



**TOSHIBA**



Product Guide 2020



# Microwave Semiconductors



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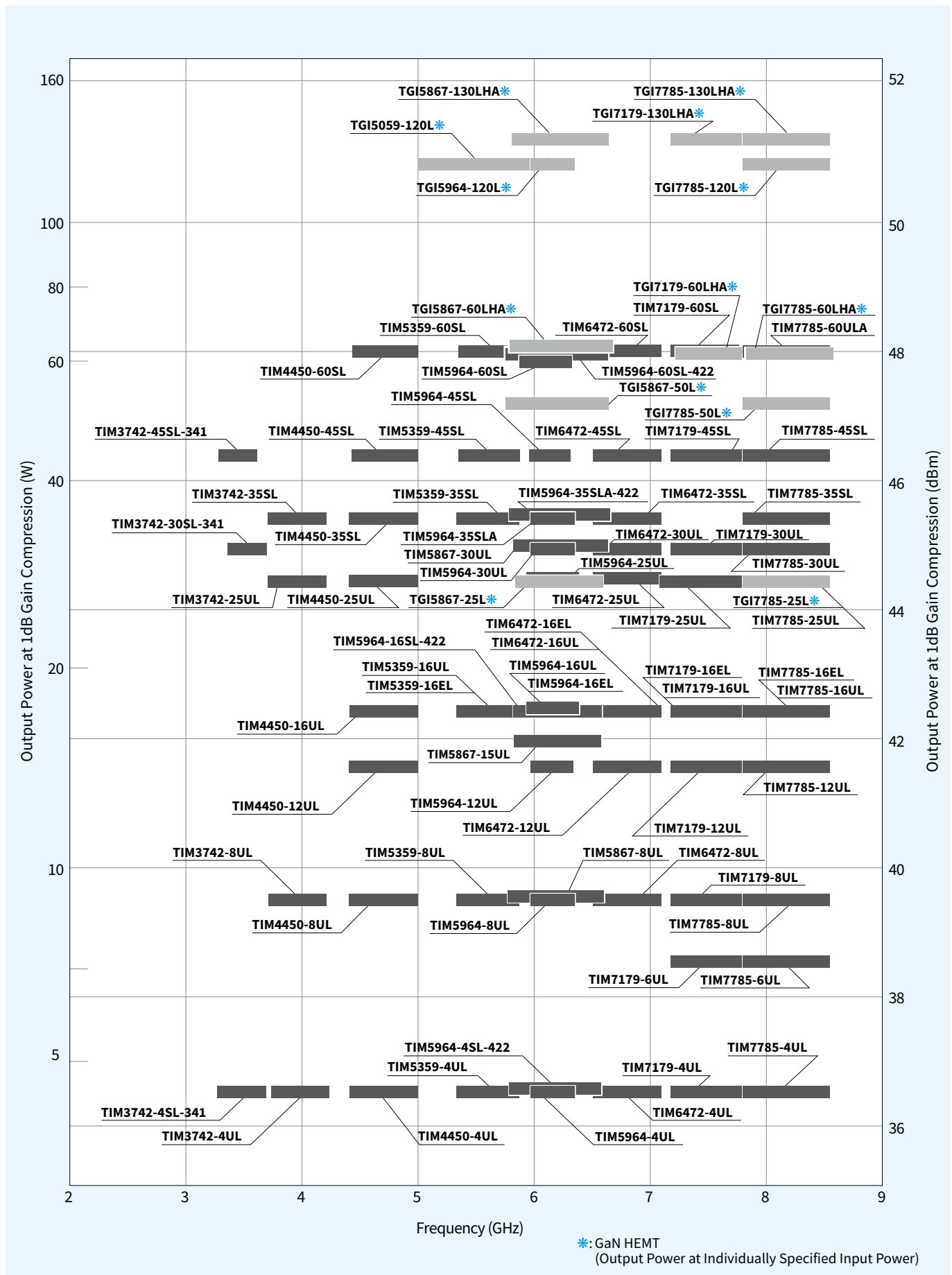
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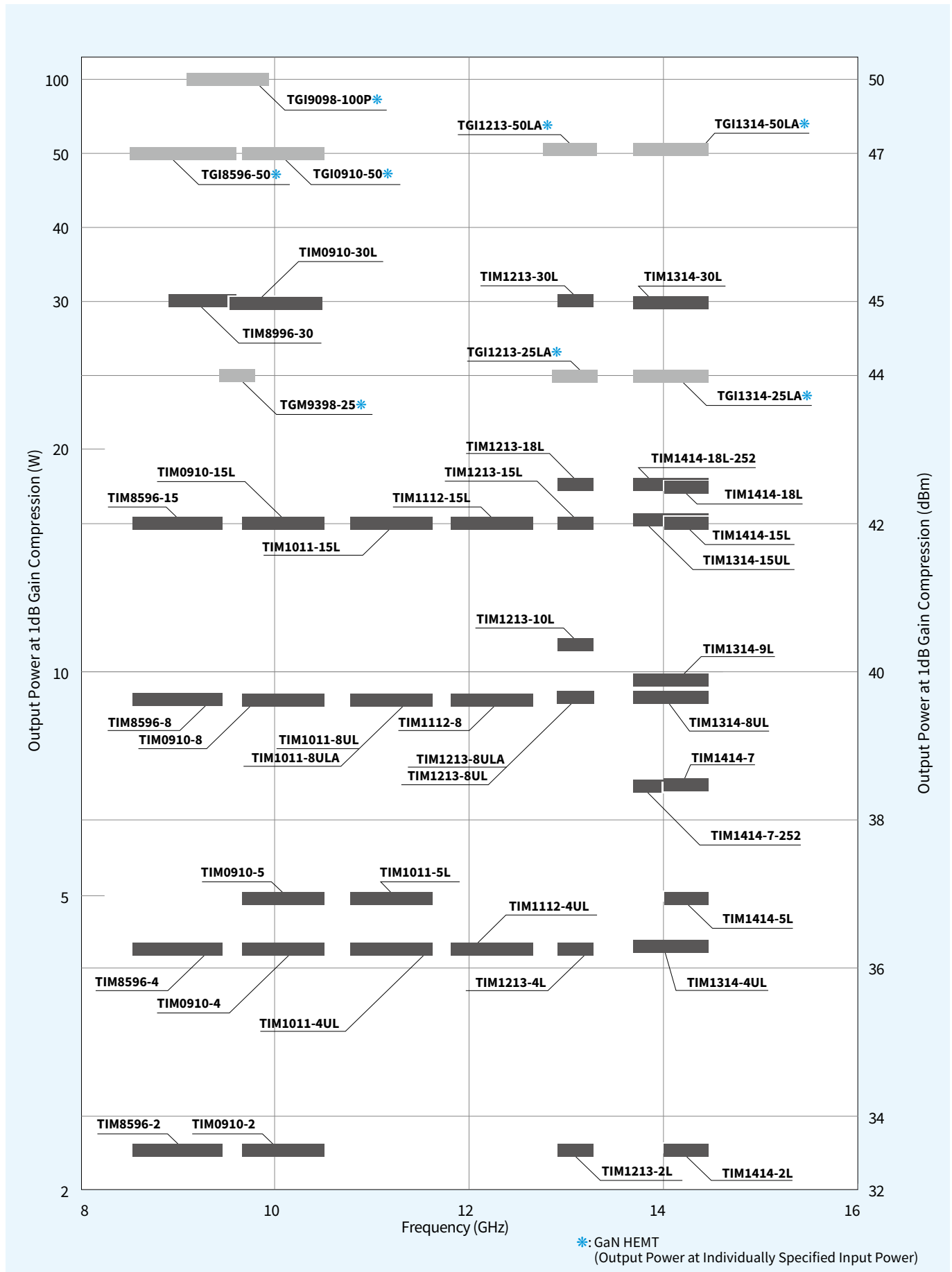
# Output Power vs. Frequency Map

