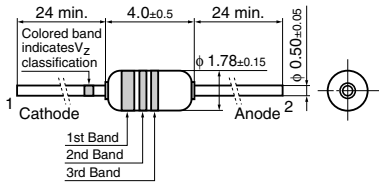
MAZ1000 Series (MA1000 Series)

Silicon planar type

For stabilization of power supply

Unit : mm



1 : Cathode
2 : Anode
DO-35-A1
(Main body to be pained in yellowish green)

■ Features

- High reliability, achieved by the combination the planar type and the glass seal
- Large power dissipation: P_D = 500 mW (With a printed-circuit board)
- Wide voltage range: V_Z = 2.0 V to 39 V
- Easy-to-use because of the finely divided zener voltage ranks, such as L, M, and H ranks
- Sharp rising performance

■ Absolute Maximum Ratings T_a = 25°C

Parameter	Symbol	Rating	Unit
Average forward current	$I_{F(AV)}$	250	mA
Repetitive peak forward current	I_{FRM}	250	mA
Total power dissipation*1	P_{tot}	500	mW
Non-repetitive reverse surge power dissipation*2	P_{ZSM}	30	W
Junction temperature	T_j	200	°C
Storage temperature	T_{stg}	−65 to +200	°C

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

•Color indication of V_Z rank classification

L rank	M rank	H rank
Black	Blue	Red

■ Common Electrical Characteristics T_a = 25°C*1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Forward voltage (DC)	V_F	I_F = 10 mA		0.8	0.9	V
Zener voltage*2	V_Z	I_Z ..... Specified value				V
Operating resistance	R_{ZK}	I_Z ..... Specified value				Ω
	R_Z	I_Z ..... Specified value				Ω
Reverse current	I_R	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

Refer to the list of the electrical characteristics within part numbers

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 parenthesis shows conventional part number.

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

•V_Z = 2.0 V to 6.8 V (I_Z = 5 mA)

Part Number	Zener voltage			Reverse current				Operating resistance				Temperature coefficient of zener voltage			Terminal capacitance		Marking (Color indication Main body: Yellowish green)		
	V_Z (V) I_Z = 5 mA			I_{R1} (μA) V_R (V)		I_{R2} (μA) V_R (V)		R_Z (Ω) I_Z = 5 mA		R_{ZK} (Ω) I_Z (mA)		S_Z (mV/°C) I_Z = 5 mA			C_t (pF) (V_R = 0 V) f = 1 MHz				
	Min	Nom	Max		Max		Max	Typ	Max		Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
MAZ1020	1.88	—	2.24	0.5	120	—	—	5	100	1	2000	−3.5	−1.5	0	375	450	Red	Black	Black
MAZ1020-L	1.88	—	2.12																
MAZ1020-H	2.01	—	2.24																
MAZ1022	2.08	—	2.45	0.7	120	—	—	5	100	1	2000	−3.5	−1.5	0	375	450	Red	Red	Red
MAZ1022-L	2.08	—	2.33																
MAZ1022-H	2.20	—	2.45																
MAZ1024	2.28	2.4	2.7	1	120	—	—	—	100	1	2000	−3.5	−1.6	0	375	450	Red	Yellow	Yellow
MAZ1024-L	2.28	—	2.56																
MAZ1024-H	2.4	—	2.7																
MAZ1027	2.5	2.7	2.9	1	100	—	—	—	100	1	1000	−3.5	−2	0	350	450	Red	Purple	Purple
MAZ1027-L	2.5	2.6	2.75																
MAZ1027-H	2.65	2.8	2.9																
MAZ1030	2.8	3.0	3.2	1	50	—	—	85	100	1	1000	−3.5	−2.1	0	350	450	Orange	Black	Black
MAZ1030-L	2.83	2.9	2.97																
MAZ1030-M	2.93	3.0	3.08																
MAZ1030-H	3.02	3.1	3.18																
MAZ1033	3.1	3.3	3.5	1	20	—	—	83	100	1	1000	−3.5	−2.4	0	325	450	Orange	Orange	Orange
MAZ1033-L	3.12	3.2	3.28																
MAZ1033-M	3.22	3.3	3.38																
MAZ1033-H	3.32	3.4	3.49																
MAZ1036	3.4	3.6	3.8	1	10	—	—	81	100	1	1000	−3.5	−2.4	0	300	450	Orange	Blue	Blue
MAZ1036-L	3.41	3.5	3.59																
MAZ1036-M	3.51	3.6	3.69																
MAZ1036-H	3.61	3.7	3.79																
MAZ1039	3.7	3.9	4.1	1	10	—	—	79	100	1	1000	−3.5	−2.5	0	300	450	Orange	White	White
MAZ1039-L	3.71	3.8	3.9																
MAZ1039-M	3.8	3.9	4.0																
MAZ1039-H	3.9	4.0	4.1																
MAZ1043	4.0	4.3	4.6	1	10	—	—	75	100	1	1000	−3.5	−2.5	0	275	450	Yellow	Orange	Orange
MAZ1043-L	4.03	4.1	4.26																
MAZ1043-M	4.17	4.3	4.4																
MAZ1043-H	4.31	4.4	4.54																
MAZ1047	4.4	4.7	5.0	1	3	—	—	50	80	1	900	−3.5	−1.4	0.2	130	180	Yellow	Purple	Purple
MAZ1047-L	4.45	4.6	4.69																
MAZ1047-M	4.59	4.7	4.83																
MAZ1047-H	4.74	4.9	4.99																
MAZ1051	4.8	5.1	5.4	2	2	—	—	40	60	1	800	−2.7	−0.8	1.2	110	160	Green	Brown	Brown
MAZ1051-L	4.87	5.0	5.12																
MAZ1051-M	5.0	5.1	5.26																
MAZ1051-H	5.14	5.3	5.4																
MAZ1056	5.3	5.6	6.0	2	1	—	—	15	40	1	500	−2	1.2	2.5	95	140	Green	Blue	Blue
MAZ1056-L	5.3	5.4	5.58																
MAZ1056-M	5.48	5.6	5.76																
MAZ1056-H	5.66	5.8	5.95																
MAZ1062	5.8	6.2	6.6	4	3	5.3	60	6	20	0.5	300	0.4	2.3	3.7	90	130	Blue	Red	Red
MAZ1062-L	5.85	6.0	6.15			5.3													
MAZ1062-M	6.05	6.2	6.36			5.5													
MAZ1062-H	6.24	6.4	6.56			5.7													
MAZ1068	6.4	6.8	7.2	4	2	5.9	60	6	15	0.5	140	1.2	3	4.5	85	110	Blue	Gray	Gray
MAZ1068-L	6.44	6.6	6.77			5.9													
MAZ1068-M	6.64	6.8	6.98			6.1													
MAZ1068-H	6.85	7.0	7.2			6.3													

