



**MITSUBISHI
ELECTRIC**

Changes for the Better

HIGH FREQUENCY DEVICES

for a greener tomorrow



High Frequency Devices

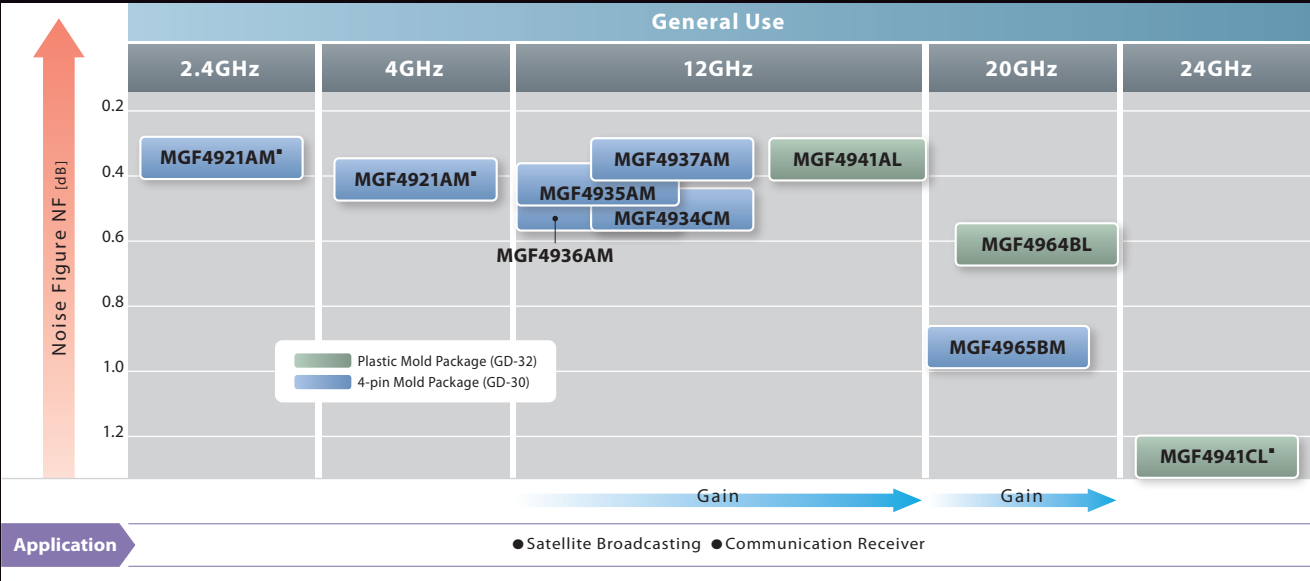
2015

The Best Solution for Realizing the Information Era.

Communication networks, such as high speed Internet, video-on-demand and high-speed data communication, are developing rapidly. We are ready to offer the best solution to the systems for realizing the information era by providing a variety of GaAs/GaN products designed for satellite communication systems to base stations.