## S and C-band Internally Matched Power GaAs FETs/GaN HEMTs Pout vs. Frequency Map



# X and Ku-band Internally Matched Power GaAs FETs/GaN HEMTs

## Pout vs. Frequency Map



## GaN HEMTs and Amplifier

### C-band Internally Matched Power GaN HEMTs

(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS										ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS (TYP.)			PACKAGE CODE				
		V <sub>DS</sub> (V)	I <sub>DS</sub> Set (A)	P <sub>out</sub> (dBm)		I <sub>DS</sub> (A)		h <sub>add</sub> (%)	G <sub>L</sub> (dB)		ΔG*** (dB)	IM <sub>3</sub> (dBc)		ΔTch* (°C)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	I <sub>DS</sub> (A)	P <sub>T</sub> (W) (Tc=25°C)	Tch (°C)	R <sub>th(C-C)</sub> MAX./TYP. (°C/W)	V <sub>Gsoff</sub> (V)		I <sub>DS</sub> (mA) @V <sub>DS</sub> = 5 V			
				MIN.	TYP.	TYP.	MAX.		TYP.	@P <sub>in</sub> (dBm)		MIN.	TYP.											MIN.	TYP.	P <sub>o</sub> @single carrier level (dBm)
5.0-5.9	<b>TGI5059-120L</b>	24	4.0	50.0	51.0	11.0	12.0	40	42.0	12.5	13.5	±0.8	20.0	-25	-27	44.0	140	50	-10	18.0	280	250	0.8/0.6	-4.0	46	7-AA06A
5.85-6.75	<b>TGI5867-25L</b>	24	1.75	44.0	44.5	2.7	3.2	39	35.0	12.5	13.5	±0.8	20.0	-40	-42	29.0	150	50	-10	7.5	70	250	3.2/2.8	-4.0	12	7-AA04A
	<b>TGI5867-50L</b>	24	3.0	46.0	47.0	5.4	6.3	33	40.0	12.5	13.5	±0.8	20.0	-40	-42	32.0	150	50	-10	15.0	140	250	1.6/1.4	-4.0	23	7-AA04A
	<b>TGI5867-60LHA</b>	40	0.4	47.0	48.0	3.5	4.5	38	40.0	11.5	12.5	±0.8	20.0	-25	-30	41.0	140***	50	-10	6.0	111	225	1.8/1.6	-3.0	15	7-AA04A
	<b>TGI5867-130LHA</b>	40	0.8	50.0	51.0	7.0	9.0	38	43.0	11.5	12.5	±0.8	20.0	-25	-30	44.0	140***	50	-10	12.0	200	225	1.0/0.8	-3.0	30	7-AA06A
5.9-6.4	<b>TGI5964-120L</b>	24	4.0	50.0	51.0	10.0	12.0	42	43.0	12.5	13.5	±0.8	20.0	-25	-30	44.0	140	50	-10	18.0	280	250	0.8/0.6	-4.0	46	7-AA06A
7.1-7.9	<b>TGI7179-60LHA</b>	40	0.4	47.0	48.0	3.5	4.5	37	40.5	11.0	12.0	±0.8	20.0	-25	-30	41.0	140***	50	-10	6.0	111	225	1.8/1.6	-3.0	15	7-AA04A
	<b>TGI7179-130LHA</b>	40	0.8	50.0	51.0	7.0	9.0	36	43.5	11.0	12.0	±0.8	20.0	-25	-30	44.0	140***	50	-10	12.0	200	225	1.0/0.8	-3.0	30	7-AA06A
7.7-8.5	<b>TGI7785-25L</b>	24	1.75	44.0	44.5	2.7	3.2	39	35.0	11.0	12.0	±0.8	20.0	-40	-42	29.0	150	50	-10	7.5	70	250	3.2/2.8	-4.0	12	7-AA04A
	<b>TGI7785-50L</b>	24	3.0	46.0	47.0	5.0	6.3	33	40.0	10.0	11.0	±0.8	20.0	-40	-	32.0	150	50	-10	15.0	140	250	1.6/1.4	-4.0	23	7-AA04A
	<b>TGI7785-60LHA</b>	40	0.4	47.0	48.0	4.0	4.5	32	41.0	10.5	11.5	±0.8	20.0	-25	-30	41.0	140***	50	-10	6.0	111	225	1.8/1.6	-3.0	15	7-AA04A
	<b>TGI7785-120L</b>	24	4.0	50.0	51.0	10.0	12.0	42	44.0	10.0	11.0	±0.8	20.0	-25	-30	44.0	140	50	-10	18.0	280	250	0.8/0.6	-4.0	46	7-AA06A
	<b>TGI7785-130LHA</b>	40	0.8	50.0	51.0	7.0	9.0	36	44.0	10.5	11.5	±0.8	20.0	-25	-30	44.0	140***	50	-10	12.0	200	225	1.0/0.8	-3.0	30	7-AA06A

\* : ΔTch = Channel Temperature Rise, Formula: ΔTch = (V<sub>DS</sub> × I<sub>DS</sub> + P<sub>in</sub> - P<sub>out</sub>) × R<sub>th(C-C)</sub> \*\*\* : Gain Flatness  
 \*\*\* : ΔTch is calculated using the same condition as IM<sub>3</sub> test

### X-band Internally Matched Power GaN HEMTs

(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS								ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS (TYP.)			PACKAGE CODE		
		V <sub>DS</sub> (V)	I <sub>DS</sub> Set (A)	P <sub>out</sub> (dBm)		I <sub>DS</sub> (A)		h <sub>add</sub> (%)	G <sub>L</sub> (dB)		ΔTch* (°C)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	I <sub>DS</sub> (A)	P <sub>T</sub> (W) (Tc=25°C)	Tch (°C)	R <sub>th(C-C)</sub> MAX./TYP. (°C/W)	V <sub>Gsoff</sub> (V)	I <sub>DS</sub> (mA) @V <sub>DS</sub> = 5 V			
				MIN.	TYP.	TYP.	MAX.		TYP.	@P <sub>in</sub> (dBm)											MIN.	TYP.
8.5-9.6	<b>TGI8596-50</b>	24	1.5	46.0	47.0	5.0	6.0	31	41.0	7.0	9.0	20.0	150	50	-10	15.0	140	250	1.6/1.4	-4.0	23	7-AA04A
9.0-9.8	<b>TGI9098-100P</b> ☆	24	6.0	49.0	50.0	10.0	13.0	40	42.0	-	12.0	35.0	-	50	-10	22.5	280	250	-/0.8	-4.0	46	7-AA03B
9.5-10.5	<b>TGI0910-50</b>	24	1.5	46.0	47.0	5.0	6.0	31	41.0	7.0	9.0	20.0	150	50	-10	15.0	140	225	1.6/1.4	-4.0	23	7-AA04A

\* : ΔTch = Channel Temperature Rise, Formula: ΔTch = (V<sub>DS</sub> × I<sub>DS</sub> + P<sub>in</sub> - P<sub>out</sub>) × R<sub>th(C-C)</sub> ☆: PULSE OPERATION (PULSE WIDTH: 100μs Duty:10%)

