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April 1<sup>st</sup>, 2010 Renesas Electronics Corporation

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## **ZENER DIODES**

# **RD2.0S to RD150S**

## ZENER DIODES 200 mW 2-PIN SUPER MINI MOLD

#### **DESCRIPTION**

Type RD2.0S to RD150S series are 2 pin super mini mold package zener diodes possessing an allowable power dissipation of 200 mW.

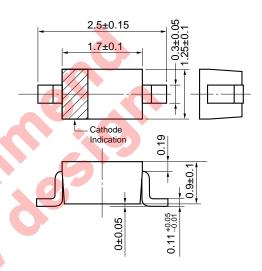
#### **FEATURES**

- · Sharp breakdown characteristic
- · Vz: Applied E24 standard

#### **APPLICATIONS**

Circuit for constant voltage, constant current, wave form clipper, surge absorver, etc.

#### **PACKAGE DRAWING (Unit: mm)**



#### ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Power Dissipation		Р	200	mW	
Forward Current	7.0	İF	100	mA	
Reverse Surge Power	, %	Prsm	85	W	(at t = 10 $\mu$ s/ 1 pulse) Show Fig.12
Junction Temperature		Tj	150	°C	
Storage Temperature		Tstg	-55 to +150	°C	

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### <R> ELECTRICAL CHARACTERISTICS (TA = 25 ±2°C)

(1/4)

Type Number	Class	Zener Voltage Vz (V) <sup>Note1</sup>			Dynamic Iı Zz (Ω		Reverse Current	
		MIN.	MAX.	Iz (mA)	MAX.	) Iz (mA)	MAX.	μΑ) V <sub>R</sub> (V)
RD2.0S	В	1.90	2.20	5	100	5	120	0.5
RD2.2S	В	2.10	2.40	5	100	5	120	0.7
RD2.4S	В	2.30	2.60	5	100	5	120	1.0
RD2.7S	В	2.50	2.90	5	110	5	120	1.0
ND2.73	B1	2.50	2.75		110	3	120	1.0
	B2	2.65	2.90					
RD3.0S	В	2.80	3.20	5	120	5	50	1.0
1120.00	B1	2.80	3.05	Ŭ	120	O	00	1.0
	B2	2.95	3.20					
RD3.3S	В	3.10	3.50	5	130	5	20	1.0
	B1	3.10	3.35					
	B2	3.25	3.50					
RD3.6S	В	3.40	3.80	5	130	5	10	1.0
	B1	3.40	3.65					
	B2	3.55	3.80					
RD3.9S	В	3.70	4.10	5	130	5	10	1.0
	B1	3.70	3.97					
	B2	3.87	4.10					
RD4.3S	В	4.00	4.49	5	130	5	10	1.0
	B1	4.00	4.22					
	B2	4.14	4.35					
	В3	4.27	4.49					
	BX	4.00	4.35					
	BY	4.14	4.49					
RD4.7S	В	4.40	4.92	5	130	5	10	1.0
	B1	4.40	4.63					
	B2	4.53	4.77					
	В3	4.67	4.92					
	ВХ	4.40	4.77					
	BY	4.53	4.92					
RD5.1S	В	4.82	5.39	5	130	5	5	1.5
	B1	4.82	5.06					
	B2	4.96	5.22					
	В3	5.12	5.39					
-	ВХ	4.82	5.22					
	BY	4.96	5.39					

Note 1. Vz is tested with pulsed (40 ms).

<sup>2.</sup> Zz is measured at Iz by given a very small A.C. current signal.

(2/4)

Type Number	Class		Zener Voltage		Dynamic I	mpedance	(2/4) Reverse Current	
Type Number	Olass		Vz (V) Note1			) Note2	IR (μA)	
		MIN.	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	V <sub>R</sub> (V)
RD5.6S	В	5.29	5.94	5	80	5	5	2.5
	B1	5.29	5.57					
	B2	5.47	5.75					
	В3	5.65	5.94					
	BX	5.29	5.57					
	BY	5.47	5.94					
RD6.2S	В	5.84	6.55	5	50	5	2	3.0
	B1	5.84	6.14					
	B2	6.04	6.35					
	В3	6.24	6.55					
	BX	5.84	6.35					
	BY	6.04	6.55					
RD6.8S	В	6.44	7.17	5	30	5	2	3.5
	B1	6.44	6.76					
	B2	6.62	6.96					
	В3	6.83	7.17		C			
	ВХ	6.44	6.96					
	BY	6.62	7.17					
RD7.5S	В	7.03	7.87	5	30	5	2	4.0
	B1	7.03	7.39					
	B2	7.25	7.63					
	В3	7.49	7.87					
	BX	7.03	7.63					
	BY	7.25	7.87					
RD8.2S	В	7.73	8.67	5	30	5	2	5.0
	B1	7.73	8.13					
	B2	7.98	8.39					
	В3	8.25	8.67					
	BX	7.73	8.39					
	BY	7.98	8.67					
RD9.1S	В	8.53	9.58	5	30	5	2	6.0
	B1	8.53	8.96					
	B2	8.81	9.26					
	В3	9.12	9.58					
	BX	8.53	9.26					
	BY	8.81	9.58					

Note 1. Vz is tested with pulsed (40 ms).

**2.** Zz is measured at Iz by given a very small A.C. current signal.

(3/4)

Type Number	Class		Zener Voltage Vz (V) Note1		Dynamic Impedance Zz (Ω) <sup>Note2</sup>		Reverse Current		
		MIN.	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	μΑ) V <sub>R</sub> (V)	
RD10S	В	9.42	10.58	5	30	5	2	7.0	
	B1	9.42	9.90						
	B2	9.74	10.24						
	В3	10.08	10.58						
	BX	9.42	10.24						
	BY	9.74	10.58						
RD11S	В	10.40	11.60	5	30	5	2	8.0	
	B1	10.40	10.92						
	B2	10.72	11.26						
	В3	11.06	11.60						
	BX	10.40	11.26						
	BY	10.72	11.60						
RD12S	В	11.38	12.64	5	35	5	2	9.0	
	B1	11.38	11.94						
	B2	11.69	12.28						
	В3	12.04	12.64						
	BX	11.38	12.28						
	BY	11.69	12.64						
RD13S	В	12.43	14.00	5	35	5	2	10	
	B1	12.43	13.07						
	B2	12.87	13.53	N					
	В3	13.33	14.00						
RD15S	В	13.80	15.56	5	40	5	2	11	
	B1	13.80	14.50						
	B2	14.30	15.02						
	В3	14.81	15.56						
RD16S	В	15.31	17.14	5	40	5	2	12	
	B1	15.31	16.07						
	B2	15.78	16.58						
	В3	16.30	17.14						
RD18S	В	16.89	19.08	5	45	5	2	13	
	B1	16.89	17.75						
	B2	17.51	18.40						
	В3	18.16	19.08						

Note 1. Vz is tested with pulsed (40 ms).

2. Zz is measured at Iz by given a very small A.C. current signal.

(4/4)

Type Number	Class	Zener Voltage Vz (V) Note1			Dynamic Impedance $Z_{Z}\left( \Omega \right) ^{Note2}$		Reverse Current IR ( $\mu$ A)	
		MIN.	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	V <sub>R</sub> (V)
RD20S	В	18.80	21.14	5	50	5	2	15
	B1	18.80	19.76					
	B2	19.46	20.45					
	В3	20.15	21.14					
RD22S	В	20.81	23.25	5	55	5	2	17
	B1	20.81	21.84					
	B2	21.46	22.55					
	В3	22.15	23.25					
RD24S	В	22.86	25.66	5	60	5	2	19
	B1	22.86	24.03					
	B2	23.65	24.85					
	В3	24.45	25.66					
RD27S	В	25.10	28.90	2	70	2	2	21
RD30S	В	28.00	32.00	2	80	2	2	23
RD33S	В	31.00	35.00	2	80	2	2	25
RD36S	В	34.00	38.00	2	90	2	2	27
RD39S	В	37.00	41.00	2	100	2	2	30
RD43S	В	40.00	45.00	2	130	2	2	33
RD47S	В	44.00	49.00	2	150	2	2	36
RD51S	В	48.00	54.00	2	180	2	1	39
RD56S	В	53.00	60.00	2	180	2	1	43
RD62S	В	58.00	66.00	2	200	2	0.2	47
RD68S	В	64.00	72.00	2	250	2	0.2	52
RD75S	В	70.00	79.00	2	300	2	0.2	57
RD82S	В	77.00	87.00	2	300	2	0.2	63
RD91S	В	85.00	96.00	1	700	1	0.2	69
RD100S	В	94.00	106.0	1	700	1	0.2	76
RD110S	В	104.00	116.00	1	800	1	0.2	84
RD120S	В	114.00	126.00	1	900	1	0.2	91
RD150S	В	140.00	160.00	1	1500	1	0.2	120

Note 1. Vz is tested with pulsed (40 ms).

2. Zz is measured at Iz by given a very small A.C. current signal.

#### TYPICAL CHARACTERISTICS (TA = 25°C)

Fig.1 POWER DISSIPATION vs. AMBIENT TEMPERATURE

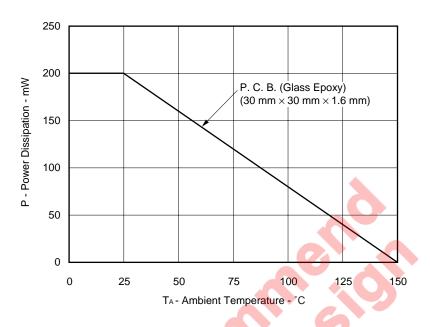
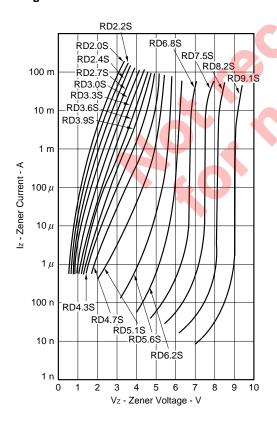