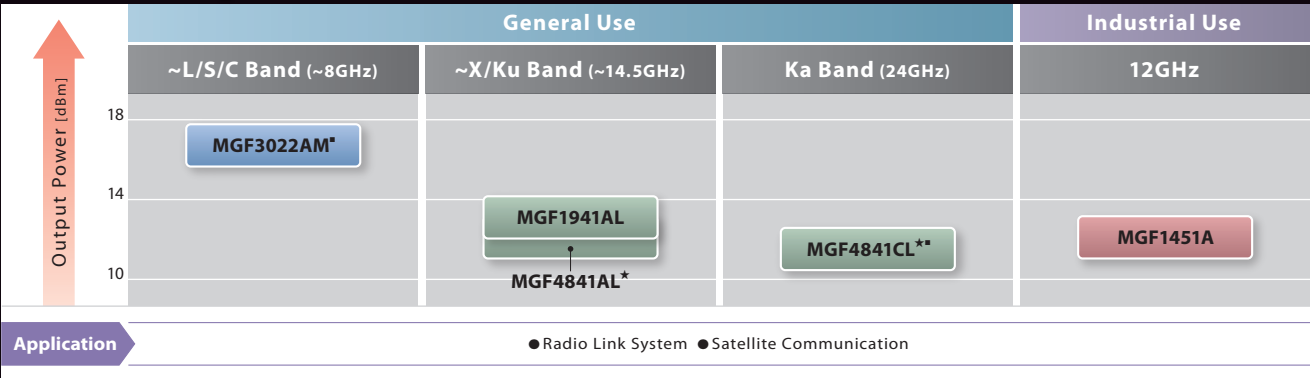
SELECTION MAP

■ GaAs HEMT SERIES FOR MICROWAVE-BAND LOW-NOISE AMPLIFIERS



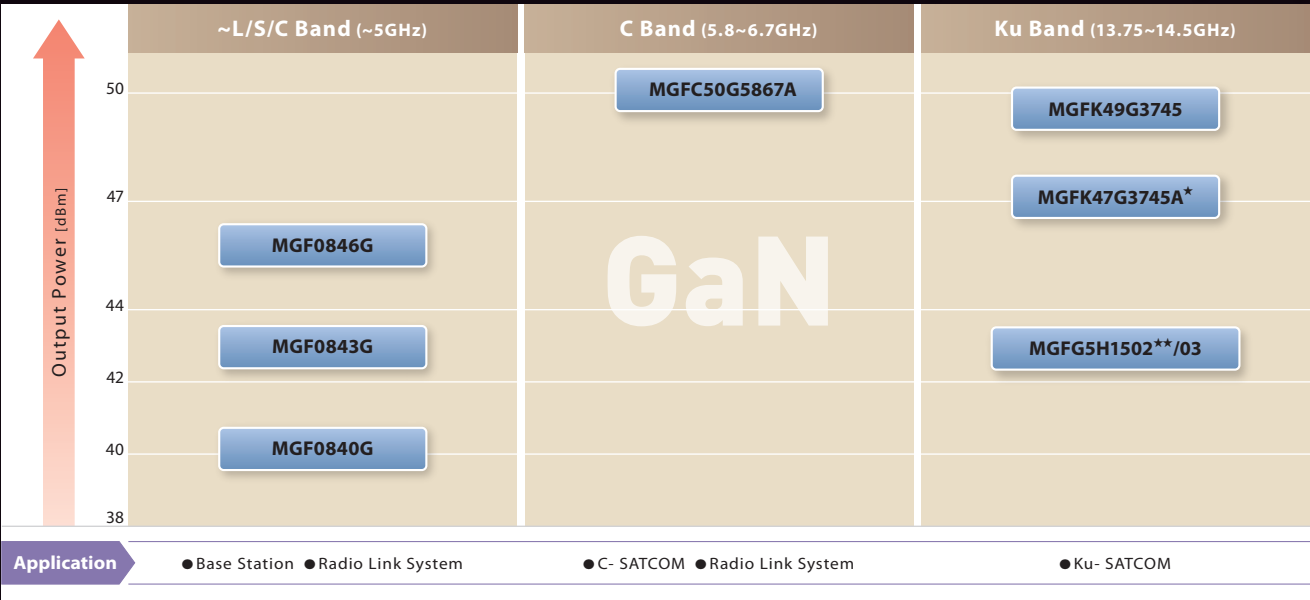
■: AEC-Q101 qualified FET: Field Effect Transistor HEMT: High Electron Mobility Transistor HBT: Heterojunction Bipolar Transistor

