

# ZMM52xxxPF

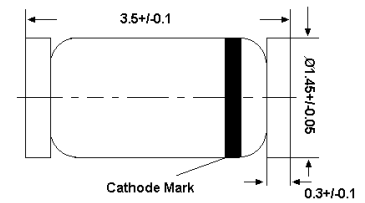
## Silicon Planar Zener Diodes

Standard zener voltage tolerance is  $\pm 20\%$ . Add suffix "A" for  $\pm 10\%$  tolerance, suffix "B" for  $\pm 5\%$  tolerance and suffix "C" for  $\pm 2\%$  tolerance. Other tolerance, non standard and higher zener voltages are upon request.

### Features

- Lead Free

LL-34



Glass case MiniMELF  
Dimensions in mm

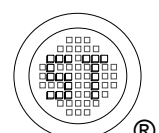
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Power Dissipation <sup>1)</sup>	$P_{\text{tot}}$	500	mW
Junction Temperature	$T_j$	175	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	- 65 to + 175	$^\circ\text{C}$

### Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Ambient <sup>1)</sup>	$R_{\theta\text{JA}}$	300	$^\circ\text{C/W}$

<sup>1)</sup> Valid provided that electrodes are kept at ambient temperature.

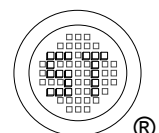


# ZMM52xxxPF

## Characteristics at $T_a = 25^\circ\text{C}$ ( $V_F = 1.1\text{ V Max. at } I_F = 200\text{ mA}$ )

Type	Zener Voltage Range <sup>1)</sup>				Dynamic Resistance			Reverse Current	
	$V_{Znom}$	$V_{ZT}$		at $I_{ZT}$	$Z_{ZT}$	$Z_{ZK}$	at $I_{ZK}$	$I_R$	at $V_R$
	(V)	Min. (V)	Max. (V)	(mA)	Max. ( $\Omega$ )	Max. ( $\Omega$ )	(mA)	Max. ( $\mu\text{A}$ )	(V)
ZMM5221PF	2.4	1.92	2.88	20	30	1200	0.25	100	1
ZMM5222PF	2.5	2	3	20	30	1250	0.25	100	1
ZMM5223PF	2.7	2.16	3.24	20	30	1300	0.25	75	1
ZMM5224PF	2.8	2.24	3.36	20	30	1400	0.25	75	1
ZMM5225PF	3	2.4	3.6	20	29	1600	0.25	50	1
ZMM5226PF	3.3	2.64	3.96	20	28	1600	0.25	25	1
ZMM5227PF	3.6	2.88	4.32	20	24	1700	0.25	15	1
ZMM5228PF	3.9	3.12	4.68	20	23	1900	0.25	10	1
ZMM5229PF	4.3	3.44	5.16	20	22	2000	0.25	5	1