Fig.2 ZENER CURRENT vs. ZENER VOLTAGE

Fig.3 ZENER CURRENT vs. ZENER VOLTAGE



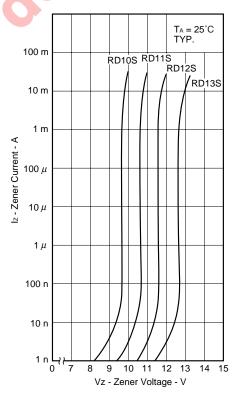


Fig.4 ZENER CURRENT vs. ZENER VOLTAGE

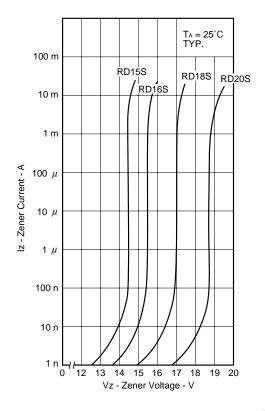


Fig.6 ZENER CURRENT vs. ZENER VOLTAGE

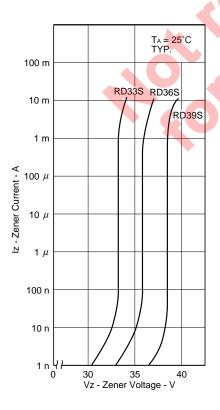


Fig.5 ZENER CURRENT vs. ZENER VOLTAGE

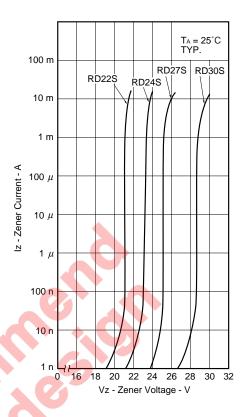
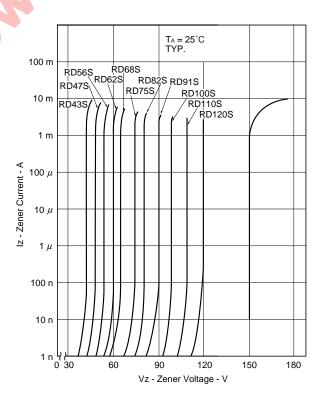


Fig.7 ZENER CURRENT vs. ZENER VOLTAGE



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Fig.8 DYNAMIC IMPEDANCE vs. ZENER CURRENT

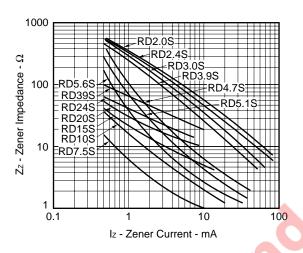
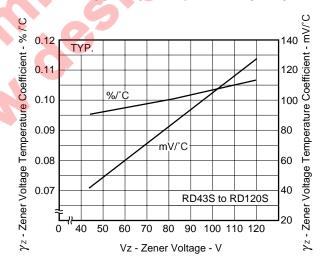


Fig.9 ZENER VOLTAGE TEMPERATURE COEFFICIENT vs. ZENER VOLTAGE

γz - Vz Temperature Coefficient - mV/°C  $\gamma_{\rm Z}$  - Vz Temperature Coefficient - %/ C 40 0.1 %/°C 32 0.08 0.06 16 0.04 mV/°C 8 0.02 -0.02 -8 -0.04-0.06 RD2.0S to RD39S 0 8 16 20 24 28 32 36 Vz - Zener Voltage - V

Fig.10 ZENER VOLTAGE TEMPERATURE
COEFFICIENT vs. ZENER VOLTAGE



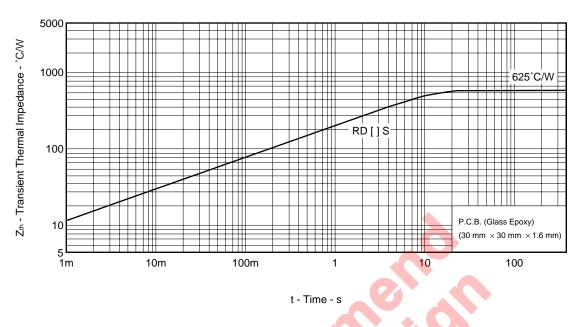
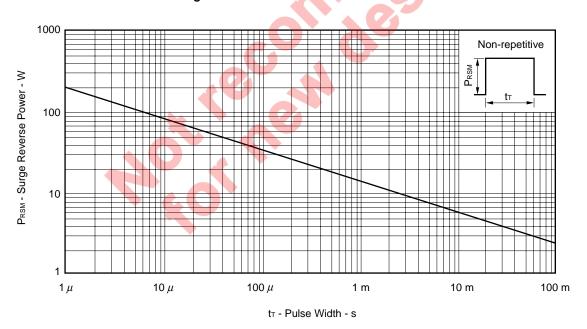


Fig.11 TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS





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