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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Phase-out/Discontinued

ZENER DIODES

RD2.0F to RD82F

1 W PLANAR TYPE SILICON ZENER DIODES

<R> DESCRIPTION

These products are zener diodes with an allowable dissipation of 1 W and a planar type glass sealed DHD (Double Heatsink Diode) structure.

<R> FEATURES

- The zener voltage series has a wide voltage range of 2 to 82 V and is ideal for standardization.
- The E24 series is employed for the zener voltage nominal value.

<R> ORDERING INFORMATION

Any of the B1 to B3 voltage classifications are available for customers who request the B grade product of the RD2.0F to RD39F.

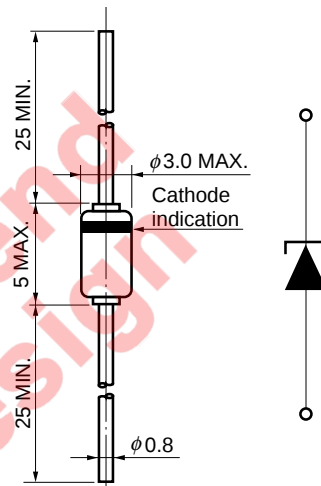
<R> APPLICATIONS

- Zener voltage and constant-current circuit
- Waveform clipper circuit and limiter circuit
- Surge absorption circuit

<R> ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Ratings	Unit	Remarks
Power dissipation	P	1.0	W	Refer to Figure 1.
Junction temperature	T _j	175	°C	
Forward current	I _F	200	mA	
Storage temperature	T _{stg}	-65 to +175	°C	
Surge reverse power	P _{RSM}	400 (t = 10 μs)	W	Refer to Figure 7.

<R> PACKAGE DRAWING (Unit: mm)



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<R> ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Type Number	Suffix	Zener Voltage V _Z (V) ^{Note 1}			Dynamic Impedance Z _Z (Ω) ^{Note 2}		Reverse Current I _R (μA)		Zener Voltage Temperature Coefficient γ _Z (mV/°C)	
		MIN.	MAX.	I _Z (mA)	MAX.	I _Z (mA)	MAX.	V _R (V)	TYP.	I _Z (mA)
RD2.0F	B	1.88	2.25	40	25	40	200	0.5	-1.5	40
	B1	1.88	2.12							
	B2	2.01	2.25							
RD2.2F	B	2.11	2.45	40	20	40	200	0.7	-2.0	40
	B1	2.11	2.34							
	B2	2.21	2.45							
RD2.4F	B	2.31	2.65	40	15	40	200	1.0	-2.0	40
	B1	2.31	2.55							
	B2	2.41	2.65							
RD2.7F	B	2.52	2.93	40	15	40	150	1.0	-2.0	40
	B1	2.52	2.78							
	B2	2.68	2.93							
RD3.0F	B	2.83	3.22	40	15	40	100	1.0	-2.0	40
	B1	2.83	3.07							
	B2	2.97	3.22							
RD3.3F	B	3.13	3.51	40	15	40	80	1.0	-2.5	40
	B1	3.13	3.37							
	B2	3.27	3.51							
RD3.6F	B	3.43	3.83	40	15	40	60	1.0	-2.5	40
	B1	3.43	3.68							
	B2	3.58	3.83							
RD3.9F	B	3.73	4.15	40	15	40	40	1.0	-2.5	40
	B1	3.73	4.00							
	B2	3.88	4.15							
RD4.3F	B	4.03	4.55	40	15	40	20	1.0	-2.0	40
	B1	4.03	4.28							
	B2	4.15	4.41							
	B3	4.28	4.55							
RD4.7F	B	4.41	4.91	40	10	40	20	1.0	-1.5	40
	B1	4.41	4.65							
	B2	4.53	4.78							
	B3	4.66	4.91							
RD5.1F	B	4.79	5.38	40	8	40	20	1.0	-0.5	40
	B1	4.79	5.05							
	B2	4.95	5.22							
	B3	5.10	5.38							
RD5.6F	B	5.28	5.95	40	8	40	20	1.5	0.5	40
	B1	5.28	5.56							
	B2	5.46	5.75							
	B3	5.65	5.95							
RD6.2F	B	5.76	6.52	40	6	40	20	3.0	2.0	40
	B1	5.76	6.14							
	B2	5.98	6.33							
	B3	6.17	6.52							

