



Gallium Nitride, 200-250W, 2.7-3.5GHz RF Power Transistor

Description

The GTAH35201BY4 is a 200W 28V, both input and output matched GaN HEMT, ideal for multiple applications from 2.7-3.5GHz, and at higher voltage 32V, capable to output more than 250W.

It can support linear and saturated application, configured as push pull or Doherty.

There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical performance across 2.7-3.5GHz class AB application circuit with device soldered

Pulsed CW Signal: 100us width , 10% duty cycle

VDS= 28V, IDQ=90mA(Vgs=-2.72V) T=25 C,



Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2700	53.4	218.6	44.1	11.6	54.37	273.8	48.6
2800	53	199.6	43.9	12.28	54.08	256.0	48.9
2900	52.58	181.1	43.4	12.37	53.85	242.4	48.9
3000	52.33	171.1	44.6	12.36	53.71	234.9	50.8
3100	52.09	161.9	45.5	12.42	53.61	229.7	52.1
3200	52.31	170.1	45.0	12.57	53.81	240.7	51.9
3300	52.59	181.7	45.7	12.83	53.99	250.5	52.4
3400	52.34	171.3	45.0	12.75	53.9	245.3	52.5
3500	52.26	168.2	42.6	12.37	53.86	243.1	49.7

VDS= 32V, IDQ=90mA(Vgs=-2.72V) T=25 C,

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2700	54.24	265.4	42.6	11.68	55.12	324.8	46.2
2800	53.93	247.1	42.9	12.44	54.86	306.1	46.5
2900	53.42	219.5	41.9	12.6	54.66	292.5	46.9
3000	53.26	211.9	43.4	12.64	54.54	284.6	48.5
3100	53.02	200.6	44.4	12.75	54.46	279.1	50.1
3200	53.13	205.5	43.8	12.9	54.6	288.5	49.7
3300	53.1	204.4	42.9	13.19	54.68	293.8	49.5
3400	52.9	194.9	42.3	13.12	54.55	285.1	49.4
3500	52.78	189.5	39.8	12.74	54.47	280.0	46.7

Applications

- S band pulse power amplifier
- 5G wideband 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

Transparent top view (Backside grounding for source)

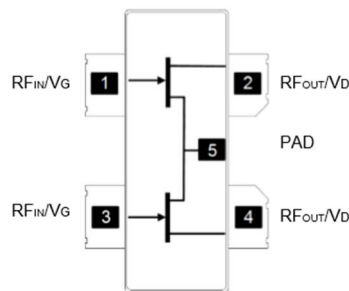


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	32	Vdc
Maximum gate current	I_{gs}	60.4	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 $T_c = 85^\circ\text{C}$, at $P_{out} = 200\text{W}$ at 3.5GHz	$R_{\theta JC}$	0.45	°C /W

Table 3. Electrical Characteristics (TA = 25°C unless otherwise noted)

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 60.4\text{mA}$	V_{DSS}		150		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 60.4\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}$, $I_{DS} = 90\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.72		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.5 GHz, $P_{out} = 200\text{W}$ Pulsed CW All phase, No device damages	VSWR		10:1		



