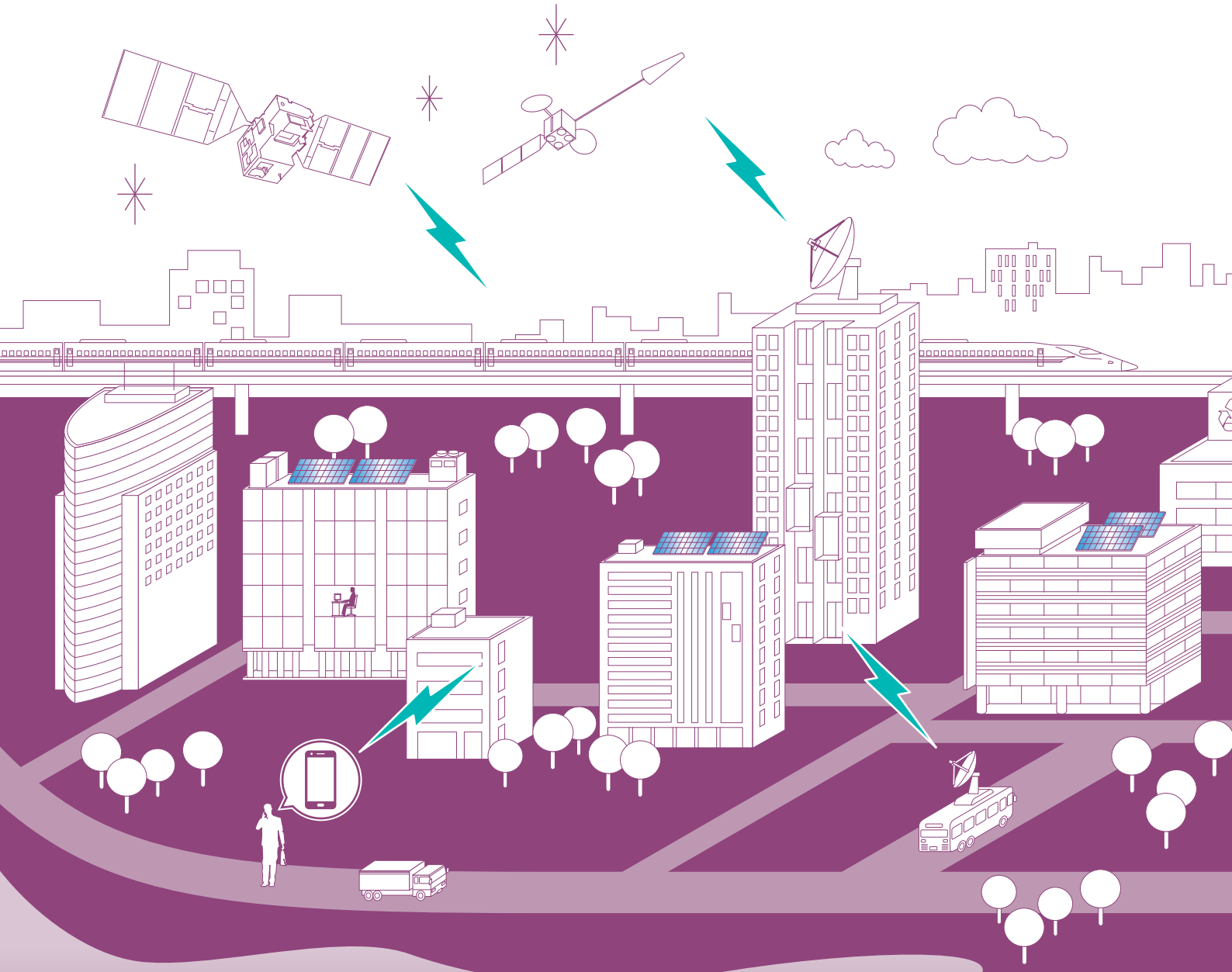
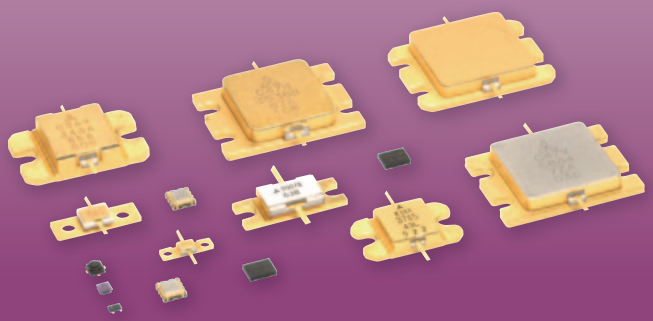
MITSUBISHI ELECTRIC

Changes for the Better

HIGH FREQUENCY DEVICES



High Frequency Devices



for a greener tomorrow eco Changes

The Best Solution for Realizing the Information Era.

