# imall

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## SMBZ5919B thru SMBZ5945B

Vishay General Semiconductor

## **Surface Mount Power Voltage-Regulating Diodes**



DO-214AA (SMBJ)

PRIMARY CHARACTERISTICS					
V <sub>Z</sub> 5.6 V to 85 V					
P <sub>tot</sub> at T <sub>L</sub> = 75 °C	3000 mW				
P <sub>tot</sub> at T <sub>A</sub> = 25 °C	550 mW				
T <sub>J</sub> max.	150 °C				
V <sub>Z</sub> specification	Pulse current				
Int. construction	Single				

#### **TYPICAL APPLICATIONS**

For general purpose regulation and protection applications.

#### FEATURES

- Low profile package
- · 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 <u>www.vishay.com/doc?99912</u>

#### **MECHANICAL DATA**

Case: DO-214AA (SMBJ)

Molding compound meets UL 94 V-0 flammability rating Base P/N-E3 - RoHS-compliant and commercial grade

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

E3 suffix meets JESD 201 class 1A whisker test

Polarity: Color band denotes cathode end

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)							
PARAMETER	SYMBOL	VALUE	UNIT				
Maximum steady state power dissipation at $T_L = 75 \text{ °C}$ (fig. 1)	P <sub>tot</sub>	3000	mW				
Maximum steady state power dissipation at $T_A = 25 \text{ °C}$ (fig. 1) <sup>(1)</sup>	P <sub>tot</sub>	550	mW				
Maximum instantaneous forward voltage at 200 mA for all types (2)	V <sub>F</sub>	1.5	V				
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	- 65 to + 150	°C				

Notes

(1) Mounted on PCB with 5.0 mm x 5.0 mm copper pads attached to each terminal

<sup>(2)</sup> Pulse test: 300 µs pulse width, 1 % duty cycle

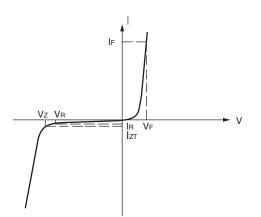
e3 RoHS



<b>SMBZ5919B</b>	thru	<b>SMBZ5945B</b>
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Vishay General Semiconductor

ELECTRICAL CHARACTERISTICS					
SYMBOL PARAMETER					
Vz	Reverse Zener voltage at I <sub>ZT</sub>				
I <sub>ZT</sub>	Reverse current				
Z <sub>ZT</sub>	Maximum Zener impedance at I <sub>ZT</sub>				
I <sub>ZK</sub>	Reverse current				
Z <sub>ZK</sub>	Maximum Zener impedance at I <sub>ZK</sub>				
I <sub>R</sub>	Reverse leakage current at V <sub>R</sub>				
V <sub>R</sub>	Reverse voltage				
I <sub>F</sub>	Forward current				
V <sub>F</sub>	Forward voltage at I <sub>F</sub>				
I <sub>ZM</sub>	Maximum DC Zener current				