Type Number	Suffix	Zener Voltage V _Z (V) Note 1			Dynamic Impedance Z _Z (Ω) Note 2		Reverse Current I _R (μA)		Zener Voltage Temperature Coefficient γ _Z (mV/°C)	
		MIN.	MAX.	I _Z (mA)	MAX.	I _Z (mA)	MAX.	V _R (V)	TYP.	I _Z (mA)
RD6.8F	B	6.35	7.10	40	6	40	20	3.5	3.0	40
	B1	6.35	6.71							
	B2	6.55	6.90							
	B3	6.74	7.10							
RD7.5F	B	6.93	7.80	40	4	40	20	4.0	4.0	40
	B1	6.93	7.33							
	B2	7.17	7.55							
	B3	7.39	7.80							
RD8.2F	B	7.58	8.54	40	4	40	20	5.0	4.5	40
	B1	7.58	8.03							
	B2	7.87	8.28							
	B3	8.12	8.54							
RD9.1F	B	8.34	9.38	40	6	40	20	6.0	5.5	40
	B1	8.34	8.80							
	B2	8.64	9.08							
	B3	8.91	9.38							
RD10F	B	9.16	10.40	40	6	40	10	7.0	6.5	40
	B1	9.16	9.67							
	B2	9.50	9.99							
	B3	9.83	10.40							
RD11F	B	10.22	11.43	20	8	20	10	8.0	7.5	20
	B1	10.22	10.75							
	B2	10.54	11.09							
	B3	10.87	11.43							
RD12F	B	11.19	12.41	20	8	20	10	8.0	8.5	20
	B1	11.19	11.77							
	B2	11.50	12.09							
	B3	11.80	12.41							
RD13F	B	12.19	13.83	20	10	20	10	10	10	20
	B1	12.19	12.85							
	B2	12.63	13.30							
	B3	13.11	13.83							
RD15F	B	13.55	15.26	20	10	20	10	11	11	20
	B1	13.55	14.28							
	B2	14.05	14.77							
	B3	14.52	15.26							
RD16F	B	14.98	16.71	20	12	20	10	12	13	20
	B1	14.98	15.75							
	B2	15.44	16.23							
	B3	15.89	16.71							
RD18F	B	16.37	18.55	20	12	20	10	13	15	20
	B1	16.37	17.27							
	B2	17.03	17.91							
	B3	17.64	18.55							

Type Number	Suffix	Zener Voltage V _Z (V) ^{Note 1}			Dynamic Impedance Z _Z (Ω) ^{Note 2}		Reverse Current I _R (μ A)		Zener Voltage Temperature Coefficient γ_Z (mV/°C)	
		MIN.	MAX.	I _Z (mA)	MAX.	I _Z (mA)	MAX.	V _R (V)	TYP.	I _Z (mA)
RD20F	B	18.26	20.84	20	14	20	10	15	17	20
	B1	18.26	19.21							
	B2	18.93	19.91							
	B3	19.59	20.84							
RD22F	B	20.45	22.86	10	14	10	10	17	19	10
	B1	20.45	21.51							
	B2	21.10	22.18							
	B3	21.75	22.86							
RD24F	B	22.44	25.14	10	16	10	10	19	21	10
	B1	22.44	23.59							
	B2	23.17	24.36							
	B3	23.90	25.14							
RD27F	B	24.63	28.43	10	16	10	10	21	24	10
	B1	24.63	26.10							
	B2	25.70	27.12							
	B3	26.72	28.43							
RD30F	B	27.43	31.26	10	18	10	10	23	26	10
	B1	27.43	29.09							
	B2	28.64	30.10							
	B3	29.57	31.26							
RD33F	B	30.35	34.15	10	18	10	10	25	29	10
	B1	30.35	31.97							
	B2	31.49	33.06							
	B3	32.39	34.15							
RD36F	B	33.24	37.01	10	20	10	10	27	32	10
	B1	33.24	34.94							
	B2	34.26	36.01							
	B3	35.19	37.01							
RD39F	B	36.11	40.80	10	20	10	10	30	36	10
	B1	36.11	38.00							
	B2	37.14	39.04							
	B3	38.13	40.80							
RD43F	B	40	45	10	50	10	5	33	40	10
RD47F	B	44	49	10	50	10	5	36	44	10
RD51F	B	48	54	10	50	10	5	39	49	10
RD56F	B	53	60	10	50	10	5	43	54	10
RD62F	B	58	66	10	50	10	5	47	60	10
RD68F	B	64	72	10	70	10	5	52	67	10
RD75F	B	70	79	10	90	10	5	57	73	10
RD82F	B	77	87	10	90	10	5	63	81	10

- Notes**
1. The zener voltage (V_Z) of the B and B1 to B3 grades is tested for 40 ms after power ON.
 2. The dynamic impedance (Z_Z) is tested by superimposing a micro AC on the standard current (I_Z).
 3. The B grade of the RD2.0F to RD39F is a composition of the B1 to B3 grades. Any of the B1, B2, and B3 voltage classifications are available for customers who request the B grade product.

