



GaN 28V, 160W, 1.8-2.7GHz RF Power Transistor

Description

The XTAH27160B4C is a dual path 160W, internal matched GaN HEMT, operated from 1.8-2.7GHz.

It can be configured as a single stage symmetrical Doherty capable of delivering P_{avg} 25W, according to normal 8.5dB back off.

XTAH27160B4CV



- Typical Doherty Pulsed CW and 1C W--CDMA Characterization Performance:

$V_{ds} = 28V$, $I_{dq-main} = 60mA$, $V_{gs-main} = -2.65V$, $V_{gs-peak} = -6V$

FREQ (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
2500	52.03	159.8	63.9	13.15	53.28	212.7	64.2
2600	50.63	115.5	59.7	13.45	52.96	197.5	67.6
2700	51.72	148.6	62.6	12.03	52.17	164.8	66.1

(2)1C WCDMA; Signal PAR = 10 dB @ 0.01% Probability on CCDF.

Freq (MHz)	Pout (dBm)	CCDF (dB)	Ppeak (dBm)	Ppeak (W)	ACPR (dBc)	Gain (dB)	Efficiency (%)
2500	44	9.05	53.06	202.5	-27.9	13.7	44
2600		8.69	52.69	185.7	-27.8	13.9	47
2700		8.46	52.47	176.5	-36.2	12.9	45

Applications

- Symmetrical Doherty amplifier within N1/N3 band and B41/B3/B1 4G band
- S band power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

- Set VGS to the pinch-off (VP) voltage, typically -5 V
- Turn on VDS to nominal supply voltage
- Increase VGS until IDS current is attained
- Apply RF input power to desired level

Turning the device OFF

- Turn RF power off
- Reduce VGS down to VP, typically -5 V
- Reduce VDS down to 0 V
- Turn off VGS

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain—Source Voltage	V_{DSS}	+150	Vdc
Gate—Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	32	Vdc
Maximum gate current	I_{gs}	43.6	mA
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 by FEA $T_C = 85^{\circ}\text{C}$, $P_{out}=25\text{W}$, 2.6GHz Doherty application board	$R_{\theta JC}$	1.3	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics ($T_A = 25^{\circ}\text{C}$ unless otherwise noted)

DC Characteristics (main and peak path, measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}$; $I_{DS}=21.8\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS}=10\text{V}$, $I_D=21.8\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS}=50\text{V}$, $I_{DS}=200\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.6		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.6GHz, $P_{out}=25\text{W}$ WCDMA 1 Carrier in Doherty circuit All phase, No device damages	VSWR		10:1		

2.5-2.7GHz

Figure 3: Efficiency and power gain as function of P_{out} (3.3-3.6GHz Doherty)