ZMM5230PF	4.7	3.76	5.64	20	19	1900	0.25	5	2
ZMM5231PF	5.1	4.08	6.12	20	17	1600	0.25	5	2
ZMM5232PF	5.6	4.48	6.72	20	11	1600	0.25	5	3
ZMM5233PF	6	4.8	7.2	20	7	1600	0.25	5	3.5
ZMM5234PF	6.2	4.96	7.44	20	7	1000	0.25	5	4
ZMM5235PF	6.8	5.44	8.16	20	5	750	0.25	3	5
ZMM5236PF	7.5	6	9	20	6	500	0.25	3	6
ZMM5237PF	8.2	6.56	9.84	20	8	500	0.25	3	6.5
ZMM5238PF	8.7	6.96	10.44	20	8	600	0.25	3	6.5
ZMM5239PF	9.1	7.28	10.92	20	10	600	0.25	3	7
ZMM5240PF	10	8	12	20	17	600	0.25	3	8
ZMM5241PF	11	8.8	13.2	20	22	600	0.25	2	8.4
ZMM5242PF	12	9.6	14.4	20	30	600	0.25	1	9.1
ZMM5243PF	13	10.4	15.6	9.5	13	600	0.25	0.5	9.9
ZMM5244PF	14	11.2	16.8	9	15	600	0.25	0.1	10
ZMM5245PF	15	12	18	8.5	16	600	0.25	0.1	11
ZMM5246PF	16	12.8	19.2	7.8	17	600	0.25	0.1	12
ZMM5247PF	17	13.6	20.4	7.4	19	600	0.25	0.1	13
ZMM5248PF	18	14.4	21.6	7.0	21	600	0.25	0.1	14
ZMM5249PF	19	15.2	22.8	6.6	23	600	0.25	0.1	14
ZMM5250PF	20	16	24	6.2	25	600	0.25	0.1	15
ZMM5251PF	22	17.6	26.4	5.6	29	600	0.25	0.1	17
ZMM5252PF	24	19.2	28.8	5.2	33	600	0.25	0.1	18
ZMM5253PF	25	20	30	5	35	600	0.25	0.1	19
ZMM5254PF	27	21.6	32.4	4.6	41	600	0.25	0.1	21
ZMM5255PF	28	22.4	33.6	4.4	44	600	0.25	0.1	21
ZMM5256PF	30	24	36	4.2	49	600	0.25	0.1	23
ZMM5257PF	33	26.4	39.6	3.8	58	700	0.25	0.1	25
ZMM5258PF	36	28.8	43.2	3.4	70	700	0.25	0.1	27
ZMM5259PF	39	31.2	46.8	3.2	80	800	0.25	0.1	30
ZMM5260PF	43	34.4	51.6	3	93	900	0.25	0.1	33
ZMM5261PF	47	37.6	56.4	2.7	105	1000	0.25	0.1	36
ZMM5262PF	51	40.8	61.2	2.5	125	1100	0.25	0.1	39
ZMM5263PF	56	44.8	67.2	2.2	150	1300	0.25	0.1	45
ZMM5264PF	60	48	72	2.1	170	1400	0.25	0.1	46
ZMM5265PF	62	49.6	74.4	2	185	1400	0.25	0.1	47
ZMM5266PF	68	54.4	81.6	1.8	230	1600	0.25	0.1	52
ZMM5267PF	75	60	90	1.7	270	1700	0.25	0.1	56