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

•V_Z = 7.5 V to 22 V (I_Z = 5 mA)

Part Number	Zener voltage V_Z (V) I_Z = 5 mA			Reverse current				Operating resistance				Temperature coefficient of zener voltage			Terminal capacitance		Marking (Color indication Main body: Yellowish green)		
				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	Mom	Max	(V)	Max	(V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
MAZ1075	7.0	7.5	7.9	5	1	6.5	60	6	15	0.5	120	2.5	4	5.3	80	100	Purple	Green	Green
MAZ1075-L	7.07	7.3	7.43			6.5													
MAZ1075-M	7.29	7.5	7.67			6.7													
MAZ1075-H	7.51	7.7	7.89			7.0													
MAZ1082	7.7	8.2	8.7	5	0.5	7.2	60	6	15	0.5	120	3.2	4.6	6.2	75	95	Gray	Red	Red
MAZ1082-L	7.77	7.9	8.17			7.2													
MAZ1082-M	8.03	8.2	8.43			7.5													
MAZ1082-H	8.29	8.5	8.7			7.7													
MAZ1091	8.5	9.1	9.6	6	0.2	8	60	6	15	0.5	130	3.8	5.5	7	70	90	White	Brown	Brown
MAZ1091-L	8.58	8.8	9.02			8													
MAZ1091-M	8.87	9.1	9.33			8.3													
MAZ1091-H	9.14	9.4	9.6			8.6													
MAZ1100	9.4	10	10.6	7	0.2	8.9	60	8	20	0.5	130	4.5	6.4	8	70	90	Brown	Black	—
MAZ1100-L	9.44	9.7	9.92			8.9													
MAZ1100-M	9.75	10	10.25			9.2													
MAZ1100-H	10.07	10.3	10.59			9.5													
MAZ1110	10.4	11	11.6	7	0.1	9.9	60	10	20	0.5	170	5.4	7.4	9	65	85	Brown	Brown	—
MAZ1110-L	10.4	10.7	10.94			9.9													
MAZ1110-M	10.73	11	11.28			10.2													
MAZ1110-H	11.05	11.3	11.6			10.5													
MAZ1120	11.4	12	12.7	8	0.1	10.9	60	10	25	0.5	170	6	8.4	10	65	85	Brown	Red	—
MAZ1120-L	11.4	11.7	11.96			10.9													
MAZ1120-M	11.73	12	12.33			11.2													
MAZ1120-H	12.06	12.3	12.68			11.5													
MAZ1130	12.4	13	14.1	9	0.1	11.9	60	10	30	0.5	170	7	9.4	11	60	80	Brown	Orange	—
MAZ1130-L	12.4	12.7	12.99			11.9													
MAZ1130-M	12.73	13	13.4			12.2													
MAZ1130-H	13.25	13.7	14.08			12.7													
MAZ1140-M	13.65	14	14.35	9	0.1	13.1	60	10	30	0.5	170	7	10	13	60	80	Brown	Yellow	—
MAZ1150	13.9	15	15.6	10	0.05	13.4	60	10	30	0.5	170	9.2	11.4	13	55	75	Brown	Green	—
MAZ1150-L	13.9	14.3	14.76			13.4													
MAZ1150-M	14.6	15	15.35			14.1													
MAZ1150-H	14.95	15.3	15.6			14.4													
MAZ1160	15.3	16	17.1	11	0.05	14.8	60	10	40	0.5	170	10.4	12.4	14	52	75	Brown	Blue	—
MAZ1160-L	15.3	15.7	16.09			14.8													
MAZ1160-M	15.7	16	16.5			15.2													
MAZ1160-H	16.26	16.7	17.1			15.7													
MAZ1180	16.9	18	19.1	13	0.05	16.4	60	10	45	0.5	170	12.4	14.4	16	47	70	Brown	Gray	—
MAZ1180-L	16.9	17.3	17.76			16.4													
MAZ1180-M	17.55	18	18.45			17													
MAZ1180-H	18.2	18.7	19.1			17.7													
MAZ1200	18.8	20	21.2	14	0.05	18.3	60	15	55	0.5	180	14.4	16.4	18	36	60	Red	Black	—
MAZ1200-L	18.85	19.3	19.81			18.3													
MAZ1200-M	19.50	20	20.5			19													
MAZ1200-H	20.15	20.7	21.19			19.6													
MAZ1220	20.8	22	23.3	15	0.05	20.3	60	20	55	0.5	180	16.4	18.4	20	34	60	Red	Red	—
MAZ1220-L	20.8	21.3	21.86			20.3													
MAZ1220-M	21.45	22	22.55			20.9													
MAZ1220-H	22.1	22.7	23.24			21.6													

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

•V_Z = 24 V (I_Z = 5 mA)

Part Number	Zener voltage V_Z (V) I_Z = 5 mA			Reverse current I_{R1} (μA)		I_{R2} (μA)		Operating resistance R_Z (Ω) I_Z = 5 mA		R_{ZK} (Ω) I_Z		Temperature coefficient of zener voltage S_Z (mV/°C) I_Z = 5 mA			Terminal capacitance C_t (pF) (V_R = 0 V) f = 1 MHz		Marking (Color indication Main body: Yellowish green)		
	Min	Nom	Max	V_R (V)	Max	V_R (V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
MAZ1240	22.8	24	25.6	17	0.05	22.3	60	25	70	0.5	180	18.4	20.4	22	33	55	Red	Yellow	—
MAZ1240-L	22.8	23.3	23.97			22.3													
MAZ1240-M	23.5	24	24.7			23.8													
MAZ1240-H	24.35	25	25.6			23.8													

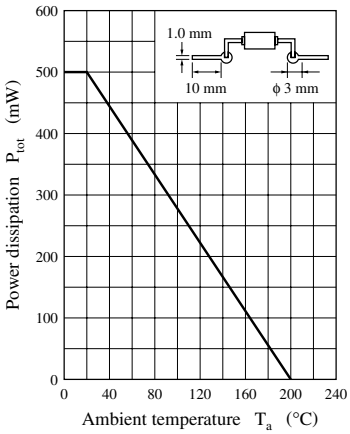
•V_Z = 27 V to 39 V (I_Z = 2 mA)

