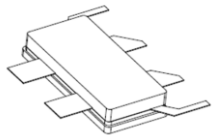
GaN 28V, 240W,3.3-3.6GHz RF Power Transistor

GTAH36240BY4V



Description

The GTAH36240BY4V is a 240-watt, internally matched GaN HEMT, designed for 5G cellular applications with frequencies from 3.3-3.6GHz, **enabled by wide band VBW capability to support IBW≥200MHz.**.

It can be configured as asymmetrical Doherty for 4G or 5G application, delivering 25 to 30W average power, according to normal 8.5 to 9.5dB back off.

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

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

V_{DD} = 28 Vdc, I_{DQA} = 230 mA, V_{GSB} = –4.2Vdc,

(1)Pulsed condition: 100us and 10%,

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
3300	51.86	153.6	52.9	10.21	53.43	220.5	53.6
3400	51.55	142.9	54.8	10.48	53.56	227.2	57.7
3500	52.23	167.2	56.1	10.16	53.61	229.6	59.0
3600	52.57	180.7	57.6	10.46	53.45	221.4	60.1

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

Freq (MHz)	Pout (dBm)	CCDF (dB)	ACPR (dBc)	Gain (dB)	Efficiency (%)
3300	44.51	8.76	-31.9	10.8	41.6
3400	44.46	9.08	-33.7	10.9	43.5
3500	44.51	8.88	-38.4	10.8	43.8
3600	44.50	9.37	-33.8	10.9	42.4

Applications

- Asymmetrical Doherty amplifier within N78 5G band and B42 4G band
- S band power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set VGS to the pinch—off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically –5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Figure 1: Pin Connection definition

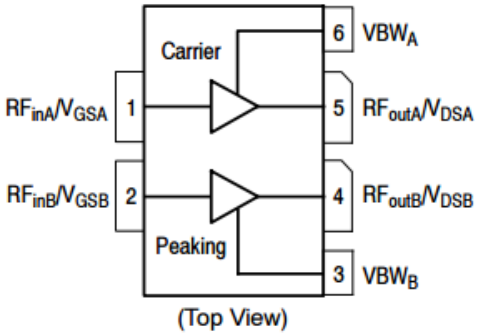


Table 1. Maximum Ratings

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	Igs	60	mA
Storage Temperature Range	Tstg	-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°C, Pout=25W, 3.6GHz Doherty application board	$R_{\theta JC}$	0.75	°C /W

Table 3. Electrical Characteristics (TA = 25℃ 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	VGS=-8V; IDS=30mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 30mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=230Ma, Measured in Functional Test	$V_{GS(Q)}$		-2.6		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.6GHz, Pout=25W WCDMA 1 Carrier in Doherty circuit All phase, No device damages	VSWR		10:1		

Figure 3: Efficiency and power gain as function of Pout (3.3-3.6GHz Doherty)

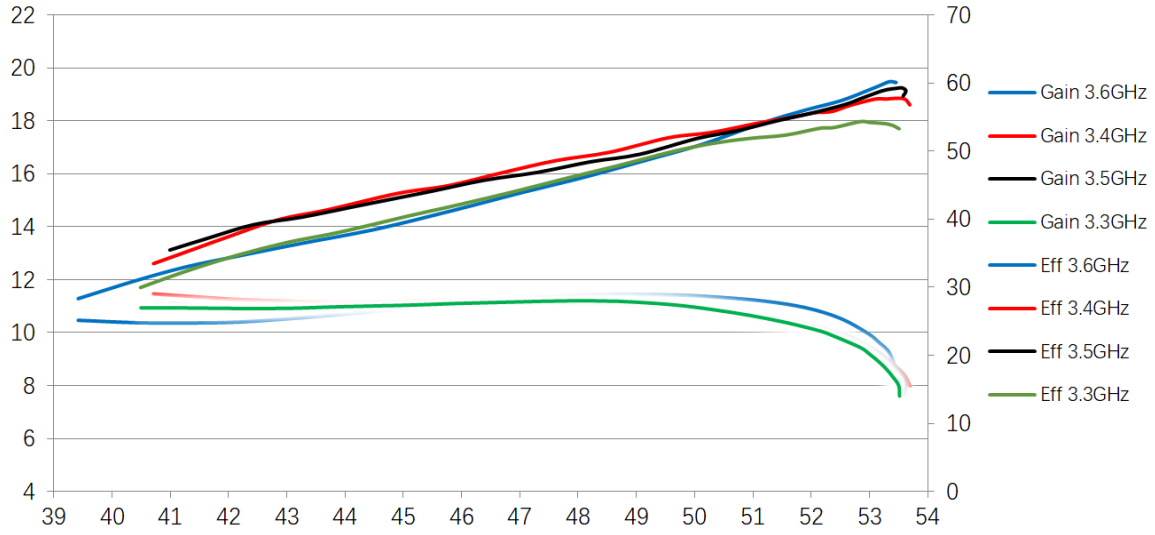


Figure 4: Network analyzer output, S11 and S21 (3.3-3.6GHz Doherty)