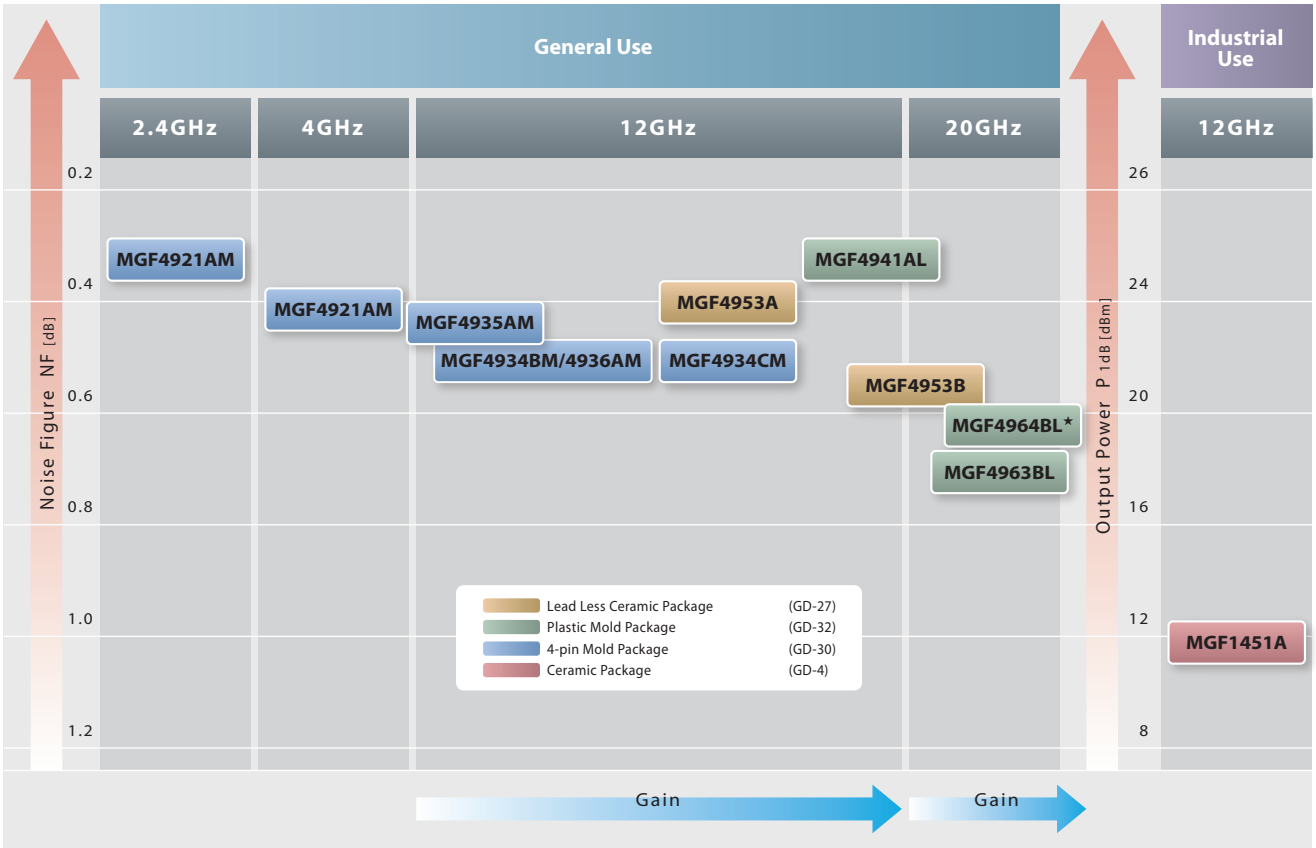
Communication networks, such as high speed Internet, video-on-demand and high-speed data communcation, are developing rapidly.
We are ready to offer the best solution to the systems for realizing the information era by providing a variety of GaAs/GaN products designed for satellite communication systems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

LINE UP

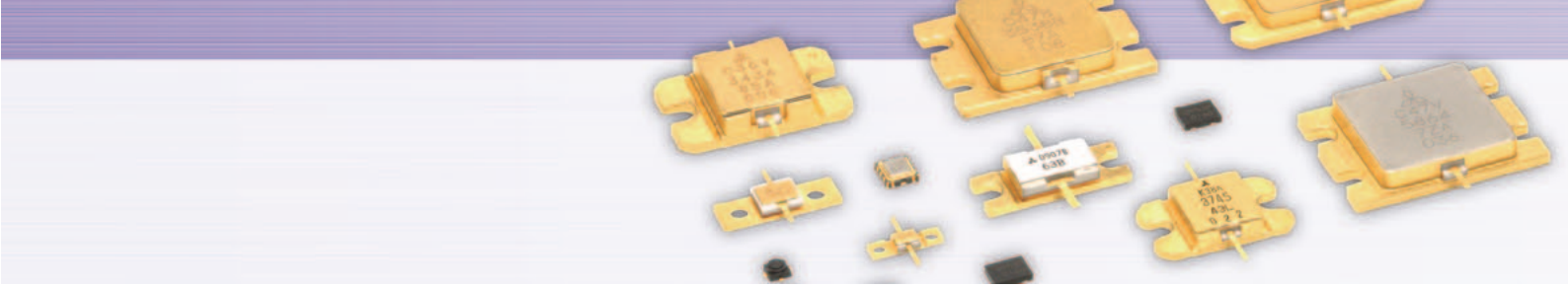
			MAP For SELECTION	PRODUCT LIST
High Frequency Devices	For Communications	GaAs FET/HEMT Series for Microwave-band Low-Noise Amplifiers	Page 1	Page 5
		GaAs FET/InGaP HBT Series for Microwave-band High Power Amplifiers (Discrete Devices)	Page 2	Page 5,6
		GaN HEMT Series for Microwave-band High Power Amplifiers	Page 2	Page 6
		Internally Matched GaAs FET Series for Microwave-band High Power Amplifiers	Page 3	Page 6,7
	For Mobile Terminal	GaAs Power Amplifiers for Mobile Phone and Data Communication	Page 3	Page 8
		GaAs Amplifiers for WiMAX / Wi-Fi	Page 4	Page 8

SELECTION MAP

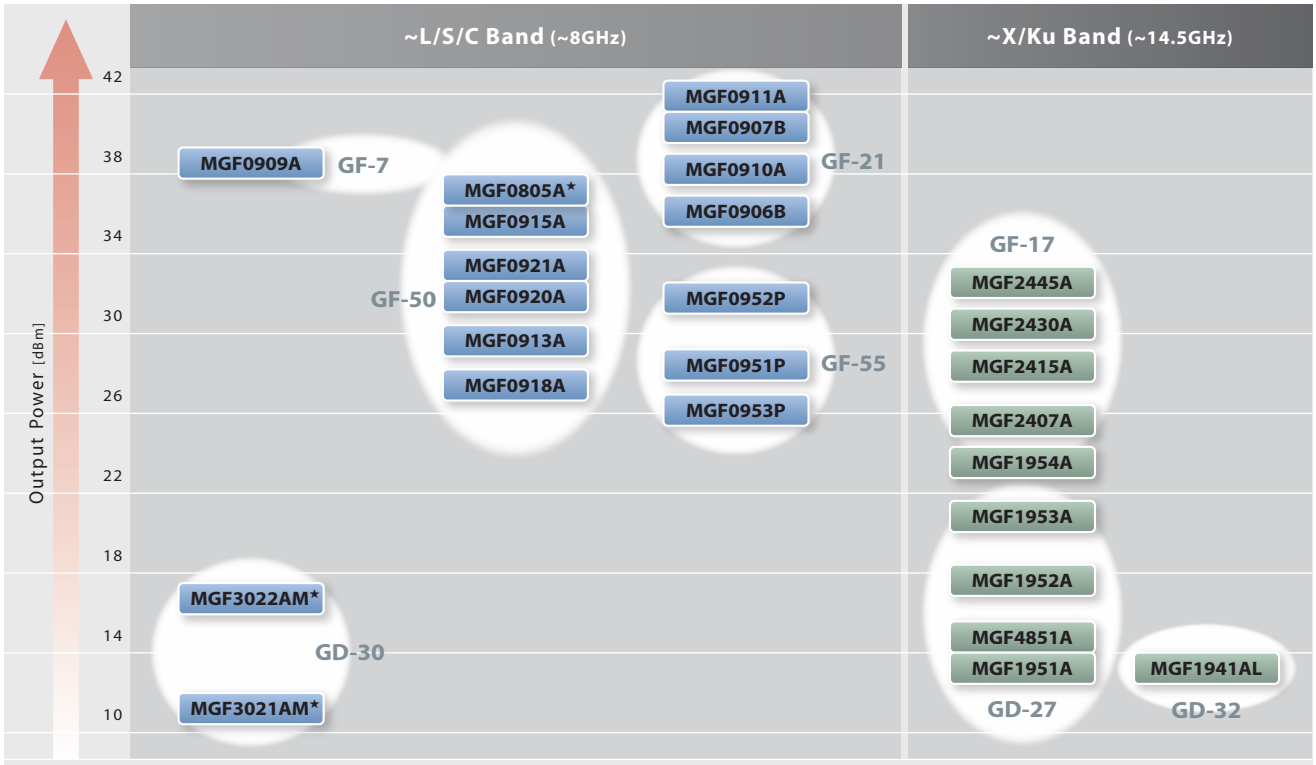
GaAs FET SERIES FOR MICROWAVE-BAND LOW-NOISE AMPLIFIERS



