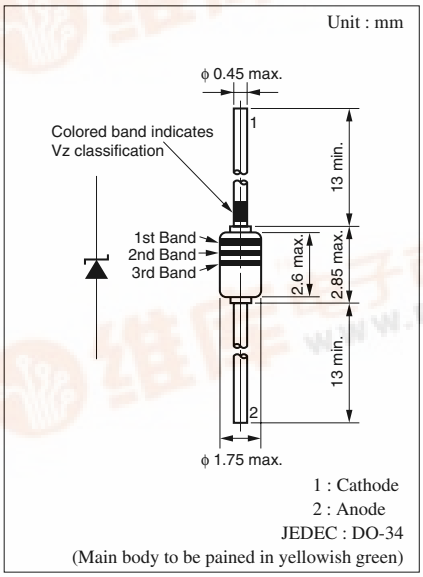
MAZ4000 Series

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: V_Z = 2.0 V to 39 V

■ Absolute Maximum Ratings T_a = 25°C

Parameter	Symbol	Rating	Unit
Average forward current	$I_{F(AV)}$	250	mA
Instanious forward current	I_{FRM}	250	mA
Total power dissipation*1	P_{tot}	370	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	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_{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

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

■ 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		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	1st.	2nd.	3rd.
MAZ4020	1.88	—	2.24	0.5	120	—	—	—	100	1	2000	−3.5	−1.5	0	375	450	Red	Black	Black
MAZ4020-L	1.88	—	2.12																
MAZ4020-H	2.01	—	2.24																
MAZ4022	2.08	—	2.45	0.7	120	—	—	—	100	1	2000	−3.5	−1.5	0	375	450	Red	Red	Red
MAZ4022-L	2.08	—	2.33																
MAZ4022-H	2.20	—	2.45																
MAZ4024	2.28	2.4	2.7	1	120	—	—	—	100	1	2000	−3.5	−1.6	0	375	450	Red	Yellow	Yellow
MAZ4024-L	2.28	—	2.56																
MAZ4024-H	2.4	—	2.7																
MAZ4027	2.5	2.7	2.9	1	100	—	—	—	100	1	1000	−3.5	−2	0	350	450	Red	Purple	Purple
MAZ4027-L	2.5	—	2.75																
MAZ4027-H	2.65	—	2.9																
MAZ4030	2.8	3.0	3.2	1	50	—	—	85	100	1	1000	−3.5	−2.1	0	350	450	Orange	Black	Black
MAZ4030-L	2.83	2.9	2.97																
MAZ4030-M	2.93	3.0	3.08																
MAZ4030-H	3.02	3.1	3.18																
MAZ4033	3.1	3.3	3.5	1	20	—	—	83	100	1	1000	−3.5	−2.4	0	325	450	Orange	Orange	Orange
MAZ4033-L	3.12	3.2	3.28																
MAZ4033-M	3.22	3.3	3.38																
MAZ4033-H	3.32	3.4	3.49																
MAZ4036	3.4	3.6	3.8	1	10	—	—	81	100	1	1000	−3.5	−2.4	0	300	450	Orange	Blue	Blue
MAZ4036-L	3.41	3.5	3.59																
MAZ4036-M	3.51	3.6	3.69																
MAZ4036-H	3.61	3.7	3.79																
MAZ4039	3.7	3.9	4.1	1	10	—	—	79	100	1	1000	−3.5	−2.5	0	300	450	Orange	White	White
MAZ4039-L	3.71	3.8	3.9																
MAZ4039-M	3.8	3.9	4.0																
MAZ4039-H	3.9	4.0	4.1																
MAZ4043	4.0	4.3	4.6	1	10	—	—	75	100	1	1000	−3.5	−2.5	0	275	450	Yellow	Orange	Orange
MAZ4043-L	4.03	4.1	4.26																
MAZ4043-M	4.17	4.3	4.4																
MAZ4043-H	4.31	4.4	4.54																
MAZ4047	4.4	4.7	5.0	1	3	—	—	50	80	1	900	−3.5	−1.4	0.2	130	180	Yellow	Purple	Purple
MAZ4047-L	4.45	4.6	4.69																
MAZ4047-M	4.59	4.7	4.83																
MAZ4047-H	4.74	4.9	4.99																
MAZ4051	4.8	5.1	5.4	2	2	—	—	40	60	1	800	−2.7	0.8	1.2	110	160	Green	Brown	Brown
MAZ4051-L	4.87	5.0	5.12																
MAZ4051-M	5.0	5.1	5.26																
MAZ4051-H	5.14	5.3	5.4																
MAZ4056	5.3	5.6	6.0	2	1	—	—	15	40	1	500	−2	1.2	2.5	95	140	Green	Blue	Blue
MAZ4056-L	5.3	5.4	5.58																
MAZ4056-M	5.48	5.6	5.76																
MAZ4056-H	5.66	5.8	5.95																
MAZ4062	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
MAZ4062-L	5.85	6.0	6.15			5.3													
MAZ4062-M	6.05	6.2	6.36			5.5													
MAZ4062-H	6.24	6.4	6.56			5.7													
MAZ4068	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
MAZ4068-L	6.44	6.6	6.77			5.9													
MAZ4068-M	6.64	6.8	6.98			6.1													
