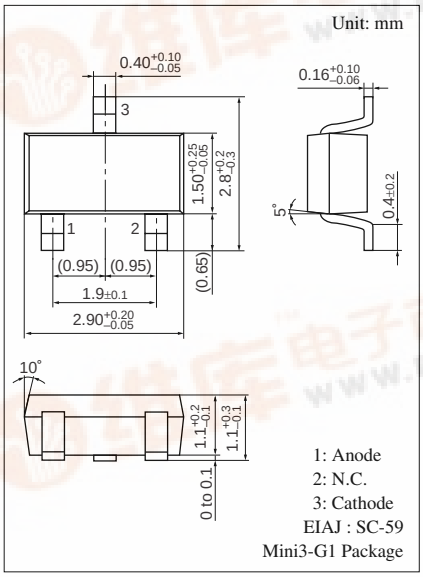
MAZ3000 Series (MA3000 Series)

Silicon planar type

For stabilization of power supply



■ Features

- Mini type 3-pin package (Mini3-G1)
- Allowing to achieve a high-density set
- Sharp rising performance
- Wide voltage range: V_Z = 2.0 V to 36 V

■ Absolute Maximum Ratings T_a = 25°C

Parameter	Symbol	Rating	Unit
Average forward current	$I_{F(AV)}$	100	mA
Repetitive peak forward current	I_{FRM}	200	mA
Total power dissipation *1	P_{tot}	200	mW
Non-repetitive reverse surge power dissipation *2	P_{ZSM}	15	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

Note) ∗1: With a printed circuit board
∗2: t = 100 µs, T_j = 150°C

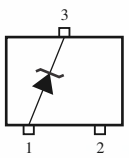
Marking Symbol

Refer to the list of the electrical characteristics within part numbers

(Example) MAZ3020: 2.0
MAZ30820H: 8.2H

Note) L/M/H marked products will be supplied unless other wise specified

Internal Connection



■ Common Electrical Characteristics T_a = 25°C *1

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Forward voltage	V_F	I_F = 10 mA			0.8	0.9	V
Zener voltage *2	V_Z	I_Z	Specified value	Refer to the list of the electrical characteristics within part numbers			V
Zener knee operating resistance	R_{ZK}	I_Z	Specified value				Ω
Zener operating resistance	R_Z	I_Z	Specified value				Ω
Reverse current	I_{R1}	V_R	Specified value				µA
	I_{R2}	V_R	Specified value				µA
Temperature coefficient of zener voltage *3	S_Z	I_Z	Specified value				mV/°C
Terminal capacitance	C_t	V_R	Specified value				pF

Note) 1. Rated input/output frequency: 5 MHz
2. ∗1 : The V_Z value is for the temperature of 25°C. In other cases, carry out the temperature compensation.
∗2: Guaranteed at 20 ms after power application.
∗3: T_j = 25°C to 150°C

Note) The part number in the parenthesis shows conventional part number.

■ Electrical characteristics within part numbers $T_a = 25°C$

• $V_Z = 2.0$ V to 8.2 V ($I_Z = 5$ mA)