Zener Voltage Regulator

<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)										
PART DEVICE	ZENER VOLTAGE RANGE		TEST CURRENT		MAXIMUM ZENER IMPEDANCE		REVERSE LEAKAGE CURRENT		MAXIMUM ZENER CURRENT I <sub>ZM</sub>	
	V <sub>Z</sub> AT I <sub>ZT</sub>		I <sub>ZT</sub> I <sub>ZK</sub>		Z <sub>ZT</sub> AT I <sub>ZT</sub> Z <sub>ZK</sub> AT I <sub>ZK</sub>		I <sub>R</sub> at V <sub>R</sub>			
OODL		v	1	r	nA			μΑ	v	mA
										MAX.
-					-					267
-	5.89	6.2	6.51	60.5	1.0	2.0		200	4.0	241
21B	6.46	6.8	7.14	55.1	1.0	2.5	400	200	5.2	220
24B	8.64	9.1	9.56	41.2	0.5	4.0	1000	25	7.0	164
25B	9.5	10	10.5	37.5	0.25	4.5	1000	25	8.0	150
26B	10.5	11	11.6	34.1	0.25	5.5	550	5	8.4	136
27B	11.4	12	12.6	31.2	0.25	6.5	550	1	9.1	125
28B	12.4	13	13.7	28.8	0.25	7.0	550	1	9.9	115
29B	14.3	15	15.8	25.0	0.25	9.0	600	1	11.4	100
30B	15.2	16	16.8	23.4	0.25	10.0	600	1	12.2	93
31B	17.1	18	18.9	20.8	0.25	12.0	650	1	13.7	83
32B	19.0	20	21.0	18.7	0.25	14.0	650	1	15.2	75
33B	20.9	22	23.1	17.0	0.25	17.5	650	1	16.7	68
34B	22.8	24	25.2	15.6	0.25	19.0	700	1	18.2	62
35B	25.7	27	28.4	13.9	0.25	23.0	700	1	20.6	55
36B	28.5	30	31.5	12.5	0.25	28.0	750	1	22.8	50
37B	31.4	33	34.7	11.4	0.25	33.0	800	1	25.1	45
38B	34.2	36	37.8	10.4	0.25	38.0	850	1	27.4	41
39B	37.1	39	41.0	9.6	0.25	45.0	900	1	29.7	38
40B	40.9	43	45.2	8.7	0.25	53.0	950	1	32.7	34
41B	44.6	47	49.4	8.0	0.25	67.0	1000	1	35.8	31
42B	48.4	51	53.6	7.3	0.25	70.0	1100	1	38.8	29
43B	53.2	56	58.8	6.7	0.25	86.0	1300	1	42.6	26
44B	58.9	62	65.1	6.0	0.25	100	1500	1	47.1	24
45B	64.6	68	71.4	5.5	0.25	120	1700	1	51.7	22
	DEVICE   MARKING   19B   20B   21B   24B   25B   26B   27B   28B   29B   30B   31B   32B   33B   34B   35B   36B   37B   38B   39B   40B   41B   42B   43B	DEVICE MARKING CODE   ZEN     I   I     19B   5.32     20B   5.89     21B   6.46     24B   8.64     25B   9.5     26B   10.5     27B   11.4     28B   12.4     29B   14.3     30B   15.2     31B   17.1     32B   19.0     33B   20.9     34B   22.8     35B   25.7     36B   25.7     36B   28.5     37B   31.4     38B   34.2     39B   37.1     40B   40.9     41B   44.6     42B   53.2	JEVICE MARKING CODE   ZENERVICE RANGE     IU   V     MIN.   NOM.     19B   5.32   5.6     20B   5.89   6.2     21B   6.46   6.8     24B   8.64   9.1     25B   9.5   10     26B   10.5   11     27B   11.4   12     28B   12.4   13     29B   14.3   15     30B   15.2   16     31B   17.1   18     32B   19.0   20     33B   20.9   22     34B   22.8   30     35B   25.7   27     36B   28.5   30     37B   31.4   33     38B   34.2   36     39B   37.1   39     40B   40.9   43     41B   44.6   47     42B   53.2   56	ZENERANCEVERANCEVERANCEVERANCEVERANCE1985.325.681985.325.682085.896.26.512186.466.87.142488.649.19.562589.510010.526810.511011.627811.412212.628812.413313.729814.315.115.830815.216.816.831817.118818.932819.020021.033820.922.223.134825.72728.435834.230.631.436834.23634.237834.23634.239834.23634.2440848.45153.6448.453.256.8	ZENER VOLTAGE RANGECURZENER VOLTAGE RANGESCURVIzrMINNOM.MAX.19B5.325.65.8866.920B5.896.26.5160.520B5.896.26.5160.521B6.466.87.1455.124B8.649.19.5641.225B9.510010.537.526B10.511.111.634.127B11.41212.631.228B12.41313.728.829B14.315.115.825.030B15.21616.823.431B17.11818.920.832B19.02021.018.733B20.92223.117.034B25.72728.413.935B25.72728.413.936B28.530.31.512.537B31.43334.711.438B34.23637.810.439B37.13941.09.644B44.64749.48.044B53.256.86.7	BENERANGE STATESETERANGE STATESETERANGE STATEIPERANGE STATEIPERANGE STATEV IPERIPERANGE VMIN. 