MAZ4068-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 20 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		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	1st.	2nd.	3rd.
MAZ4075	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
MAZ4075-L	7.07	7.3	7.43			6.5													
MAZ4075-M	7.29	7.5	7.67			6.7													
MAZ4075-H	7.51	7.7	7.89			7.0													
MAZ4082	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
MAZ4082-L	7.77	7.9	8.17			7.2													
MAZ4082-M	8.03	8.2	8.43			7.5													
MAZ4082-H	8.29	8.5	8.7			7.7													
MAZ4091	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
MAZ4091-L	8.58	8.8	9.02			8													
MAZ4091-M	8.87	9.1	9.33			8.3													
MAZ4091-H	9.14	9.4	9.6			8.6													
MAZ4100	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	—
MAZ4100-L	9.44	9.7	9.92			8.9													
MAZ4100-M	9.75	10	10.25			9.2													
MAZ4100-H	10.07	10.3	10.59			9.5													
MAZ4110	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	—
MAZ4110-L	10.4	10.7	10.94			9.9													
MAZ4110-M	10.73	11	11.28			10.2													
MAZ4110-H	11.05	11.3	11.6			10.5													
MAZ4120	11.4	12	12.7	8	0.1	10.9	60	10	25	0.5	170	6	8.4	10	65	85	Brown	Red	—
MAZ4120-L	11.4	11.7	11.96			10.9													
MAZ4120-M	11.73	12	12.33			11.2													
MAZ4120-H	12.06	12.3	12.68			11.5													
MAZ4130	12.4	13	14.1	9	0.1	11.9	60	10	30	0.5	170	7	9.4	11	60	80	Brown	Orange	—
MAZ4130-L	12.4	12.7	12.99			11.9													
MAZ4130-M	12.73	13	13.4			12.2													
MAZ4130-H	13.25	13.7	14.08			12.7													
MAZ4140-M	13.65	14	14.35	9	0.1	13.1	60	10	30	0.5	170	7	10	13	60	80	Brown	Yellow	—
MAZ4150	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	—
MAZ4150-L	13.9	14.3	14.76			13.4													
MAZ4150-M	14.6	15	15.35			14.1													
MAZ4150-H	14.95	15.3	15.6			14.4													
MAZ4160	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	—
MAZ4160-L	15.3	15.7	16.09			14.8													
MAZ4160-M	15.7	16	16.5			15.2													
MAZ4160-H	16.26	16.7	17.1			15.7													
MAZ4180	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	—
MAZ4180-L	16.9	17.3	17.76			16.4													
MAZ4180-M	17.55	18	18.45			17													
MAZ4180-H	18.2	18.7	19.1			17.7													
MAZ4200	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	—
MAZ4200-L	18.85	19.3	19.81			18.3													
MAZ4200-M	19.50	20	20.5			19													
MAZ4200-H	20.15	20.7	21.19			19.6													

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

•V_Z = 22 V to 24 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)		I_{R2} (μA)		R_Z (Ω)		R_{ZK} (Ω)		S_Z (mV/°C)			C_t (pF)				
				V_R		V_R		I_Z = 5 mA		I_Z		I_Z = 5 mA			(V_R = 0 V) f = 1 MHz				
	Min	Nom	Max	(V)	Max	(V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
MAZ4220	20.8	22	23.3	15	0.05	20.3	60	20	5.5	0.5	180	16.4	18.4	20	34	60	Red	Red	—
MAZ4220-L	20.8	21.3	21.86			20.3													
MAZ4220-M	21.45	22	22.55			20.9													
MAZ4220-H	22.1	22.7	23.24			21.6													
MAZ4240	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	—
MAZ4240-L	22.8	23.3	23.97			22.3													
MAZ4240-M	23.5	24	24.7			23													
MAZ4240-H	24.35	25	25.6			23.8													