★: New Product

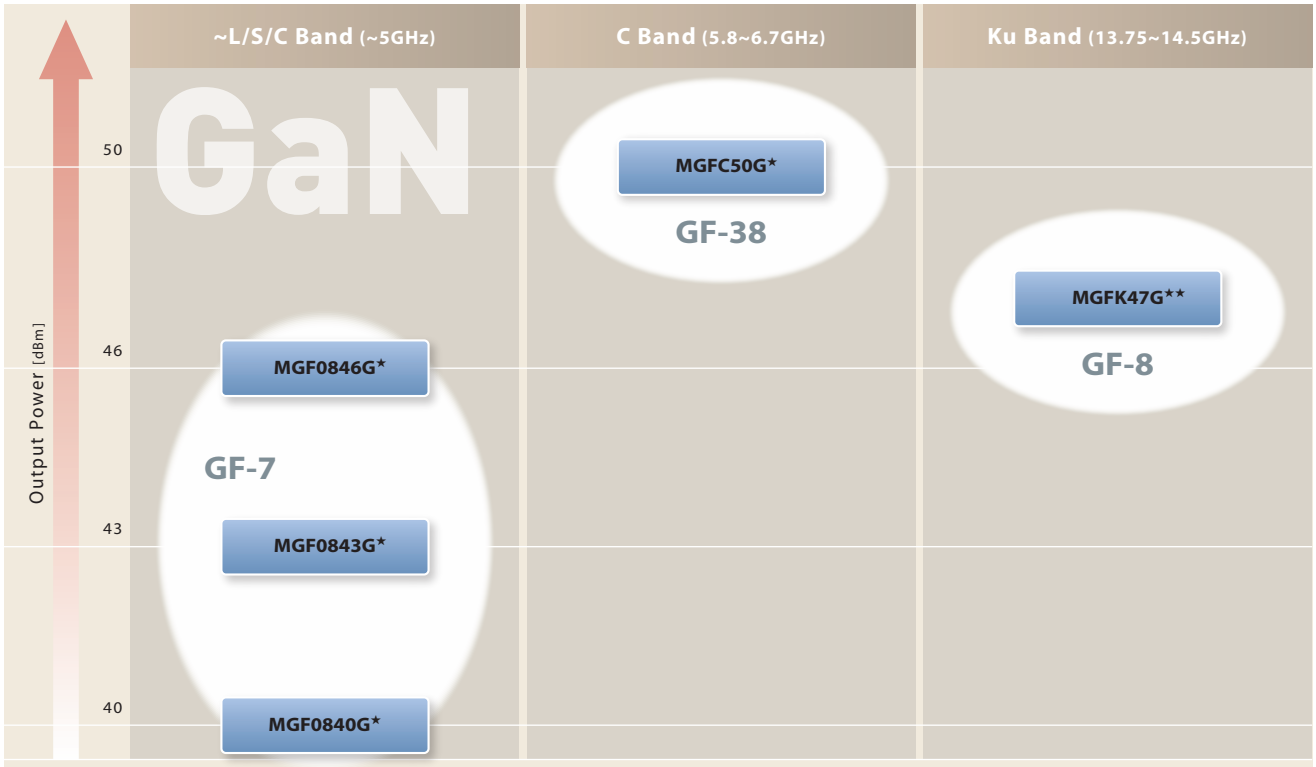


GaAs FET/InGaP HBT SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Discrete Devices)



★: New Product

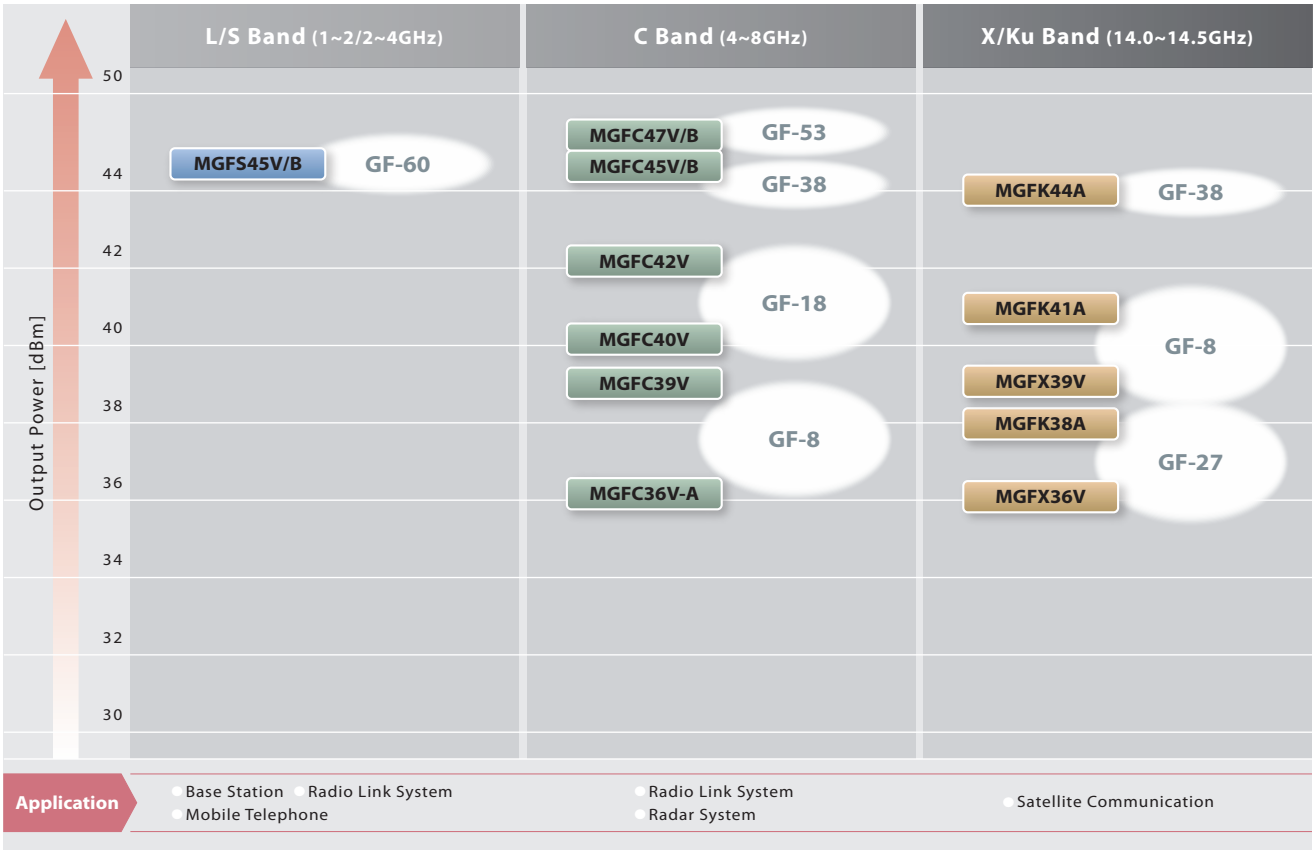
GaN HEMT SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Discrete Devices / Internally Matched)



