

< Low Noise GaAs HEMT >

MGF4935AM

4pin flat lead package

DESCRIPTION

The MGF4935AM super-low noise InGaAs HEMT (High Electron Mobility Transistor) is designed for use in S to Ku band amplifiers.

The 4pin flat lead package is small-thin size, and offers high cost performance.

FEATURES

- Low noise figure @ f=12GHz
NFmin. = 0.45dB (Typ.)
- High associated gain @ f=12GHz
Gs = 12.0dB (Typ.)

APPLICATION

S to Ku band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

VDS=2V , ID=10mA

ORDERING INFORMATION

Tape & reel 15000pcs/reel

RoHS COMPLIANT

MGF4935AM is a RoHS compliant product. RoHS compliance is indicated by the letter "G" after the Lot Marking.

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Parameter	Ratings	Unit
VGDO	Gate to drain voltage	-3	V
VGSO	Gate to source voltage	-3	V
ID	Drain current	IDSS	mA
PT	Total power dissipation	50	mW
Tch	Channel temperature	125	°C
Tstg	Storage temperature	-55 to +125	°C
Top	Operation temperature	-55 to +125	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
V(BR)GDO	Gate to drain breakdown voltage	IG=-10μA	-3.5	--	--	V
IGSS	Gate to source leakage current	VGS=-2V,VDS=0V	--	--	50	μA
IDSS	Saturated drain current	VGS=0V,VDS=2V	12	--	60	mA
VGS(off)	Gate to source cut-off voltage	VDS=2V,ID=500μA	-0.1	--	-1.5	V
Gs	Associated gain	VDS=2V, ID=10mA,f=12GHz	11.0	12.0	--	dB
NFmin.	Minimum noise figure		--	0.45	0.65	dB

Note: Gs and NFmin. are tested with sampling inspection.