Part number	Zener voltage			Reverse current				Zener operating resistance				Temperature coefficient of zener voltage			Terminal capacitance		Marking symbol
	V_Z (V) I_Z = 5 mA			I_{R1} (μA) V_R		I_{R2} (μA) V_R		R_Z (Ω) I_Z = 5 mA		R_{ZK} (Ω) I_Z		S_Z (mV/°C) I_Z = 5 mA			C_t (pF) (V_R = 0 V) f = 1 MHz		
	Min	Nom	Max	(V)	Max	(V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	
MAZ3020	1.88	2.0	2.12	0.5	120	—	—	5	100	—	—	−3.5	−1.5	0	—	—	2.0
MAZ3022	2.08	2.2	2.32	0.7	120	—	—	5	100	—	—	−3.5	−1.5	0	—	—	2.2
MAZ3024	2.28	2.4	2.60	1	120	—	—	5	100	—	—	−3.5	−1.6	0	—	—	2.4
MAZ3027	2.50	2.7	2.90														2.7L or 2.7H
MAZ30270L	2.50	2.6	2.75	1	120	—	—	5	110	—	—	−3.5	−2.0	0	—	—	2.7L
MAZ30270H	2.65	2.8	2.90														2.7H
MAZ3030	2.80	3.0	3.20														3.0L or 3.0H
MAZ30300L	2.80	2.9	3.05	1	50	—	—	5	120	—	—	−3.5	−2.1	0	—	—	3.0L
MAZ30300H	2.95	3.1	3.20														3.0H
MAZ3033	3.10	3.3	3.50														3.3L or 3.3H
MAZ30330L	3.10	3.2	3.35	1	20	—	—	5	130	—	—	−3.5	−2.4	0	—	—	3.3L
MAZ30330H	3.25	3.4	3.50														3.3H
MAZ3036	3.40	3.6	3.80														3.6L or 3.6H
MAZ30360L	3.40	3.5	3.65	1	10	—	—	5	130	—	—	−3.5	−2.4	0	—	—	3.6L
MAZ30360H	3.55	3.7	3.80														3.6H
MAZ3039	3.70	3.9	4.10														3.9L or 3.9H
MAZ30390L	3.70	3.8	3.97	1	10	—	—	5	130	—	—	−3.5	−2.5	0	—	—	3.9L
MAZ30390H	3.87	4.0	4.10														3.9H
MAZ3043	4.00	4.3	4.60														4.3L or 4.3M or 4.3H
MAZ30430L	4.03	4.1	4.26	1	10	—	—	5	130	—	—	−3.5	−2.5	0	—	—	4.3L
MAZ30430M	4.17	4.3	4.40														4.3M
MAZ30430H	4.31	4.4	4.54														4.3H
MAZ3047	4.4	4.7	5.0														4.7L or 4.7M or 4.7H
MAZ30470L	4.45	4.6	4.69	1	3	—	—	50	80	1	900	−3.5	−1.4	0.2	130	180	4.7L
MAZ30470M	4.59	4.7	4.83														4.7M
MAZ30470H	4.74	4.9	4.99														4.7H
MAZ3051	4.8	5.1	5.4														5.1L or 5.1M or 5.1H
MAZ30510L	4.87	5.0	5.12	2	2	—	—	40	60	1	800	−2.7	−0.8	1.2	110	160	5.1L
MAZ30510M	5.0	5.1	5.26														5.1M
MAZ30510H	5.14	5.3	5.4														5.1H
MAZ3056	5.3	5.6	6.0														5.6L or 5.6M or 5.6H
MAZ30560L	5.3	5.4	5.58	2	1	—	—	15	40	1	500	−2	1.2	2.5	95	140	5.6L
MAZ30560M	5.48	5.6	5.76														5.6M
MAZ30560H	5.66	5.8	5.95														5.6H
MAZ3062	5.8	6.2	6.6			5.3											6.2L or 6.2M or 6.2H
MAZ30620L	5.85	6.0	6.15	4	3	5.3	60	6	20	0.5	300	0.4	2.3	3.7	90	130	6.2L
MAZ30620M	6.05	6.2	6.36			5.5											6.2M
MAZ30620H	6.24	6.4	6.56			5.7											6.2H
MAZ3068	6.4	6.8	7.2			5.9											6.8L or 6.8M or 6.8H
MAZ30680L	6.44	6.6	6.77	4	2	5.9	60	6	15	0.5	140	1.2	3	4.5	85	110	6.8L
MAZ30680M	6.64	6.8	6.98			6.1											6.8M
MAZ30680H	6.85	7.0	7.2			6.3											6.8H
MAZ3075	7.0	7.5	7.9			6.5											7.5L or 7.5M or 7.5H
MAZ30750L	7.07	7.3	7.43	5	1	6.5	60	6	15	0.5	120	2.5	4	5.3	80	100	7.5L
MAZ30750M	7.29	7.5	7.67			6.7											7.5M
MAZ30750H	7.51	7.7	7.89			7.0											7.5H
MAZ3082	7.7	8.2	8.7			7.2											8.2L or 8.2M or 8.2H
MAZ30820L	7.77	7.9	8.17	5	0.5	7.2	60	6	15	0.5	120	3.2	4.6	6.2	75	95	8.2L
MAZ30820M	8.03	8.2	8.43			7.5											8.2M
MAZ30820H	8.29	8.5	8.7			7.7											8.2H