■ GaAs FET/HEMT, InGaP HBT SERIES FOR SMALL SIGNAL AMPLIFIERS

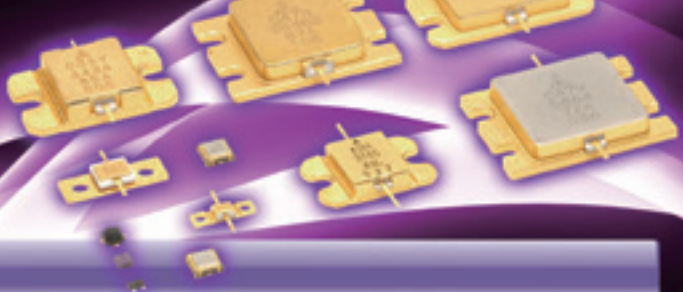


★: New Product ■: AEC-Q101 qualified

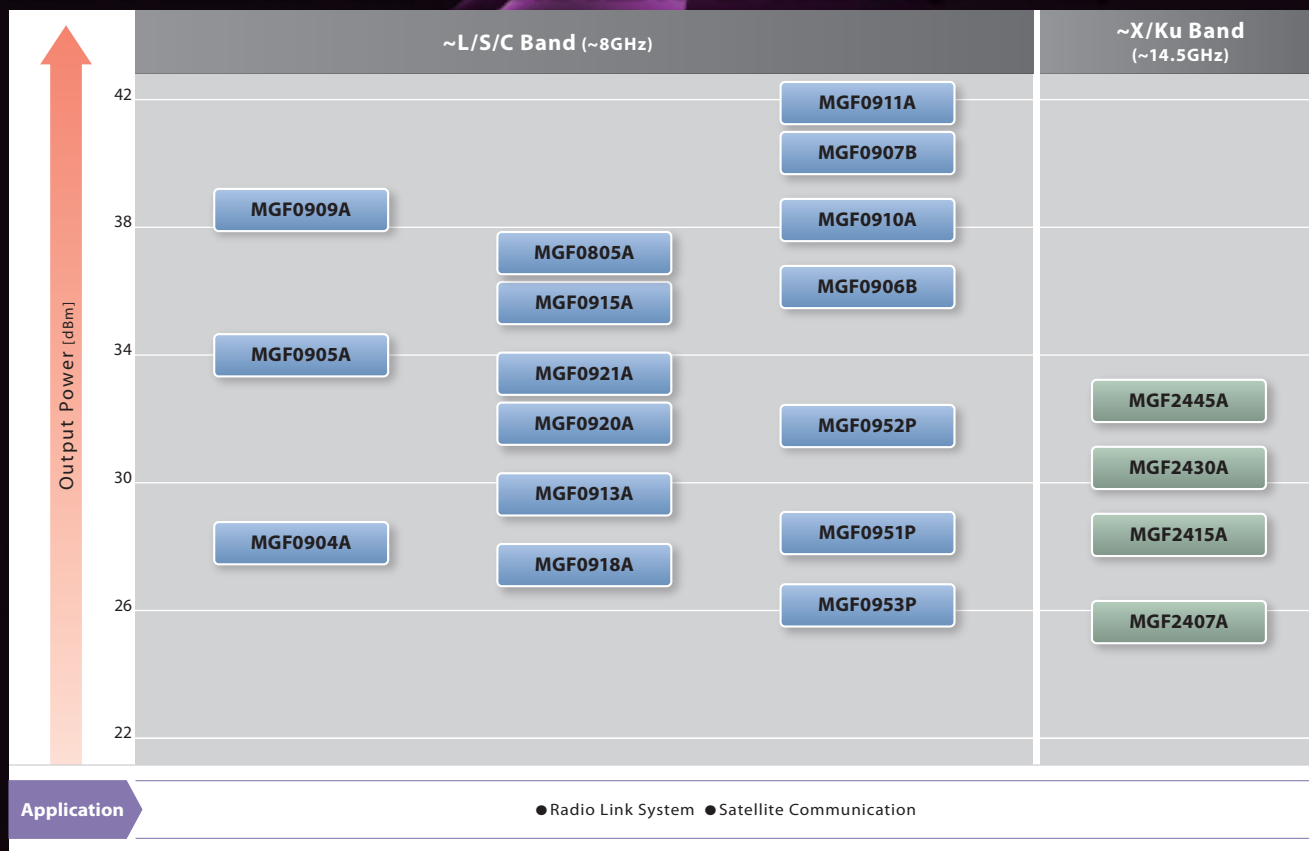
■ GaN HEMT SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Discrete Devices / Internally Matched)



