

# MAZ4000 Series (MA4000 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:  $V_Z = 2.0\text{ V to }39\text{ V}$

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

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

Note) \*1 : With a printed-circuit board

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

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

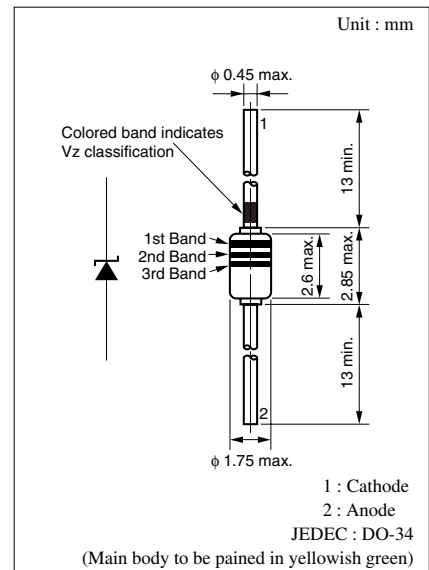
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Forward voltage	$V_F$	$I_F = 10\text{ mA}$		0.8	0.9	V
Zener voltage <sup>*2</sup>	$V_Z$	$I_Z$ ..... Specified value				V
Operating resistance	$R_{ZK}$	$I_Z$ ..... Specified value				$\Omega$
	$R_Z$	$I_Z$ ..... Specified value				$\Omega$
Reverse current	$I_{R1}$	$V_R$ ..... Specified value				$\mu\text{A}$
	$I_{R2}$	$V_R$ ..... Specified value				$\mu\text{A}$
Temperature coefficient of zener voltage <sup>*3</sup>	$S_Z$	$I_Z$ ..... Specified value				$\text{mV}/^\circ\text{C}$
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  $25^\circ\text{C}$ . In other cases, carry out the temperature compensation.

\*2 : Guaranteed at 20 ms after power application.

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



### •Color indication of $V_Z$ rank classification

L rank	M rank	H rank
Black	Blue	Red

■ Electrical characteristics within part numbers  $T_a = 25^\circ\text{C}$

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

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) $I_Z = 5\text{ mA}$			$I_{R1}$ ( $\mu\text{A}$ ) $V_R$ (V)		$I_{R2}$ ( $\mu\text{A}$ ) $V_R$ (V)		$R_Z$ ( $\Omega$ ) $I_Z = 5\text{ mA}$		$R_{ZK}$ ( $\Omega$ ) $I_Z$ (mA)		$S_Z$ (mV/ $^\circ\text{C}$ ) $I_Z = 5\text{ mA}$			$C_t$ (pF) ( $V_R = 0\text{ V}$ ) $f = 1\text{ MHz}$		1st.	2nd.	3rd.
	Min	Nom	Max	Max	Max	Typ	Max	Typ	Max	Min	Typ	Max	Typ	Max					
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																
MAZ4062-M	6.05	6.2	6.36																
MAZ4062-H	6.24	6.4	6.56																
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																
MAZ4068-M	6.64	6.8	6.98																
MAZ4068-H	6.85	7.0	7.2																

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■ Electrical characteristics within part numbers (continued)  $T_a = 25^\circ\text{C}$

•  $V_Z = 7.5\text{ V to }20\text{ V}$  ( $I_Z = 5\text{ mA}$ )

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)			$I_{R1}$ ( $\mu\text{A}$ )	$I_{R2}$ ( $\mu\text{A}$ )	$R_Z$ ( $\Omega$ )		$R_{ZK}$ ( $\Omega$ )		$S_Z$ (mV/ $^\circ\text{C}$ )			$C_t$ (pF)						
	$I_Z = 5\text{ mA}$			$V_R$	$V_R$	$I_Z = 5\text{ mA}$		$I_Z$		$I_Z = 5\text{ mA}$			$(V_R = 0\text{ V})$						
	Min	Nom	Max	(V)	Max	Typ	Max	(mA)	Max	Min	Typ	Max	Typ	Max	1st.	2nd.	3rd.		
MAZ4075	7.0	7.5	7.9	5	1	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	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	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	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	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	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	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	60	10	30	0.5	170	7	10	13	60	80	Brown	Yellow	—	
MAZ4150	13.9	15	15.6																13.4
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	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	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	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)  $T_a = 25^\circ\text{C}$

•  $V_Z = 22\text{ V to } 24\text{ V}$  ( $I_Z = 5\text{ mA}$ )