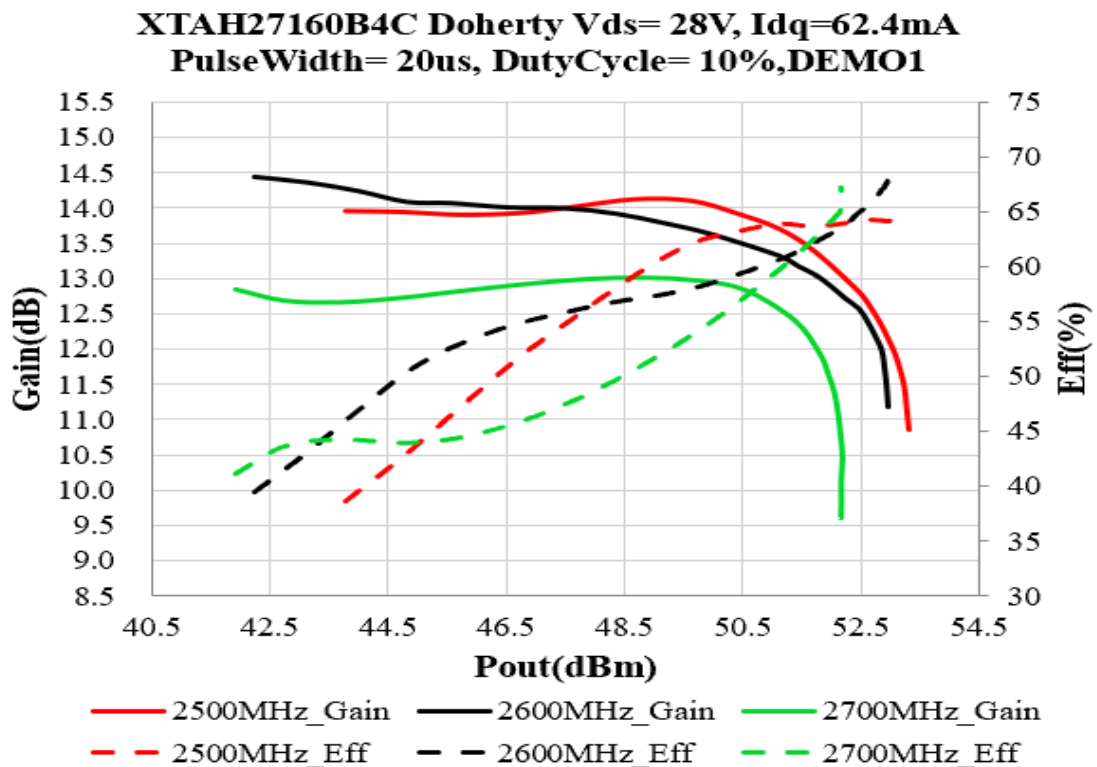




Figure 4: Network analyzer output, S11 and S21

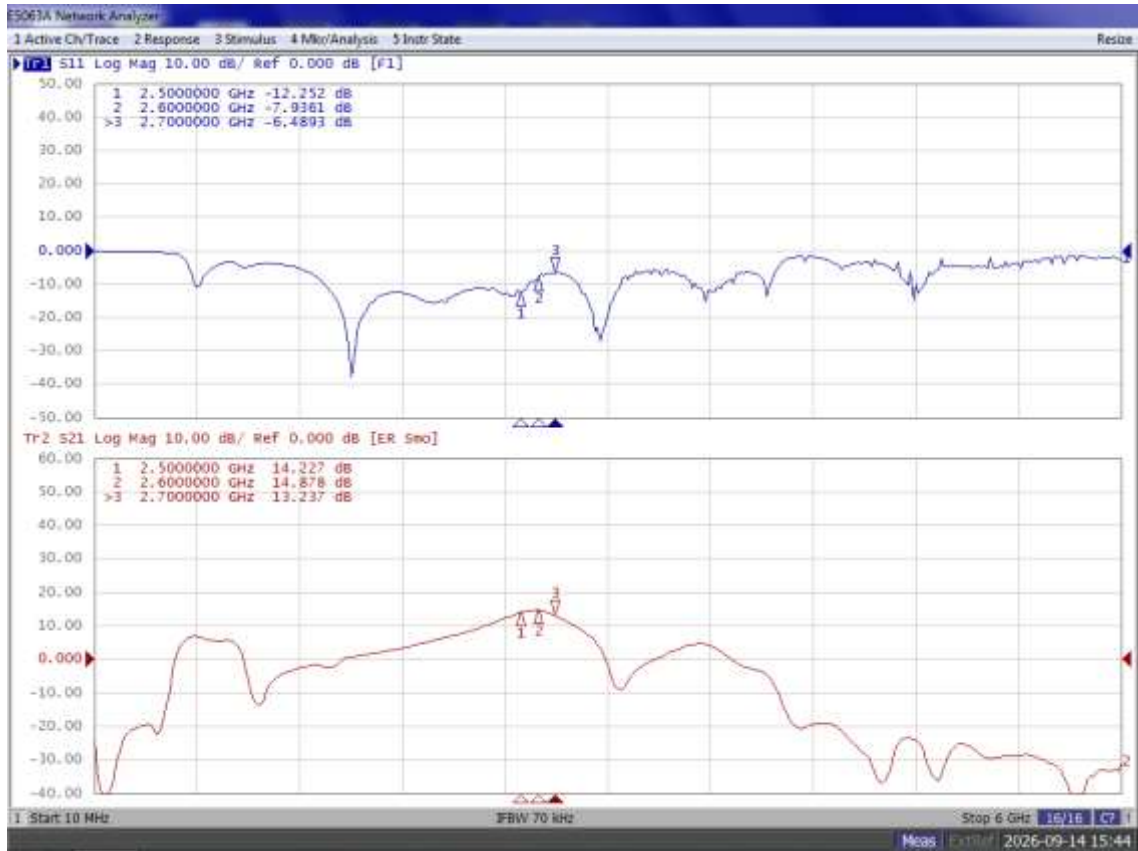


Figure 5: Picture of application board Doherty circuit

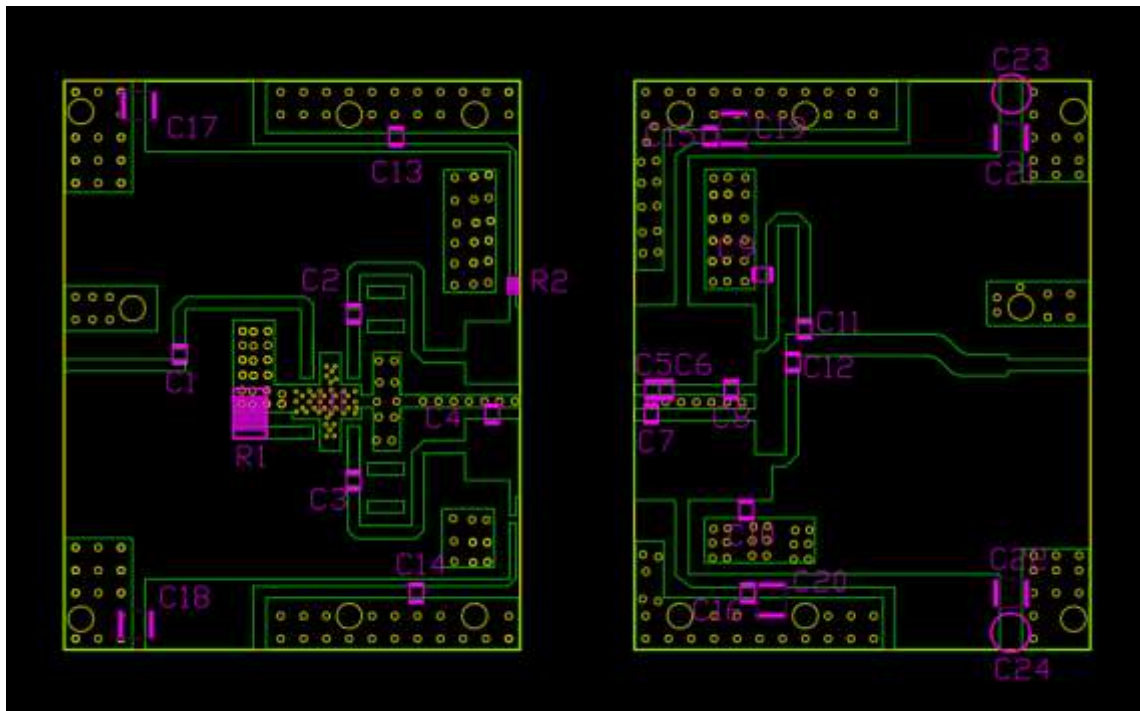


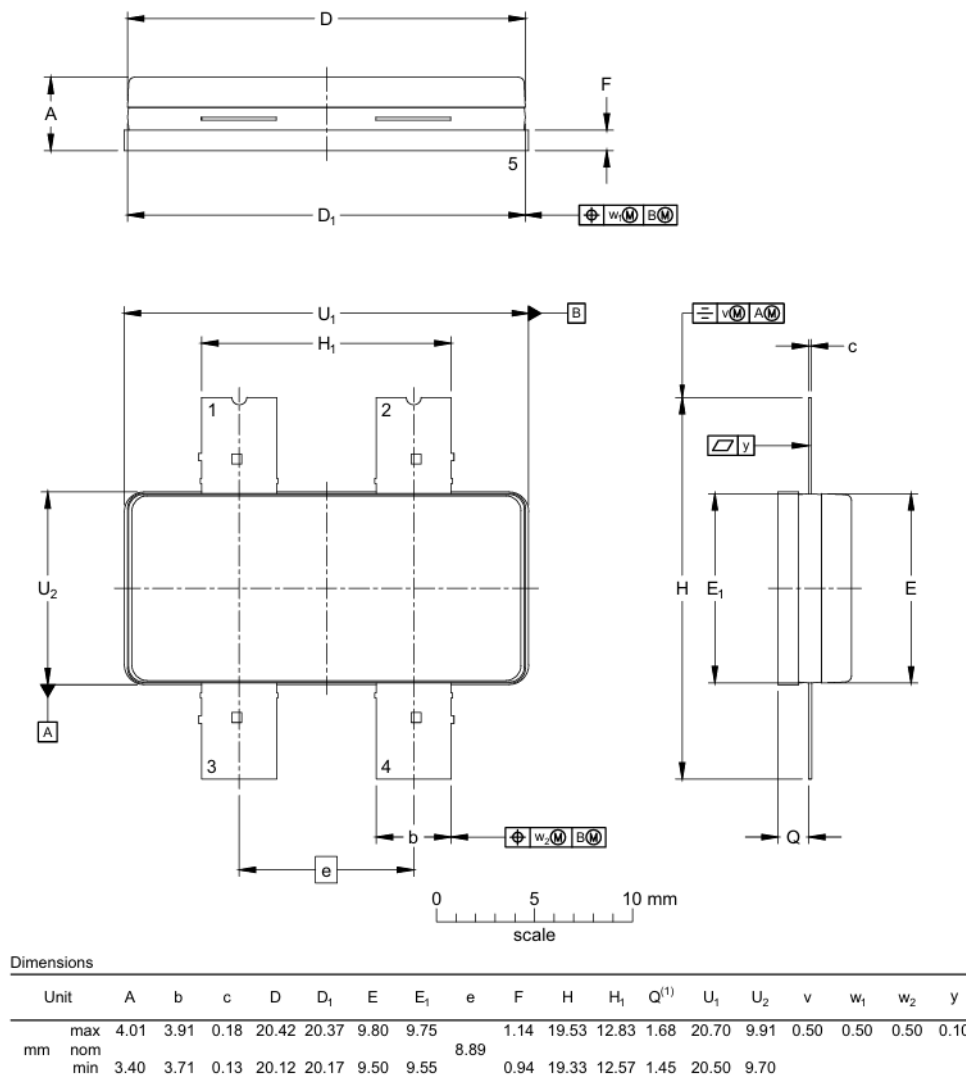


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Component	Value	Suggested Manufacture	Quantity
U1	3dB Brige	HC2500P03	1
C1	3.9pF	GQM2195C2E3R9BB12D	1
C2、C3、C11、C12、C13、 C14、C15、C16	12pF	GQM2195C2E12R0BB12D	8
C5	0.6pF	GQM2195C2E0R6BB12D	1
C4、C6、C8、C10	0.3pF	GQM2195C2E0R3BB12D	4
C7	1.2pF	GQM2195C2E1R2BB12D	1
C9	0.4pF	GQM2195C2E0R4BB12D	1
C17、C18、C19、C20、 C21、C22	10uF/63V	GRM32EC72A106KE05	6
C23、C24	470uF/63V	EEVFK1J471M	2
R1	50 Ω	C8A50Z4B	1
R2	10 Ω	ERJPA3F10R0V	1



Earless Flanged Plastic Air Cavity Package; 4 leads



Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2026/9/16	V1.0	Preliminary Datasheet Creation

Application data based on ZYX-26-32

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