■ Electrical characteristics within part numbers (continued) $T_a = 25°C$

• $V_Z = 9.1$ V to 24.0 V ($I_Z = 5$ mA)

Part number	Zener voltage			Reverse current				Zener operating resistance				Temperature coefficient of zener voltage			Terminal capacitance		Marking symbol
	V_Z (V) I_Z = 5 mA			I_{R1} (μA) V_R		I_{R2} (μA) V_R		R_Z (Ω) I_Z = 5 mA		R_{ZK} (Ω) I_Z		S_Z (mV/°C) I_Z = 5 mA			C_t (pF) (V_R = 0 V) f = 1 MHz		
	Min	Nom	Max	(V)	Max	(V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	
MA3091	8.5	9.1	9.6	6	0.2	8	60	6	15	0.5	130	3.8	5.5	7	70	90	9.1L or 9.1M or 9.1H
MAZ30910L	8.58	8.8	9.02			8											9.1L
MAZ30910M	8.87	9.1	9.33			8.3											9.1M
MAZ30910H	9.14	9.4	9.6			8.6											9.1H
MAZ3100	9.4	10	10.6	7	0.2	8.9	60	8	20	0.5	130	4.5	6.4	8	70	90	10L or 10M or 10H
MAZ31000L	9.44	9.7	9.92			8.9											10L
MAZ31000M	9.75	10	10.25			9.2											10M
MAZ31000H	10.07	10.3	10.59			9.5											10H
MAZ3110	10.4	11	11.6	7	0.1	9.9	60	10	20	0.5	170	5.4	7.4	9	65	85	11L or 11M or 11H
MAZ31100L	10.4	10.7	10.94			9.9											11L
MAZ31100M	10.73	11	11.28			10.2											11M
MAZ31100H	11.05	11.3	11.6			10.5											11H
MAZ3120	11.4	12	12.7	8	0.1	10.9	60	10	25	0.5	170	6	8.4	10	65	85	12L or 12M or 12H
MAZ31200L	11.4	11.7	11.96			10.9											12L
MAZ31200M	11.73	12	12.33			11.2											12M
MAZ31200H	12.06	12.3	12.68			11.5											12H
MAZ3130	12.4	13	14.1	9	0.1	11.9	60	10	30	0.5	170	7	9.4	11	60	80	13L or 13M or 13H
MAZ31300L	12.4	12.7	12.99			11.9											13L
MAZ31300M	12.73	13	13.4			12.2											13M
MAZ31300H	13.25	13.7	14.08			12.7											13H
MAZ31400M	13.65	14	14.35	9	0.1	13.1	60	10	30	0.5	170	7	10	13	60	80	14M
MAZ3150	13.9	15	15.6	10	0.05	13.4	60	10	30	0.5	170	9.2	11.4	13	55	75	15L or 15M or 15H
MAZ31500L	13.9	14.3	14.76			13.4											15L
MAZ31500M	14.6	15	15.35			14.1											15M
MAZ31500H	14.95	15.3	15.6			14.4											15H
MAZ3160	15.3	16	17.1	11	0.05	14.8	60	10	40	0.5	170	10.4	12.4	14	52	75	16L or 16M or 16H
MAZ31600L	15.3	15.7	16.09			14.8											16L
MAZ31600M	15.7	16	16.5			15.2											16M
MAZ31600H	16.26	16.7	17.1			15.7											16H
MAZ3180	16.9	18	19.1	13	0.05	16.4	60	10	45	0.5	170	12.4	14.4	16	47	70	18L or 18M or 18H
MAZ31800L	16.9	17.3	17.76			16.4											18L
MAZ31800M	17.55	18	18.45			17											18M
MAZ31800H	18.2	18.7	19.1			17.7											18H
MAZ3200	18.8	20	21.2	14	0.05	18.3	60	15	55	0.5	180	14.4	16.4	18	36	60	20L or 20M or 20H
MAZ32000L	18.85	19.3	19.81			18.3											20L
MAZ32000M	19.50	20	20.5			19											20M
MAZ32000H	20.15	20.7	21.19			19.6											20H
MAZ3220	20.8	22	23.3	15	0.05	20.3	60	20	55	0.5	180	16.4	18.4	20	34	60	22L or 22M or 22H
MAZ32200L	20.8	21.3	21.86			20.3											22L
MAZ32200M	21.45	22	22.55			20.9											22M
MAZ32200H	22.1	22.7	23.24			21.6											22H
MAZ3240	22.8	24	25.6	17	0.05	22.3	60	25	70	0.5	180	18.4	20.4	22	33	55	24L or 24M or 24H
MAZ32400L	22.8	23.3	23.97			22.3											24L
MAZ32400M	23.5	24	24.7			23											24M
MAZ32400H	24.35	25	25.6			23.8											24H