<sup>1)</sup> Tested with pulses  $t_p = 20\text{ ms}$ .

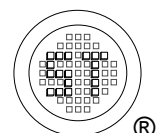


# ZMM52xxxPF

## Characteristics at $T_a = 25^\circ\text{C}$ ( $V_F = 1.1\text{ V Max. at } I_F = 200\text{ mA}$ )

Type	Zener Voltage Range <sup>1)</sup>				Dynamic Resistance			Reverse Current	
	$V_{Znom}$	$V_{ZT}$		at $I_{ZT}$	$Z_{ZT}$	$Z_{ZK}$	at $I_{ZK}$	$I_R$	at $V_R$
	(V)	Min. (V)	Max. (V)	(mA)	Max. ( $\Omega$ )	Max. ( $\Omega$ )	(mA)	Max. ( $\mu\text{A}$ )	(V)
ZMM5221APF	2.4	2.16	2.64	20	30	1200	0.25	100	1
ZMM5222APF	2.5	2.25	2.75	20	30	1250	0.25	100	1
ZMM5223APF	2.7	2.43	2.97	20	30	1300	0.25	75	1
ZMM5224APF	2.8	2.52	3.08	20	30	1400	0.25	75	1
ZMM5225APF	3	2.7	3.3	20	29	1600	0.25	50	1
ZMM5226APF	3.3	2.97	3.63	20	28	1600	0.25	25	1
ZMM5227APF	3.6	3.24	3.96	20	24	1700	0.25	15	1
ZMM5228APF	3.9	3.51	4.29	20	23	1900	0.25	10	1
ZMM5229APF	4.3	3.87	4.73	20	22	2000	0.25	5	1
ZMM5230APF	4.7	4.23	5.17	20	19	1900	0.25	5	2
ZMM5231APF	5.1	4.59	5.61	20	17	1600	0.25	5	2
ZMM5232APF	5.6	5.04	6.16	20	11	1600	0.25	5	3
ZMM5233APF	6	5.4	6.6	20	7	1600	0.25	5	3.5
ZMM5234APF	6.2	5.58	6.82	20	7	1000	0.25	5	4
ZMM5235APF	6.8	6.12	7.48	20	5	750	0.25	3	5
ZMM5236APF	7.5	6.75	8.25	20	6	500	0.25	3	6
ZMM5237APF	8.2	7.38	9.02	20	8	500	0.25	3	6.5
ZMM5238APF	8.7	7.83	9.57	20	8	600	0.25	3	6.5
ZMM5239APF	9.1	8.19	10.01	20	10	600	0.25	3	7
ZMM5240APF	10	9	11	20	17	600	0.25	3	8
ZMM5241APF	11	9.9	12.1	20	22	600	0.25	2	8.4
ZMM5242APF	12	10.8	13.2	20	30	600	0.25	1	9.1
ZMM5243APF	13	11.7	14.3	9.5	13	600	0.25	0.5	9.9
ZMM5244APF	14	12.6	15.4	9	15	600	0.25	0.1	10
ZMM5245APF	15	13.5	16.5	8.5	16	600	0.25	0.1	11
ZMM5246APF	16	14.4	17.6	7.8	17	600	0.25	0.1	12
ZMM5247APF	17	15.3	18.7	7.4	19	600	0.25	0.1	13
ZMM5248APF	18	16.2	19.8	7.0	21	600	0.25	0.1	14
ZMM5249APF	19	17.1	20.9	6.6	23	600	0.25	0.1	14
ZMM5250APF	20	18	22	6.2	25	600	0.25	0.1	15
ZMM5251APF	22	19.8	24.2	5.6	29	600	0.25	0.1	17
ZMM5252APF	24	21.6	26.4	5.2	33	600	0.25	0.1	18
ZMM5253APF	25	22.5	27.5	5	35	600	0.25	0.1	19
ZMM5254APF	27	24.3	29.7	4.6	41	600	0.25	0.1	21
ZMM5255APF	28	25.2	30.8	4.4	44	600	0.25	0.1	21
ZMM5256APF	30	27	33	4.2	49	600	0.25	0.1	23
ZMM5257APF	33	29.7	36.3	3.8	58	700	0.25	0.1	25
ZMM5258APF	36	32.4	39.6	3.4	70	700	0.25	0.1	27
ZMM5259APF	39	35.1	42.9	3.2	80	800	0.25	0.1	30
ZMM5260APF	43	38.7	47.3	3	93	900	0.25	0.1	33
ZMM5261APF	47	42.3	51.7	2.7	105	1000	0.25	0.1	36
ZMM5262APF	51	45.9	56.1	2.5	125	1100	0.25	0.1	39
ZMM5263APF	56	50.4	61.6	2.2	150	1300	0.25	0.1	45
ZMM5264APF	60	54	66	2.1	170	1400	0.25	0.1	46
ZMM5265APF	62	55.8	68.2	2	185	1400	0.25	0.1	47
ZMM5266APF	68	61.2	74.8	1.8	230	1600	0.25	0.1	52
ZMM5267APF	75	67.5	82.5	1.7	270	1700	0.25	0.1	56

<sup>1)</sup> Tested with pulses  $t_p = 20\text{ ms}$ .