Figure 2: Median Lifetime vs. Channel Temperature

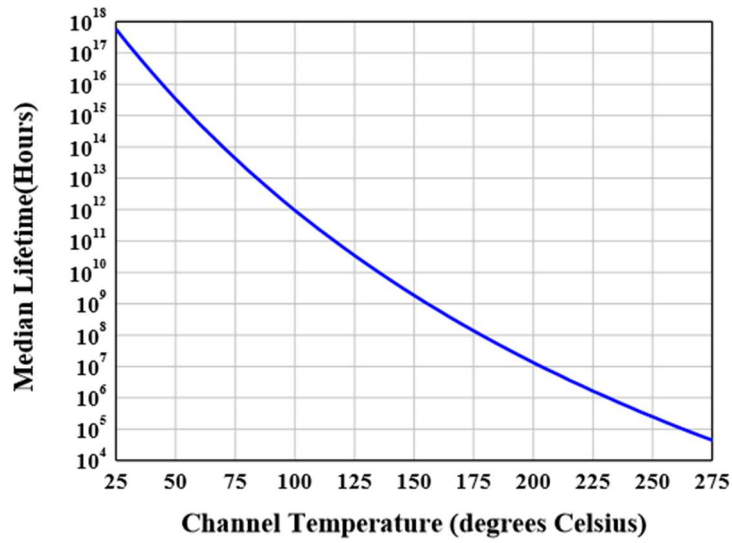
