

# MAZ4xxx Series (MA4xxx Series)

## Silicon planar type

For stabilization of power supply

### ■ Features

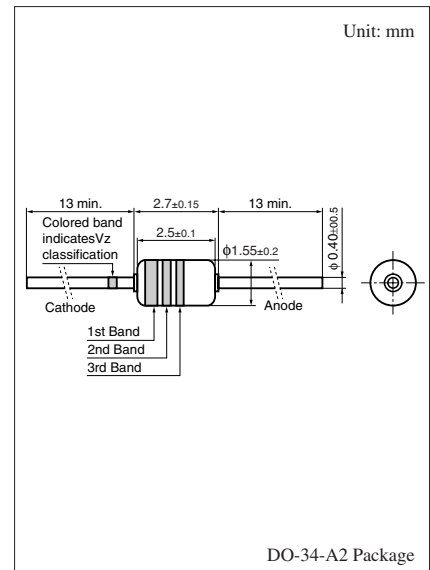
- High reliability, achieved by the DHD structure
- Allowing to insert to a 5 mm pitch hole
- Finely divided zener-voltage rank
- Sharp rising performance
- Wide voltage range: Zener voltage  $V_Z = 2.0\text{ V}$  to  $39.0\text{ V}$

### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Forward current (Average)	$I_{F(AV)}$	250	mA
Repetitive peak forward current	$I_{FRM}$	250	mA
Power dissipation *1	$P_D$	370	mW
Non-repetitive reverse surge power dissipation *2	$P_{ZSM}$	30	W
Junction temperature	$T_j$	200	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-65 to +200	$^\circ\text{C}$

Note) \*1:  $P_D = 370\text{ mW}$  achieved with a printed circuit board

\*2:  $t = 100\ \mu\text{s}$ ,  $T_j = 150^\circ\text{C}$



### ■ Common Electrical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$ \*1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Forward voltage	$V_F$	$I_F = 10\text{ mA}$		0.8	0.9	V
Zener voltage *2	$V_Z$	$I_Z$ Specified value				V
Zener rise operating resistance	$R_{ZK}$	$I_Z$ Specified value				$\Omega$
Zener operating resistance	$R_Z$	$I_Z$ Specified value				$\Omega$
Reverse current	$I_{R1}$	$V_R$ Specified value	Refer to the list of the electrical characteristics within part numbers			$\mu\text{A}$
	$I_{R2}$	$V_R$ Specified value				
Temperature coefficient of zener voltage *3	$S_Z$	$I_Z$ Specified value				mV/ $^\circ\text{C}$
Terminal capacitance	$C_t$	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ Specified value				pF

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7031 measuring methods for diodes.

2. Absolute frequency of input and output is 50 MHz.

3. \*1: The temperature must be controlled  $25^\circ\text{C}$  for  $V_Z$  measurement.

$V_Z$  value measured at other temperature must be adjusted to  $V_Z (25^\circ\text{C})$

\*2:  $V_Z$  guaranteed 20 ms after current flow.