■ Electrical characteristics within part numbers (continued) $T_a = 25°C$

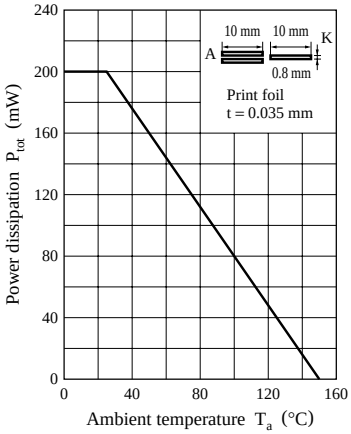
•V_Z = 27.0 V to 36.0 V (I_Z = 2 mA)

Part number	Zener voltage			Reverse current				Zener operating resistance				Temperature coefficient of zener voltage			Terminal capacitance		Marking symbol
	V_Z (V) I_Z = 2 mA			I_{R1} (μA) V_R		I_{R2} (μA) V_R		R_Z (Ω) I_Z = 2 mA		R_{ZK} (Ω) I_Z		S_Z (mV/°C) I_Z = 2 mA			C_t (pF) (V_R = 0 V) f = 1 MHz		
	Min	Nom	Max	(V)	Max	(V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	
MAZ3270	25.1	27	28.9	19	0.05	24.8	60	25	80	0.5	200	21.4	23.4	25.3	30	50	27L or 27M or 27H
MAZ32700L	25.3	26	26.7			24.8											27L
MAZ32700M	26.3	27	27.7			25.8											27M
MAZ32700H	27.3	28	28.7			26.8											27H
MAZ3300	28	30	32	21	0.05	27.8	60	30	80	0.5	200	24.4	26.6	29.4	27	50	30L or 30M or 30H
MAZ33000L	28.3	29	29.7			27.8											30L
MAZ33000M	29.3	30	30.8			28.8											30M
MAZ33000H	30.2	31	31.8			29.7											30H
MAZ3330	31	33	35	23	0.05	30.7	60	35	80	0.5	200	27.4	29.7	33.4	25	45	33L or 33M or 33H
MAZ33300L	31.2	32	32.8			30.7											33L
MAZ33300M	32.2	33	33.8			31.7											33M
MAZ33300H	33.2	34	34.9			32.7											33H
MAZ3360	34	36	38	25	0.05	33.6	60	35	90	0.5	200	30.4	33	37.4	23	45	36L or 36M or 36H
MAZ33600L	34.1	35	35.9			33.6											36L
MAZ33600M	35.1	36	36.9			34.6											36M
MAZ33600H	36.1	37	37.9			35.6											36H

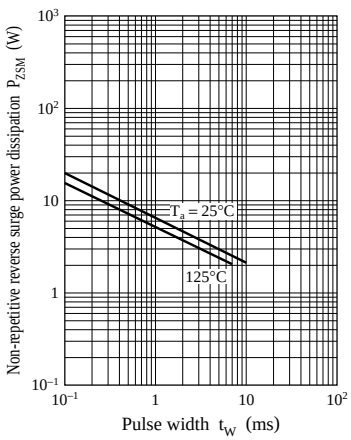
Note) 1. The V_Z value is the one after power application for 20 ms at T_a = 25°C.