Part Number	Zener voltage V_Z (V) I_Z = 2 mA			Reverse current I_{R1} (μA)		I_{R2} (μA)		Operating resistance R_Z (Ω) I_Z = 2 mA		R_{ZK} (Ω) I_Z		Temperature coefficient of zener voltage S_Z (mV/°C) I_Z = 2 mA			Terminal capacitance C_t (pF) (V_R = 0 V) f = 1 MHz		Marking (Color indication Main body: Yellowish green)		
	Min	Nom	Max	V_R (V)	Max	V_R (V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
MAZ1270	25.1	27	28.9	19	0.05	24.8	60	25	80	0.5	200	21.4	23.4	25.3	30	50	Red	Purple	—
MAZ1270-L	25.3	26	26.7			24.8													
MAZ1270-M	26.3	27	27.7			25.8													
MAZ1270-H	27.3	28	28.7			26.8													
MAZ1300	28	30	32	21	0.05	27.8	60	30	80	0.5	200	24.4	26.6	29.4	27	50	Orange	Black	—
MAZ1300-L	28.3	29	29.7			27.8													
MAZ1300-M	29.3	30	30.8			28.8													
MAZ1300-H	30.2	31	31.8			29.7													
MAZ1330	31	33	35	23	0.05	30.7	60	35	80	0.5	200	27.4	29.7	33.4	25	45	Orange	Orange	—
MAZ1330-L	31.2	32	32.8			30.7													
MAZ1330-M	32.2	33	33.8			31.7													
MAZ1330-H	33.2	34	34.9			32.7													
MAZ1360	34	36	38	25	0.05	33.6	60	35	90	0.5	200	30.4	33	37.4	23	45	Orange	Blue	—
MAZ1360-L	34.1	35	35.9			33.6													
MAZ1360-M	35.1	36	36.9			34.6													
MAZ1360-H	36.1	37	37.9			35.6													
MAZ1390	37	—	41	27	0.05	36	60	—	130	0.5	250	33.4	36.4	41.2	21	45	Orange	White	—
MAZ1390-L	37.1	—	39			36													
MAZ1390-M	38	—	40			36													
MAZ1390-H	39	—	41			36													

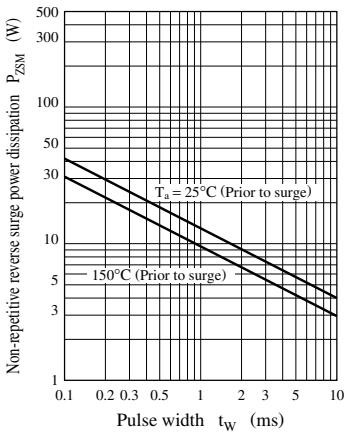
Note) 1. The V_Z value is the one after power application for 20 ms at T_a = 25°C.