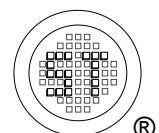


# ZMM52xxxPF

## Characteristics at $T_a = 25^\circ\text{C}$ ( $V_F = 1.1\text{ V Max. at } I_F = 200\text{ mA}$ )

Type	Zener Voltage Range <sup>1)</sup>				Dynamic Resistance			Reverse Current	
	$V_{Znom}$	$V_{ZT}$		at $I_{ZT}$	$Z_{ZT}$	$Z_{ZK}$	at $I_{ZK}$	$I_R$	at $V_R$
	(V)	Min. (V)	Max. (V)	(mA)	Max. ( $\Omega$ )	Max. ( $\Omega$ )	(mA)	Max. ( $\mu\text{A}$ )	(V)
ZMM5221BPF	2.4	2.28	2.52	20	30	1200	0.25	100	1
ZMM5222BPF	2.5	2.38	2.62	20	30	1250	0.25	100	1
ZMM5223BPF	2.7	2.57	2.83	20	30	1300	0.25	75	1
ZMM5224BPF	2.8	2.66	2.94	20	30	1400	0.25	75	1
ZMM5225BPF	3	2.85	3.15	20	29	1600	0.25	50	1
ZMM5226BPF	3.3	3.14	3.46	20	28	1600	0.25	25	1
ZMM5227BPF	3.6	3.42	3.78	20	24	1700	0.25	15	1
ZMM5228BPF	3.9	3.71	4.09	20	23	1900	0.25	10	1
ZMM5229BPF	4.3	4.09	4.51	20	22	2000	0.25	5	1
ZMM5230BPF	4.7	4.47	4.93	20	19	1900	0.25	5	2
ZMM5231BPF	5.1	4.85	5.35	20	17	1600	0.25	5	2
ZMM5232BPF	5.6	5.32	5.88	20	11	1600	0.25	5	3
ZMM5233BPF	6	5.7	6.3	20	7	1600	0.25	5	3.5
ZMM5234BPF	6.2	5.89	6.51	20	7	1000	0.25	5	4
ZMM5235BPF	6.8	6.46	7.14	20	5	750	0.25	3	5
ZMM5236BPF	7.5	7.13	7.87	20	6	500	0.25	3	6
ZMM5237BPF	8.2	7.79	8.61	20	8	500	0.25	3	6.5
ZMM5238BPF	8.7	8.27	9.13	20	8	600	0.25	3	6.5
ZMM5239BPF	9.1	8.65	9.55	20	10	600	0.25	3	7
ZMM5240BPF	10	9.5	10.5	20	17	600	0.25	3	8
ZMM5241BPF	11	10.45	11.55	20	22	600	0.25	2	8.4
ZMM5242BPF	12	11.4	12.6	20	30	600	0.25	1	9.1
ZMM5243BPF	13	12.35	13.65	9.5	13	600	0.25	0.5	9.9
ZMM5244BPF	14	13.3	14.7	9	15	600	0.25	0.1	10
ZMM5245BPF	15	14.25	15.75	8.5	16	600	0.25	0.1	11
ZMM5246BPF	16	15.2	16.8	7.8	17	600	0.25	0.1	12
ZMM5247BPF	17	16.15	17.85	7.4	19	600	0.25	0.1	13
ZMM5248BPF	18	17.1	18.9	7.0	21	600	0.25	0.1	14
ZMM5249BPF	19	18.05	19.95	6.6	23	600	0.25	0.1	14
ZMM5250BPF	20	19	21	6.2	25	600	0.25	0.1	15
ZMM5251BPF	22	20.9	23.1	5.6	29	600	0.25	0.1	17
ZMM5252BPF	24	22.8	25.2	5.2	33	600	0.25	0.1	18
ZMM5253BPF	25	23.75	26.25	5	35	600	0.25	0.1	19
ZMM5254BPF	27	25.65	28.35	4.6	41	600	0.25	0.1	21
ZMM5255BPF	28	26.6	29.4	4.4	44	600	0.25	0.1	21
ZMM5256BPF	30	28.5	31.5	4.2	49	600	0.25	0.1	23
ZMM5257BPF	33	31.35	34.65	3.8	58	700	0.25	0.1	25
ZMM5258BPF	36	34.2	37.8	3.4	70	700	0.25	0.1	27
ZMM5259BPF	39	37.05	40.95	3.2	80	800	0.25	0.1	30
ZMM5260BPF	43	40.85	45.15	3	93	900	0.25	0.1	33
ZMM5261BPF	47	44.65	49.35	2.7	105	1000	0.25	0.1	36
ZMM5262BPF	51	48.45	53.55	2.5	125	1100	0.25	0.1	39
ZMM5263BPF	56	53.2	58.8	2.2	150	1300	0.25	0.1	45
ZMM5264BPF	60	57	63	2.1	170	1400	0.25	0.1	46
ZMM5265BPF	62	58.9	65.1	2	185	1400	0.25	0.1	47
ZMM5266BPF	68	64.6	71.4	1.8	230	1600	0.25	0.1	52
ZMM5267BPF	75	71.25	78.75	1.7	270	1700	0.25	0.1	56

<sup>1)</sup> Tested with pulses  $t_p = 20\text{ ms}$ .

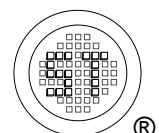


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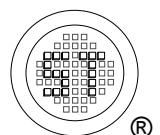
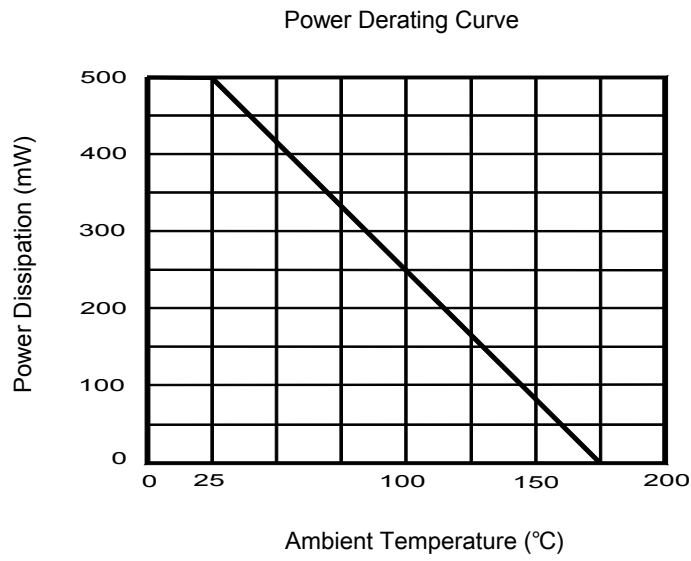
## Characteristics at $T_a = 25^\circ\text{C}$ ( $V_F = 1.1\text{ V Max. at } I_F = 200\text{ mA}$ )