<R> TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Figure 1. P vs. T_A Rating

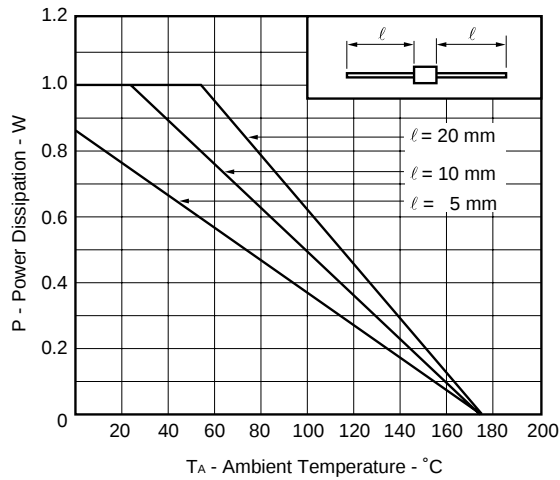


Figure 2. R_{th} vs. S Example of Characteristics

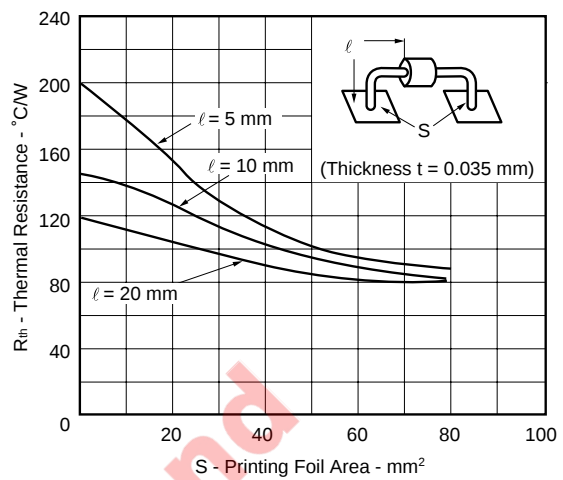
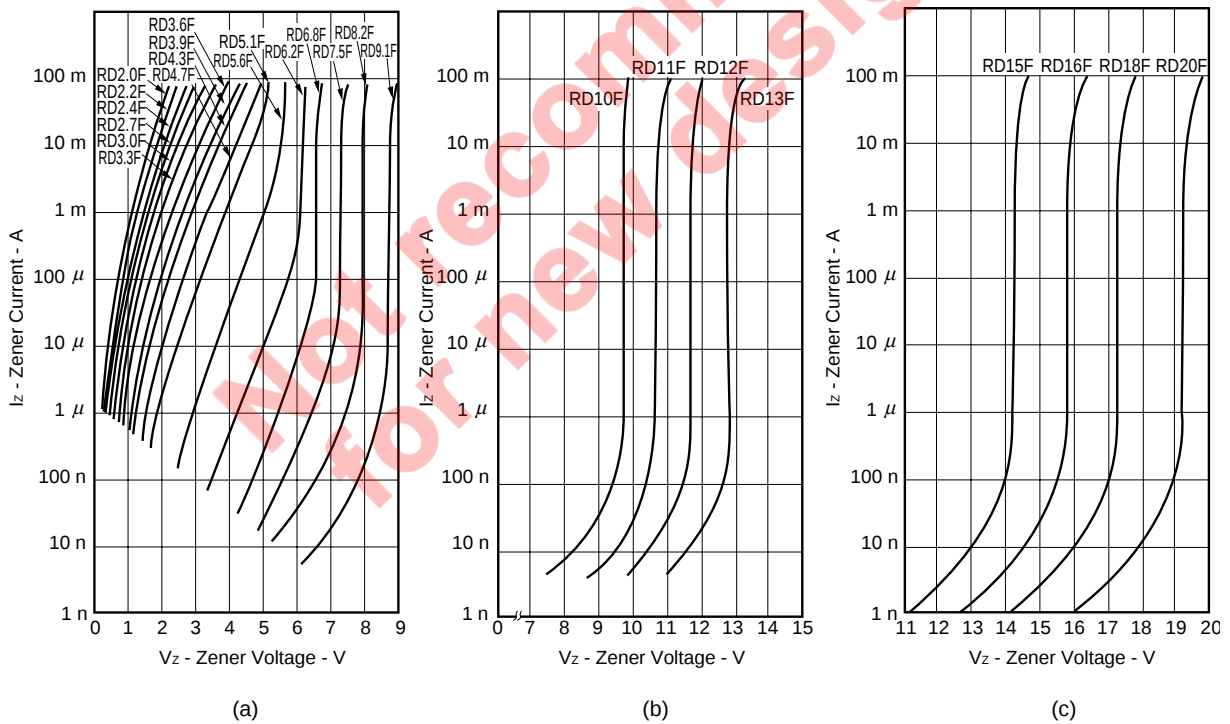