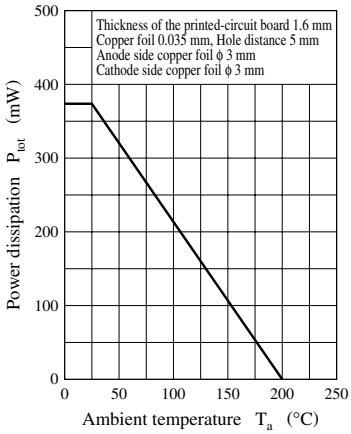
•V_Z = 27 V to 39 V (I_Z = 2 mA)

Part Number	Zener voltage V_Z (V) I_Z = 2 mA			Reverse current				Operating resistance				Temperature coefficient of zener voltage			Terminal capacitance		Marking (Color indication Main body: Yellowish green)		
				I_{R1} (μA)		I_{R2} (μA)		R_Z (Ω)		R_{ZK} (Ω)		S_Z (mV/°C)			C_t (pF)				
				V_R		V_R		I_Z = 2 mA		I_Z		I_Z = 2 mA			(V_R = 0 V) f = 1 MHz				
	Min	Nom	Max	(V)	Max	(V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.
MAZ4270	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	—
MAZ4270-L	25.3	26	26.7			24.8													
MAZ4270-M	26.3	27	27.7			25.8													
MAZ4270-H	27.3	28	28.7			26.8													
MAZ4300	28	30	32	21	0.05	27.8	60	30	80	0.5	200	24.4	26.6	29.4	27	50	Orange	Black	—
MAZ4300-L	28.3	29	29.7			27.8													
MAZ4300-M	29.3	30	30.8			28.8													
MAZ4300-H	30.2	31	31.8			29.7													
MAZ4330	31	33	35	23	0.05	30.7	60	35	80	0.5	200	27.4	29.7	33.4	25	45	Orange	Orange	—
MAZ4330-L	31.2	32	32.8			30.7													
MAZ4330-M	32.2	33	33.8			31.7													
MAZ4330-H	33.2	34	34.9			32.7													
MAZ4360	34	36	38	25	0.05	33.6	60	35	90	0.5	200	30.4	33	37.4	23	45	Orange	Blue	—
MAZ4360-L	34.1	35	35.9			33.6													
MAZ4360-M	35.1	36	36.9			34.6													
MAZ4360-H	36.1	37	37.9			35.6													
MAZ4390	37	—	41	27	0.05	36	60	—	130	0.5	250	33.4	36.4	41.2	21	45	Orange	White	—
MAZ4390-L	37.1	—	39			36													
MAZ4390-M	38	—	40			36													
MAZ4390-H	39	—	41			36													

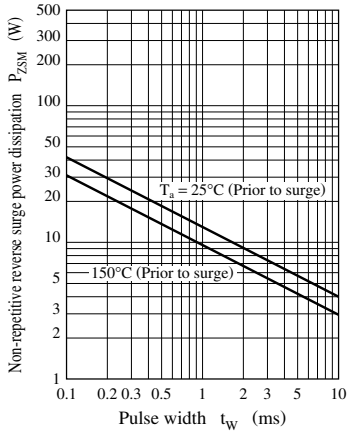
Note) 1. The V_Z value is the one after power application for 20 ms at $T_a = 25°C$.

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

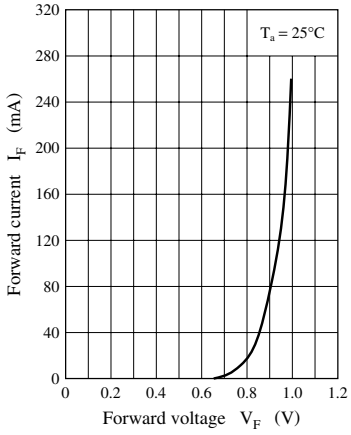
P_{tot} — T_a



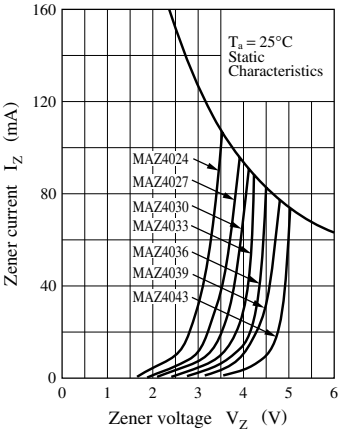
P_{ZSM} — t_W



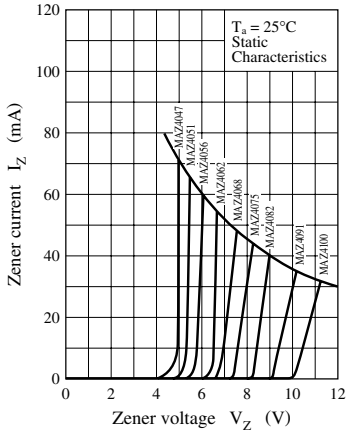
I_F — V_F



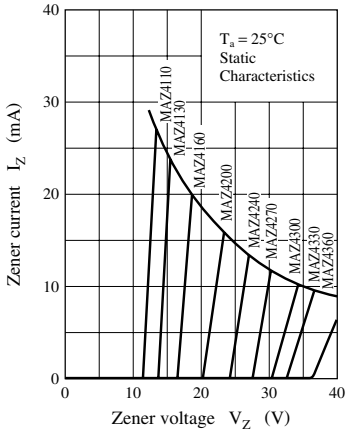
I_Z — V_Z



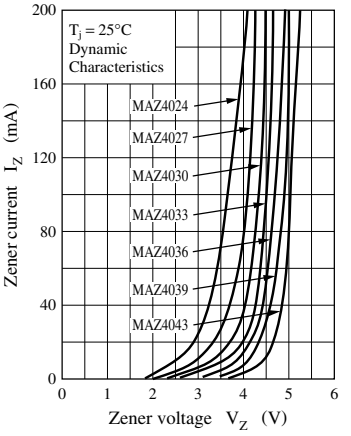
I_Z — V_Z



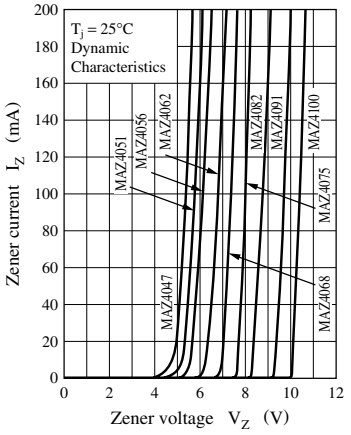
I_Z — V_Z



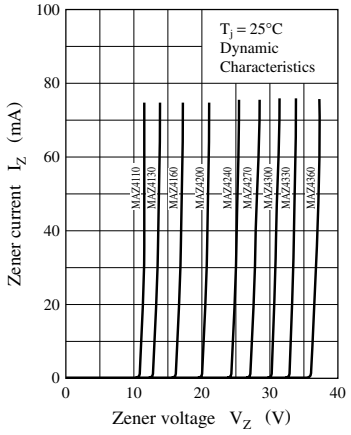
I_Z — V_Z



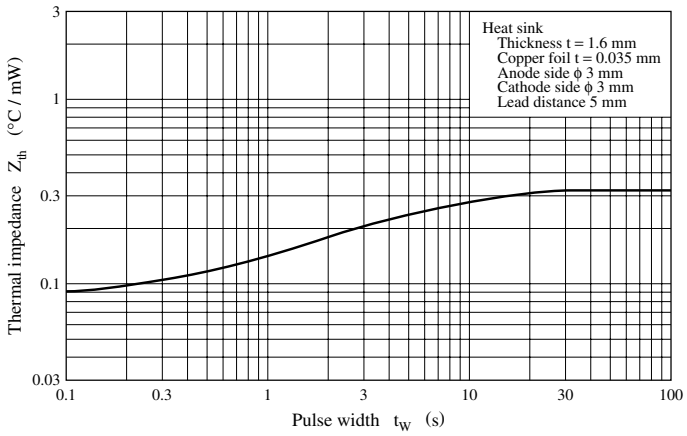
I_Z — V_Z



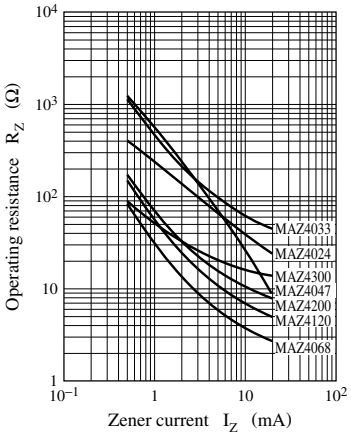
I_Z — V_Z



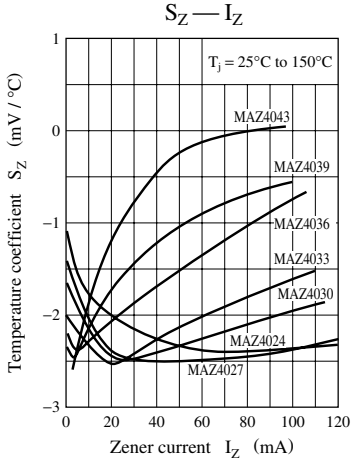
Z_{th} — t_W



R_Z — I_Z



S_Z — I_Z



S_Z — I_Z