Outline Drawing

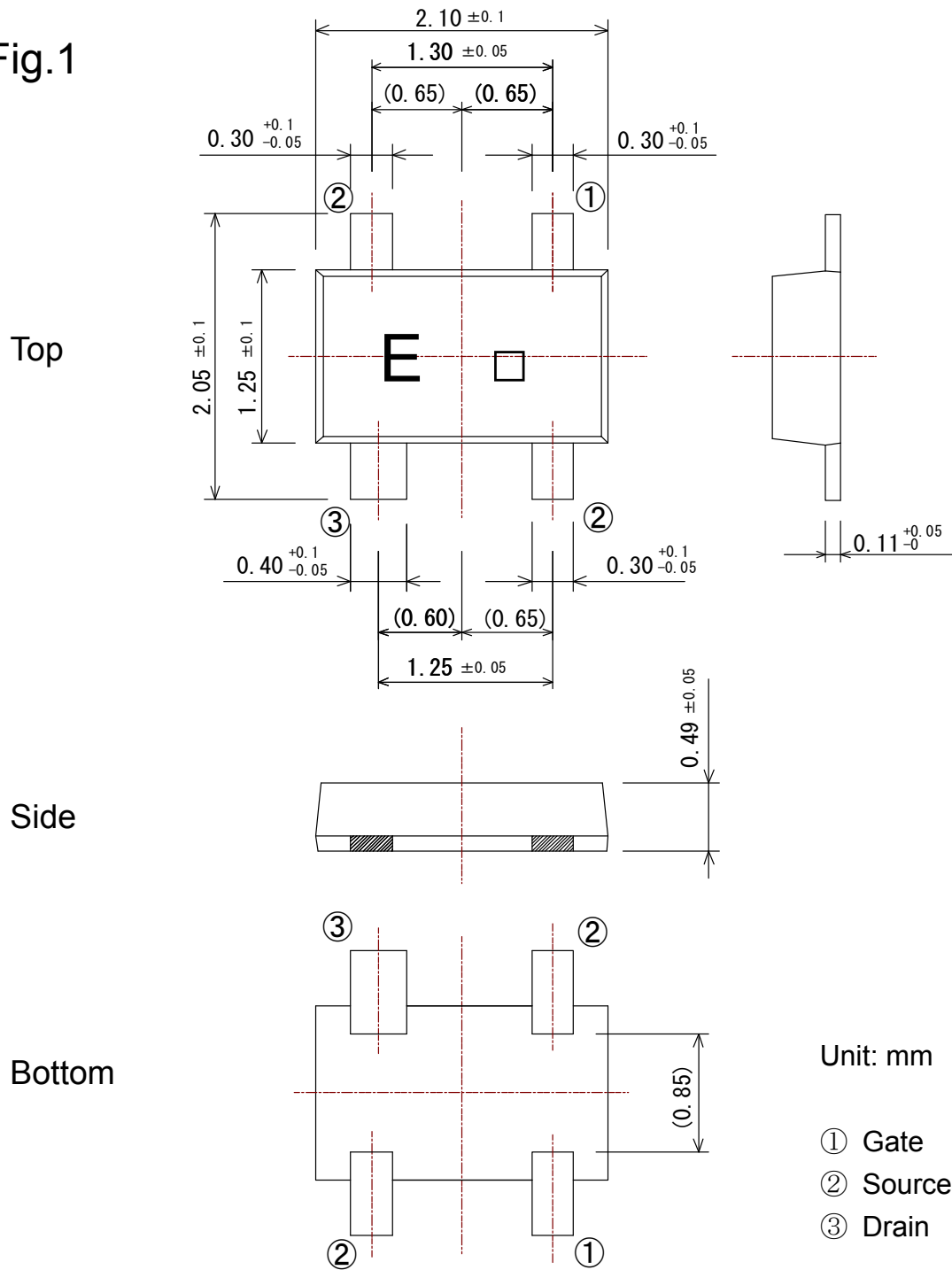
Fig.1

MITSUBISHI Proprietary

Not to be reproduced or disclosed without permission by Mitsubishi Electric

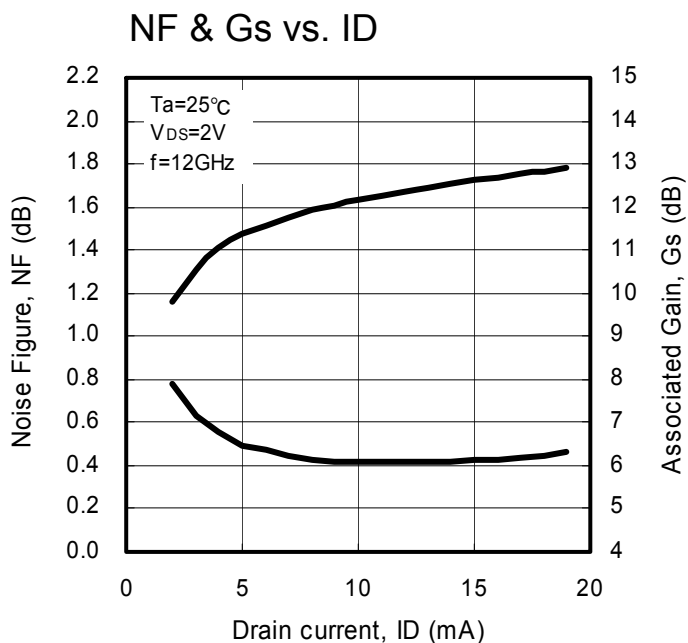
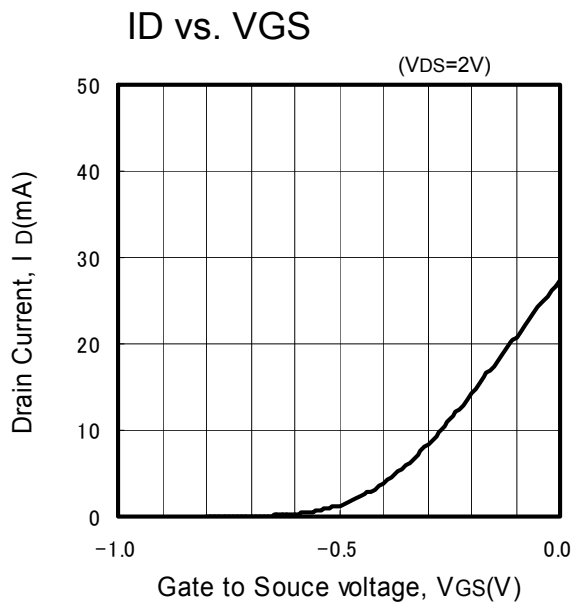
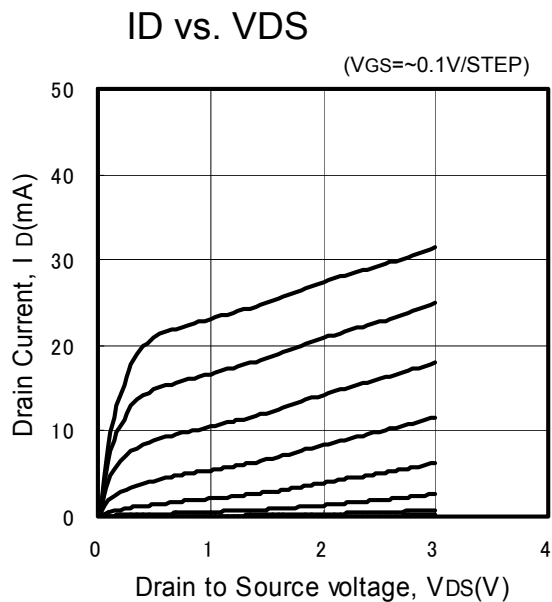
< Low Noise GaAs HEMT >
MGF4935AM
 4pin flat lead package

Fig.1



(GD-30)

TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS

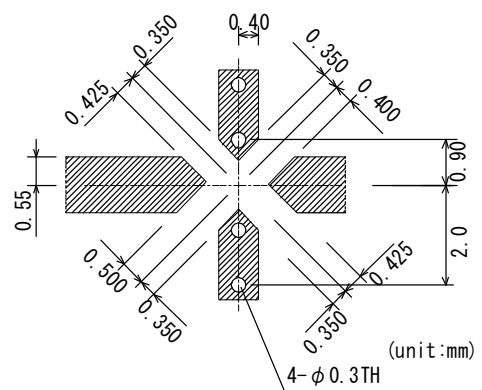
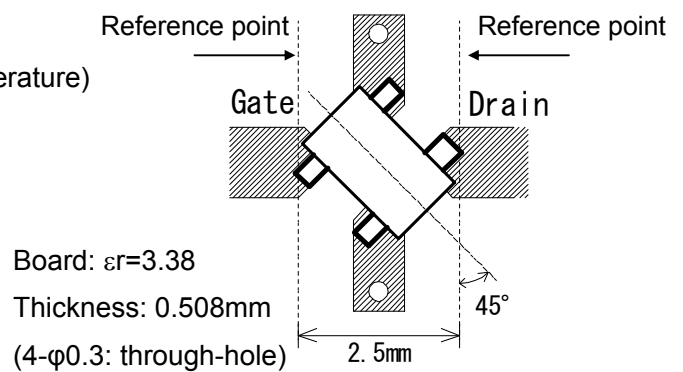
(V_{DS}=2V, I_D=10mA, T_a=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
6	0.776	-82.2	4.431	91.4	0.075	30.6	0.536	-70.3
7	0.693	-99.0	4.360	75.7	0.082	20.6	0.490	-82.9
8	0.616	-118.3	4.252	59.9	0.090	9.7	0.440	-96.8
9	0.527	-138.0	4.057	44.9	0.092	-0.3	0.383	-109.6
10	0.458	-158.8	3.878	30.9	0.090	-8.3	0.333	-121.5
11	0.424	178.3	3.709	16.8	0.090	-14.7	0.292	-135.0
12	0.423	153.5	3.549	3.0	0.090	-20.6	0.255	-149.3
13	0.445	129.7	3.383	-10.7	0.090	-27.3	0.225	-165.1
14	0.482	109.2	3.250	-24.1	0.088	-32.2	0.211	179.8
15	0.517	91.6	3.104	-37.6	0.088	-37.0	0.206	161.3
16	0.598	78.5	2.884	-53.7	0.093	-43.4	0.243	131.8
17	0.668	64.2	2.701	-67.5	0.096	-49.2	0.261	113.6
18	0.714	51.9	2.493	-81.7	0.099	-57.5	0.312	93.2
19	0.735	41.8	2.189	-94.6	0.098	-65.4	0.357	76.4
20	0.775	33.5	2.011	-105.3	0.102	-72.8	0.392	62.8

Noise Parameter

(V_{DS}=2V, I_D=10mA, T_a=room temperature)

Freq. (GHz)	NFmin (dB)	Γ _{opt}		Rn/50 (Ω)
		(mag)	(ang)	
6	0.27	0.891	33.2	0.19
7	0.30	0.801	50.8	0.17
8	0.32	0.705	70.6	0.13
9	0.35	0.608	92.4	0.10
10	0.38	0.514	115.7	0.06
11	0.42	0.430	140.1	0.04
12	0.45	0.361	165.1	0.04
13	0.48	0.311	-169.6	0.05
14	0.52	0.286	-144.5	0.06
15	0.55	0.291	-120.0	0.08
16	0.59	0.331	-96.6	0.11
17	0.62	0.412	-74.5	0.16
18	0.66	0.539	-54.4	0.23
19	0.70	0.717	-36.5	0.33
20	0.73	0.951	-21.3	0.47



MGF4935AM

4pin flat lead package

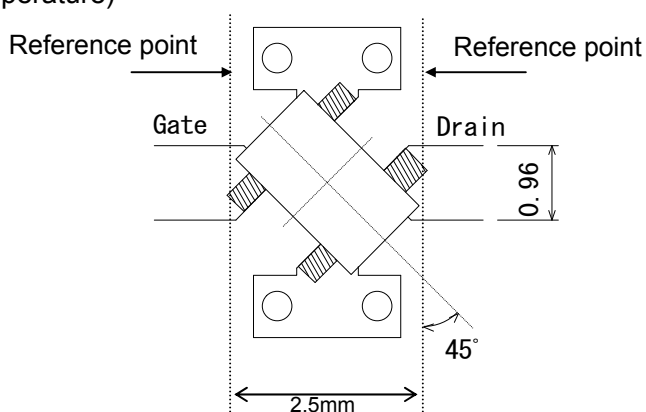
S PARAMETERS (V_{DS}=2V, I_D=10mA, T_a=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.990	-13.4	4.592	164.5	0.013	80.2	0.669	-10.6
2	0.964	-26.9	4.545	149.2	0.027	71.6	0.658	-21.3
3	0.923	-40.6	4.476	134.3	0.039	62.7	0.636	-31.2
4	0.866	-54.5	4.463	119.5	0.051	54.6	0.603	-41.8
5	0.804	-68.1	4.370	105.1	0.061	46.8	0.569	-51.7
6	0.734	-82.3	4.241	91.0	0.069	39.3	0.529	-61.1
7	0.659	-96.5	4.113	77.4	0.076	33.2	0.488	-69.7
8	0.582	-111.0	3.965	64.0	0.082	28.2	0.446	-77.6
9	0.507	-126.1	3.804	51.4	0.086	24.0	0.404	-84.9
10	0.438	-142.0	3.660	38.9	0.091	20.9	0.368	-91.9
11	0.381	-158.6	3.548	26.9	0.097	19.0	0.338	-99.5
12	0.340	-178.7	3.440	14.7	0.106	16.9	0.320	-109.4
13	0.319	158.0	3.355	2.2	0.118	13.2	0.303	-120.9
14	0.327	133.9	3.276	-10.8	0.131	8.5	0.300	-137.1
15	0.370	112.0	3.191	-24.0	0.146	2.8	0.307	-157.2
16	0.440	93.2	3.080	-37.9	0.159	-4.2	0.327	179.4
17	0.520	78.4	2.914	-51.9	0.173	-11.5	0.369	157.8
18	0.601	64.0	2.690	-66.0	0.183	-19.4	0.419	137.5
19	0.672	50.4	2.405	-78.6	0.190	-27.1	0.472	122.4
20	0.737	38.9	2.146	-88.9	0.195	-34.2	0.510	110.5
21	0.800	30.7	1.931	-99.1	0.197	-42.0	0.548	98.5
22	0.847	27.2	1.738	-108.8	0.196	-49.0	0.582	83.9
23	0.886	25.8	1.574	-118.1	0.195	-55.9	0.619	68.2
24	0.920	23.1	1.459	-127.4	0.193	-61.4	0.652	52.9
25	0.948	16.5	1.382	-137.6	0.202	-67.4	0.693	40.5
26	0.954	3.1	1.332	-150.9	0.213	-77.2	0.730	31.4

Noise Parameter (V_{DS}=2V, I_D=10mA, T_a=room temperature)

Freq. (GHz)	NFmin (dB)	Γ _{opt}		R _n (Ω)
		(mag)	(ang)	
1	0.20	0.99	3.1	18.0
2	0.20	0.98	8.3	16.5
3	0.21	0.98	14.9	15.0
4	0.22	0.97	20.4	13.5
5	0.24	0.95	30.4	12.0
6	0.26	0.90	41.5	10.5
7	0.29	0.83	52.7	9.0
8	0.31	0.71	68.0	7.0
9	0.34	0.60	83.3	5.5
10	0.37	0.50	99.7	4.0
11	0.40	0.41	117.8	3.0
12	0.44	0.33	137.8	2.5
13	0.47	0.27	162.0	2.5
14	0.51	0.24	-178.1	2.5

Note ; R_n is normalized by 50 ohm.



Board: ε_r=2.6

Thickness: 0.4mm

(4-φ0.4: through-hole)

Note:

We are ready to provide nonlinear model for ADS and MWO users. If you are interested, please contact our sales offices.

S PARAMETERS (VDS=0V,VGS=0V,Ta=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.999	-11.6	0.008	97.0	0.008	96.6	0.648	168.2
2	0.996	-24.0	0.018	98.4	0.018	100.0	0.648	156.5
3	0.990	-36.5	0.032	97.9	0.032	98.7	0.652	144.6
4	0.988	-50.0	0.050	94.7	0.050	94.7	0.664	133.1
5	0.981	-64.3	0.073	87.6	0.074	87.8	0.674	121.4
6	0.972	-79.2	0.099	79.4	0.100	79.7	0.682	109.6
7	0.958	-95.5	0.130	69.2	0.130	69.1	0.693	97.9
8	0.944	-113.8	0.165	58.0	0.165	58.2	0.706	87.1
9	0.918	-133.8	0.200	45.6	0.200	45.8	0.717	76.9
10	0.896	-155.7	0.235	32.2	0.237	32.2	0.725	67.5
11	0.881	-179.8	0.269	17.4	0.269	17.5	0.732	59.1
12	0.865	154.3	0.292	2.2	0.294	2.2	0.739	51.4
13	0.863	127.9	0.306	-13.3	0.307	-13.6	0.747	44.3
14	0.873	103.1	0.306	-28.4	0.307	-28.4	0.751	36.9
15	0.885	82.6	0.294	-41.6	0.295	-41.5	0.755	29.4
16	0.901	66.1	0.280	-52.6	0.280	-52.5	0.764	22.4
17	0.912	52.7	0.264	-61.5	0.265	-61.5	0.768	16.4
18	0.922	40.6	0.252	-69.0	0.252	-69.0	0.778	12.5
19	0.926	28.9	0.242	-76.7	0.242	-76.8	0.784	11.1
20	0.933	19.0	0.224	-84.1	0.225	-83.9	0.777	10.0
21	0.941	12.3	0.210	-89.8	0.210	-89.2	0.761	6.6
22	0.942	10.5	0.193	-94.8	0.193	-94.7	0.749	-0.3
23	0.943	10.3	0.176	-100.3	0.175	-100.9	0.743	-9.5
24	0.958	9.3	0.163	-103.8	0.163	-103.9	0.755	-19.4
25	0.970	3.2	0.158	-109.2	0.157	-109.0	0.781	-28.9
26	0.951	-10.3	0.151	-117.4	0.149	-118.2	0.789	-36.1