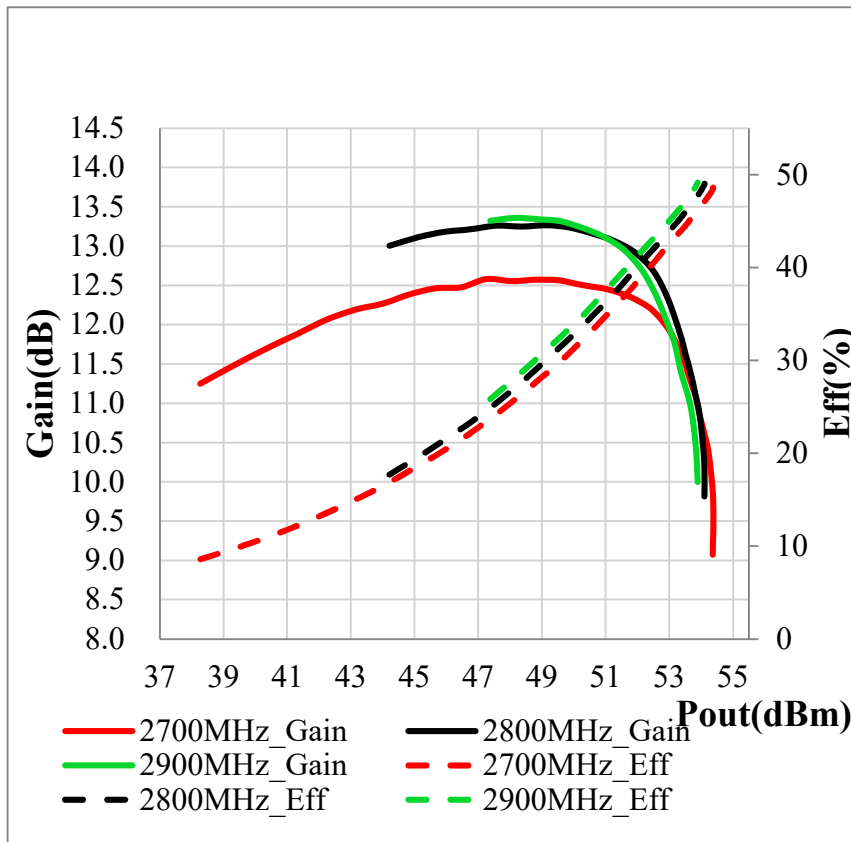
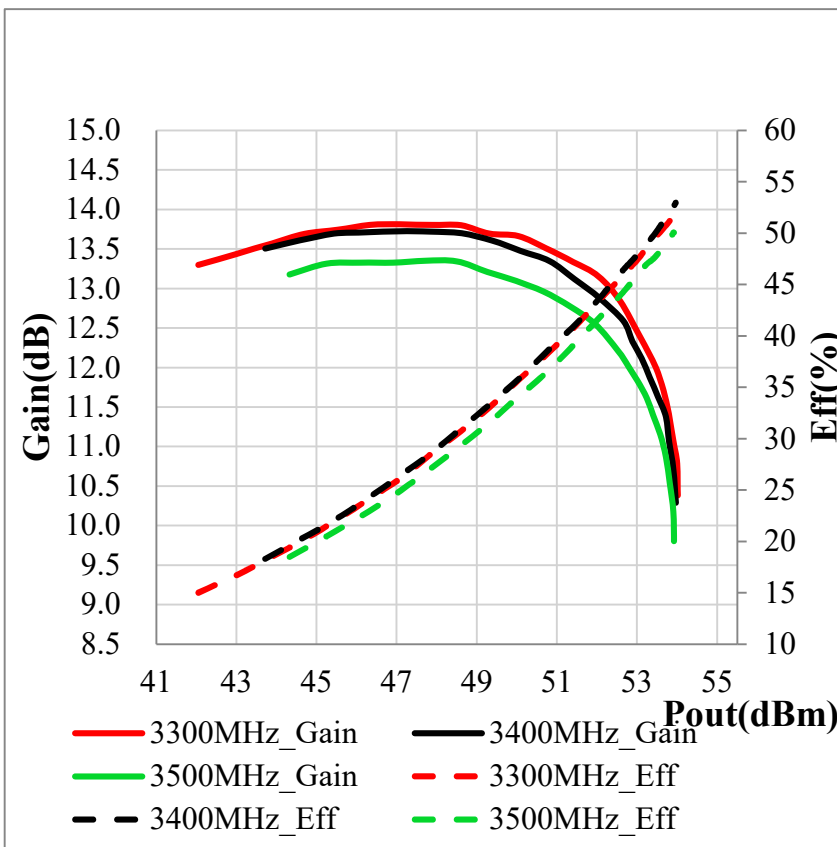
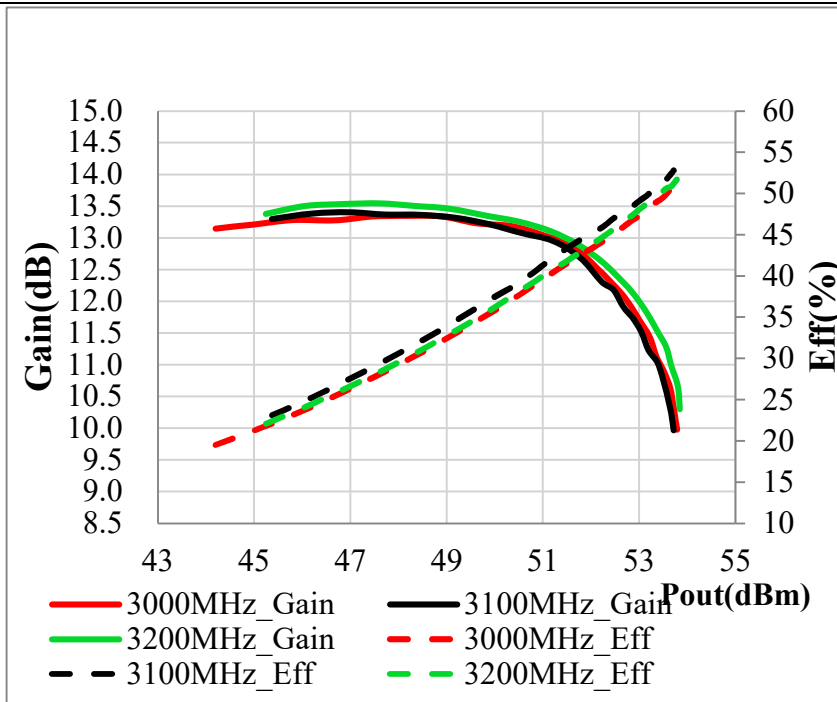