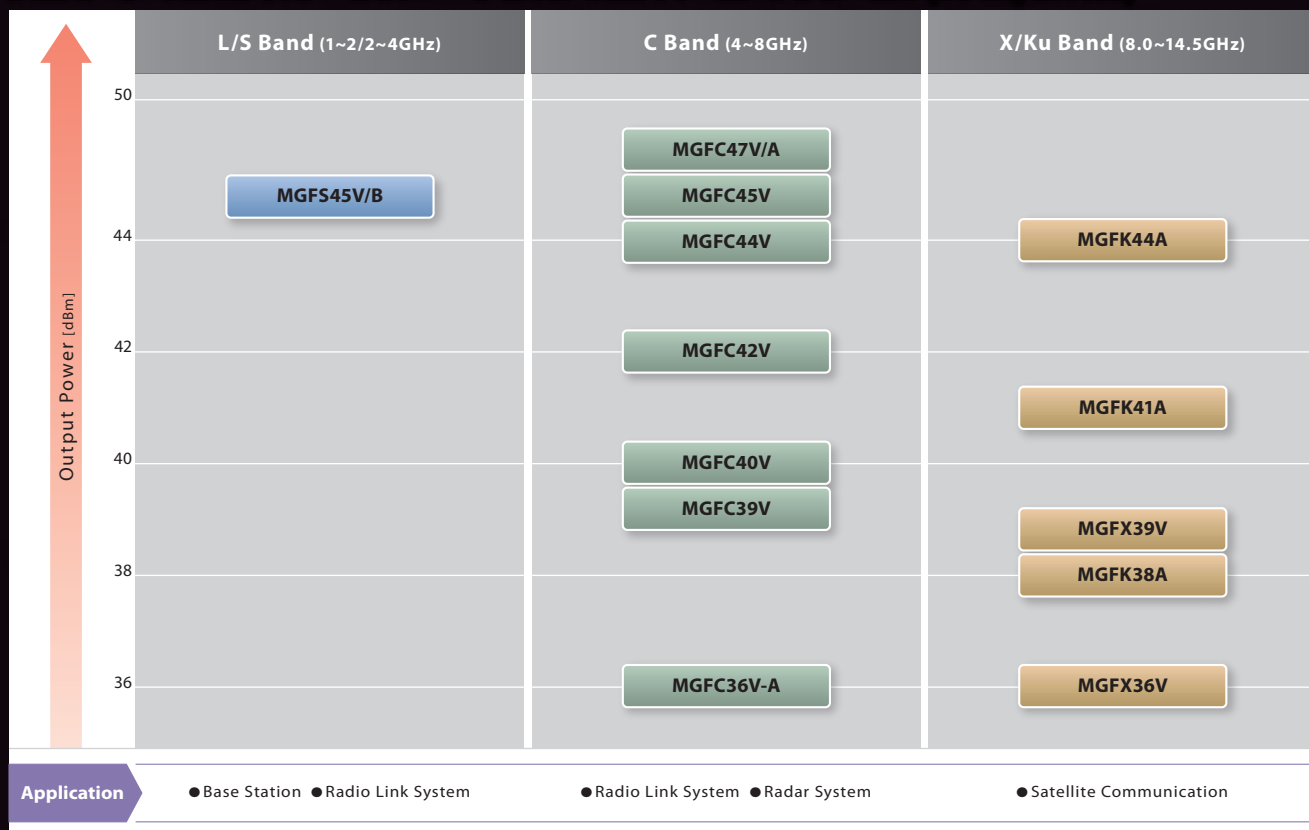
★: New Product ★★: Under Development



■ GaAs FET SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Discrete Devices)



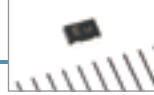
■ GaAs FET SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Internally Matched)



PRODUCT LIST

GaAs HEMT SERIES FOR MICROWAVE-BAND
LOW-NOISE AMPLIFIERS

GD-30



GD-32

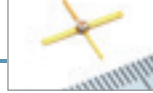


Type Number	Noise Figure [dB]		Associated Gain [dB]		Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [mA]	Package Outline
	Typ.	Max.	Min.	Typ.				
MGF4921AM [■]	0.35	0.55	11.5	13.0	4	2	10	GD-30
MGF4934CM	0.50	0.75	11.5	13.0	12	2	10	GD-30
MGF4935AM	0.45	0.65	11.0	12.0	12	2	10	GD-30
MGF4936AM	0.50	0.70	11.0	12.0	12	2	10	GD-30
MGF4937AM	0.35	0.50	11.5	13.0	12	2	10	GD-30
MGF4941AL	0.35	0.50	12.0	13.5	12	2	10	GD-32
MGF4964BL	0.65	0.90	11.5	13.5	20	2	10	GD-32
MGF4965BM	0.95	1.25	9.5	11.5	20	2	10	GD-30
MGF4941CL [■]	2.40	3.80	7.5	10.0	24	1.5	Idss	GD-32

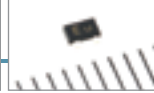
Ta=25°C ■: AEC-Q101 qualified

GaAs FET/HEMT, InGaP HBT SERIES FOR
SMALL SIGNAL AMPLIFIERS

GD-4



GD-30



GD-32



Type Number	Output Power at 1dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGF1451A [▲]	11.0	13.0	-	10.5	-	-	-	12	3	0.03	-	-	GD-4
MGF1941AL	11.0	15.0	-	10.0	-	-	-	12	3	0.03	-	-	GD-32
MGF4841AL [★]	11.5	14.5	-	12.0	-	-	-	12	2.5	0.025	-	-	GD-32
MGF4841CL ^{★★}	-	11.5	-	8.5	-	-	-	24	1.5	Idss	-	-	GD-32
MGF3022AM [■]	14.0	16.5	-	18.0	-	-	-	2.4	3	0.033	-	-	GD-30