### Ku-band Internally Matched Power GaN HEMTs

(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS										ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS (TYP.)			PACKAGE CODE				
		V <sub>DS</sub> (V)	I <sub>DS</sub> Set (A)	P <sub>out</sub> (dBm)		I <sub>DS</sub> (A)		h <sub>add</sub> (%)	G <sub>L</sub> (dB)		ΔG*** (dB)	IM <sub>3</sub> (dBc)		ΔTch* (°C)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	I <sub>DS</sub> (A)	P <sub>T</sub> (W) (Tc=25°C)	Tch (°C)	R <sub>th(C-C)</sub> MAX./TYP. (°C/W)	V <sub>Gsoff</sub> (V)		I <sub>DS</sub> (mA) @V <sub>DS</sub> = 5 V			
				MIN.	TYP.	TYP.	MAX.		TYP.	@P <sub>in</sub> (dBm)		MIN.	TYP.											MIN.	TYP.	P <sub>o</sub> @single carrier level (dBm)
12.7-13.2	<b>TGI1213-25LA</b>	24	1.0	43.0	44.0	2.5	3.0	29	39.0	7.0	8.0	±0.8	20.0	-25	-	37.0	140	50	-10	7.5	70	250	3.2/2.8	-4.0	11.5	7-AA07A
	<b>TGI1213-50LA</b>	24	2.0	46.0	47.0	5.0	6.0	29	42.0	7.0	8.0	±0.8	20.0	-25	-	40.0	160	50	-10	15.0	140	250	1.6/1.4	-4.0	23	7-AA07A
13.75-14.5	<b>TGI1314-25LA</b>	24	1.0	43.0	44.0	2.5	3.0	29	39.0	7.0	8.0	±0.8	20.0	-25	-	37.0	140	50	-10	7.5	70	250	3.2/2.8	-4.0	11.5	7-AA07A
	<b>TGI1314-50LA</b>	24	2.0	46.0	47.0	5.0	6.0	29	42.0	7.0	8.0	±0.8	20.0	-25	-	40.0	160	50	-10	15.0	140	225	1.6/1.4	-4.0	23	7-AA07A

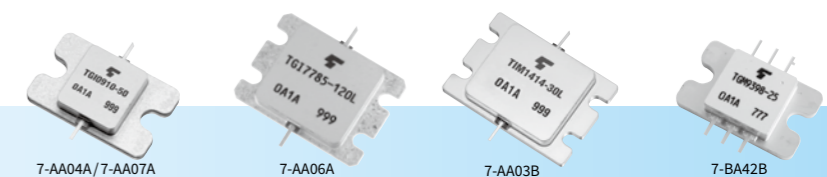
\* : ΔTch = Channel Temperature Rise, Formula: ΔTch = (V<sub>DS</sub> × I<sub>DS</sub> + P<sub>in</sub> - P<sub>out</sub>) × R<sub>th(C-C)</sub> \*\*\* : Gain Flatness

### X-band Power GaN Amplifier

(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS								ABSOLUTE MAXIMUM RATINGS					PACKAGE CODE	
		V <sub>DS</sub> (V)	I <sub>DS</sub> Set (A)	P <sub>out</sub> (dBm)		I <sub>DS</sub> * (A)		h <sub>add</sub> (%)	G <sub>L</sub> (dB)		V <sub>DD1,2</sub> (V)	V <sub>GG1,2</sub> (V)	P <sub>in</sub> (dBm)	P <sub>T</sub> (W) (Tc=25°C)	Tf			
				MIN.	TYP.	TYP.	MAX.		TYP.	@P <sub>in</sub> (dBm)						MIN.		TYP.
9.3-9.8	<b>TGM9398-25</b>	24	1.2	43.0	44.0	2.6	3.5	38	23.0	20.0	24.0	7.0	50	-10	27.0	140	-40to+90°C	7-BA42B

