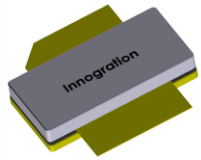
GTAH58180BY2 GaN TRANSISTOR

Document Number: GTAH58180BY2
Preliminary Datasheet V1.0

Gallium Nitride 28V 180W, C band RF Power Transistor

GTAH58180BY2



Description

The GTAH58180BY2 is a 180W internally matched, GaN HEMT, designed from 5.0 to 6.0GHz, especially 5G NR or LTE application, as well as either Pulse or CW application

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

- Typical **CW/Pulsed CW** performance (on 5.3-5.9GHz fixture with device soldered):

Vds=28V, I_{DQ}=220mA, Tc=25 °C

Pulsed CW (100us, 10%)

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
5300	51.62	145.2	40.5	10.75	52.8	190.7	46.9
5400	51.66	146.7	42.7	11.38	52.8	190.7	48.3
5500	51.95	156.7	44.6	11.56	53.1	204.4	50.5
5600	52.16	164.5	43.3	11.53	53.41	219.3	48.0
5700	51.98	157.7	42.2	11.4	53.22	209.8	46.4
5800	51.74	149.3	42.0	11.2	53.12	205.3	47.0
5900	51.61	145.0	41.4	10.64	52.97	198.3	46.4

CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
5300	51.18	131.2	39.0	10.43	52.86	193.4	46.4
5400	51.47	140.4	42.0	10.9	52.87	193.7	48.3
5500	51.51	141.6	42.1	11.08	53.07	203.0	48.7
5600	51.46	140.0	40.4	11.11	53.25	211.2	46.8
5700	51.2	131.9	38.7	10.78	52.97	198.1	44.5
5800	51.13	129.6	39.3	10.77	52.92	195.8	45.2
5900	51.03	126.8	38.8	10.3	52.8	190.4	44.3

Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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 (28V)
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

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Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum Forward Gate Current @ TC = 25°C	Igmax	43.2	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature(See note 1)	T_J	+225	°C

Note: 1. Continuous operation at maximum junction temperature will affect MTTF

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, RF CW operation	RθJC	0.55	C/W

Table 3. Electrical Characteristics (T_C = 25℃ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=43.2mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =43.2mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=300mA, Measured in Functional Test	$V_{GS(Q)}$		-2.55		V

Typical performance

Figure 2: Small singal gain and return loss Vs Frequency

Vds=28V, Idq=300mA, input power=0dBm

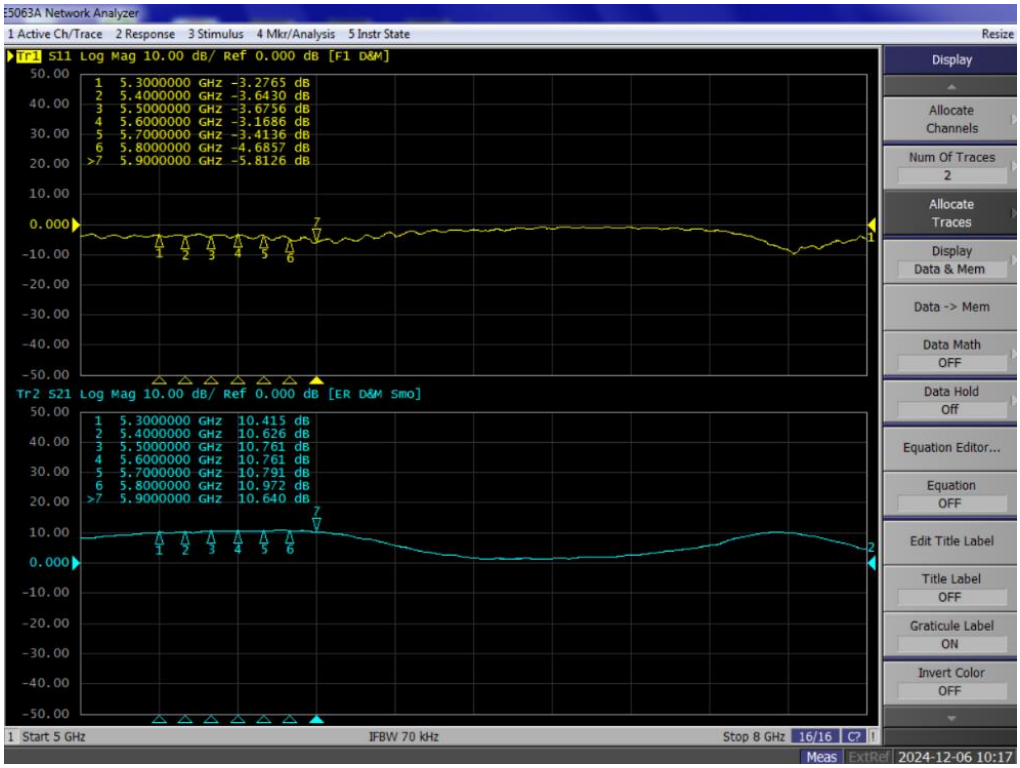


Figure 3:Power gain， Efficiency as function of output power

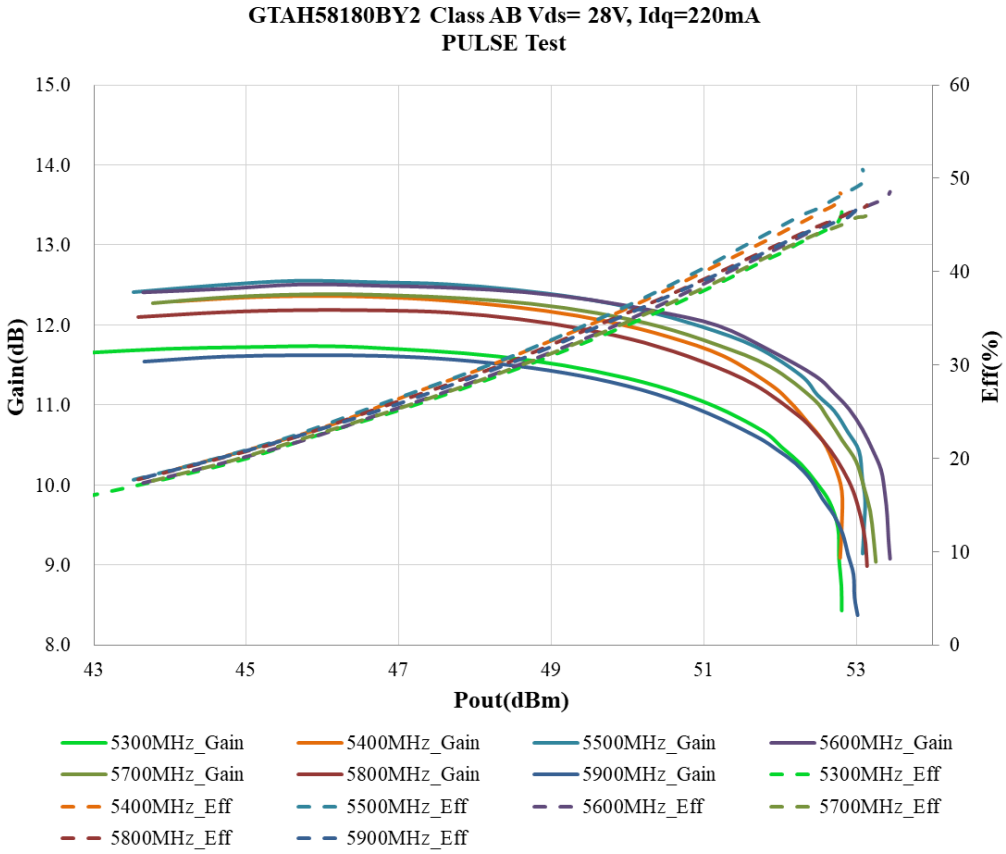
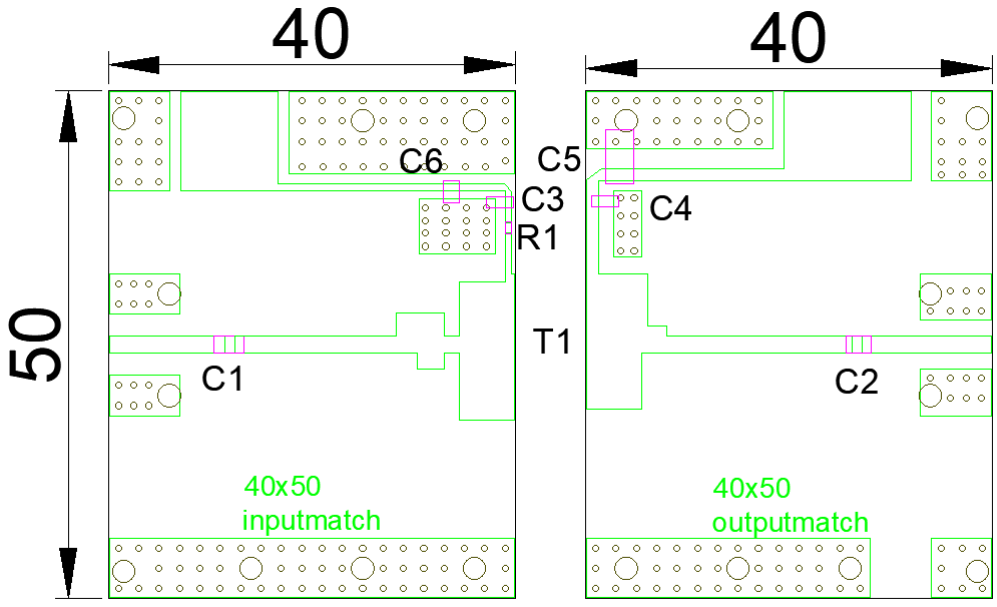


