



**THE DATASHEET OF  
SMPZ3938B-M3/85A**



## Surface Mount Power Voltage-Regulating Diodes

### eSMP® Series


**SMP (DO-220AA)**

Anode Cathode


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Low Zener impedance
- Low regulation factor
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### TYPICAL APPLICATIONS

For general purpose regulation, industrial, and protection applications.

### MECHANICAL DATA

**Case:** SMP (DO-220AA)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and industrial grade

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test

**Polarity:** color band denotes cathode end

### LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$V_Z$	5.6 V to 43 V
$P_{tot}$ at $T_L = 75\text{ °C}$	1500 mW
$P_{tot}$ at $T_L = 25\text{ °C}$	500 mW
$T_J$ max.	150 °C
$V_Z$ specification	Pulse current
Package	SMP (DO-220AA)
Circuit configuration	Single

PACKAGE				
PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
SMP (DO-220AA)	24 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Power dissipation at $T_L = 75\text{ °C}$ (fig. 1) <sup>(1)</sup>	$P_{tot}$	1500	mW
Power dissipation at $T_A = 25\text{ °C}$ (fig. 1) <sup>(2)</sup>	$P_{tot}$	500	mW
Maximum instantaneous forward voltage at 200 mA for all types <sup>(3)</sup>	$V_F$	1.5	V
Operating junction and storage temperature range	$T_J, T_{STG}$	-65 to +150	°C

#### Notes

- (1) Mounted on PCB with 5.0 mm x 5.0 mm copper pads attached to each terminal
- (2) Mounted on minimum recommended pad layout
- (3) Pulse test: 300  $\mu$ s pulse width, 1 % duty cycle



ELECTRICAL CHARACTERISTICS	
SYMBOL	PARAMETER
$V_Z$	Reverse Zener voltage at $I_{ZT}$
$I_{ZT}$	Reverse current
$Z_{ZT}$	Maximum Zener impedance at $I_{ZT}$
$I_{ZK}$	Reverse current
$Z_{ZK}$	Maximum Zener impedance at $I_{ZK}$
$I_R$	Reverse leakage current at $V_R$
$V_R$	Reverse voltage
$I_F$	Forward current
$V_F$	Forward voltage at $I_F$
$I_{ZM}$	Maximum DC Zener current



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)											
PART NUMBER	DEVICE MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		MAXIMUM ZENER IMPEDANCE		MAXIMUM REVERSE LEAKAGE CURRENT		MAXIMUM ZENER CURRENT
		$V_Z$ at $I_{ZT}$			$I_{ZT}$	$I_{ZK}$	$Z_{ZT}$ AT $I_{ZT}$	$Z_{ZK}$ AT $I_{ZK}$	$I_R$ AT $V_R$		$I_{ZM}$
		V			mA		$\Omega$		$\mu\text{A}$	V	mA
		MIN.	NOM.	MAX.			MAX.	MAX.	MAX.		MAX.
SMPZ3919B	19B	5.32	5.6	5.88	66.9	1.0	5.0	700	200	3.0	268
SMPZ3920B	20B	5.89	6.2	6.51	60.5	1.0	2.0	700	200	4.0	242
SMPZ3921B	21B	6.46	6.8	7.14	55.1	1.0	2.5	400	200	5.2	221
SMPZ3922B	22B	7.12	7.5	7.88	50.0	0.5	3.0	400	150	6.0	200
SMPZ3923B	23B	7.79	8.2	8.61	45.7	0.5	3.5	400	50	6.5	183
SMPZ3924B	24B	8.64	9.1	9.56	41.2	0.5	4.0	500	10	7.0	165
SMPZ3925B	25B	9.5	10	10.5	37.5	0.25	4.5	500	2.5	8.0	150
SMPZ3926B	26B	10.5	11	11.6	34.1	0.25	5.5	550	0.5	8.4	136
SMPZ3927B	27B	11.4	12	12.6	31.2	0.25	6.5	550	0.5	9.1	125
SMPZ3928B	28B	12.4	13	13.7	28.8	0.25	7.0	550	0.5	9.9	115
SMPZ3929B	29B	14.3	15	15.8	25	0.25	9.0	600	0.5	11.4	100
SMPZ3930B	30B	15.2	16	16.8	23.4	0.25	10.0	600	0.5	12.2	94
SMPZ3931B	31B	17.1	18	18.9	20.8	0.25	12.0	650	0.5	13.7	83
SMPZ3932B	32B	19.0	20	21	18.7	0.25	14.0	650	0.5	15.2	75
SMPZ3933B	33B	20.9	22	23.1	17.0	0.25	17.5	650	0.5	16.7	68
SMPZ3934B	34B	22.8	24	25.2	15.6	0.25	19.0	700	0.5	18.2	63
SMPZ3935B	35B	25.7	27	28.4	13.9	0.25	23.0	700	0.5	20.6	56
SMPZ3936B	36B	28.5	30	31.5	12.5	0.25	26.0	750	0.5	22.8	50
SMPZ3937B	37B	31.4	33	34.7	11.4	0.25	33.0	800	0.5	25.1	45
SMPZ3938B	38B	34.2	36	37.8	10.4	0.25	38.0	850	0.5	27.4	42
SMPZ3939B	39B	37.1	39	41	9.6	0.25	45.0	900	0.5	29.7	38
SMPZ3940B	40B	40.9	43	45.2	8.7	0.25	53.0	950	0.5	32.7	35

THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Typical thermal resistance, junction to lead <sup>(1)</sup>	$R_{\theta JL}$	50	$^\circ\text{C}/\text{W}$
Typical thermal resistance, junction to ambient <sup>(2)</sup>	$R_{\theta JA}$	250	$^\circ\text{C}/\text{W}$

Notes

- (1) Mounted on PCB with 5.0 mm x 5.0 mm copper pad areas attached to each terminal
- (2) Mounted on minimum recommended pad layout



ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SMPZ3919B-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel
SMPZ3919B-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

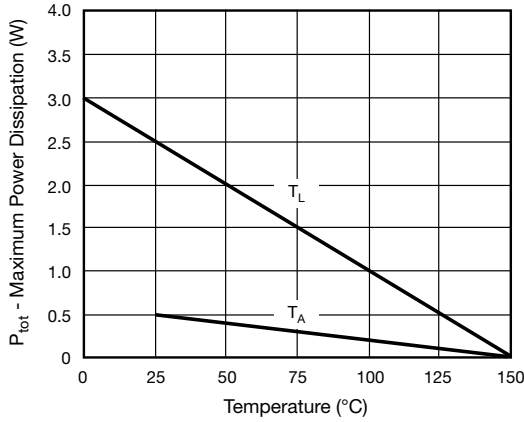


Fig. 1 - Steady State Power Derating

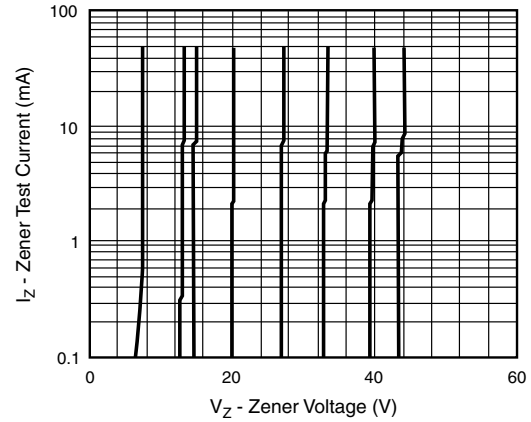


Fig. 3 - Typical Zener Voltage

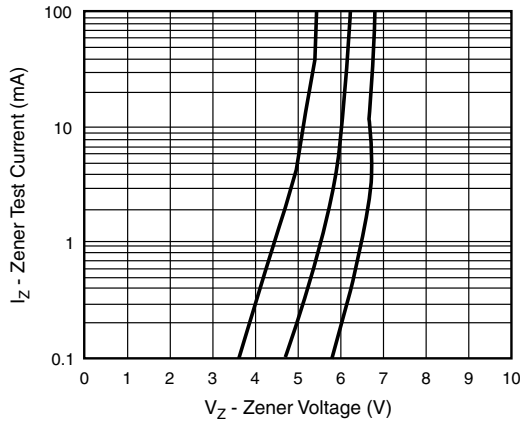


Fig. 2 - Typical Zener Voltage

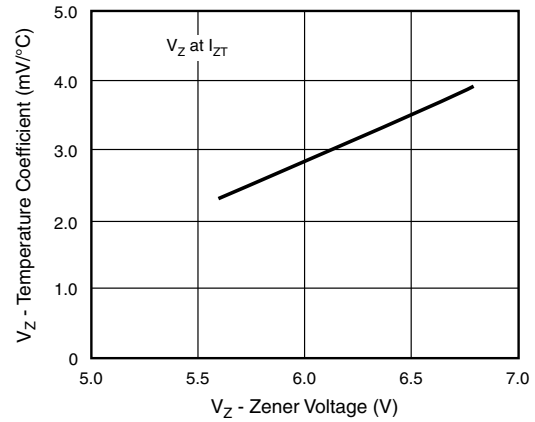


Fig. 4 - Typical temperature Coefficients



Fig. 5 - Typical Transient Temperature Coefficients



Fig. 6 - Typical Junction Capacitance

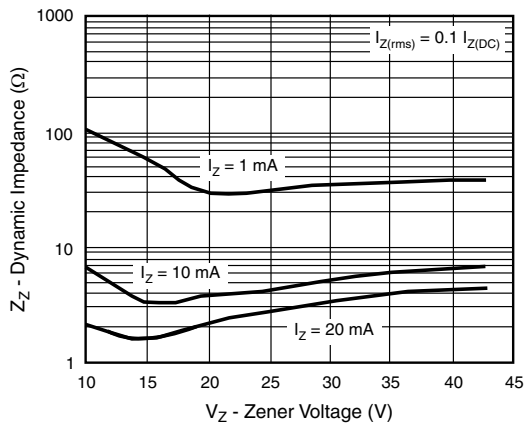
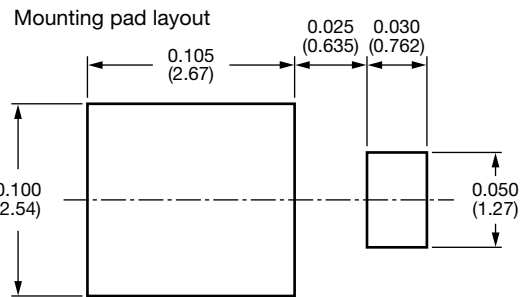


Fig. 7 - Typical Zener Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### SMP (DO-220AA)





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