Ta=25°C ★: New Product ■: AEC-Q101 qualified ▲: Industrial grade

Ga^N HEMT SERIES FOR MICROWAVE-BAND
HIGH POWER AMPLIFIERS (Discrete Devices)

GF-7



Type Number	Output Power at 3dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Drain Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGF0840G	39	40	-	14	-	-	60	2.6	47	0.09	5	-	GF-7
MGF0843G	42	43	-	13	-	-	60	2.6	47	0.18	3	-	GF-7
MGF0846G	45	46	-	12	-	-	60	2.6	47	0.35	2.2	-	GF-7

Ta=25°C

Ga^N HEMT SERIES
FOR SATELLITE COMMUNICATION (Internally Matched)

GF-8



GF-38



GF-65



Type Number	Output Power at 3dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGFC50G5867A	49	50	-	10	-	-	40	5.8~6.7	40	1.92	0.6	0.8	GF-38
MGFK47G3745A [★]	-	-	47	9	-	-	30	13.75~14.5	24	1.05	1.1	1.4	GF-8
MGFK49G3745	-	-	49	7.5	-	-	28	13.75~14.5	24	2.1	0.4	0.6	GF-38
MGFG5H1502 ^{★★}	-	-	43	20	-25	-	12	13.75~14.5	24	1.8	TBD		GF-65
MGFG5H1503	-	-	43	20	-25	-	12	13.75~14.5	24	2.7	1.2	1.5	GF-65

Ta=25°C ★: New Product ★★: Under Development MGFG5H1502 : Driver for 50W+80W GaN HEMT, MGFG5H1503 : Driver for 50W GaN HEMT (Refer to P.10 Lineup for Satellite Communication)

GaAs FET SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Discrete Devices)

GF-7



GF-17



GF-21



GF-50



GF-55



Type Number	Output Power at 1dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGF0805A	-	-	36.5	14.5	-	-	55	1.9	10	0.4	5	7	GF-50
MGF0904A	-	-	28.0	14.0	-	-	40	1.65	8	0.2	-	40	GF-7
MGF0905A	-	-	34.0	11.0	-	-	40	1.65	8	0.8	-	12.5	GF-7
MGF0906B▲	35.5	37.0	-	11.0	-	-	40	2.3	10	1.2	-	6.5	GF-21
MGF0907B▲	38.5	40.0	-	8.0	-	-	37	2.3	10	2.4	-	4	GF-21
MGF0909A	37.0	38.0	-	10.0	-	-	45	2.3	10	1.3	-	5	GF-7
MGF0910A▲	37.0	38.0	-	10.0	-	-	37	2.3	10	1.3	-	6	GF-21
MGF0911A▲	40.0	41.0	-	10.0	-	-	40	2.3	10	2.6	-	4.5	GF-21
MGF0913A	-	-	29.5	11.0	-	-	48	1.9	10	0.2	20	30	GF-50
MGF0915A	-	-	35.0	13.0	-	-	50	1.9	10	0.8	5	8	GF-50
MGF0918A	-	-	25.0	18.0	-	-	45	1.9	10	0.15	35	50	GF-50
MGF0920A	-	-	30.0	16.0	-	-	45	1.9	10	0.4	13	18	GF-50
MGF0921A	-	-	31.0	15.0	-	-	40	1.9	10	0.5	11	15	GF-50
MGF0951P	-	-	31.0	11.0	-	-42	50	2.15	10	0.2	20	25	GF-55
MGF0952P	-	-	36.5	11.0	-	-42	50	2.15	10	0.7	5	6	GF-55
MGF0953P	-	-	28.0	18.0	-	-	40	2.15	10	0.15	14	20	GF-55
MGF2407A▲	23.0	24.5	-	7.0	-	-	30	14.5	10	0.075	-	100	GF-17
MGF2415A▲	26.0	27.5	-	6.5	-	-	29	14.5	10	0.15	-	60	GF-17
MGF2430A▲	29.0	30.5	-	5.5	-	-	27	14.5	10	0.3	-	30	GF-17
MGF2445A▲	31.0	32.0	-	5.5	-	-	20	12	10	0.45	-	15	GF-17