\*3:  $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$

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

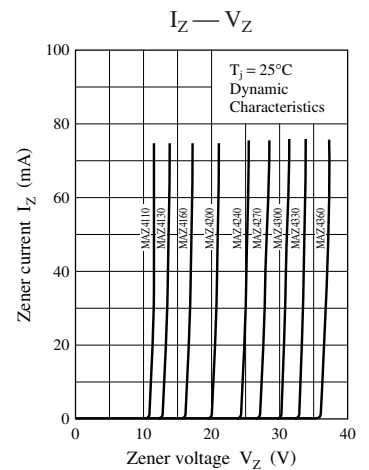
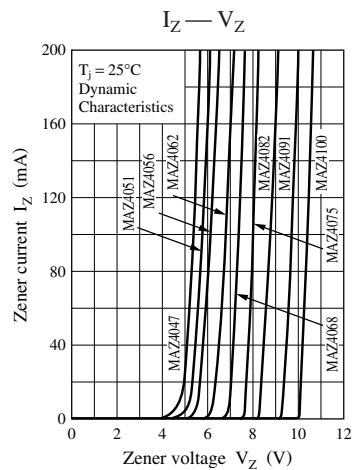
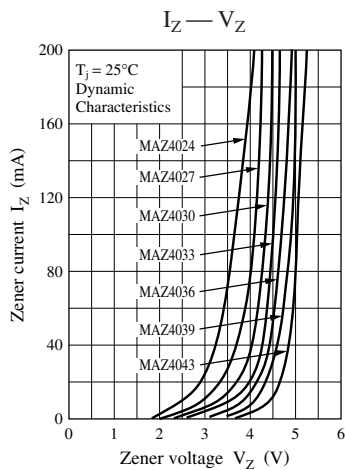
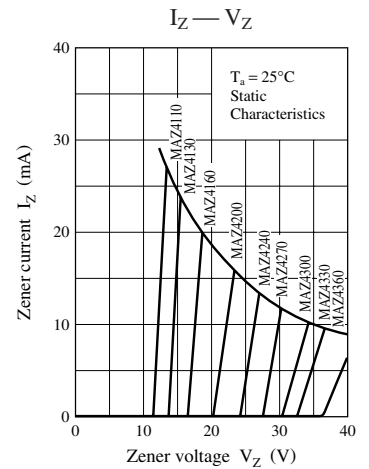
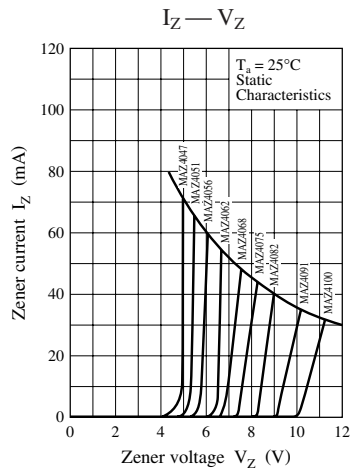
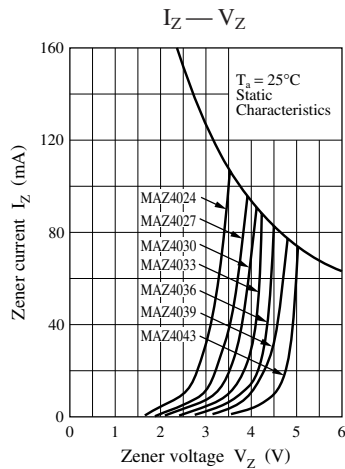
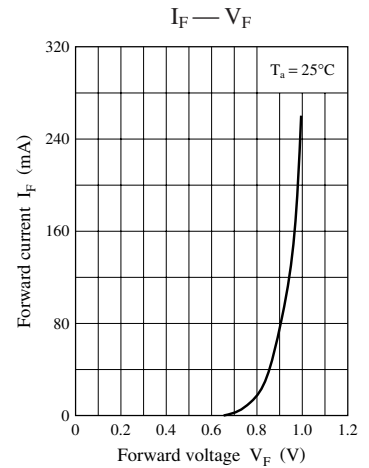
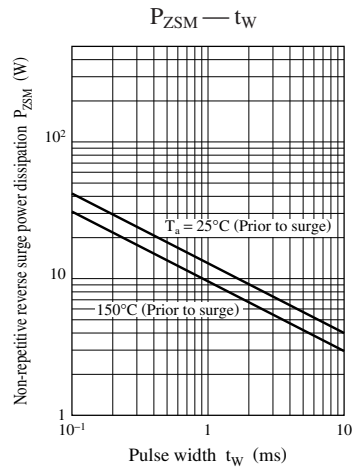
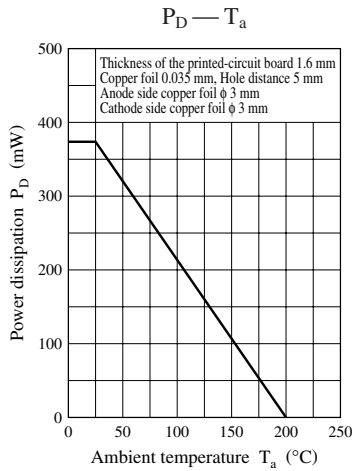
■ Electrical Characteristics within Part Numbers  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

•  $V_Z = 2.0\text{ V to } 6.8\text{ V}$  ( $I_Z = 5\text{ mA}$ )