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MAX.   MAX.     19B   5.32   5.6   5.88   66.9   1.0   5.00   700   200   3.0     20B   5.89   62.6   6.51   60.5   1.0   2.0   700   200   4.0     21B   6.46   6.8   7.14   55.1   1.0   2.5   400   200   5.2     24B   8.64   9.1   9.56   41.2   0.5   4.0   1000   25   7.0     25B   9.5   10   10.5   37.5   0.25   4.55   100   25   8.4     27B   11.4   12   12.6   31.2   0.25   5.5   550   1   9.9     28B   12.4   13   13.7   28.8</td>	ZENER VOLTAGE RANGETESENT MAXIMU IMPER TECURRENTMAXIMU IMPER TECURRENTMAXIMU IMPERVIzrIzrIzrZET AT IzrVNOMMAX1985.325.65.886.691.00MAX1985.325.65.886.616.0051.002.02085.896.26.666.466.415.00.202186.466.415.50.254.02186.466.111.002.52489.51.002.52481.111.163.120.256.52781.111.163.120.250.252781.1212.63.120.251.002881.1212.63.120.251.01 <td< td=""><td>PEVICE MARKING CODEMAXIMUZENERMAXIMUZENERMAXIMUZENERMAXIMUZENERVIzrIzrIzrZzrAT IzrZzr, AT IzrZzr, AT IzrZzr, AT IzrZzr, AT IzrZzr, AT IzrMAX.19B5.325.65.8866.91.05.070070020B5.896.26.5160.51.02.070021B6.466.87.1455.11.02.540024B8.649.19.5641.20.554.0100025B9.51010.537.50.254.5100026B10.51111.634.10.255.5055027B11.41212.631.20.256.555028B12.41313.728.80.257.055029B14.31515.825.00.2510.060030B15.21616.823.40.2510.065032B19.02021.018.70.2514.065033B20.92223.117.00.2514.065034B25.72728.413.90.2523.070035B25.72728.413.90.2523.070035B25.727</td></td<> <td>Test cursesMAXIMUM Zener IMPEDACERev Leak CURV ZAT IztIztIzkZzt AT IztZzk AT IzkIna CURVMAX.MAX.MAX.MAX.NOMMAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.1066.20Add.0.50</td>	PEVICE MARKING CODEMAXIMUZENERMAXIMUZENERMAXIMUZENERMAXIMUZENERVIzrIzrIzrZzrAT IzrZzr, AT IzrZzr, AT IzrZzr, AT IzrZzr, AT IzrZzr, AT IzrMAX.19B5.325.65.8866.91.05.070070020B5.896.26.5160.51.02.070021B6.466.87.1455.11.02.540024B8.649.19.5641.20.554.0100025B9.51010.537.50.254.5100026B10.51111.634.10.255.5055027B11.41212.631.20.256.555028B12.41313.728.80.257.055029B14.31515.825.00.2510.060030B15.21616.823.40.2510.065032B19.02021.018.70.2514.065033B20.92223.117.00.2514.065034B25.72728.413.90.2523.070035B25.72728.413.90.2523.070035B25.727	Test cursesMAXIMUM Zener IMPEDACERev Leak CURV ZAT IztIztIzkZzt AT IztZzk AT IzkIna CURVMAX.MAX.MAX.MAX.NOMMAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.MAX.1066.20Add.0.50	DEVICE MARKING CODE   ZENER VOLTAGE RANGE   TEST CURRENT   MAXIMUM ZENER IMPEDANCE   REVERSE LEAKAGE ZET AT IZT   ZEN AT IZT   IZR   ZZ AT IZT   ZEN AT IZX   In at Vn     V   MN   NOM   MAX   MAX   MAX.   MAX.   MAX.     19B   5.32   5.6   5.88   66.9   1.0   5.00   700   200   3.0     20B   5.89   62.6   6.51   60.5   1.0   2.0   700   200   4.0     21B   6.46   6.8   7.14   55.1   1.0   2.5   400   200   5.2     24B   8.64   9.1   9.56   41.2   0.5   4.0   1000   25   7.0     25B   9.5   10   10.5   37.5   0.25   4.55   100   25   8.4     27B   11.4   12   12.6   31.2   0.25   5.5   550   1   9.9     28B   12.4   13   13.7   28.8