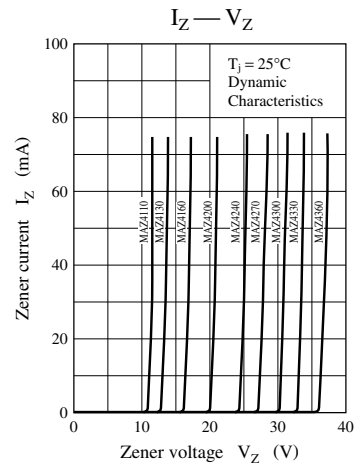
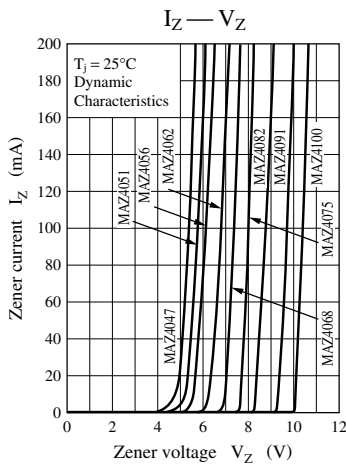
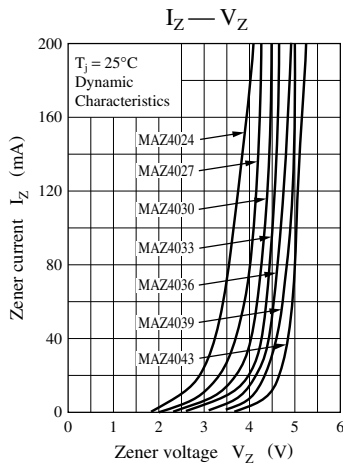
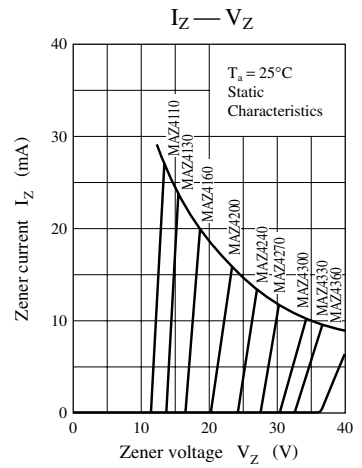
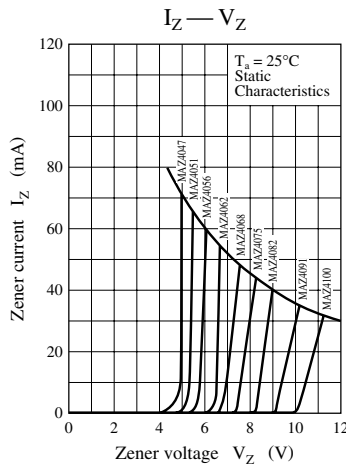
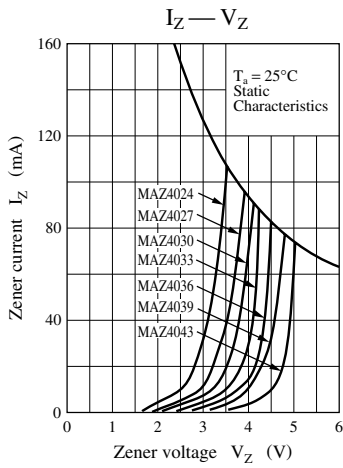
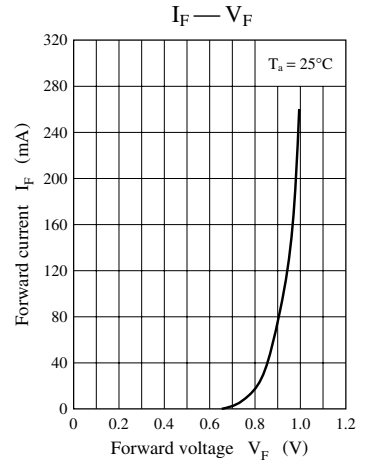
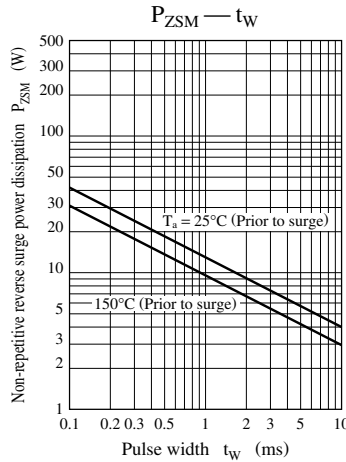
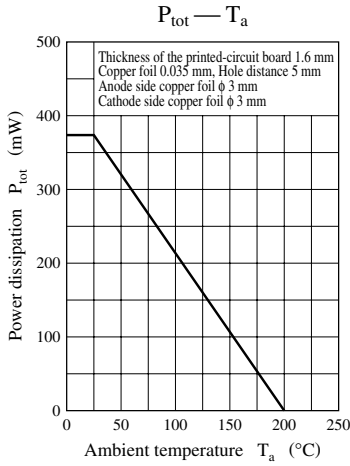
Part Number	Zener voltage			Reverse current				Operating resistance				Temperature coefficient of zener voltage			Terminal capacitance		Marking (Color indication) Main body: Yellowish green		
	$V_Z$ (V) $I_Z = 5\text{ mA}$			$I_{R1}$ ( $\mu\text{A}$ )		$I_{R2}$ ( $\mu\text{A}$ )		$R_Z$ ( $\Omega$ )		$R_{ZK}$ ( $\Omega$ )		$S_Z$ (mV/ $^\circ\text{C}$ ) $I_Z = 5\text{ mA}$			$C_t$ (pF) ( $V_R = 0\text{ V}$ ) $f = 1\text{ MHz}$				
	Min	Nom	Max	$V_R$ (V)	Max	$V_R$ (V)	Max	$I_Z = 5\text{ mA}$ Typ	Max	$I_Z$ (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	17	0.05	21.6	60	25	70	0.5	180	18.4	20.4	22	33	55	Red	Yellow	—
MAZ4240	22.8	24	25.6			22.3													
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															