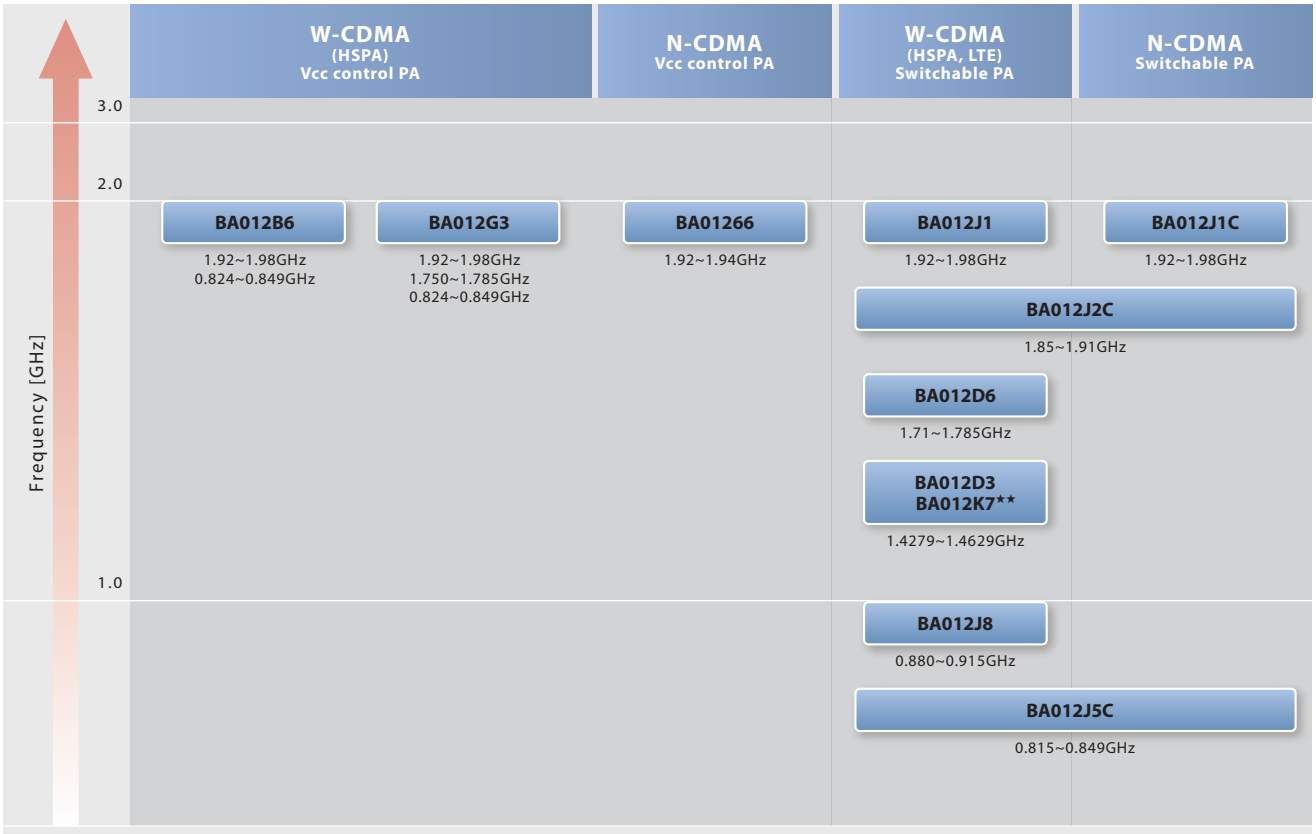
★: New Product ★★: Under Development

SELECTION MAP

INTERNALLY MATCHED GaAs FET SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS

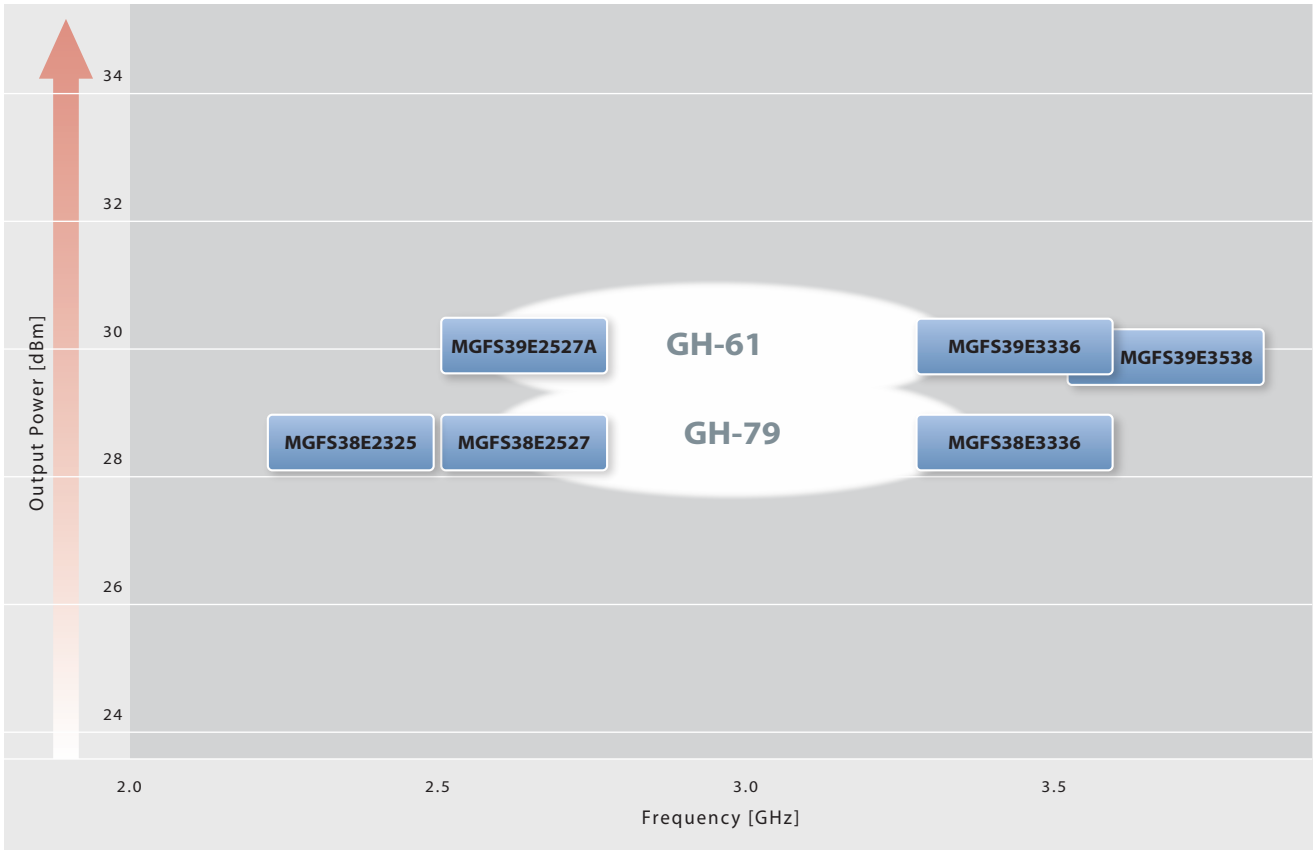


GaAs POWER AMPLIFIERS FOR MOBILE PHONE AND DATA COMMUNICATION



★★: Under Development

GaAs AMPLIFIERS FOR WiMAX / Wi-Fi



Type Name Definition of High Frequency Devices

GaAs FET/GaN HEMT (Discrete)

MGF 0951 P

A Plastic Mold : P
GaN : G

GaN HEMT (Internally Matched)

MGF C 50 G

A Freq. Band : C
B Typical Output power in dBm
C GaN : G

Internally Matched GaAs FET and GaAs Power Amplifier for WiMAX/Wi-Fi

MGF C 42 V 5964 A

A Freq. Band :
L, S, C, X, K, Ku

B Typical Output power in dBm
ex.36=36dBm=4W(typ.)

C Internally Matched : V, A, B
Multi Stage FET Amp : H
Multi Stage HBT Amp : E

D Freq. Band in GHz
ex.5964=5.9-6.4GHz

E Series Number

GaAs Power Amplifier

BA 01 2 D6

A Device Structure : FA(FET), BA(Bipolar Transistor)

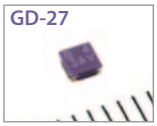
B Freq. Band in GHz

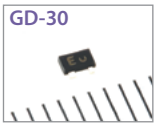
C Stage Number

D Series Number

PRODUCT LIST

GaAs FET/HEMT SERIES FOR MICROWAVE-BAND LOW-NOISE AMPLIFIERS

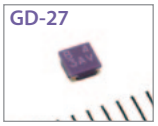


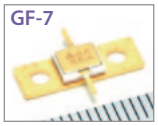


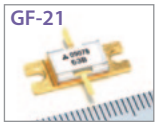
Type Number	Noise Figure [dB]		Associated Gain [dB]		Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [mA]	Package Outline
	Typ.	Max.	Min.	Typ.				
MGF4941AL	0.35	0.50	12.0	13.5	12	2	10	GD-32
MGF4953A	0.40	0.50	12.0	13.0	12	2	10	GD-27
MGF4921AM	0.35	0.55	11.5	13.0	4	2	15	GD-30
MGF4931AM	0.60	0.80	10.0	11.5	12	2	7.5	GD-30
MGF4934BM	0.50	0.80	11.5	12.5	12	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	0.80	11.5	12.5	12	2	10	GD-30
MGF4953B	0.55	0.80	9.0	10.5	20	2	10	GD-27
MGF4963BL★	0.70	0.95	11.0	13.5	20	2	10	GD-32
MGF4964BL★	0.65	0.90	11.5	13.5	20	2	10	GD-32

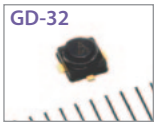
Ta=25°C ★: New Product

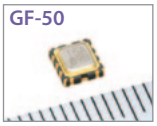
GaAs FET SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Discrete Devices)