Ta=25°C ▲: Industrial grade

GaAs FET SERIES FOR L/S BAND HIGH POWER AMPLIFIERS (Internally Matched)

GF-8



GF-18



GF-53



GF-60



Type Number	Output Power at 1dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGFC36V3436	35	37	-	11	-42	-45	32	3.4~3.6	10	1.2	5	6	GF-8
MGFC39V3436	38	39.5	-	10	-42	-45	32	3.4~3.6	10	2.4	3	3.5	GF-8
MGFC42V3436	41.5	42.5	-	12	-42	-45	37	3.4~3.6	10	4.5	-	1.9	GF-18
MGFC45B3436B	-	-	45	11	-	-45	-	3.4~3.6	12	0.8	-	1.9	GF-60
MGFS45B2527B	-	-	45	12	-	-45	-	2.5~2.7	12	0.9	-	1.9	GF-60
MGFC47B3436B	-	-	47	10.5	-	-45	-	3.4~3.6	12	1.5	-	1.2	GF-60
MGFC47B3538B	-	-	47	10.5	-	-45	-	3.5~3.8	12	1.5	-	1.2	GF-60
MGFS45V2123A	44	45	-	12	-42	-45	45	2.1~2.3	10	6.5	1.25	1.5	GF-53
MGFS45V2325A	44	45	-	12	-42	-45	45	2.3~2.5	10	6.5	1.25	1.5	GF-53
MGFS45V2527A	44	45	-	12	-42	-45	45	2.5~2.7	10	6.5	1.25	1.5	GF-53
MGFS45V2735	44	45	-	12	-42	-45	45	2.5~2.7	10	6.5	0.8	1	GF-53

Ta=25°C L Band: 0.5~2GHz S Band: 2~4GHz

Type Name Definition of High Frequency Devices

Discrete

MGF 49 41 A L

A B C D

A Device Structure — 0x: MES FET, HEMT (L/S Band H/P)
1x: MES FET (Small Signal)
2x: MES FET (C~KuBand H/P)
3x: HBT
4x: HEMT

B Chip Type
C Series Number
D Auxiliary Symbol

Internally Matched

MGF C 50 G 5867 A

A B C D E

A Freq. Band — L, S, C, X, K, Ku
B Output Power in dBm — ex. 50=50dBm=100W(typ.)
C Device Structure — A, B: HFET
V: MES FET
G: GaN HEMT

D Freq. Band in GHz — ex. 5867=5.8GHz~6.7GHz
E Series Number

PRODUCT LIST

GaAs FET SERIES FOR C BAND HIGH POWER AMPLIFIERS (Internally Matched)