Type	Zener Voltage Range <sup>1)</sup>				Dynamic Resistance			Reverse Current	
	$V_{Znom}$	$V_{ZT}$		at $I_{ZT}$	$Z_{ZT}$	$Z_{ZK}$	at $I_{ZK}$	$I_R$	at $V_R$
	(V)	Min. (V)	Max. (V)	(mA)	Max. ( $\Omega$ )	Max. ( $\Omega$ )	(mA)	Max. ( $\mu\text{A}$ )	(V)
ZMM5221CPF	2.4	2.35	2.45	20	30	1200	0.25	100	1
ZMM5222CPF	2.5	2.45	2.55	20	30	1250	0.25	100	1
ZMM5223CPF	2.7	2.65	2.75	20	30	1300	0.25	75	1
ZMM5224CPF	2.8	2.74	2.86	20	30	1400	0.25	75	1
ZMM5225CPF	3	2.94	3.06	20	29	1600	0.25	50	1
ZMM5226CPF	3.3	3.23	3.37	20	28	1600	0.25	25	1
ZMM5227CPF	3.6	3.53	3.67	20	24	1700	0.25	15	1
ZMM5228CPF	3.9	3.82	3.98	20	23	1900	0.25	10	1
ZMM5229CPF	4.3	4.21	4.39	20	22	2000	0.25	5	1
ZMM5230CPF	4.7	4.61	4.79	20	19	1900	0.25	5	2
ZMM5231CPF	5.1	4.99	5.20	20	17	1600	0.25	5	2
ZMM5232CPF	5.6	5.49	5.71	20	11	1600	0.25	5	3
ZMM5233CPF	6	5.88	6.12	20	7	1600	0.25	5	3.5
ZMM5234CPF	6.2	6.08	6.32	20	7	1000	0.25	5	4
ZMM5235CPF	6.8	6.66	6.94	20	5	750	0.25	3	5
ZMM5236CPF	7.5	7.35	7.65	20	6	500	0.25	3	6
ZMM5237CPF	8.2	8.04	8.36	20	8	500	0.25	3	6.5
ZMM5238CPF	8.7	8.53	8.87	20	8	600	0.25	3	6.5
ZMM5239CPF	9.1	8.92	9.28	20	10	600	0.25	3	7
ZMM5240CPF	10	9.8	10.2	20	17	600	0.25	3	8
ZMM5241CPF	11	10.78	11.22	20	22	600	0.25	2	8.4
ZMM5242CPF	12	11.76	12.24	20	30	600	0.25	1	9.1
ZMM5243CPF	13	12.74	13.26	9.5	13	600	0.25	0.5	9.9
ZMM5244CPF	14	13.72	14.28	9	15	600	0.25	0.1	10
ZMM5245CPF	15	14.7	15.3	8.5	16	600	0.25	0.1	11
ZMM5246CPF	16	15.68	16.32	7.8	17	600	0.25	0.1	12
ZMM5247CPF	17	16.66	17.34	7.4	19	600	0.25	0.1	13
ZMM5248CPF	18	17.64	18.36	7.0	21	600	0.25	0.1	14
ZMM5249CPF	19	18.62	19.38	6.6	23	600	0.25	0.1	14
ZMM5250CPF	20	19.6	20.4	6.2	25	600	0.25	0.1	15
ZMM5251CPF	22	21.56	22.44	5.6	29	600	0.25	0.1	17
ZMM5252CPF	24	23.52	24.48	5.2	33	600	0.25	0.1	18
ZMM5253CPF	25	24.5	25.5	5	35	600	0.25	0.1	19
ZMM5254CPF	27	26.46	27.54	4.6	41	600	0.25	0.1	21
ZMM5255CPF	28	27.44	28.56	4.4	44	600	0.25	0.1	21
ZMM5256CPF	30	29.4	30.6	4.2	49	600	0.25	0.1	23
ZMM5257CPF	33	32.34	33.66	3.8	58	700	0.25	0.1	25
ZMM5258CPF	36	35.28	36.72	3.4	70	700	0.25	0.1	27
ZMM5259CPF	39	38.22	39.78	3.2	80	800	0.25	0.1	30
ZMM5260CPF	43	42.14	43.86	3	93	900	0.25	0.1	33
ZMM5261CPF	47	46.06	47.94	2.7	105	1000	0.25	0.1	36
ZMM5262CPF	51	49.98	52.02	2.5	125	1100	0.25	0.1	39
ZMM5263CPF	56	54.88	57.12	2.2	150	1300	0.25	0.1	45
ZMM5264CPF	60	58.8	61.2	2.1	170	1400	0.25	0.1	46
ZMM5265CPF	62	60.76	63.24	2	185	1400	0.25	0.1	47
ZMM5266CPF	68	66.64	69.36	1.8	230	1600	0.25	0.1	52
ZMM5267CPF	75	73.5	76.5	1.7	270	1700	0.25	0.1	56

<sup>1)</sup> Tested with pulses  $t_p = 20\text{ ms}$ .



## Electrical Characteristics Curves



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