\* : I<sub>DD</sub> = I<sub>DD1</sub> + I<sub>DD2</sub>





## C-band Internally Matched Power GaAs FETs (1/2)

(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS										ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS (TYP.)			PACKAGE CODE				
		V <sub>DS</sub> (V)	I <sub>DS</sub> Set (A)	P <sub>1dB</sub> (dBm)		G <sub>1dB</sub> (dB)		I <sub>DS</sub> (A)		ΔG*** (dB)	h <sub>add</sub> (%)	IM <sub>3</sub> (dBc)		ΔTch* (°C)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	I <sub>DS</sub> (A)	P <sub>T</sub> (W) (Tc = 25 °C)	Tch (°C)	R <sub>th(C-C)</sub> MAX./TYP. (°C/W)	V <sub>GSOFF</sub> (V)		I <sub>DS</sub> (mA) @V <sub>DS</sub> = 3 V			
				MIN.	TYP.	MIN.	TYP.	TYP.	MAX.			MAX.	TYP.											MIN.	TYP.	P <sub>0</sub> @single carrier level (dBm)
3.3-3.6	TIM3742-4SL-341	10	1.1	35.5	36.5	10.0	11.0	1.1	1.3	±0.6	37			-42	-45	25.5	80	15	-5	3.5	23.1	175	6.5/4.5	-2.5	15	2-11D1B
	TIM3742-30SL-341	10	7.0	44.0	45.0	10.0	11.0	7.0	8.0	±0.8	42			-42	-45	34.5	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	100	2-16G1B
	TIM3742-45SL-341	10	9.0	46.0	46.5	10.0	11.0	9.6	10.8	±0.8	43			-42	-45	35.5	100	15	-5	20.0	125.0	175	1.2/0.8	-2.5	170	2-16G1B
3.7-4.2	TIM3742-4UL	10	0.9	35.5	36.5	11.0	12.0	1.1	1.3	±0.6	38			-44	-47	25.5	80	15	-5	3.5	25.0	175	6.0/4.5	-2.5	15	2-11D1B
	TIM3742-8UL	10	1.8	38.5	39.5	10.0	11.0	2.2	2.6	±0.6	37			-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM3742-25UL	10	5.2	43.5	44.5	9.5	10.5	6.8	7.6	±0.6	38			-44	-47	33.5	80	15	-5	20.0	100.0	175	1.5/1.2	-2.5	80	2-16G1B
	TIM3742-35SL	10	8.0	45.0	45.5	9.0	10.0	8.0	9.0	±0.8	40			-42	-45	35.0	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	140	2-16G1B
4.4-5.0	TIM4450-4UL	10	0.9	35.5	36.5	10.0	11.0	1.1	1.3	±0.6	37			-44	-47	25.5	80	15	-5	3.5	25.0	175	6.0/4.5	-2.5	15	2-11D1B
	TIM4450-8UL	10	1.8	38.5	39.5	9.5	10.5	2.2	2.6	±0.6	37			-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM4450-12UL	10	2.6	40.5	41.5	9.5	10.5	3.2	3.8	±0.6	40			-44	-47	30.5	80	15	-5	10.0	62.5	175	2.4/2.0	-2.5	40	2-16G1B
	TIM4450-16UL	10	3.6	41.5	42.5	9.0	10.0	4.4	5.0	±0.6	36			-44	-47	31.5	80	15	-5	14.0	83.3	175	1.8/1.5	-2.5	60	2-16G1B
	TIM4450-25UL	10	5.2	43.5	44.5	9.0	10.0	6.8	7.6	±0.6	37			-44	-47	33.5	80	15	-5	20.0	100.0	175	1.5/1.2	-2.5	80	2-16G1B
	TIM4450-35SL	10	8.0	45.0	45.5	8.5	9.5	8.0	9.0	±0.8	39			-42	-45	35.0	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	140	2-16G1B
	TIM4450-45SL	10	9.0	46.0	46.5	8.5	9.5	9.6	10.8	±0.8	41			-42	-45	35.5	100	15	-5	20.0	125.0	175	1.2/0.8	-2.5	170	2-16G1B
	TIM4450-60SL	10	9.5	47.0	48.0	8.5	9.5	13.2	15.0	±0.8	42			-42	-45	36.5	100	15	-5	20.0	187.5	175	0.8/0.6	-1.8	200	2-16G1B
5.3-5.9	TIM5359-4UL	10	0.9	35.5	36.5	9.5	10.5	1.1	1.3	±0.6	37			-44	-47	25.5	80	15	-5	3.5	25.0	175	6.0/4.5	-2.5	15	2-11D1B
	TIM5359-8UL	10	1.8	38.5	39.5	9.0	10.0	2.2	2.6	±0.6	36			-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM5359-16UL	10	3.6	41.5	42.5	9.0	10.0	4.4	5.0	±0.6	36			-44	-47	31.5	80	15	-5	14.0	83.3	175	1.8/1.05	-2.5	60	2-16G1B
	TIM5359-35SL	10	8.0	45.0	45.5	7.5	8.5	8.0	9.0	±0.8	38			-42	-45	35.0	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	140	2-16G1B
	TIM5359-45SL	10	9.0	46.0	46.5	8.0	9.0	9.6	10.8	±0.8	41			-42	-45	35.5	100	15	-5	20.0	125.0	175	1.2/0.8	-2.5	170	2-16G1B
5.9-6.4	TIM5964-4UL	10	0.9	35.5	36.5	9.0	10.0	1.1	1.3	±0.6	37			-44	-47	25.5	80	15	-5	3.5	25.0	175	6.0/4.5	-2.5	15	2-11D1B
	TIM5964-8UL	10	1.8	38.5	39.5	9.0	10.0	2.2	2.6	±0.6	36			-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM5964-12UL	10	2.6	40.5	41.5	9.0	10.0	3.2	3.8	±0.6	40			-44	-47	30.5	80	15	-5	10.0	62.5	175	2.4/2.0	-2.5	40	2-16G1B
	TIM5964-16UL	10	3.6	41.5	42.5	9.0	10.0	4.4	5.0	±0.6	36			-44	-47	31.5	80	15	-5	14.0	83.3	175	1.8/1.5	-2.5	60	2-16G1B
	TIM5964-25UL	10	5.2	43.5	44.5	9.0	10.0	6.8	7.6	±0.6	37			-44	-47	33.5	80	15	-5	20.0	100.0	175	1.5/1.2	-2.5	80	2-16G1B
	TIM5964-30UL	10	6.4	44.0	45.0	9.0	10.0	7.0	8.0	±0.6	41			-44	-47	34.0	100	15	-5	18.0	100.0	175	1.5/1.0	-2.0	80	7-AA05A
	TIM5964-35SLA	10	8.0	45.0	45.5	8.0	9.0	8.0	9.0	±0.8	39			-42	-45	35.0	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	140	2-16G1B
	TIM5964-45SL	10	9.0	46.0	46.5	8.0	9.0	9.6	10.8	±0.8	41			-42	-45	35.5	100	15	-5	20.0	125.0	175	1.2/0.8	-2.5	170	2-16G1B
5.85-6.75	TIM5964-60SL	10	9.5	47.0	48.0	7.5	8.5	13.2	15.0	±0.8	41			-42	-45	36.5	100	15	-5	20.0	187.5	175	0.8/0.6	-1.8	200	2-16G1B
	TIM5964-4SL-422	10	1.1	35.5	36.5	8.0	9.0	1.1	1.3	±0.6	35			-42	-45	25.5	80	15	-5	3.5	23.1	175	6.5/4.5	-2.5	15	2-11D1B
	TIM5867-8UL	10	1.8	38.5	39.5	9.0	10.0	2.2	2.6	±0.8	36			-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM5867-15UL	10	3.2	41.0	42.0	9.0	10.0	3.5	4.0	±0.8	41			-42	-47	31.0	80	15	-5	12.0	62.5	175	2.4/2.0	-2.0	40	2-16G1B
	TIM5964-16SL-422	10	4.4	41.5	42.5	8.0	9.0	4.4	5.0	±0.8	35			-42	-45	31.5	80	15	-5	14.0	75.0	175	2.0/1.5	-2.5	60	2-16G1B
	TIM5867-30UL	10	6.4	44.0	45.0	9.0	10.0	7.0	8.0	±0.8	41			-44	-47	34.0	100	15	-5	18.0	100.0	175	1.5/1.0	-2.0	80	7-AA05A
	TIM5964-35SLA-422	10	8.0	45.0	45.5	8.0	9.0	8.0	9.0	±0.8	39			-42	-45	35.0	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	140	2-16G1B
TIM5964-60SL-422	10	9.5	47.0	48.0	7.0	8.0	13.2	15.0	±0.8	40			-40	-45	36.5	100	15	-5	20.0	187.5	175	0.8/0.6	-1.8	200	2-16G1B	

\*: ΔTch = Channel Temperature Rise, Formula: ΔTch = (V<sub>DS</sub> × I<sub>DS</sub> + P<sub>in</sub> - P<sub>1dB</sub>) × R<sub>th(C-C)</sub>, \*\*: Gain Flatness