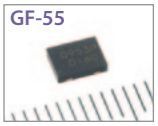








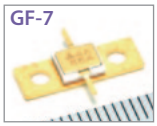




Type Number	Output Power at 1dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGF0805A★	-	-	36.5	14.5	-	-	55	1.9	10	0.4	5	7	GF-50
MGF0904A	-	-	28	14	-	-	40	1.65	8	0.2	-	40	GF-7
MGF0905A	-	-	34	11	-	-	40	1.65	8	0.8	-	12.5	GF-7
MGF0906B▲	35.5	37	-	11	-	-	40	2.3	10	1.2	-	6.5	GF-21
MGF0907B▲	38.5	40	-	8	-	-	37	2.3	10	2.4	-	4	GF-21
MGF0909A	37	38	-	10	-	-	45	2.3	10	1.3	-	5	GF-7
MGF0910A▲	37	38	-	10	-	-	37	2.3	10	1.3	-	6	GF-21
MGF0911A▲	40	41	-	10	-	-	40	2.3	10	2.6	-	4.5	GF-21
MGF0913A	-	-	29.5	11	-	-	48	1.9	10	0.2	20	30	GF-50
MGF0915A	-	-	35	13	-	-	50	1.9	10	0.8	5	8	GF-50
MGF0918A	-	-	25	18	-	-	45	1.9	10	0.15	35	50	GF-50
MGF0920A	-	-	30	16	-	-	45	1.9	10	0.4	13	18	GF-50
MGF0921A	-	-	31	15	-	-	40	1.9	10	0.5	11	15	GF-50
MGF0951P	-	-	31	11	-	-42	50	2.15	10	0.2	20	25	GF-55
MGF0952P	-	-	36.5	11	-	-42	50	2.15	10	0.7	5	6	GF-55
MGF0953P	-	-	28	18	-	-	40	2.15	10	0.15	14	20	GF-55
MGF1451A▲	11	13	-	10.5	-	-	-	12	3	0.03	-	-	GD-4
MGF1941AL★	11	13	-	9	-	-	-	12	3	0.03	-	-	GD-32
MGF1951A	11	13	-	7	-	-	-	12	3	0.03	-	-	GD-27
MGF1952A	15	17	-	5	-	-	-	12	3	0.06	-	-	GD-27
MGF1953A	18	20	-	4	-	-	-	12	4	0.1	-	-	GD-27
MGF1954A	21	23	-	3	-	-	-	12	6	0.1	-	-	GD-27
MGF2407A▲	23	24.5	-	7	-	-	30	14.5	10	0.075	-	100	GF-17
MGF2415A▲	26	27.5	-	6.5	-	-	29	14.5	10	0.15	-	60	GF-17
MGF2430A▲	29	30.5	-	5.5	-	-	27	14.5	10	0.3	-	30	GF-17
MGF2445A▲	31	32	-	5.5	-	-	20	12	10	0.45	-	15	GF-17
MGF4851A	12	14.5	-	9	-	-	-	12	2.5	0.025	-	-	GD-27

Ta=25°C ▲: Industrial grade ★: New Product

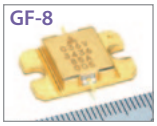
GaN HEMT SERIES FOR MICROWAVE-BAND HIGH POWER AMPLIFIERS (Discrete Devices)

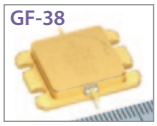


Type Number	Output Power at 3dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Drain Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGF0840G★	39	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 ★: New Product

GaN HEMT SERIES FOR SATELLITE COMMUNICATION (Internally Matched)

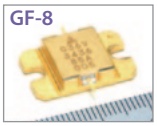


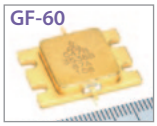


Type Number	Output Power at 3dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGFC50G5867★	49	50	-	10	-	-	40	5.8~6.7	40	1.92	0.6	0.8	GF-38
MGFK47G3745★★	-	-	47	9	-	-	30	13.75~14.5	24	1.05	-	-	GF-8

Ta=25°C ★: New Product ★★: Under Development

INTERNALLY MATCHED GaAs FET SERIES FOR WiMAX BASE STATION

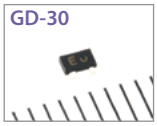




Type Number	Output Power at 1dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGFC36V3436	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			45	2.1~2.3	10	6.5	1.25	1.5	GF-53
MGFS45V2325A	44	45	-	12			45	2.3~2.5	10	6.5	1.25	1.5	GF-53
MGFS45V2527A	44	45	-	12			45	2.5~2.7	10	6.5	1.25	1.5	GF-53
MGFS45V2735	44	45	-	12			45	2.5~2.7	10	6.5	0.8	1	GF-53

Ta=25°C

InGaP HBT SERIES FOR SATELLITE DIGITAL RADIOS

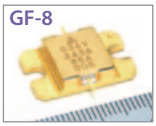


Type Number	Output Power at 1dB Gain Compression [dBm]		Output Power [dBm]	Linear Power Gain [dB]	3rd Order IM Distortion [dBc]		Power Added Efficiency [%]	Frequency [GHz]	Drain-Source Voltage [V]	Drain Current [A]	Thermal Resistance [°C/W]		Package Outline
	Min.	Typ.			Min.	Typ.					Typ.	Max.	
MGF3021AM★	-	11	-	22	-	24	-	2.4	3	14	-	-	GD-30
MGF3022AM★	-	16.5	-	18	-	32	-	2.4	3	33	-	-	GD-30

Ta=25°C ★: New Product

PRODUCT LIST

INTERNALLY MATCHED GaAs FET SERIES FOR C BAND HIGH POWER AMPLIFIERS


GF-8


GF-18

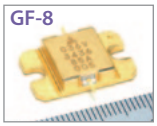

GF-38


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
MGFC45V6472A	44.5	45	7	-42	-45	35	6.4~7.2	10	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

INTERNALLY MATCHED GaAs FET SERIES FOR X/Ku BAND HIGH POWER AMPLIFIERS


GF-8


GF-27

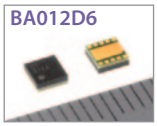

GF-38

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

GaAs HYBRID IC FOR MOBILE PHONE

BA012D6

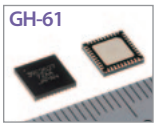


Type Number	Application	Frequency [MHz]	Po [dBm]	Vcc [V]	Vref [V]	PAE [%]	Pin [dBm]	Package Size
BA01266	CDMA2000	1920~1940	27.5	3.5	2.85	42	1.0	3×3×1.2mm^3
BA012B6	HSPA	824~849 1920~1980	26.5	3.5	2.9	40 43	-1.5 0.8	3×4.5×1mm^3
BA012G3	HSPA/LTE	824~849 1750~1785 1920~1980	26.5	3.5	2.9	38 42 41	-0.5 -1.0 0.0	3×4.5×1mm^3
BA012J1	HSPA/LTE	1920~1980	28.25	3.4	-	40	1.25	3×3×1mm^3
BA012J1C	HSPA/LTE/CDMA2000	1920~1980	28.25	3.4	-	37	1.25	3×3×1mm^3
BA012J2C	HSPA/LTE/CDMA2000	1850~1910	28.6	3.4	-	37	1.6	3×3×1mm^3
BA012J5C	HSPA/LTE/CDMA2000	815~849	28.25	3.4	-	37	1.25	3×3×1mm^3
BA012J8	HSPA/LTE	880~915	28.5	3.4	-	40	1.5	3×3×1mm^3
BA012D3	HSPA/LTE	1427.9~1462.9	28.5	3.4	-	40	0.5	3×3×1mm^3
BA012K7★★	HSPA/LTE	1427.9~1462.9	28.5	3.4	-	40	0.5	3×3×1mm^3
BA012D6	HSPA/LTE	1710~1785	28.4	3.4	-	40	1.4	3×3×1mm^3