Figure 3. I_z vs. V_z Rating



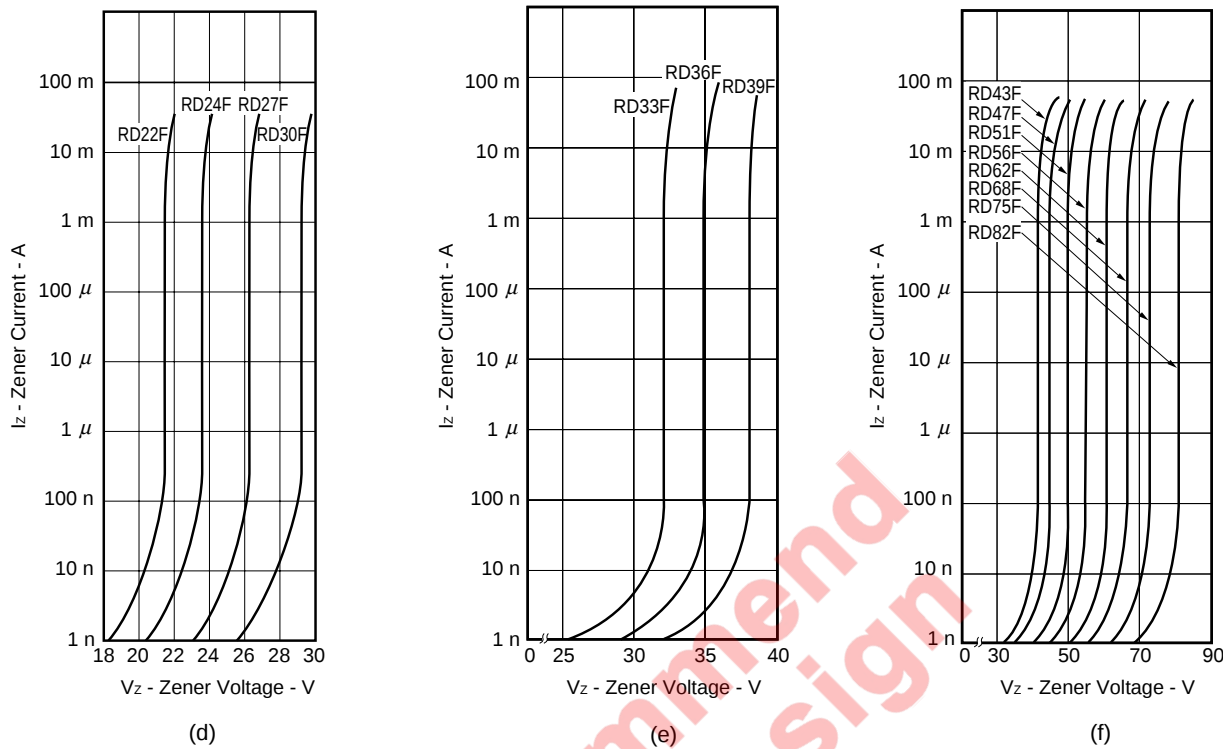


Figure 4. γ_z vs. V_z Example of Characteristics

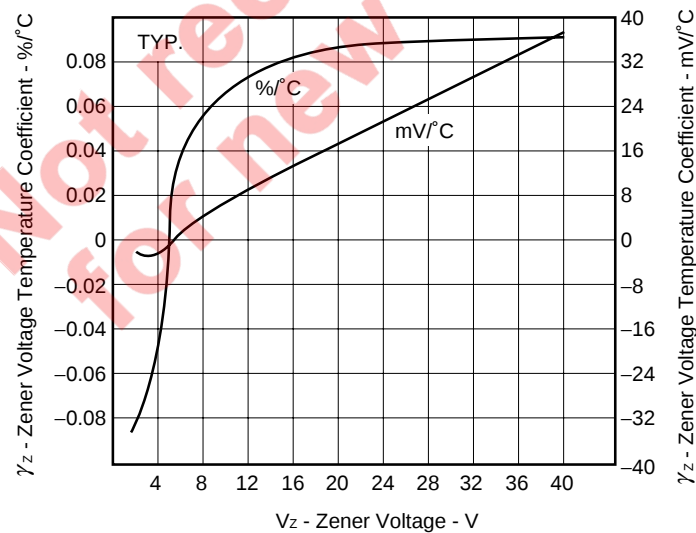


Figure 5. γ_z vs. V_z Example of Characteristics

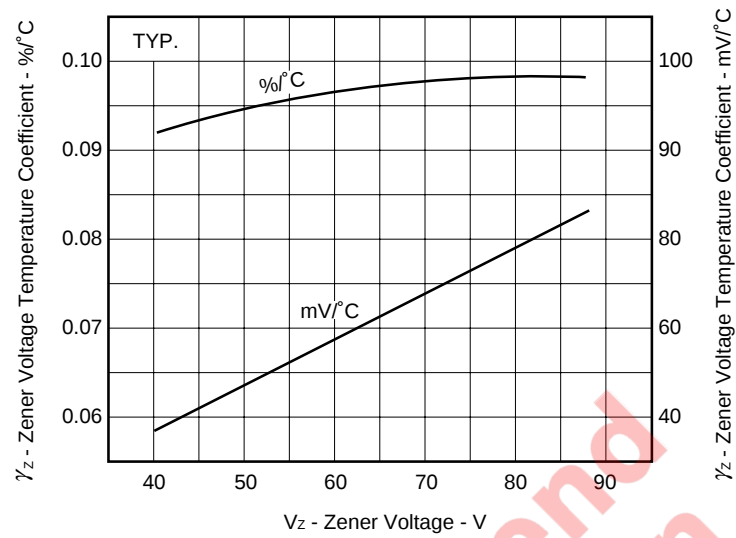


Figure 6. Z_z vs. I_z Example of Characteristics