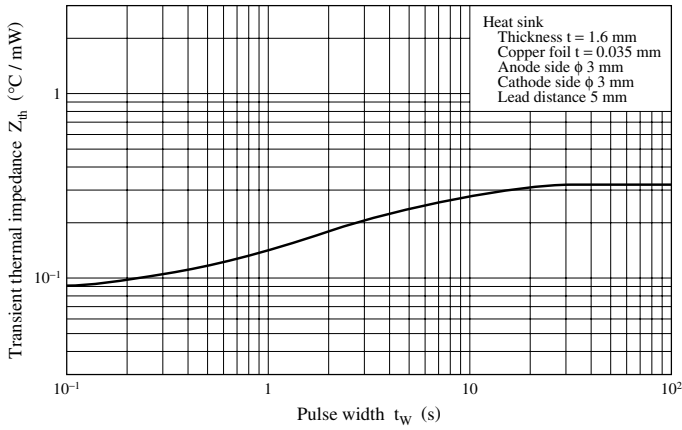
Part number	Zener voltage $V_Z$ (V) $I_Z = 5\text{ mA}$		Reverse current				Zener operating resistance $R_Z$ ( $\Omega$ ) $I_Z = 5\text{ mA}$	Zener rise operating resistance $R_{ZK}$ ( $\Omega$ )		Temperature coefficient of zener voltage $S_Z$ (mV/ $^\circ\text{C}$ ) $I_Z = 5\text{ mA}$			Terminal capacitance $C_t$ (pF) $(V_R = 0\text{ V})$ $f = 1\text{ MHz}$		Marking symbol (Color indication) Main body: Light green		
			$I_{R1}$ ( $\mu\text{A}$ )		$I_{R2}$ ( $\mu\text{A}$ )			$I_Z$									
	Min	Max	$V_R$ (V)	Max	$V_R$ (V)	Max	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
	MAZ4020	1.88	2.24	0.5	120	—	—	100	1	2000	-3.5	-1.5	0	375	450	Red	Black
MAZ4022	2.08	2.45	0.7	120	—	—	100	1	2000	-3.5	-1.5	0	375	450	Red	Red	Red
MAZ4024	2.28	2.70	1.0	120	—	—	100	1	2000	-3.5	-1.6	0	375	450	Red	Yellow	Yellow
MAZ4027	2.50	2.90	1.0	100	—	—	100	1	1000	-3.5	-2.0	0	350	450	Red	Purple	Purple
MAZ4030	2.80	3.20	1.0	50	—	—	100	1	1000	-3.5	-2.1	0	350	450	Orange	Black	Black
MAZ4033	3.10	3.50	1.0	20	—	—	100	1	1000	-3.5	-2.4	0	325	450	Orange	Orange	Orange
MAZ4036	3.40	3.80	1.0	10	—	—	100	1	1000	-3.5	-2.4	0	300	450	Orange	Blue	Blue
MAZ4039	3.70	4.10	1.0	10	—	—	100	1	1000	-3.5	-2.5	0	300	450	Orange	White	White
MAZ4043	4.00	4.60	1.0	10	—	—	100	1	1000	-3.5	-2.5	0	275	450	Yellow	Orange	Orange
MAZ4047	4.40	5.00	1.0	3	—	—	80	1	900	-3.5	-1.4	0.2	130	180	Yellow	Purple	Purple
MAZ4051	4.80	5.40	2.0	2	—	—	60	1	800	-2.7	-0.8	1.2	110	160	Green	Brown	Brown
MAZ4056	5.30	6.00	2.0	1	—	—	40	1	500	-2.0	1.2	2.5	95	140	Green	Blue	Blue
MAZ4062	5.80	6.60	4.0	3	5.3	60	20	0.5	300	0.4	2.3	3.7	90	130	Blue	Red	Red
MAZ4068	6.40	7.20	4.0	2	5.9	60	15	0.5	140	1.2	3.0	4.5	85	110	Blue	Gray	Gray
MAZ4075	7.00	7.90	5	1	6.5	60	15	0.5	120	2.5	4.0	5.3	80	100	Purple	Green	Green
MAZ4082	7.70	8.70	5	0.5	7.2	60	15	0.5	120	3.2	4.6	6.2	75	95	Gray	Red	Red
MAZ4091	8.50	9.60	6	0.2	8.0	60	15	0.5	130	3.8	5.5	7.0	70	90	White	Brown	Brown
MAZ4100	9.40	10.60	7	0.2	8.9	60	20	0.5	130	4.5	6.4	8.0	70	90	Brown	Black	—
MAZ4110	10.40	11.60	7	0.1	9.9	60	20	0.5	170	5.4	7.4	9.0	65	85	Brown	Brown	—
MAZ4120	11.40	12.70	8	0.1	10.9	60	25	0.5	170	6.0	8.4	10.0	65	85	Brown	Red	—
MAZ4130	12.40	14.10	9	0.1	11.9	60	30	0.5	170	7.0	9.4	11.0	60	80	Brown	Orange	—
MAZ4140	13.65	14.35	9	0.1	13.1	60	30	0.5	170	7.0	10.0	13.0	60	80	Brown	Yellow	—
MAZ4150	13.90	15.60	10	0.05	13.4	60	30	0.5	170	9.2	11.4	13.0	55	75	Brown	Green	—
MAZ4160	15.30	17.10	11	0.05	14.8	60	40	0.5	170	10.4	12.4	14.0	52	75	Brown	Blue	—
MAZ4180	16.90	19.10	13	0.05	16.4	60	45	0.5	170	12.4	14.4	16.0	47	70	Brown	Gray	—
MAZ4200	18.80	21.20	14	0.05	18.3	60	55	0.5	180	14.4	16.4	18.0	36	60	Red	Black	—
MAZ4220	20.80	23.30	15	0.05	20.3	60	55	0.5	180	16.4	18.4	20.0	34	60	Red	Red	—
MAZ4240	22.80	25.60	17	0.05	22.3	60	70	0.5	180	18.4	20.4	22.0	33	55	Red	Yellow	—