Figure 3: Efficiency and power gain as function of Pout at different VDD (Pulsed CW Signal: 100us width , 10% duty cycle)

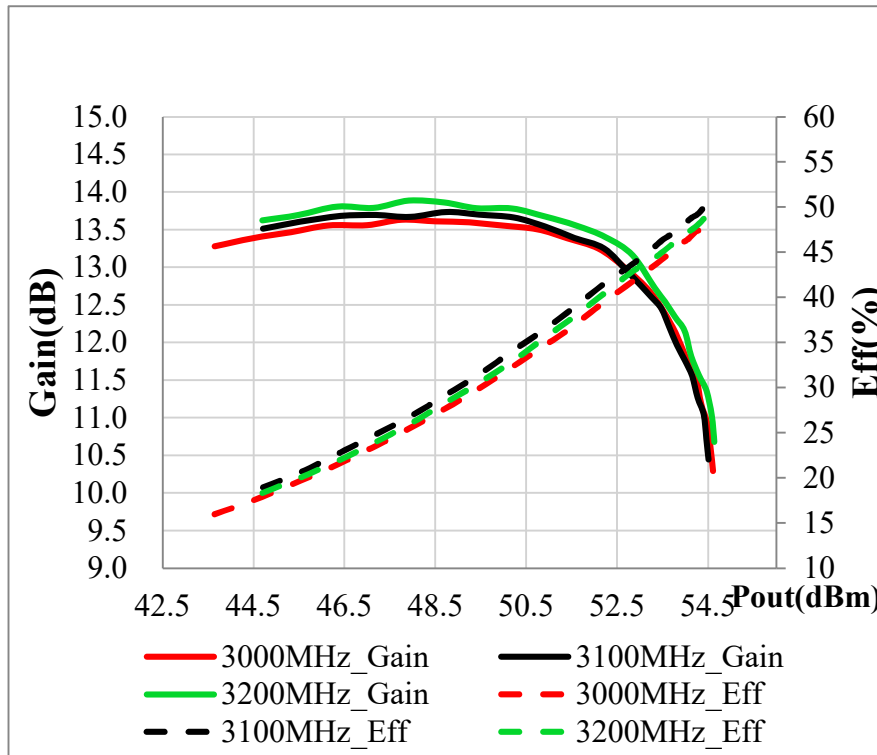
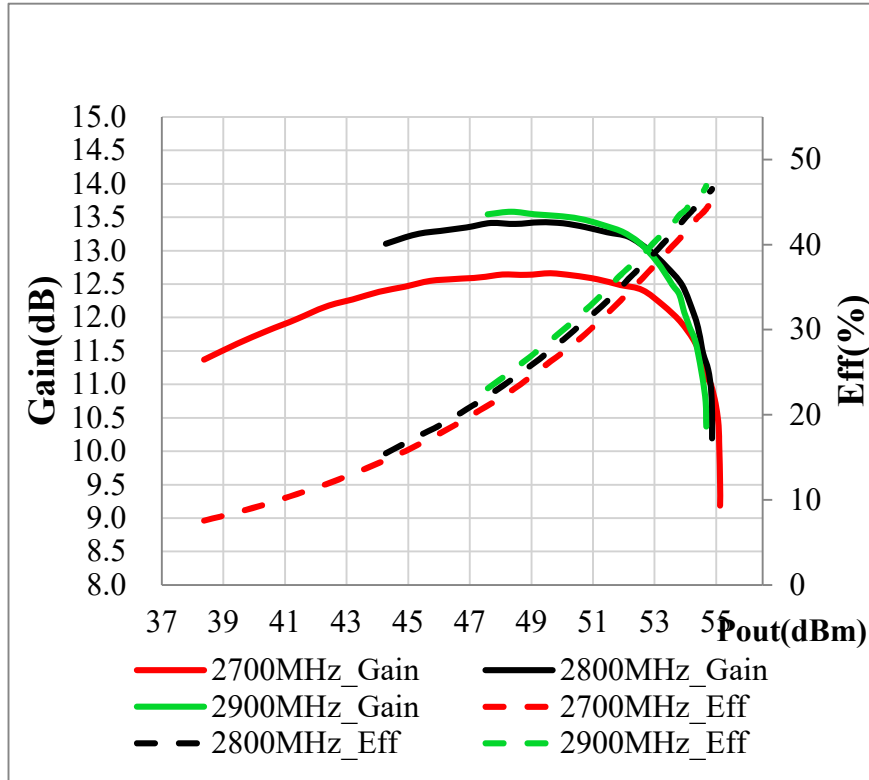
28V:







32V:



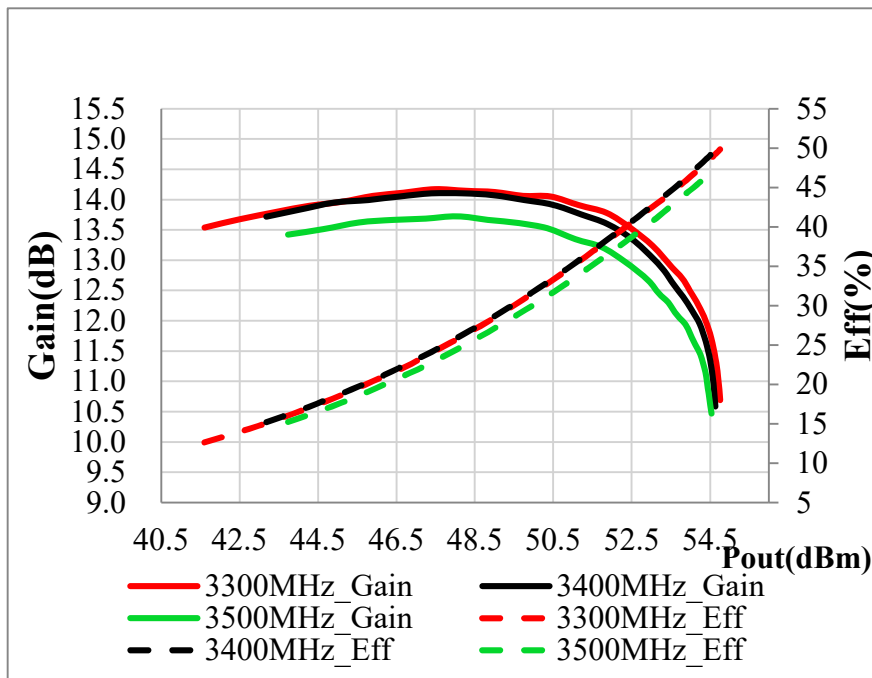


Figure 4: Network analyzer output, S11 and S21 (2.7-3.5GHz Class AB)

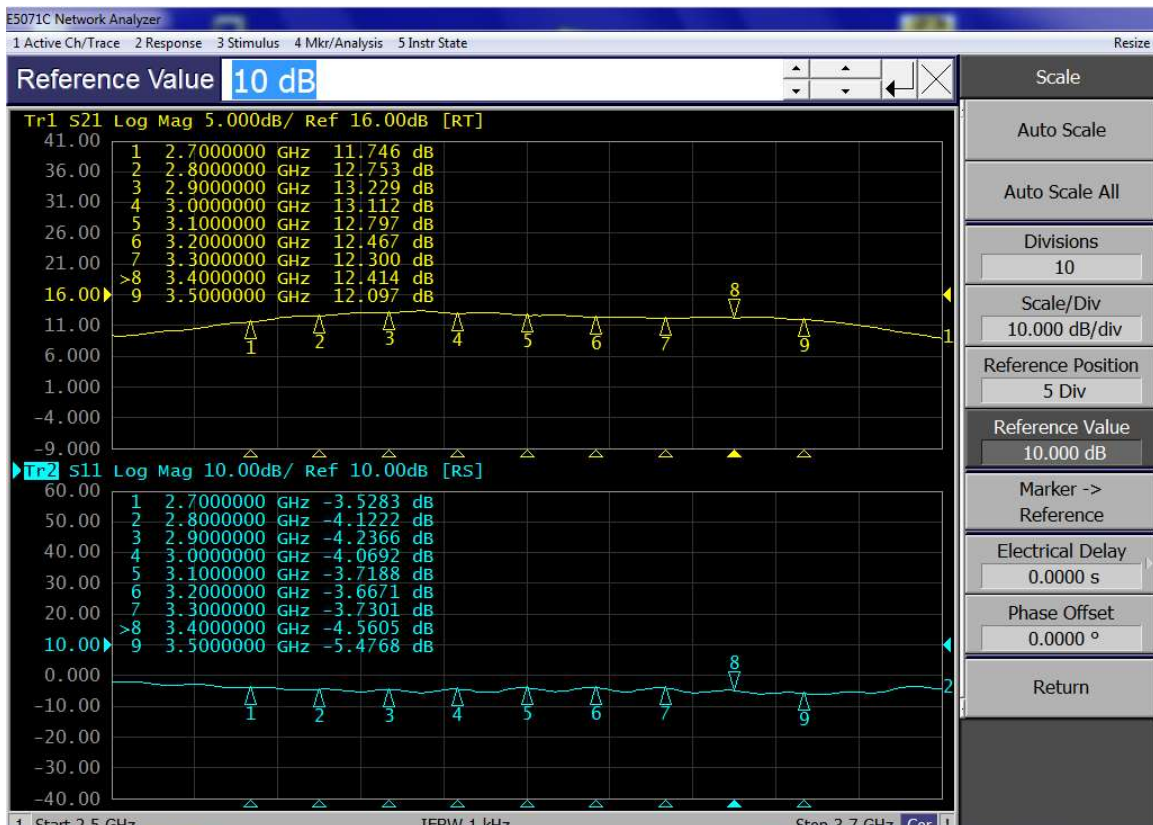


Figure 5: Picture of application board 2.7-3.5GHz class AB

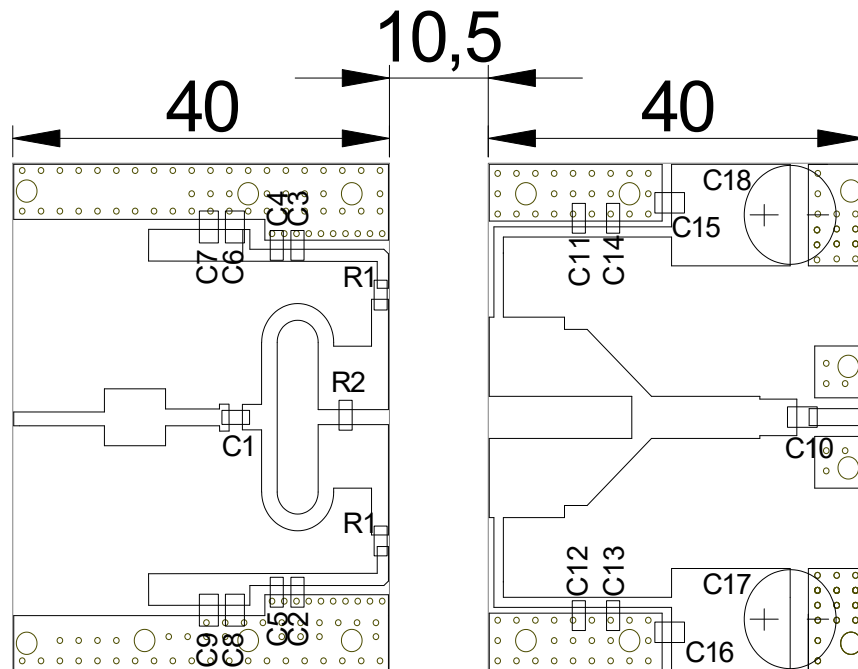
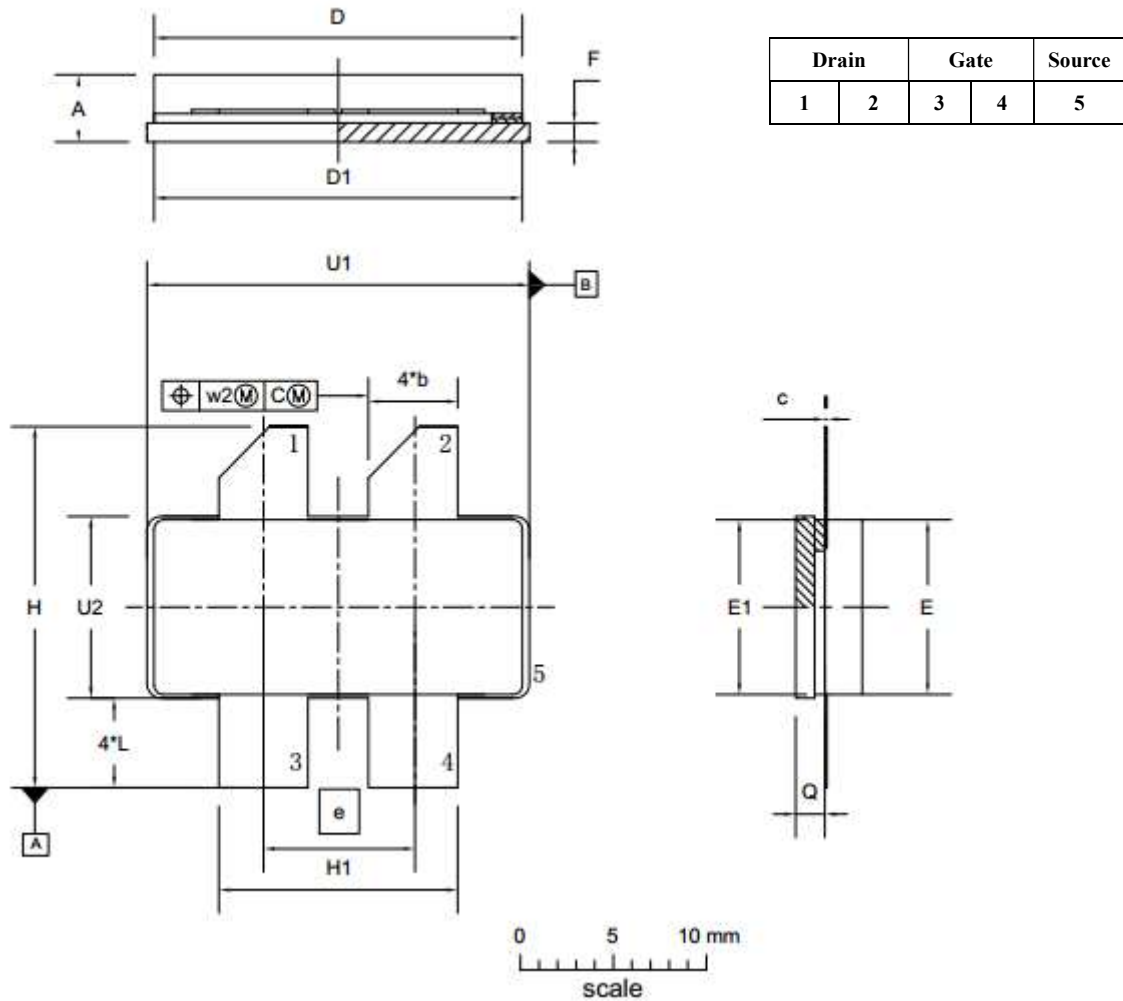


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggested Manufacturer
C1、C2、C3、C11、C12	8.2pF	DLC75D
C10	8.2pF	DLC70B
C4、C5、C13、C14	100pF	DLC75D
C6、C7、C8、C9、C15、C16	Ceramic multilayer capacitor, 10uF, 100V	10uF/100V
C17、C18	1000UF	63V/470UF
R1	Chip Resistor, 9.1 Ω, 0805	
R2	Chip Resistor, 120*2 Ω, 0805	
PCB	30mil Rogers4350B	



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 4. Document revision history

Date	Revision	Datasheet Status
2020/12/23	V1.0	Preliminary Datasheet Creation based on NK3520HS

Application data based on: YHG-20-32

Notice

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