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

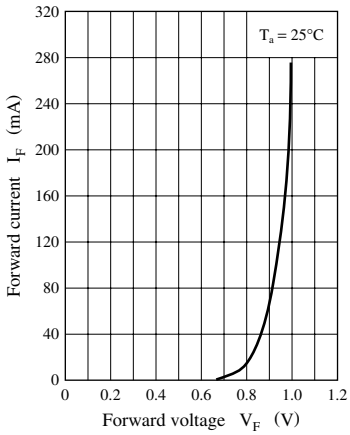
P_{tot} — T_a



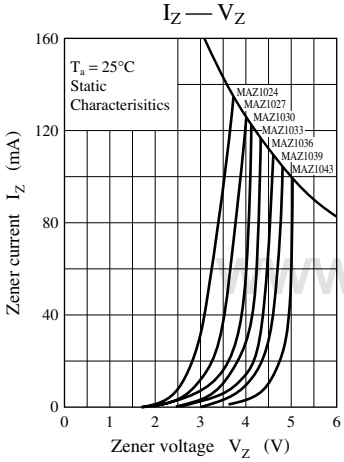
P_{ZSM} — t_W



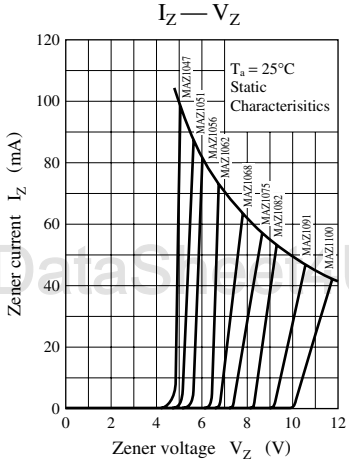
I_F — V_F



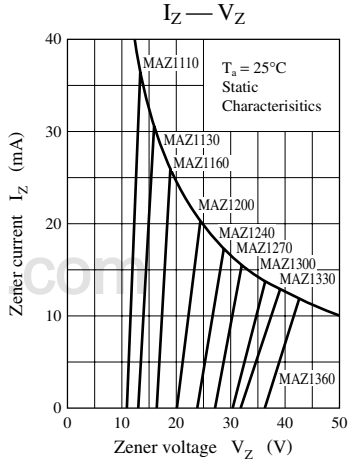
I_Z — V_Z



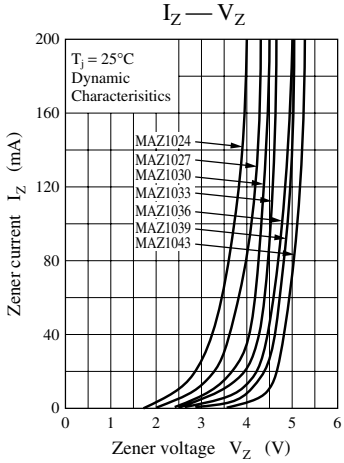
I_Z — V_Z



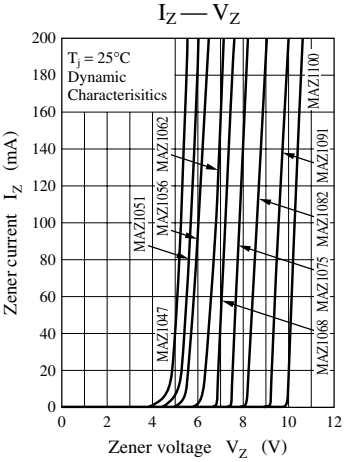