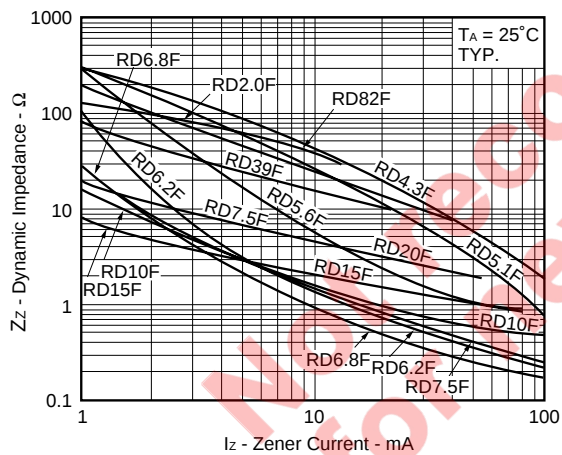


Figure 7. Surge Reverse Power Rating

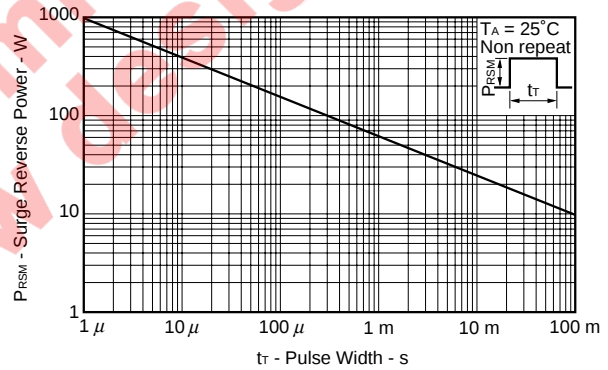
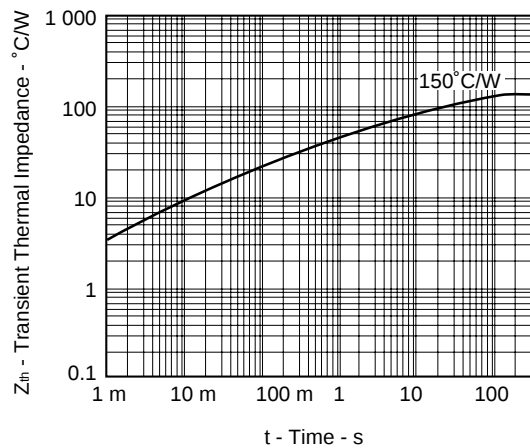


Figure 8. Transient Heat Thermal Impedance



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