•  $V_Z = 27.0\text{ V to } 39.0\text{ V}$  ( $I_Z = 2\text{ mA}$ )

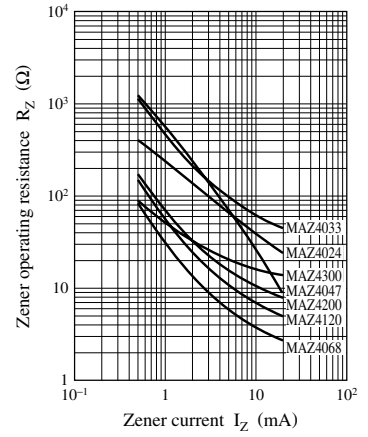
Part number	Zener voltage $V_Z$ (V) $I_Z = 2\text{ mA}$		Reverse current				Zener operating resistance $R_Z$ ( $\Omega$ ) $I_Z = 2\text{ mA}$	Zener rise operating resistance $R_{ZK}$ ( $\Omega$ )		Temperature coefficient of zener voltage $S_Z$ (mV/ $^\circ\text{C}$ ) $I_Z = 2\text{ mA}$			Terminal capacitance $C_t$ (pF) $(V_R = 0\text{ V})$ $f = 1\text{ MHz}$		Marking symbol (Color indication) Main body: Light green		
			$I_{R1}$ ( $\mu\text{A}$ )		$I_{R2}$ ( $\mu\text{A}$ )			$I_Z$									
	Min	Max	$V_R$ (V)	Max	$V_R$ (V)	Max	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
	MAZ4270	25.10	28.90	19	0.05	24.8	60	80	0.5	200	21.4	23.4	25.3	30	50	Red	Purple
MAZ4300	28.00	32.00	21	0.05	27.8	60	80	0.5	200	24.4	26.6	29.4	27	50	Orange	Black	—
MAZ4330	31.00	35.00	23	0.05	30.7	60	80	0.5	200	27.4	29.7	33.4	25	45	Orange	Orange	—
MAZ4360	34.00	38.00	25	0.05	33.6	60	90	0.5	200	30.4	33.0	37.4	23	45	Orange	Blue	—
MAZ4390	37.00	41.00	27	0.05	36.0	60	130	0.5	250	33.4	36.4	41.2	21	45	Orange	White	—



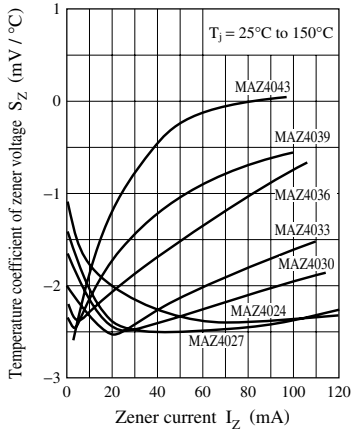
$Z_{th} - t_w$



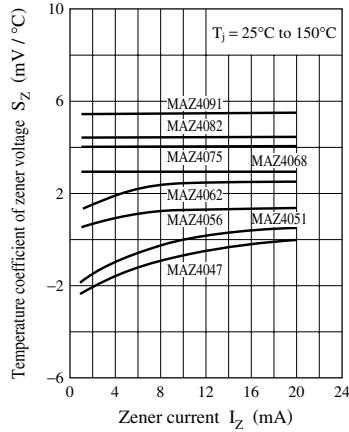
$R_Z - I_Z$



$S_Z - I_Z$



$S_Z - I_Z$



## 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 technical information 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 circuits examples of the products. It neither warrants non-infringement of intellectual property right or any other rights owned by our company or a third party, nor grants any license.
- (3) We are not liable for the infringement of rights owned by a third party arising out of the use of the technical information as described in this material.
- (4) 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.
- (5) The products and product specifications described in this material are subject to change without notice for 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.
- (6) 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, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.
- (7) When using products for which damp-proof packing is required, observe the conditions (including shelf life and amount of time let standing of unsealed items) agreed upon when specification sheets are individually exchanged.
- (8) This material may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd.