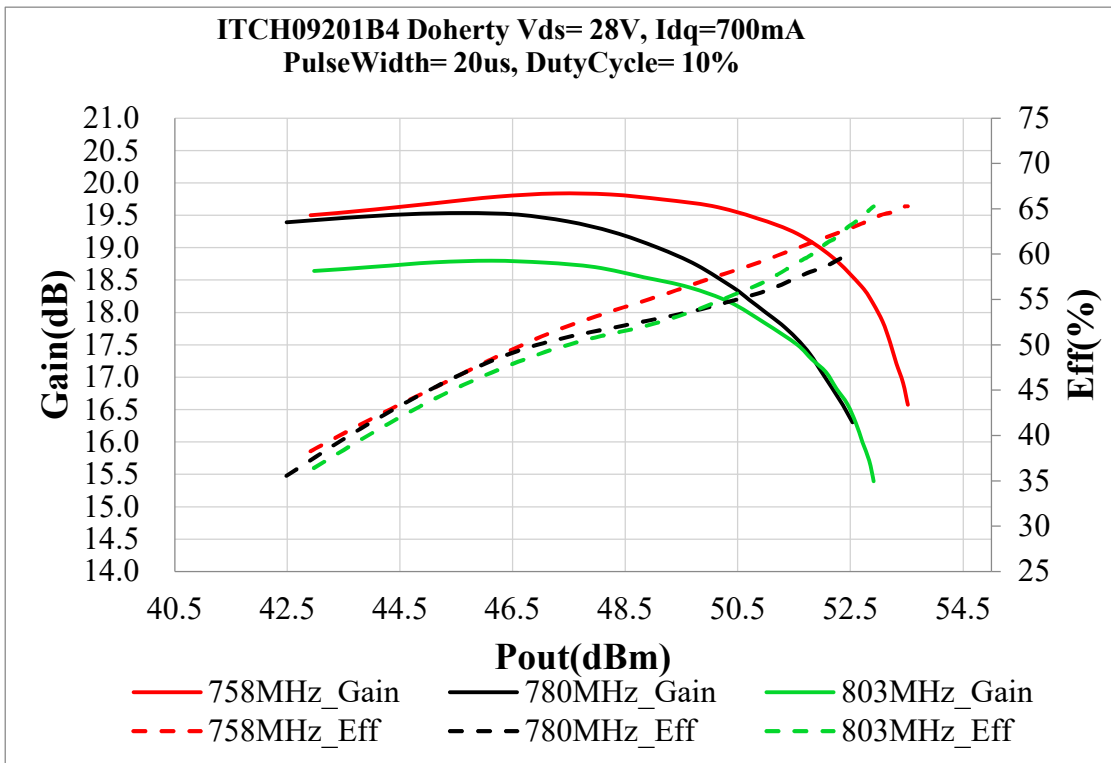


Figure 2. Power gain and drain efficiency as function of pulsed CW Pout

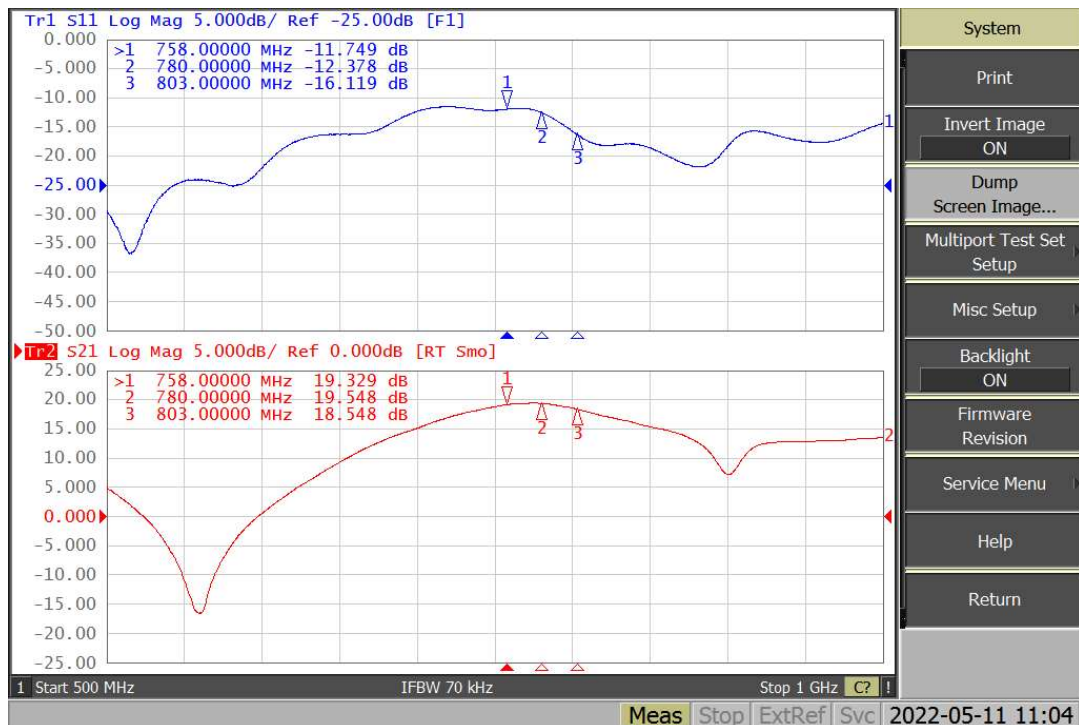
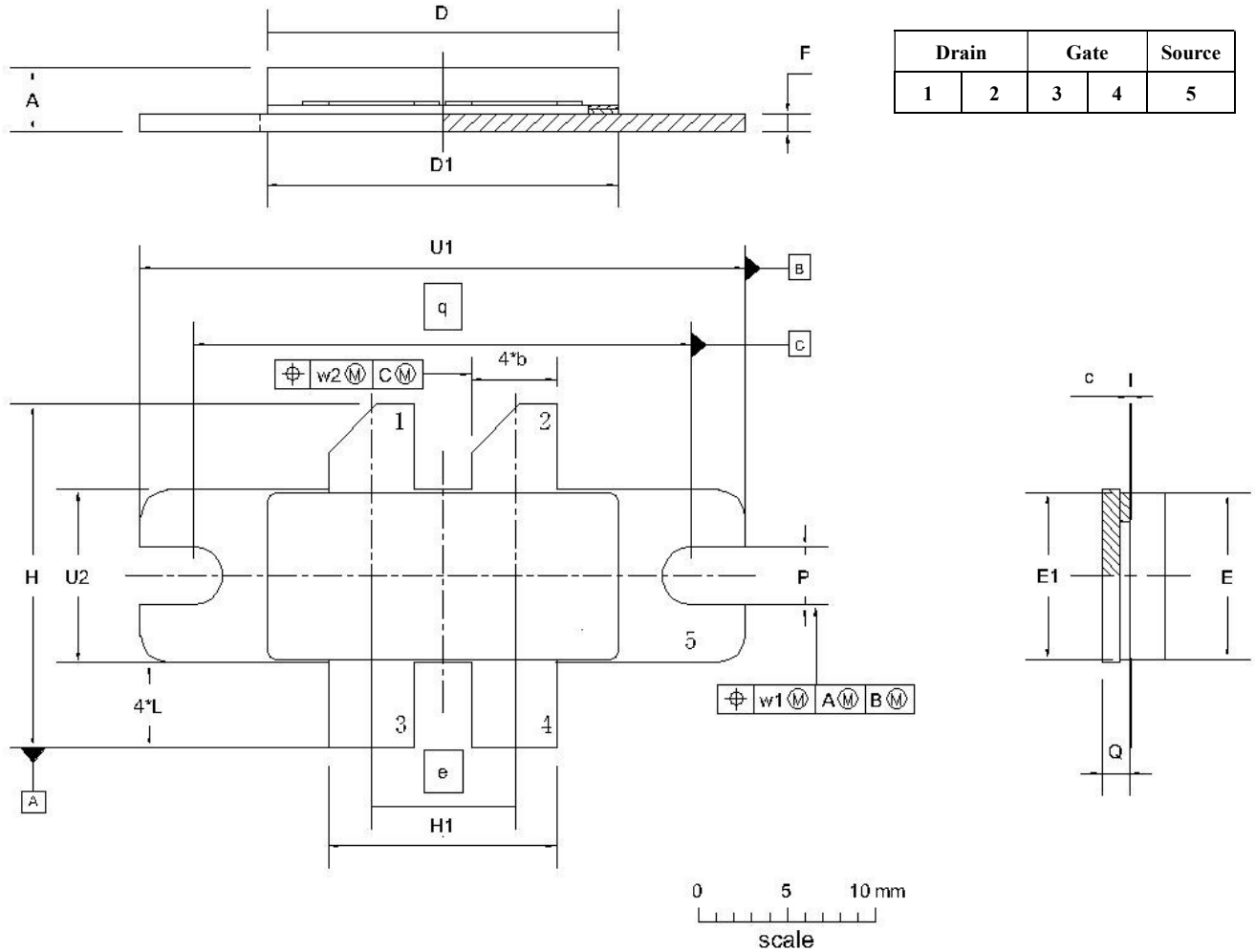


Figure 3. Broadband Frequency Response



Package Outline

Eared Flanged Ceramic Package; 2 mounting holes; 4 leads



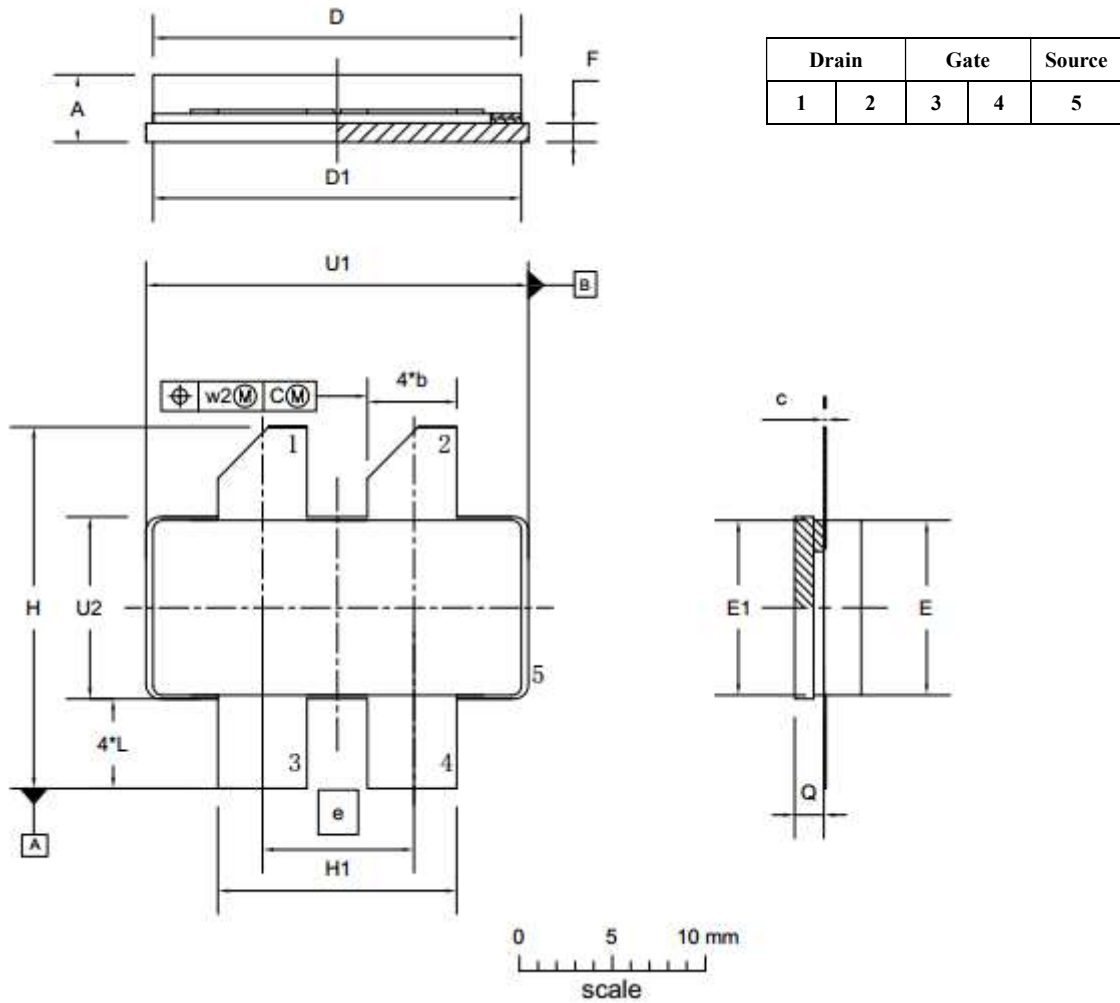
Drain		Gate		Source
1	2	3	4	5

UNIT	A	b	c	D	D ₁	e	E	E ₁	F	H	H ₁	L	p	Q	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	3.38	1.70	27.94	34.16	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	3.12	1.45		33.91	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	0.133	0.067	1.100	1.345	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	0.123	0.057		1.335	0.380		

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B4E					03/12/2013



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
2022/5/11	Rev 1.0	Preliminary Datasheet

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