I_Z — V_Z



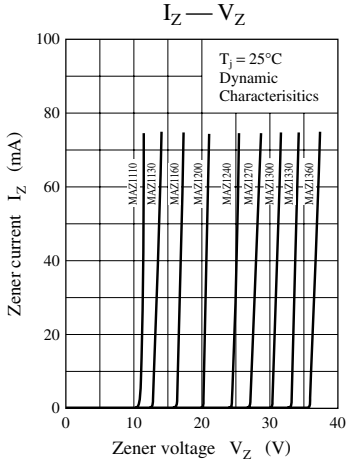
I_Z — V_Z



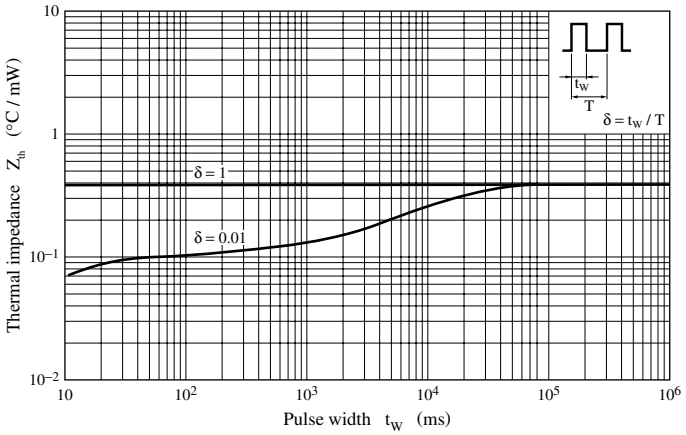
I_Z — V_Z



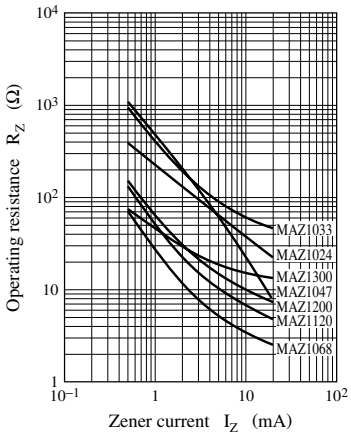
I_Z — V_Z



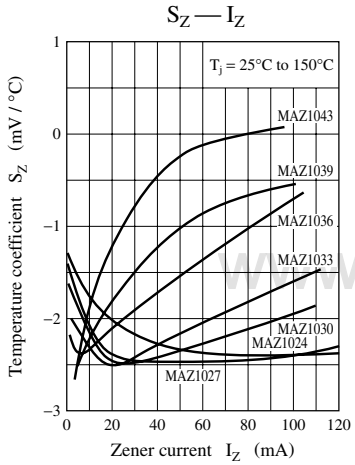
Z_{th} — t_W



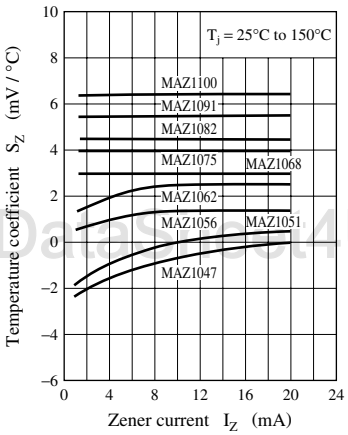
R_Z — I_Z



S_Z — I_Z



S_Z — I_Z



Zener Diodes

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