GF-8



GF-18



GF-38



GF-53



Type Number	Output Power at 1dB Gain Compression [dBm]		Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.		Min.	Typ.					Typ.	Max.	
MGFC36V4450A	35	37	9	-42	-45	32	4.4~5.0	10	1.2	5	6	GF-8
MGFC36V5258	35	36	9	-	-	33	5.2~5.8	10	1.2	-	6	GF-8
MGFC36V5964A	35	37	9	-42	-45	30	5.9~6.4	10	1.2	5	6	GF-8
MGFC36V6472A	35	37	8	-42	-45	30	6.4~7.2	10	1.2	5	6	GF-8
MGFC36V7177A	35	36.5	8	-42	-45	30	7.1~7.7	10	1.2	5	6	GF-8
MGFC39V3742A	38	39.5	9	-42	-45	31	3.7~4.2	10	2.4	-	3.5	GF-8
MGFC39V4450A	38	39	8	-42	-45	30	4.4~5.0	10	2.4	-	3.5	GF-8
MGFC39V5258	38	39	8	-	-	30	5.2~5.8	10	2.4	-	3.5	GF-8
MGFC39V5964A	38	39.5	8	-42	-45	30	5.9~6.4	10	2.4	-	3.5	GF-8
MGFC39V6472A	38	39.5	7	-42	-45	28	6.4~7.2	10	2.4	-	3.5	GF-8
MGFC39V7177A	38	39.5	7	-42	-45	28	7.1~7.7	10	2.4	-	3.5	GF-8
MGFC39V7785A	38	39.5	6	-42	-45	27	7.7~8.5	10	2.4	-	3.5	GF-8
MGFC40V3742	39.5	40.5	9	-42	-45	32	3.7~4.2	10	2.4	-	3.5	GF-18
MGFC40V4450	39.5	40.5	9	-42	-45	32	4.4~5.0	10	2.4	-	3.5	GF-18
MGFC40V5258	39.5	40.5	8	-	-	32	5.2~5.8	10	2.4	-	3.5	GF-18
MGFC40V5964	39.5	40.5	8	-42	-49	30	5.9~6.4	10	2.4	3	3.5	GF-18
MGFC40V6472	39.5	40.5	7	-42	-45	32	6.4~7.2	10	2.4	-	3.5	GF-18
MGFC40V7177	39	40	7	-42	-45	32	7.1~7.7	10	2.4	-	3.5	GF-18
MGFC42V3742	41.5	42.5	9	-42	-45	32	3.7~4.2	10	4.5	-	1.9	GF-38
MGFC42V4450	41.5	42.5	9	-42	-45	32	4.4~5.0	10	4.5	-	1.9	GF-18
MGFC42V5258	41.5	42.5	8	-	-	31	5.2~5.8	10	4.5	-	1.9	GF-18
MGFC42V5964A	41.5	42.5	8	-42	-45	33	5.9~6.4	10	4.5	-	1.6	GF-38
MGFC42V6472	41.5	42.5	7	-42	-45	30	6.4~7.2	10	4.5	-	1.9	GF-38
MGFC42V6472A	41.5	42.5	7	-42	-45	31	6.4~7.2	10	4.5	-	1.6	GF-38
MGFC42V7177	41	42	7	-42	-45	30	7.1~7.7	10	4.5	-	1.9	GF-38
MGFC42V7785A	41	42	6	-42	-45	28	7.7~8.5	10	4.5	-	1.6	GF-38
MGFC44V5964	43	44	8	-42	-	33	5.9~6.4	10	6.4	-	1.6	GF-38
MGFC44V6472	43	44	7	-42	-	31	6.4~7.2	10	6.4	-	1.6	GF-38
MGFC45V4450A	44	45	9	-42	-45	34	4.4~5.0	10	8	0.8	1	GF-38
MGFC45V5964A	44	45	8	-42	-45	33	5.9~6.4	10	8	0.8	1	GF-38
MGFC47A4450	46	47	9.5	-	-	40	4.4~5.0	10	9.8	0.8	0.9	GF-53
MGFC47V5864	46	47	8.5	-	-	35	5.8~6.4	10	9.8	0.8	0.9	GF-53

Ta=25°C C Band: 4~8GHz

GaAs FET SERIES FOR X/Ku BAND HIGH POWER AMPLIFIERS (Internally Matched)

GF-8



GF-27



GF-38



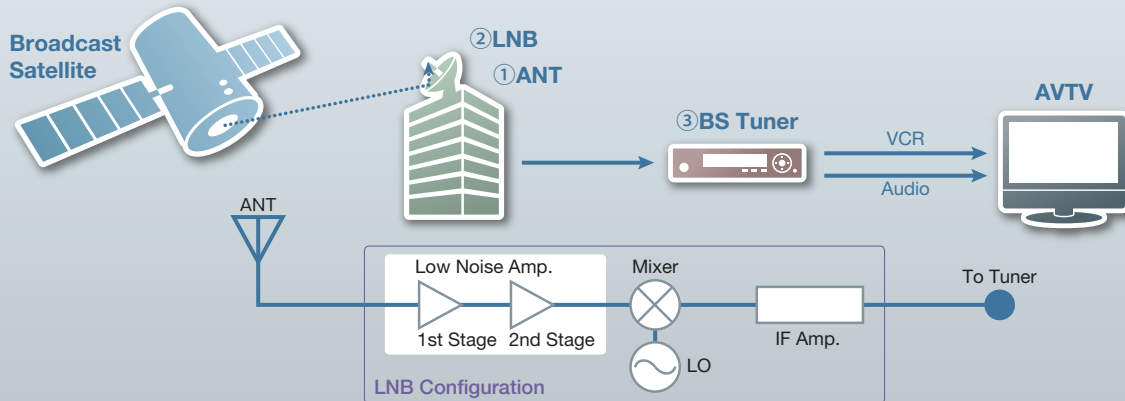
Type Number	Output Power at 1dB Gain Compression [dBm]		Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.		Min.	Typ.					Typ.	Max.	
MGFK38A3745	37	38	7	-	-	30	13.75~14.5	10	1.5	3.6	4	GF-27
MGFK41A4045	40	41	6	-35	-	25	14.0~14.5	10	3	1.8	2.2	GF-8
MGFK44A4045	43	44	5	-35	-	17	14.0~14.5	10	6	1.2	1.5	GF-38
MGFX36V0717	34.5	36	8	-42	-	32	10.7~11.7	10	1.2	-	5.5	GF-27
MGFX39V0717	37.5	39	7	-42	-	26	10.7~11.7	10	2.4	-	3.5	GF-8

Ta=25°C X Band: 8~12GHz Ku Band: 12~18GHz

High Frequency devices are compliant with the **RoHS** (2011/65/EU).