2. The zener voltage temperature coefficient is the one for T_j = 25°C to 150°C.

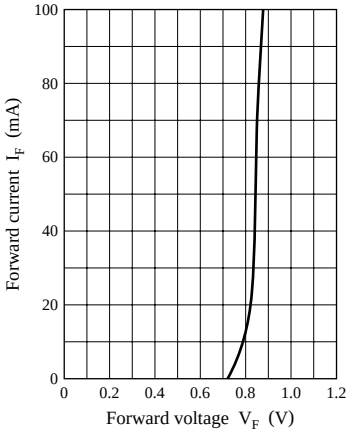
P_{tot} — T_a



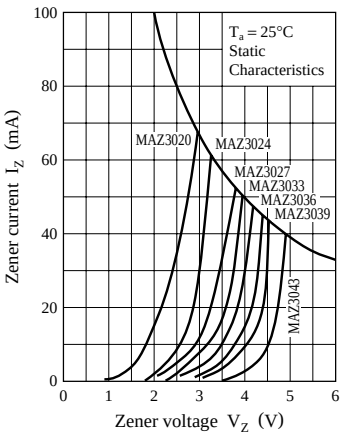
P_{ZSM} — t_W



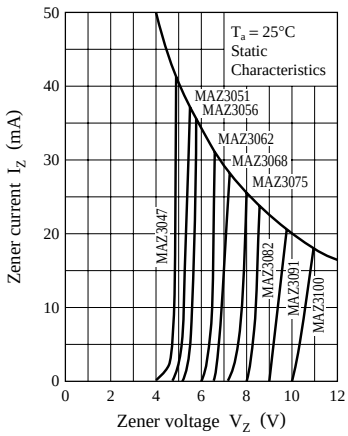
I_F — V_F



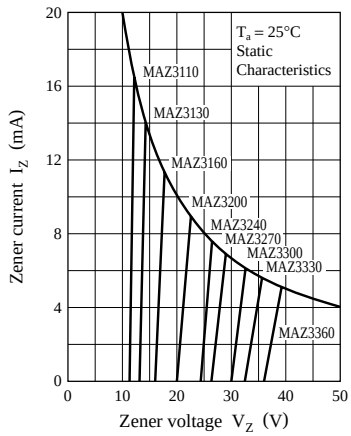
I_Z — V_Z



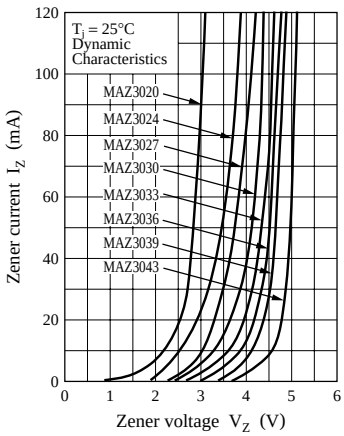
I_Z — V_Z



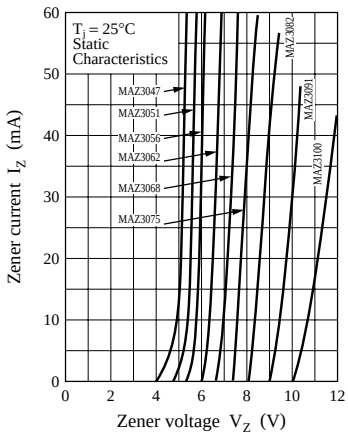
I_Z — V_Z



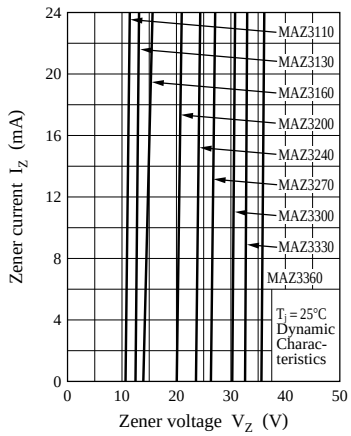
I_Z — V_Z



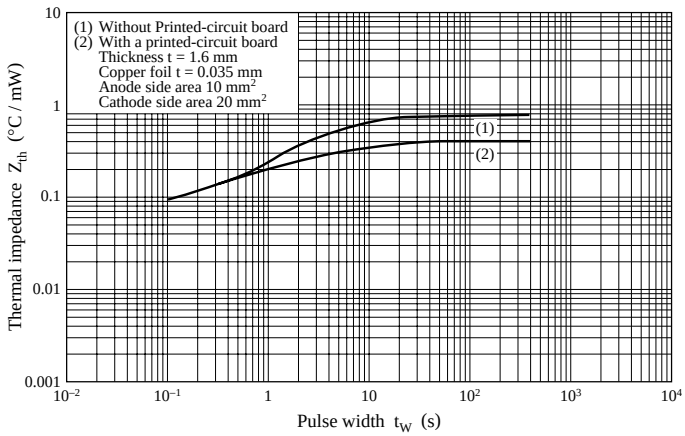
I_Z — V_Z



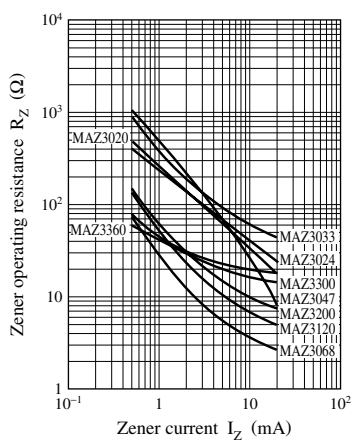
I_Z — V_Z



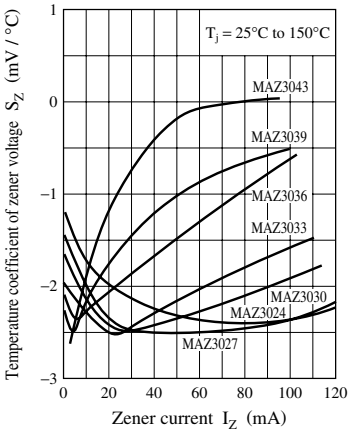
Z_{th} — t_W



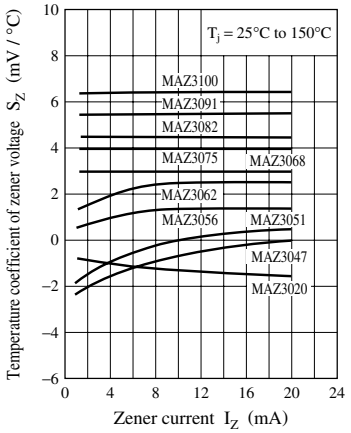
R_Z — I_Z



S_Z — I_Z


T_j = 25°C to 150°C
MAZ3043
MAZ3039
MAZ3036
MAZ3033
MAZ3030
MAZ3024
MAZ3027
Temperature coefficient of zener voltage S_Z (mV / °C)
Zener current I_Z (mA)
1
0
−1
−2
−3
0
20
40
60
80
100
120

S_Z — I_Z


T_j = 25°C to 150°C
MAZ3100
MAZ3091
MAZ3082
MAZ3075
MAZ3068
MAZ3062
MAZ3056
MAZ3051
MAZ3047
MAZ3020
Temperature coefficient of zener voltage S_Z (mV / °C)
Zener current I_Z (mA)
10
8
6
4
2
0
−2
−4
−6
0
4
8
12
16
20
24

Request for your special attention and precautions in using the technical information and semiconductors described in this material

(1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.

(2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.

(3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.

(6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.

(7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

Please read the following notes before using the datasheets

A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.

B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.

C. These materials are solely intended for a customer's individual use.
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.