2-11D1B



2-16G1B



7-AA05A

**C-band Internally Matched Power GaAs FETs (2/2)**

(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS										ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS (TYP.)			PACKAGE CODE			
		V <sub>DS</sub> (V)	I <sub>DSset</sub> (A)	P <sub>1dB</sub> (dBm)		G <sub>1dB</sub> (dB)		I <sub>DS</sub> (A)		ΔG*** (dB)	h <sub>add</sub> (%h)	IM <sub>3</sub> (dBc)		P <sub>o@single carrier level</sub> (dBm)	ΔTch* (°C)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	I <sub>DS</sub> (A)	P <sub>T</sub> (W) (Tc = 25 °C)	Tch (°C)	R <sub>th(C-C)</sub> MAX./TYP. (°C/W)		V <sub>GSoff</sub> (V)	I <sub>DS</sub> (mA) @V <sub>DS</sub> = 3 V	
				MIN.	TYP.	MIN.	TYP.	TYP.	MAX.	MAX.	TYP.	MIN.	TYP.												MAX.
6.4-7.2	TIM6472-4UL	10	0.9	35.5	36.5	8.5	9.5	1.1	1.3	±0.6	36		-44	-47	25.5	80	15	-5	3.5	25.0	175	6.0/4.5	-2.5	15	2-11D1B
	TIM6472-8UL	10	1.8	38.5	39.5	8.5	9.5	2.2	2.6	±0.6	36		-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM6472-12UL	10	2.6	40.5	41.5	8.5	9.5	3.2	3.8	±0.6	39		-44	-47	30.5	80	15	-5	10.0	62.5	175	2.4/2.0	-2.5	40	2-16G1B
	TIM6472-16UL	10	3.6	41.5	42.5	8.5	9.5	4.4	5.0	±0.6	36		-44	-47	31.5	80	15	-5	14.0	83.3	175	1.8/1.5	-2.5	60	2-16G1B
	TIM6472-25UL	10	5.2	43.5	44.5	8.5	9.5	6.8	7.6	±0.6	37		-44	-47	33.5	80	15	-5	20.0	100.0	175	1.5/1.2	-2.5	80	2-16G1B
	TIM6472-30UL	10	6.4	44.0	45.0	8.5	9.5	7.0	8.0	±0.6	40		-44	-47	34.0	100	15	-5	18.0	100.0	175	1.5/1.0	-2.0	80	7-AA05A
	TIM6472-35SL	10	8.0	45.0	45.5	7.0	8.0	8.0	9.0	±0.8	37		-42	-45	35.0	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	140	2-16G1B
	TIM6472-45SL	10	9.0	46.0	46.5	7.0	8.0	9.6	10.8	±0.8	37		-42	-45	35.5	100	15	-5	20.0	125.0	175	1.2/0.8	-2.5	170	2-16G1B
	TIM6472-60SL	10	9.5	47.0	48.0	6.5	7.5	13.2	15.0	±0.8	39		-42	-45	36.5	100	15	-5	20.0	187.5	175	0.8/0.6	-1.8	200	2-16G1B
7.1-7.9	TIM7179-4UL	10	0.9	35.5	36.5	8.0	9.0	1.1	1.3	±0.6	35		-44	-47	25.5	80	15	-5	3.5	25.0	175	6.0/4.5	-2.5	15	2-11D1B
	TIM7179-6UL	10	1.3	37.5	38.5	8.0	9.0	1.6	1.9	±0.6	39		-44	-47	27.5	80	15	-5	5.0	32.6	175	4.6/3.8	-2.5	20	2-11D1B
	TIM7179-8UL	10	1.8	38.5	39.5	8.0	9.0	2.2	2.6	±0.6	35		-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM7179-12UL	10	2.6	40.5	41.5	8.0	9.0	3.2	3.8	±0.6	39		-44	-47	30.5	80	15	-5	10.0	62.5	175	2.4/2.0	-2.5	40	2-16G1B
	TIM7179-16UL	10	3.6	41.5	42.5	7.5	8.5	4.4	5.0	±0.6	35		-44	-47	31.5	80	15	-5	14.0	83.3	175	1.8/1.5	-2.5	60	2-16G1B
	TIM7179-25UL	10	5.2	43.5	44.5	7.5	8.5	6.8	7.6	±0.6	36		-44	-47	33.5	80	15	-5	20.0	100.0	175	1.5/1.2	-2.5	80	2-16G1B
	TIM7179-30UL	10	6.4	44.0	45.0	7.5	8.5	7.0	8.0	±0.6	39		-44	-47	34.0	100	15	-5	18.0	100.0	175	1.5/1.0	-2.0	80	7-AA05A
	TIM7179-45SL	10	9.0	46.0	46.5	5.5	6.5	9.6	10.8	±0.8	36		-42	-45	35.5	100	15	-5	20.0	125.0	175	1.2/0.8	-2.5	170	2-16G1B
	TIM7179-60SL	10	9.5	47.0	48.0	5.5	6.5	13.2	15.0	±0.8	37		-42	-45	36.5	100	15	-5	20.0	187.5	175	0.8/0.6	-1.8	200	2-16G1B
7.7-8.5	TIM7785-4UL	10	0.9	35.5	36.5	7.5	8.5	1.1	1.3	±0.6	35		-44	-47	25.5	80	15	-5	3.5	25.0	175	6.0/4.5	-2.5	15	2-11D1B
	TIM7785-6UL	10	1.3	37.5	38.5	7.5	8.5	1.6	1.9	±0.6	38		-44	-47	27.5	80	15	-5	5.0	32.6	175	4.6/3.8	-2.5	20	2-11D1B
	TIM7785-8UL	10	1.8	38.5	39.5	7.5	8.5	2.2	2.6	±0.6	35		-44	-47	28.5	80	15	-5	7.0	42.9	175	3.5/2.5	-2.5	30	2-11D1B
	TIM7785-12UL	10	2.6	40.5	41.5	7.5	8.5	3.2	3.8	±0.6	38		-44	-47	30.5	80	15	-5	10.0	62.5	175	2.4/2.0	-2.5	40	2-16G1B
	TIM7785-16UL	10	3.6	41.5	42.5	7.5	8.5	4.4	5.0	±0.6	35		-44	-47	31.5	80	15	-5	14.0	83.3	175	1.8/1.5	-2.5	60	2-16G1B
	TIM7785-25UL	10	5.2	43.5	44.5	7.5	8.5	6.8	7.6	±0.6	36		-44	-47	33.5	80	15	-5	20.0	100.0	175	1.5/1.2	-2.5	80	2-16G1B
	TIM7785-30UL	10	6.4	44.0	45.0	7.5	8.5	7.0	8.0	±0.6	39		-44	-47	34.0	100	15	-5	18.0	100.0	175	1.5/1.0	-2.0	80	7-AA05A
	TIM7785-35SL	10	8.0	45.0	45.5	5.0	6.0	8.0	9.0	±0.8	33		-42	-45	35.0	100	15	-5	20.0	115.4	175	1.3/1.0	-2.5	140	2-16G1B
	TIM7785-45SL	10	9.0	46.0	46.5	5.0	6.0	9.6	10.8	±0.8	35		-42	-45	35.5	100	15	-5	20.0	125.0	175	1.2/0.8	-2.5	170	2-16G1B
TIM7785-60SL	10	9.5	47.0	48.0	5.0	6.0	13.2	15.0	±0.8	36		-42	-45	36.5	100	15	-5	20.0	187.5	175	0.8/0.6	-1.8	200	2-16G1B	
TIM7785-60ULA	10	9.5	47.0	48.0	6.5	7.5	14.5	16.0	±0.8	36		-25	-30	41.0	100	15	-5	20.0	150.0	175	1.0/0.8	-1.8	120	7-AA09A	

\* : ΔTch = Channel Temperature Rise, Formula : ΔTch = (V<sub>DS</sub> × I<sub>DS</sub> + P<sub>in</sub> - P<sub>1dB</sub>) × R<sub>th(C-C)</sub>, \*\*\* : Gain Flatness





**X and Ku-band Internally Matched Power GaAs FETs (1/2)**

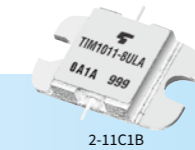
(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS										ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS (TYP.)			PACKAGE CODE		
		V <sub>DS</sub> (V)	I <sub>DSSET</sub> (A)	P <sub>1dB</sub> (dBm)		G <sub>1dB</sub> (dB)		I <sub>DS</sub> (A)		ΔG*** (dB)	h <sub>add</sub> (%)	IM <sub>3</sub> (dBc)		ΔTch* (°C)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	I <sub>DS</sub> (A)	P <sub>T</sub> (W) (Tc = 25 °C)	Tch (°C)	R <sub>th</sub> (C-C) MAX./TYP. (°C/W)	V <sub>GSoff</sub> (V)		I <sub>DS</sub> (mA) @V <sub>DS</sub> = 3 V	
				MIN.	TYP.	MIN.	TYP.	TYP.	MAX.			MAX.	TYP.											MIN.
8.5-9.6	TIM8596-2	9	1.0	32.5	33.5	6.5	7.5	0.85	1.1	—	24	—	—	—	60	15	-5	2.6	25.0	175	6.0/5.0	-3.5	30	2-9D1B
	TIM8596-4	9	2.0	35.5	36.5	6.5	7.5	1.7	2.2	—	24	—	—	—	70	15	-5	5.2	42.8	175	3.5/2.9	-3.5	60	2-9D1B
	TIM8596-8	9	4.0	38.5	39.5	5.0	6.0	3.4	4.4	—	22	—	—	—	80	15	-5	10.4	60.0	175	2.5/1.6	-3.5	120	2-11C1B
	TIM8596-15	9	4.0	41.0	42.0	6.0	7.0	4.5	5.5	—	31	—	—	—	100	15	-5	11.5	60.0	175	2.5/2.0	-3.0	145	2-11C1B
8.9-9.6	TIM8996-30	10	7.0	44.0	45.0	6.0	7.0	10.0	11.5	—	25	—	—	—	100	15	-5	20.0	136.0	175	1.1/1.0	-2.0	290	7-AA03B
9.5-10.5	TIM0910-2	9	1.0	32.5	33.5	6.5	7.5	0.85	1.1	—	24	—	—	—	60	15	-5	2.6	25.0	175	6.0/5.0	-3.5	30	2-9D1B
	TIM0910-4	9	2.0	35.5	36.5	6.5	7.5	1.7	2.2	—	24	—	—	—	70	15	-5	5.2	42.8	175	3.5/2.9	-3.5	60	2-9D1B
	TIM0910-5	9	2.0	37.0	37.5	6.0	7.0	2.0	2.5	—	25	—	—	—	80	15	-5	5.7	40.5	175	3.7/3.0	-3.0	72	2-9D1B
	TIM0910-8	9	4.0	38.5	39.5	5.0	6.0	3.4	4.4	—	22	—	—	—	80	15	-5	10.4	60.0	175	2.5/1.6	-3.5	120	2-11C1B
	TIM0910-15L	9	4.0	41.0	42.0	6.0	7.0	4.5	5.5	±0.8	31	-42	-45	30.0	100	15	-5	11.5	60.0	175	2.5/2.0	-3.0	145	2-11C1B
	TIM0910-30L	10	7.0	44.0	45.0	6.0	7.0	10.0	11.5	±0.8	25	-25	—	38.0	100	15	-5	20.0	136.0	175	1.1/1.0	-2.0	290	7-AA03B
10.7-11.7	TIM1011-4UL	10	1.0	35.5	36.5	8.5	9.5	1.1	1.6	±0.8	36	-42	-45	24.0	60	15	-5	3.3	34.1	175	4.4/3.8	-2.0	40	2-9D1B
	TIM1011-5L	9	2.0	37.0	37.5	6.0	7.0	2.0	2.5	±0.8	25	-42	-45	26.0	80	15	-5	5.7	40.5	175	3.7/3.0	-3.0	72	2-9D1B
	TIM1011-8UL	10	2.0	38.5	39.5	8.0	9.0	2.0	2.5	±0.8	39	-42	-45	27.0	80	15	-5	5.7	40.5	175	3.7/3.0	-2.0	72	2-9D1B
	TIM1011-8ULA	10	2.0	38.5	39.5	8.0	9.0	2.0	2.5	±0.8	39	-42	-45	27.0	80	15	-5	5.7	40.5	175	3.7/3.0	-2.0	72	2-11C1B
	TIM1011-15L	9	4.0	41.0	42.0	6.0	7.0	4.5	5.5	±0.8	31	-42	-45	30.0	100	15	-5	11.5	60.0	175	2.5/2.0	-3.0	145	2-11C1B
11.7-12.7	TIM1112-4UL	10	1.0	35.5	36.5	8.5	9.5	1.1	1.6	±0.8	36	-42	-45	24.0	60	15	-5	3.3	34.1	175	4.4/3.8	-2.0	40	2-9D1B
	TIM1112-8	9	4.0	38.5	39.5	4.0	5.0	3.4	4.4	—	20	—	—	—	80	15	-5	10.4	60.0	175	2.5/1.6	-3.5	120	2-11C1B
	TIM1112-15L	9	4.0	41.0	42.0	5.0	6.0	4.5	5.5	±0.8	29	-42	-45	30.0	100	15	-5	11.5	60.0	175	2.5/2.0	-3.0	145	2-11C1B
12.7-13.2	TIM1213-2L	9	1.0	32.5	33.5	6.5	7.5	0.85	1.1	±0.8	24	-42	-45	22.0	60	15	-5	2.6	25.0	175	6.0/5.0	-3.5	30	2-9D1B
	TIM1213-4L	9	2.0	35.5	36.5	6.5	7.5	1.7	2.2	±0.8	24	-42	-45	25.0	70	15	-5	3.3	42.8	175	3.5/2.9	-3.5	60	2-9D1B
	TIM1213-8UL	10	2.0	38.5	39.5	7.0	8.0	2.0	2.5	±0.8	39	-42	-45	27.0	80	15	-5	5.7	40.5	175	3.7/3.0	-2.0	72	2-9D1B
	TIM1213-8ULA	10	2.0	38.5	39.0	7.0	8.0	2.0	2.5	±0.8	38	-42	-45	27.0	80	15	-5	5.7	40.5	175	3.7/3.0	-2.0	72	2-11C1B
	TIM1213-10L	9	4.0	40.0	40.5	5.0	6.0	4.0	5.0	±0.8	23	-42	-45	29.0	90	15	-5	11.5	60.0	175	2.5/2.0	-3.0	145	2-11C1B
	TIM1213-15L	9	4.0	41.0	42.0	5.0	6.0	4.5	5.5	±0.8	29	-42	-45	30.0	100	15	-5	11.5	60.0	175	2.5/2.0	-3.0	145	2-11C1B
	TIM1213-18L	10	4.4	42.0	42.5	5.0	6.0	5.5	6.0	±0.8	28	-25	-28	36.0	100	15	-5	11.5	65.0	175	2.3/1.8	-2.8	145	2-11C1B
TIM1213-30L	10	7.0	44.0	45.0	4.5	5.5	10.0	11.0	±0.8	23	-25	-28	38.0	100	15	-5	20.0	136.0	175	1.1/1.0	-2.0	290	7-AA03B	

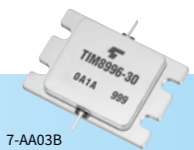
\* : ΔTch = Channel Temperature Rise, Formula: ΔTch = (V<sub>DS</sub> × I<sub>DS</sub> + P<sub>in</sub> - P<sub>1dB</sub>) × R<sub>th(C-C)</sub>, \*\* : Gain Flatness



2-9D1B



2-11C1B



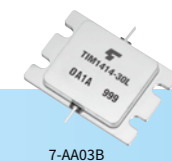
7-AA03B

**X and Ku-band Internally Matched Power GaAs FETs (2/2)**

(Ta = 25 °C)