(VDS=0V,VGS=-2V,Ta=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.997	-9.0	0.022	81.0	0.023	79.7	0.997	-9.9
2	0.997	-18.1	0.045	70.6	0.045	70.6	0.995	-19.8
3	0.997	-27.7	0.068	60.4	0.068	61.1	0.993	-29.2
4	0.993	-37.3	0.092	50.9	0.092	50.6	0.987	-39.0
5	0.988	-47.1	0.116	40.8	0.116	40.9	0.980	-49.4
6	0.985	-57.4	0.139	30.9	0.139	30.6	0.979	-59.2
7	0.972	-68.0	0.162	19.9	0.162	19.8	0.974	-69.1
8	0.973	-79.2	0.184	8.1	0.185	8.1	0.966	-79.5
9	0.956	-91.8	0.201	-4.1	0.202	-4.2	0.957	-89.9
10	0.942	-104.7	0.216	-17.7	0.216	-17.8	0.950	-101.6
11	0.938	-119.1	0.221	-32.2	0.220	-32.3	0.942	-114.0
12	0.934	-136.1	0.217	-47.7	0.218	-47.8	0.942	-127.8
13	0.928	-156.1	0.201	-65.7	0.201	-65.7	0.934	-143.2
14	0.935	-178.9	0.170	-85.7	0.169	-85.7	0.941	-161.1
15	0.939	155.9	0.119	-107.4	0.119	-107.2	0.945	179.1
16	0.943	130.2	0.057	-127.3	0.057	-127.6	0.954	158.6
17	0.949	105.8	0.005	-25.0	0.005	-27.7	0.963	139.9
18	0.952	83.3	0.051	6.5	0.050	7.1	0.970	123.7
19	0.957	63.4	0.086	-4.4	0.086	-4.4	0.978	112.1
20	0.963	46.8	0.115	-16.6	0.115	-16.8	0.976	101.9
21	0.972	35.0	0.133	-29.5	0.132	-28.8	0.961	90.3
22	0.970	29.8	0.143	-40.0	0.143	-39.8	0.951	76.5
23	0.967	27.0	0.145	-49.6	0.147	-49.5	0.941	61.2
24	0.974	24.0	0.149	-56.9	0.149	-57.0	0.953	46.5
25	0.983	17.1	0.159	-64.6	0.159	-64.7	0.974	33.8
26	0.960	2.8	0.168	-75.8	0.168	-75.4	0.990	24.2

Note:

We are ready to provide nonlinear model for ADS and MWO users. If you are interested, please contact our sales offices.

Keep safety first in your circuit designs!

- Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

- These materials are intended as a reference to assist our customers in the selection of the Mitsubishi semiconductor product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Mitsubishi Electric Corporation or a third party.
- Mitsubishi Electric Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
- All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Mitsubishi Electric Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for the latest product information before purchasing a product listed herein.
The information described here may contain technical inaccuracies or typographical errors.
Mitsubishi Electric Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
Please also pay attention to information published by Mitsubishi Electric Corporation by various means, including the Mitsubishi Semiconductor home page (<http://www.mitsubishielectric.com/>).
- When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Mitsubishi Electric Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
- Mitsubishi Electric Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
- The prior written approval of Mitsubishi Electric Corporation is necessary to reprint or reproduce in whole or in part these materials.
- If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
Any diversion or re-export contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
- Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for further details on these materials or the products contained therein.