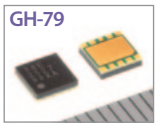
★★: Under Development

GaAs AMPLIFIER FOR WiMAX / Wi-Fi

GH-61



GH-79



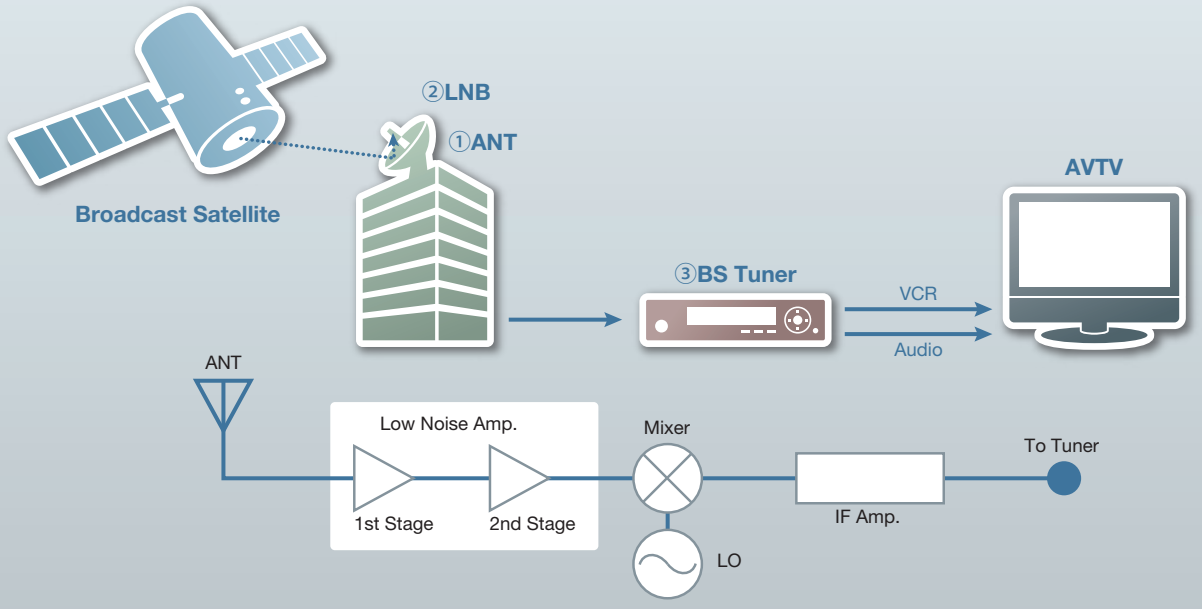
Type Number	Frequency [GHz]	Pout & EVM	Gain [dB]	Vcc [V]	Vref [V]	PAE [%]	Package Outline
MGFS39E2527A	2.5~2.7 (2.3~2.5)	30dBm@2.5%	43	6	2.85	14	GH-61
MGFS39E3336	3.3~3.6	30dBm@2.5%	43	6	2.85	14	GH-61
MGFS39E3538★	3.5~3.8	30dBm@2.5%	39	6	2.85	14	GH-61
MGFS38E2325★	2.3~2.5	28.5dBm@2.5%	36	5	2.85	15	GH-79
MGFS38E2527★	2.5~2.7	28.5dBm@2.5%	36	5	2.85	15	GH-79
MGFS38E3336★	3.3~3.6	28.5dBm@2.5%	35	5	2.85	15	GH-79