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## SMBZ5919B thru SMBZ5945B

Vishay General Semiconductor

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	LIMIT	UNIT			
Typical thermal resistance, junction to lead	$R_{ ext{ ext{ ext{ ext{ ext{ ext{ ext{ ext$	25	°C/W			
Typical thermal resistance, junction to ambient <sup>(1)</sup>	$R_{ hetaJA}$	226	°C/W			

Note

<sup>(1)</sup> Mounted on minimum recommended pad layout

ORDERING INFORMATION (Example)							
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE			
SMBZ5935B-E3/52	0.096	52	750	7" diameter plastic tape and reel			
SMBZ5935B-E3/5B	0.096	5B	3200	13" diameter plastic tape and reel			

#### **RATINGS AND CHARACTERISTICS CURVES**

(T<sub>A</sub> = 25 °C unless otherwise noted)

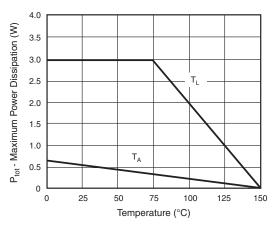


Fig. 1 - Steady State Power Durating

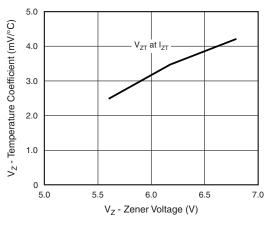


Fig. 2 - Typical Temperature Coefficients

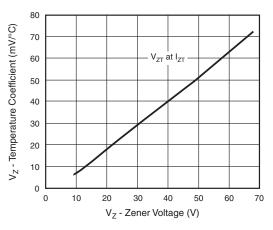


Fig. 3 - Typical Temperature Coefficients

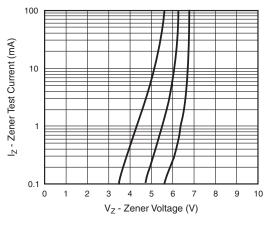


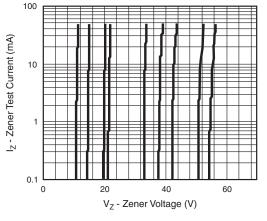
Fig. 4 - Typical Zener Voltage

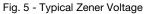
#### Revision: 25-May-12

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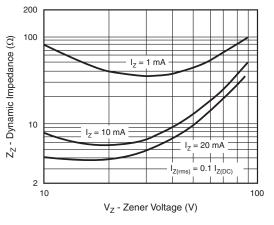
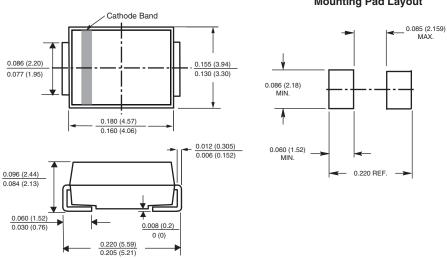


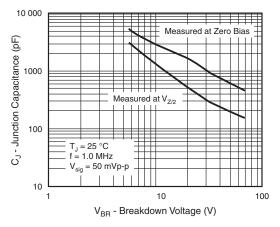
Fig. 6 - Typical Zener Impedance

#### **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters) DO-214AA (SMB-J-Bend)



SMBZ5919B thru SMBZ5945B

Vishay General Semiconductor





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Mounting Pad Layout



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