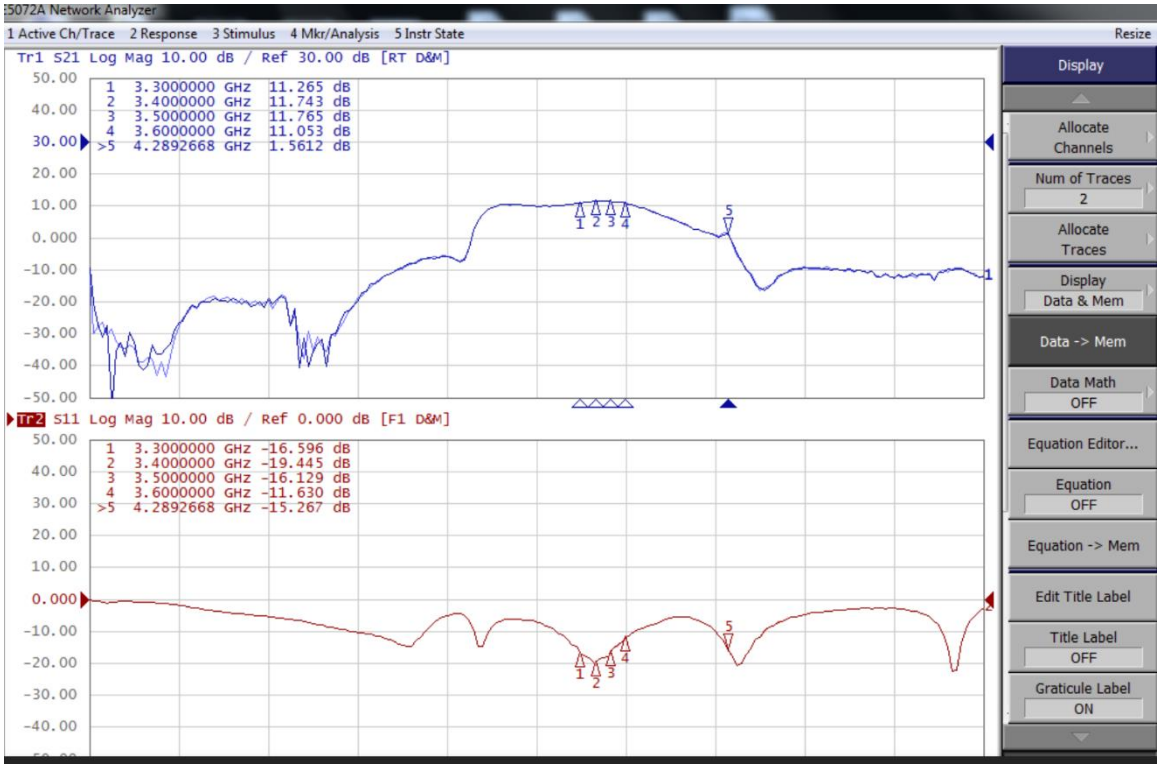


Figure 5: Picture of application board Doherty circuit for 3.3-3.6GHz

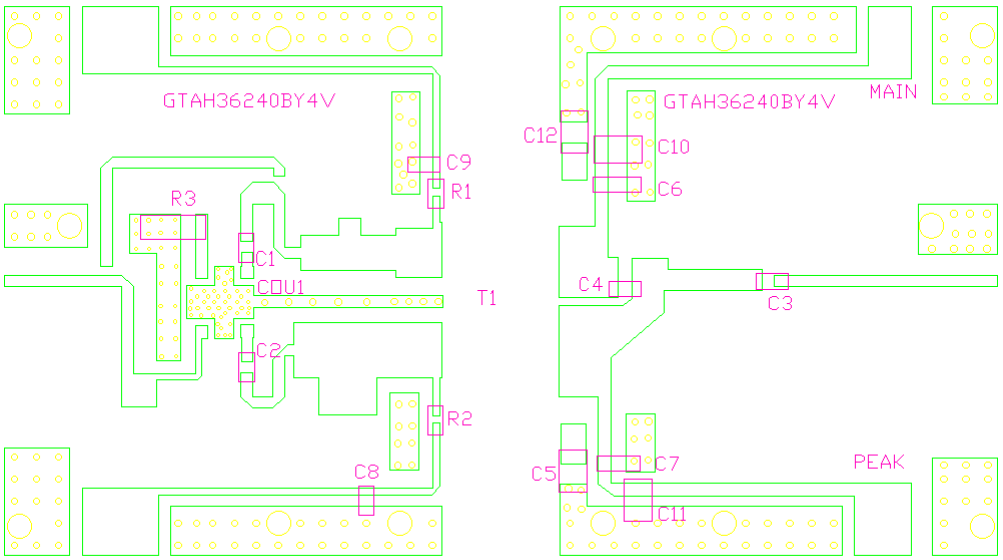
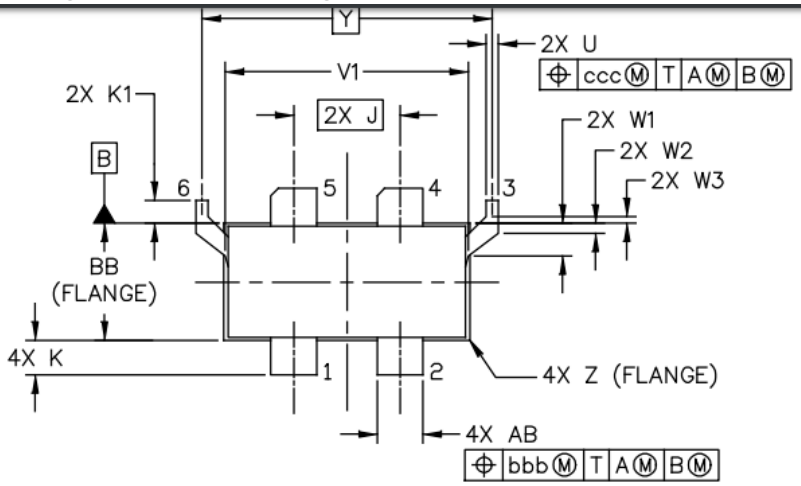
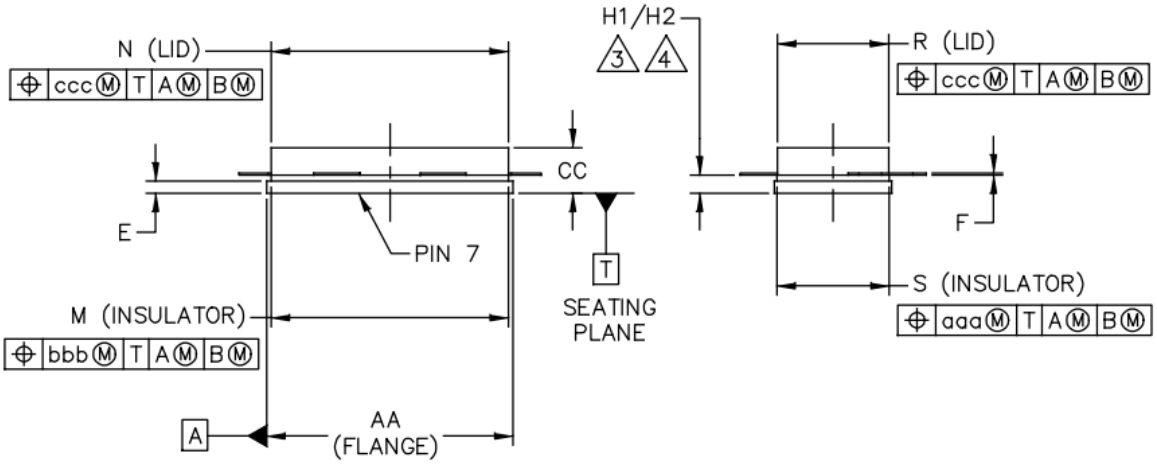


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Part	Quantity	Description	Part Number	Manufacture
C1,C2, C3,C6, C7,C8,C9	7	8.2pFHigh Q Capacitor	251SHS8R2BSE	TEMEX
C4	1	1.1pFHigh Q Capacitor	251SHF1R1BSE	TEMEX
C10,C11,C12,C5	4	10uF MLCC	GRM32EC72A106ME05	Murata
R1,R2	2	10Ω Power Resistor	ESR03EZPF10R0	ROHM
`R3	1	51Ω Power Resistor	RFR50-20CT0421B	YT
COUT1	1	3 dB Bridge	XC3500P-03S	ANAREN
T1	1	240W GaN Dual Transistor	GTAH36240BY4V	Innogration

Earless Flanged Ceramic Package; 6 leads- BY4V





DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX	DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX
AA	.805	.815	20.45	20.70	R	.365	.375	9.27	9.53
BB	.380	.390	9.65	9.91	S	.365	.375	9.27	9.53
CC	.125	.170	3.18	4.32	U	.035	.045	0.89	1.14
E	.035	.045	0.89	1.14	V1	.795	.805	20.19	20.45
F	.004	.007	0.10	0.18	W1	.0975	.1175	2.48	2.98
H1	.057	.067	1.45	1.70	W2	.0225	.0425	0.57	1.08
H2	.054	.070	1.37	1.78	W3	.0125	.0325	0.32	0.83
J	.350 BSC		8.89 BSC		Y	.956 BSC		24.28 BSC	
K	.0995	.1295	2.53	3.29	Z	R.000	R.040	R0.00	R1.02
K1	.070	.090	1.78	2.29	AB	.145	.155	3.68	3.94
M	.774	.786	19.66	19.96	aaa	.005		0.13	
N	.772	.788	19.61	20.02	bbb	.010		0.25	
					ccc	.015		0.38	

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/10/10	**V1.0**	**Preliminary Datasheet Creation**

Application data based on LWH-25-39

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