★: New Product

All Products Here Are RoHS Compliant

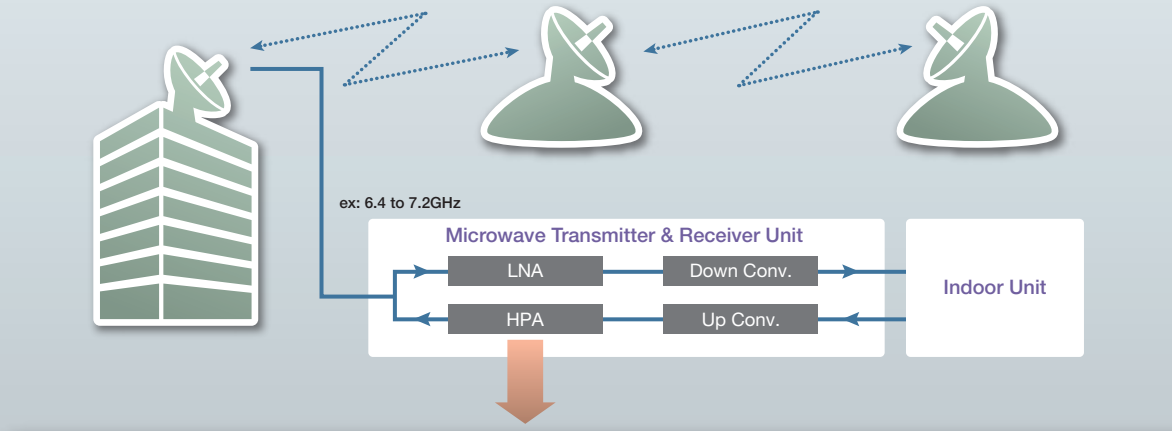
APPLICATION EXAMPLES

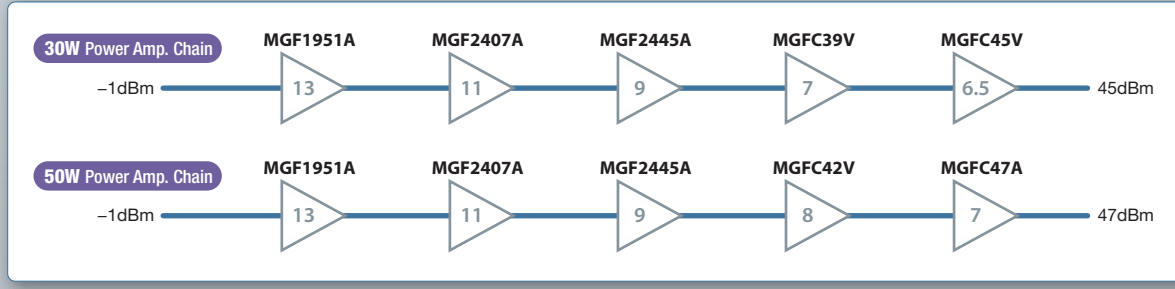
Lineup for 12GHz -Band LNB



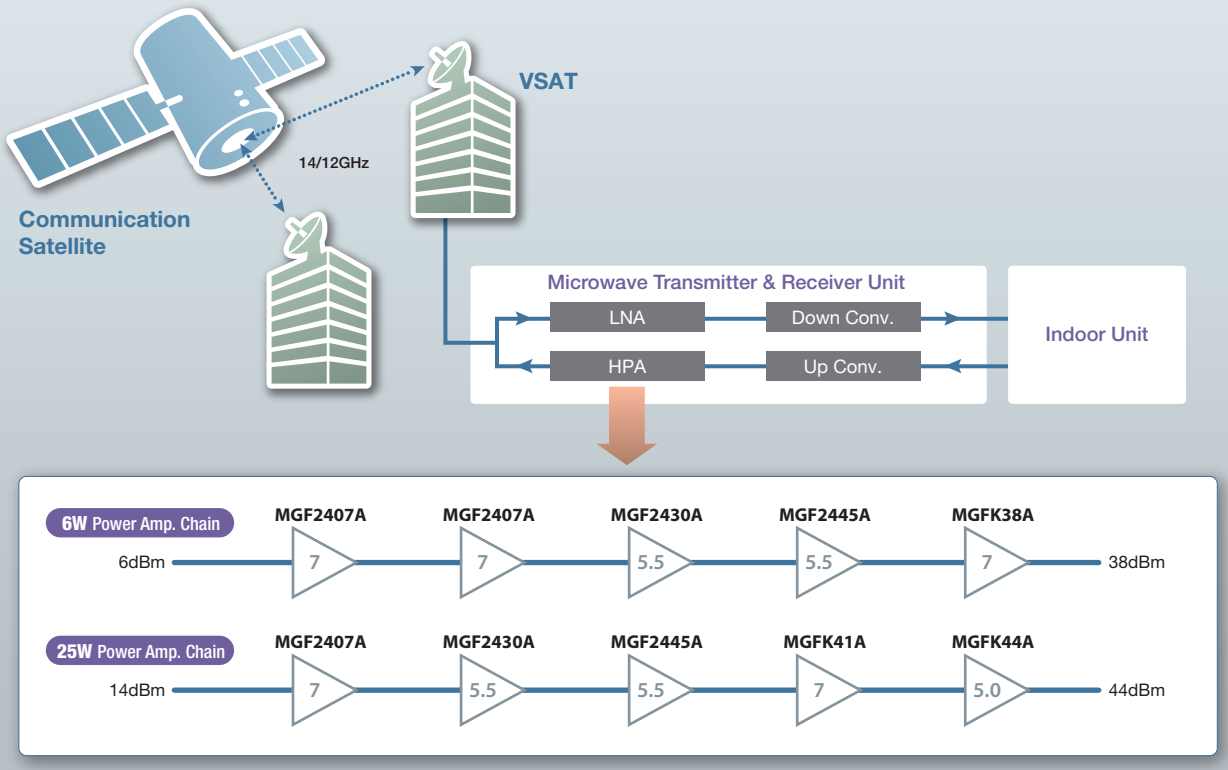
Performance of LNB	1st Stage	2nd Stage	Mixer
Low Noise Model	**MGF4941AL**	**MGF4941AL**	**MGF4934CM**
Standard Model	**MGF4935AM**	**MGF4934CM**	**MGF4934CM**

Lineup for Microwave Links

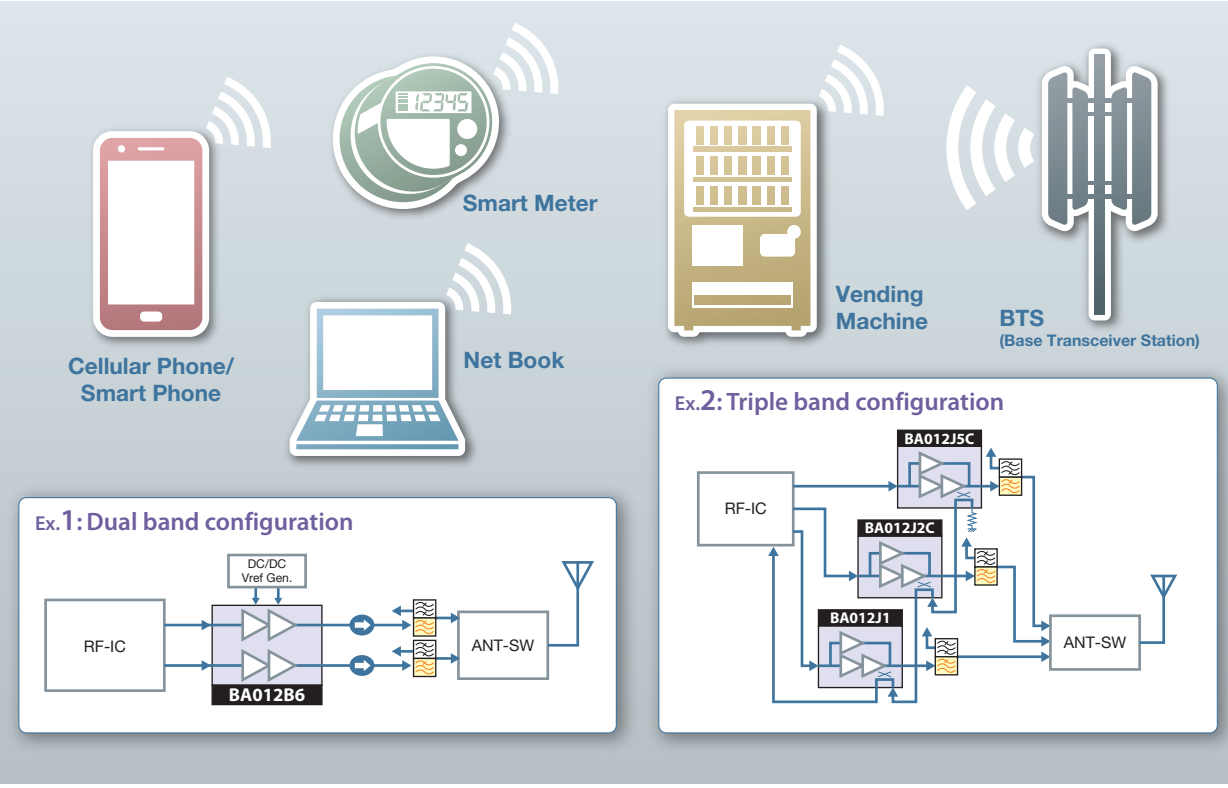




Lineup for Satellite Communication



GaAs Hybrid IC for Mobile Phone Tx block configuration for mobile phone



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HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
http://www.MitsubishiElectric.com

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