FREQUENCY BAND (GHz)	MODEL No.	BIAS CONDITIONS		RF PERFORMANCE SPECIFICATIONS										ABSOLUTE MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS (TYP.)			PACKAGE CODE				
		V <sub>DS</sub> (V)	I <sub>DSset</sub> (A)	P <sub>1dB</sub> (dBm)		G <sub>1dB</sub> (dB)		I <sub>DS</sub> (A)		ΔG*** (dB)	h <sub>add</sub> (%)	IM <sub>3</sub> (dBc)		ΔTch* (°C)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	I <sub>DS</sub> (A)	P <sub>T</sub> (W) (Tc = 25 °C)	Tch (°C)	R <sub>th(C-C)</sub> MAX./TYP. (°C/W)	V <sub>GSoff</sub> (V)		I <sub>DS</sub> (mA) @V <sub>DS</sub> = 3V			
				MIN.	TYP.	MIN.	TYP.	TYP.	MAX.			MAX.	TYP.											MIN.	TYP.	P <sub>o@single carrier level</sub> (dBm)
14.0-14.5	<b>TIM1414-2L</b>	9	1.0	32.5	33.5	5.5	6.5	0.85	1.1	±0.8	23			-42	-45	22.0	60	15	-5	2.6	25.0	175	6.0/5.0	-3.5	30	2-9D1B
	<b>TIM1414-5L</b>	9	2.0	37.0	37.5	5.0	6.0	2.0	2.5	±0.8	23			-42	-45	26.0	80	15	-5	5.7	40.5	175	3.7/3.0	-3.0	72	2-9D1B
	<b>TIM1414-7</b>	9	2.0	37.5	38.5	5.5	6.5	2.25	2.75	—	27			—	—	—	80	15	-5	5.7	40.5	175	3.7/3.0	-3.0	72	2-9D1B
	<b>TIM1414-15L</b>	9	4.0	41.0	42.0	5.0	6.0	4.5	5.5	±0.8	29			-42	-45	30.0	100	15	-5	11.5	60.0	175	2.5/2.0	-3.0	145	2-11C1B
	<b>TIM1414-18L</b>	9	4.4	42.0	42.5	5.0	6.0	5.5	6.0	±0.8	28			-25	—	36.0	100	15	-5	11.5	65.0	175	2.3/1.8	-2.8	145	2-11C1B
13.75-14.5	<b>TIM1314-4UL</b>	10	1.0	35.5	36.5	7.0	8.0	1.1	1.6	—	34			-42	-45	23.0	60	15	-5	3.3	34.1	175	4.4/3.8	-2.0	40	2-9D1B
	<b>TIM1414-7-252</b>	9	2.0	37.0	38.0	5.0	6.0	2.25	2.75	—	23			—	—	—	80	15	-5	5.7	40.5	175	3.7/3.0	-3.0	72	2-9D1B
	<b>TIM1314-8UL</b>	10	2.0	38.5	39.0	6.0	7.0	2.0	2.5	±0.8	32			-42	-45	27.0	80	15	-5	5.7	40.5	175	3.7/3.0	-2.0	72	2-9D1B
	<b>TIM1314-9L</b>	9	2.2	39.0	39.5	5.0	6.0	2.8	3.0	—	26			-25	—	33.0	80	15	-5	5.7	30.0	175	3.7/3.0	-2.0	72	2-9D1B
	<b>TIM1314-15UL</b>	10	4.0	41.0	42.0	6.0	7.0	4.0	5.0	±0.8	32			-42	-45	30.0	80	15	-5	12.5	60.0	175	2.5/2.0	-2.0	160	2-11C1B
	<b>TIM1414-18L-252</b>	9	4.4	41.5	42.0	5.0	6.0	5.5	6.0	—	24			-25	—	36.0	100	15	-5	11.5	65.0	175	2.3/1.8	-2.8	145	2-11C1B
	<b>TIM1314-30L</b>	10	7.0	44.0	45.0	4.0	5.0	10.0	11.0	—	22			-25	—	38.0	100	15	-5	20.0	136.0	175	1.1/1.0	-2.0	290	7-AA03B

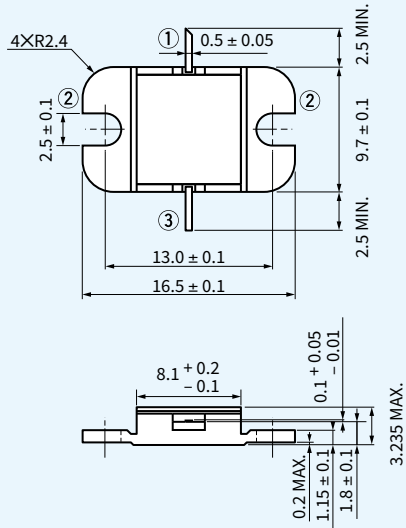
\* : ΔTch = Channel Temperature Rise, Formula: ΔTch = (V<sub>DS</sub> × I<sub>DS</sub> + P<sub>in</sub> - P<sub>1dB</sub>) × R<sub>th(C-C)</sub>, \*\* : Gain Flatness