Figure 4: Picture and Bill of materials of 5.3-5.9GHz wide band application circuit

(Layout Gerber file upon request)



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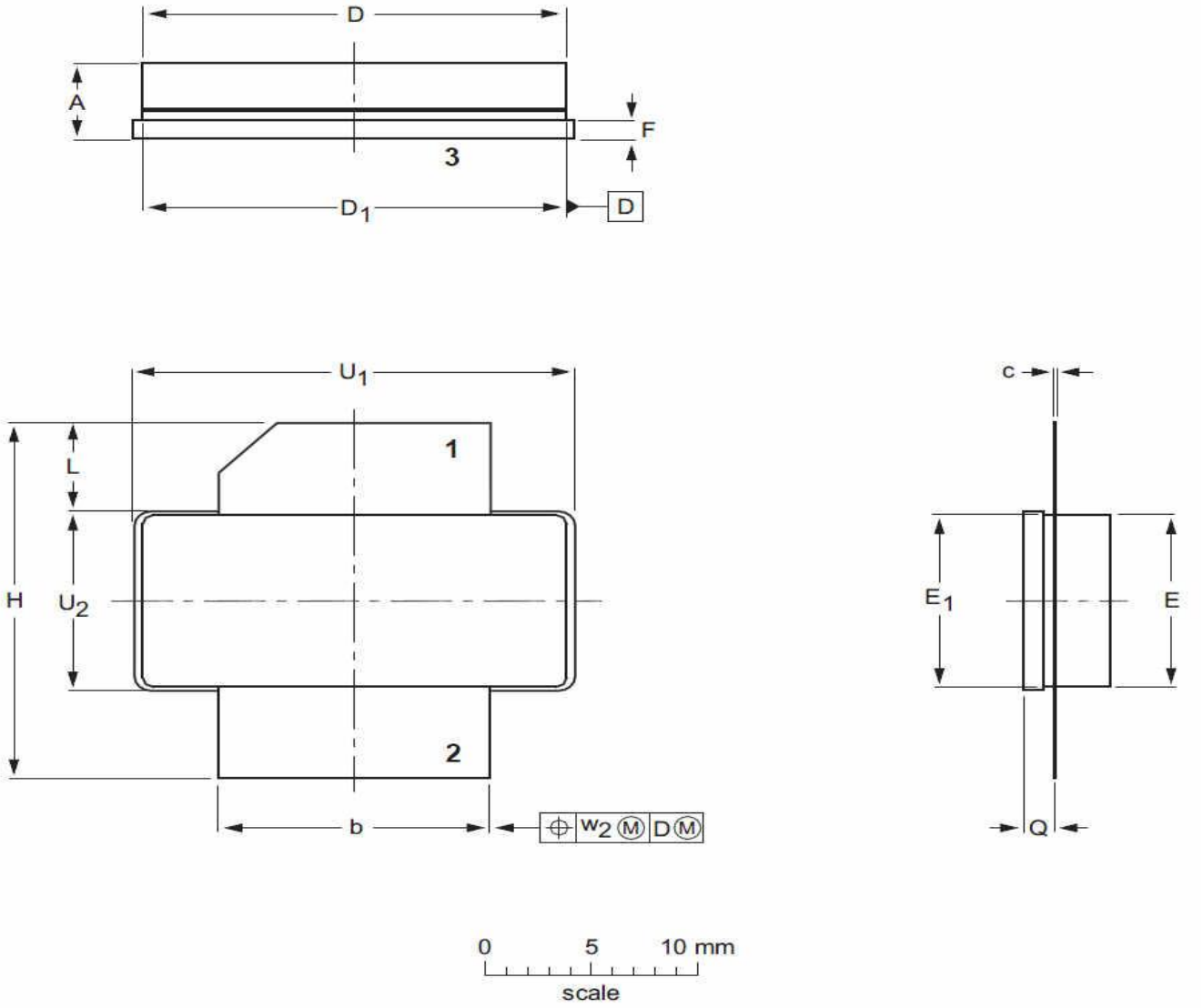
Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	3.9pFHigh Q Capacitor	251SHS3R9BSE	TEMEX
C5,C6	2	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10 Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	180W GaN Transistor	GTAH58180BY2	Innogration

Package Outline

Earless flanged ceramic package; 2 leads（1—DRAIN、2—GATE、3—SOURCE）



UNIT	A	b	c	D	D_1	E	E_1	F	H	L	Q	U_1	U_2	W_2
mm	4.72 3.43	12.83 12.57	0.15 0.08	20.02 19.61	19.96 19.66	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	5.33 4.32	1.70 1.45	20.70 20.45	9.91 9.65	0.25
inches	0.186 0.135	0.505 0.495	0.006 0.003	0.788 0.772	0.786 0.774	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.210 0.170	0.067 0.057	0.815 0.805	0.390 0.380	0.010

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B2					03/12/2013

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Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/12/6	V1.0	Preliminary Datasheet Creation

Application data based on LWH-24-44/45

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