RoHS: Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

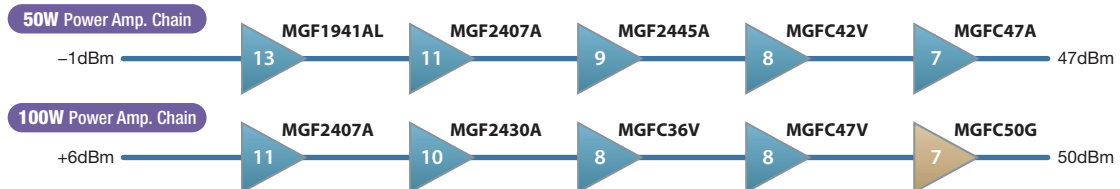
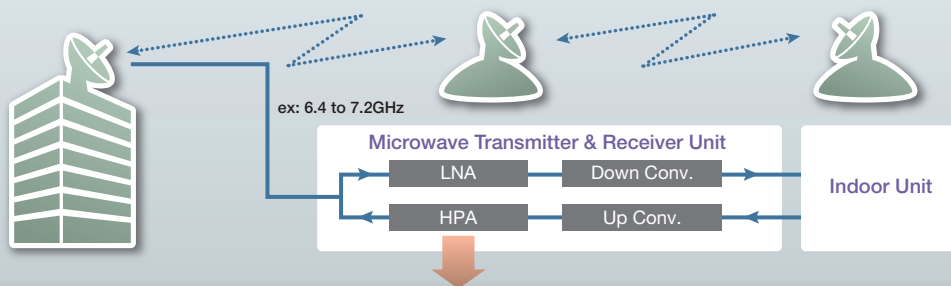
Lineup for 12GHz -Band LNB



Performance of LNB	1st Stage	2nd Stage	Mixer
Low Noise Model	MGF4937AM	MGF4937AM	MGF4934CM
Standard Model	MGF4935AM	MGF4936AM	MGF4934CM

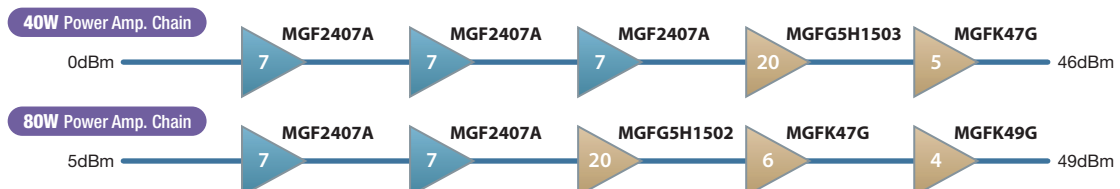
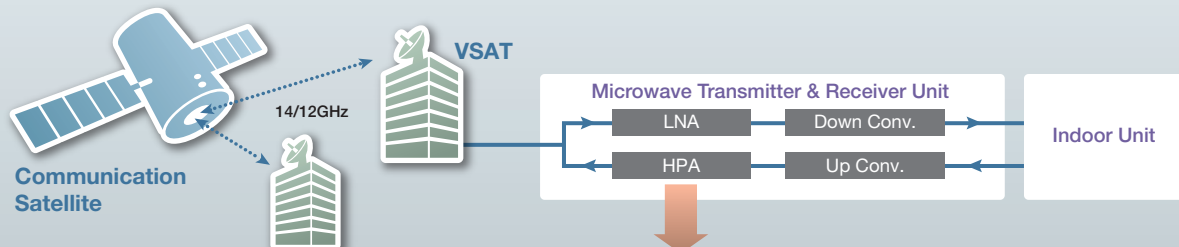
LNB: Low Noise Block Converter

Lineup for Microwave Links



GaAs GaN

Lineup for Satellite Communication



VSAT: Very Small Aperture Terminal

GaAs GaN

HIGH FREQUENCY DEVICES

Please visit our website for further details.

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for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



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