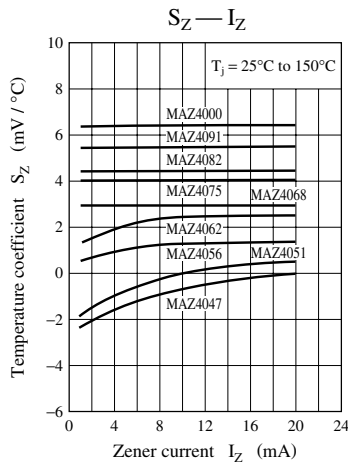
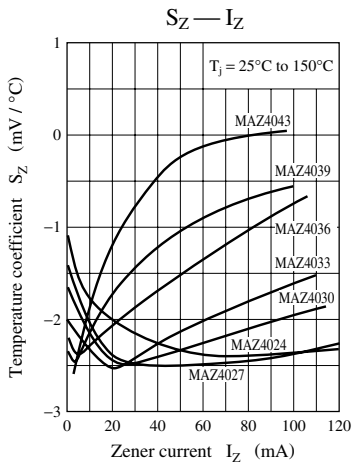
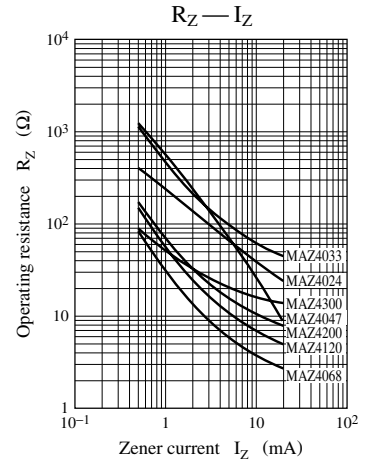
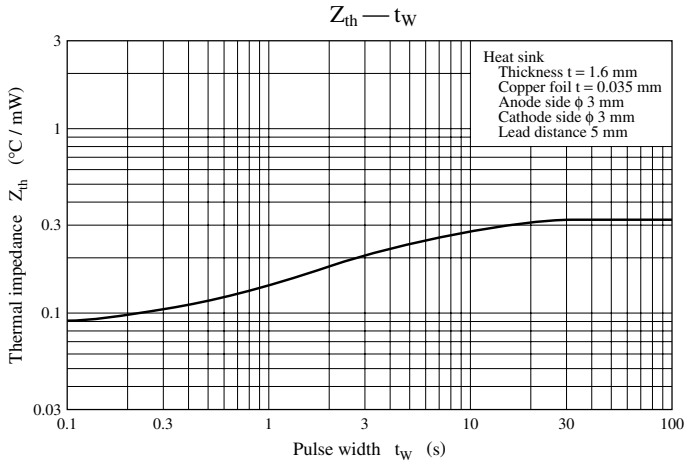
•  $V_Z = 27\text{ V to } 39\text{ V}$  ( $I_Z = 2\text{ mA}$ )

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) $I_Z = 2\text{ mA}$			$I_{R1}$ ( $\mu\text{A}$ )		$I_{R2}$ ( $\mu\text{A}$ )		$R_Z$ ( $\Omega$ )		$R_{ZK}$ ( $\Omega$ )		$S_Z$ (mV/ $^\circ\text{C}$ ) $I_Z = 2\text{ mA}$			$C_t$ (pF) ( $V_R = 0\text{ V}$ ) $f = 1\text{ MHz}$				
	Min	Nom	Max	$V_R$ (V)	Max	$V_R$ (V)	Max	$I_Z = 2\text{ mA}$ Typ	Max	$I_Z$ (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	21	0.05	26.8	60	30	80	0.5	200	24.4	26.6	29.4	27	50	Orange	Black	—
MAZ4300	28	30	32			27.8													
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	23	0.05	29.7	60	35	80	0.5	200	27.4	29.7	33.4	25	45	Orange	Orange	—
MAZ4330	31	33	35			30.7													
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	25	0.05	32.7	60	35	90	0.5	200	30.4	33	37.4	23	45	Orange	Blue	—
MAZ4360	34	36	38			33.6													
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	27	0.05	35.6	60	—	130	0.5	250	33.4	36.4	41.2	21	45	Orange	White	—
MAZ4390	37	—	41			36													
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  $T_a = 25^\circ\text{C}$ .

2. The zener voltage temperature coefficient is the one for  $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$ .





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