Unit in mm

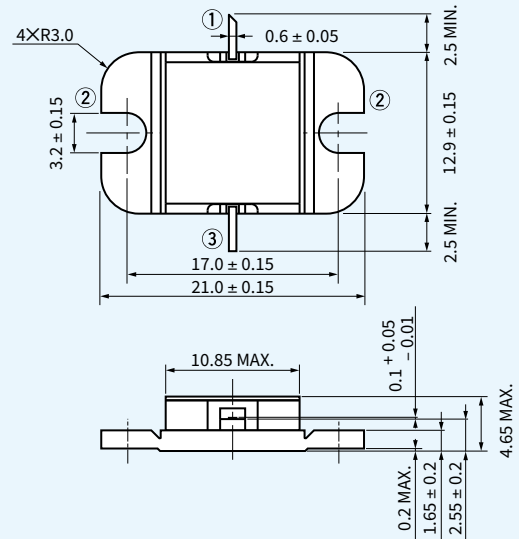
## Package Code and Outlines

### 2-9D1B



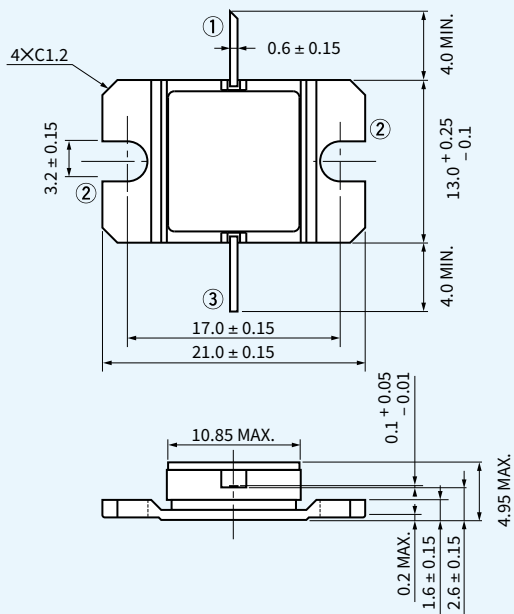
- ① Gate
- ② Source
- ③ Drain

### 2-11C1B



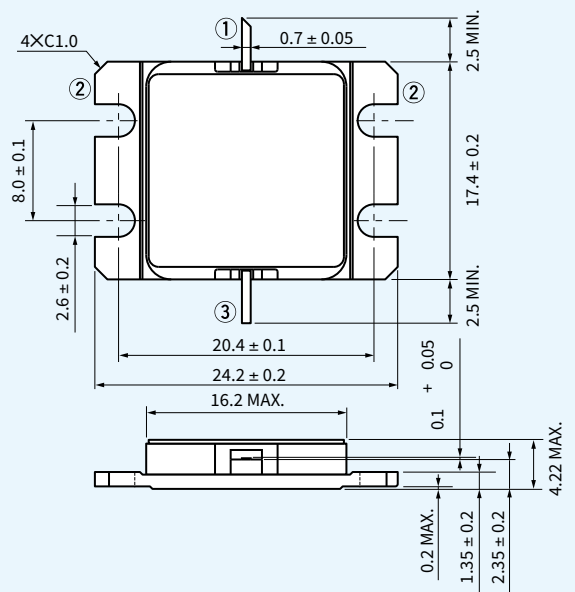
- ① Gate
- ② Source
- ③ Drain

### 2-11D1B



- ① Gate
- ② Source
- ③ Drain

### 2-16G1B

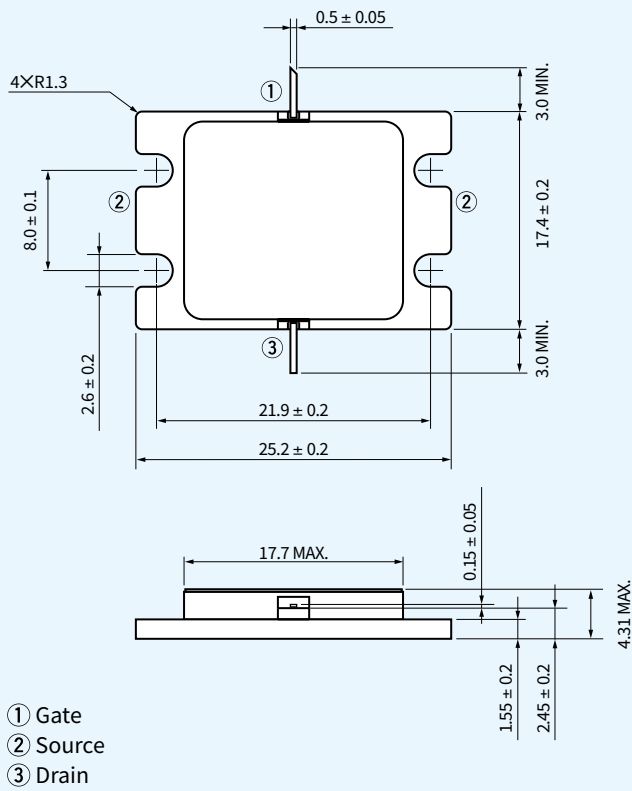


- ① Gate
- ② Source
- ③ Drain

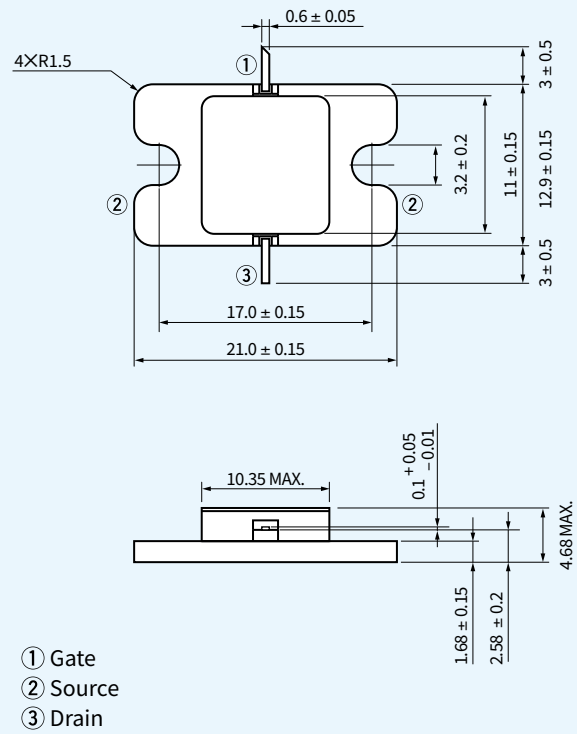


Unit in mm

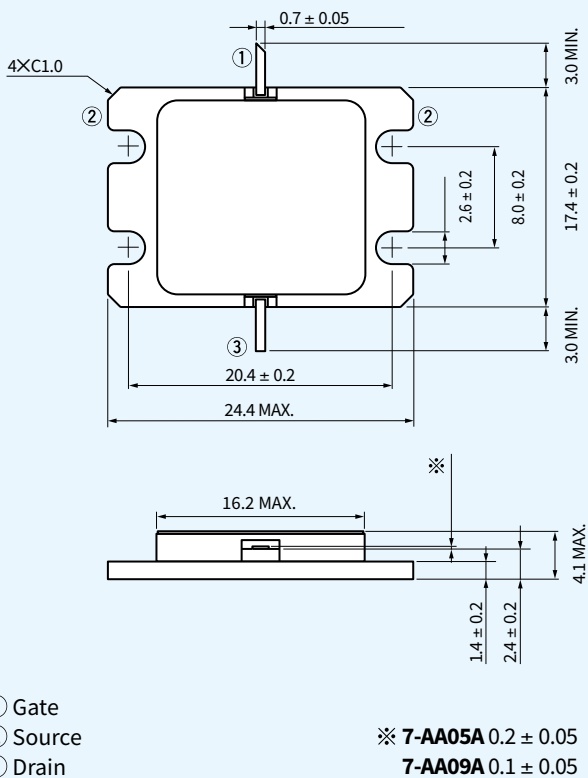
7-AA03B



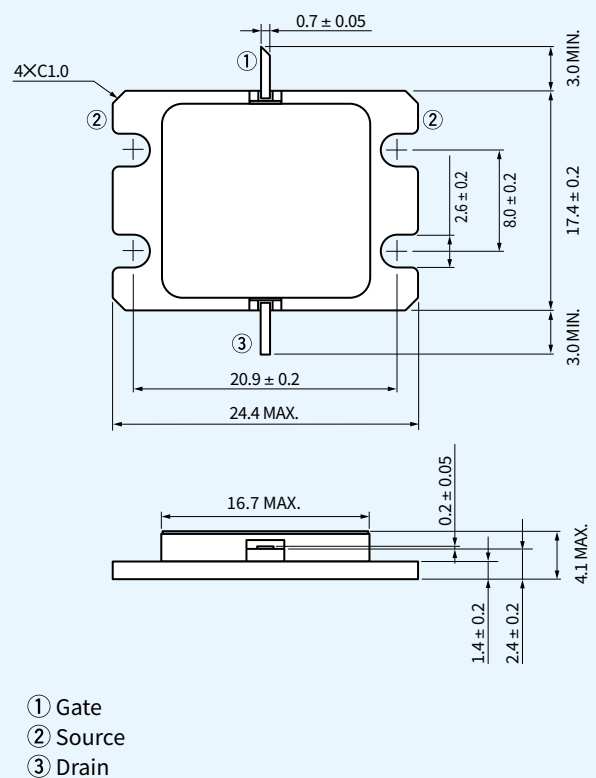
7-AA04A/7-AA07A



7-AA05A/7-AA09A



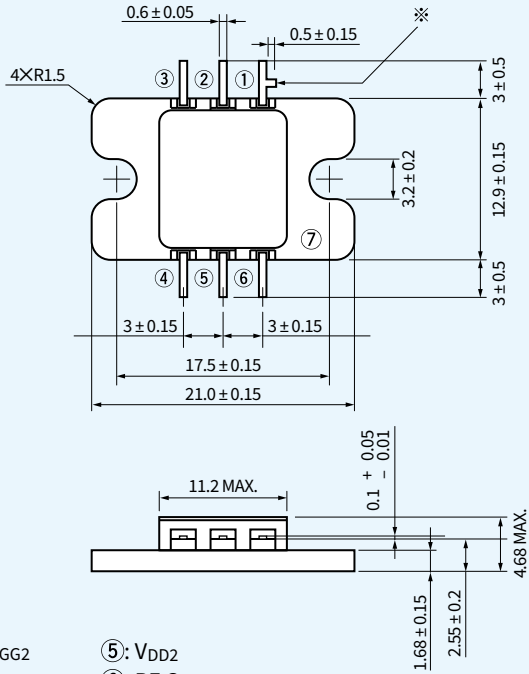
7-AA06A



# Package Code and Outlines

Unit in mm

## 7-BA42B



- ①: V<sub>GG2</sub>
- ②: V<sub>DD1</sub>
- ③: RF Input
- ④: V<sub>GG1</sub>
- ⑤: V<sub>DD2</sub>
- ⑥: RF Output
- ⑦: GND
- ※: Orientation Tab

Note

A series of horizontal dotted lines for taking notes.



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