NEC

ZENER DIODES

RD2.0ES to RD39ES

400 mW DHD ZENER DIODE

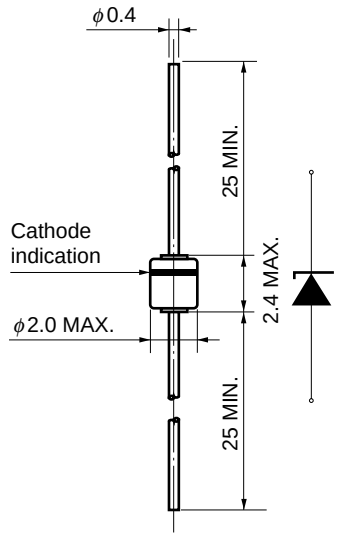
(DO-34)

DESCRIPTION

NEC Type RD2.0ES to RD39ES Series are planar type diodes into DO-34 Package (Body length 2.4 mm MAX.) with DHD (Double Heatsink Diode) construction having allowable power dissipation of 400 mW.

PACKAGE DIMENSIONS

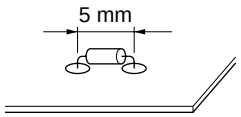
(in millimeters)



DO-34 (JEDEC)
Marking color: Black

FEATURES

- DO-34 Glass sealed package
  This diode can be inserted into a PC board with a shorter pitch (5 mm)



- Planar process
- DHD (Double Heatsink Diode) construction
- V_Z Applied E24 standard

ORDERING INFORMATION

RD2.0ES to RD39ES with suffix "AB1", "AB2", or "AB3" should be applied for orders for suffix "AB".

APPLICATIONS

Circuits for Constant Voltage, Constant Current, Waveform clipper, Surge absorber, etc.

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Forward Current	I_F	150 mA	
Power Dissipation	P	400 mW	to see Fig. 6
Surge Reverse Power	P_{RSM}	100 W (t = 10 μs)	to see Fig. 10
Junction Temperature	T_j	175 °C	
Storage Temperature	T_{stg}	–65 to +175 °C	

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

Type Number	Suffix	Zener Voltage V_Z (V)**Note 1**			Dynamic Impedance Z_Z (Ω)**Note 2**		Knee Dynamic Impedance Z_{ZK} (Ω)**Note 2**		Reverse Current I_R (μA)	
		MIN.	MAX.	I_Z(mA)	MAX.	I_Z(mA)	MAX.	I_Z(mA)	MAX.	V_R(V)
RD2.0ES	AB	1.88	2.24	5	100	5	1000	0.5	120	0.5
	AB1	1.88	2.12							
	AB2	2.01	2.24							
RD2.2ES	AB	2.11	2.44	5	100	5	1000	0.5	120	0.7
	AB1	2.11	2.34							
	AB2	2.22	2.44							
RD2.4ES	AB	2.32	2.65	5	100	5	1000	0.5	120	1.0
	AB1	2.32	2.54							
	AB2	2.41	2.65							
RD2.7ES	AB	2.52	2.93	5	110	5	1000	0.5	100	1.0
	AB1	2.52	2.77							
	AB2	2.68	2.93							
RD3.0ES	AB	2.84	3.24	5	120	5	1000	0.5	50	1.0
	AB1	2.84	3.08							
	AB2	2.99	3.24							
RD3.3ES	AB	3.15	3.54	5	120	5	1000	0.5	20	1.0
	AB1	3.15	3.39							
	AB2	3.31	3.54							
RD3.6ES	AB	3.46	3.84	5	120	5	1100	0.5	10	1.0
	AB1	3.46	3.69							
	AB2	3.60	3.84							
RD3.9ES	AB	3.74	4.16	5	120	5	1200	0.5	5	1.0
	AB1	3.74	4.01							
	AB2	3.89	4.16							
RD4.3ES	AB	4.04	4.57	5	120	5	1200	0.5	5	1.0
	AB1	4.04	4.29							
	AB2	4.17	4.43							
	AB3	4.30	4.57							
RD4.7ES	AB	4.44	4.93	5	100	5	1200	0.5	5	1.0
	AB1	4.44	4.68							
	AB2	4.55	4.80							
	AB3	4.68	4.93							
RD5.1ES	AB	4.81	5.37	5	70	5	1200	0.5	5	1.5
	AB1	4.81	5.07							
	AB2	4.94	5.20							
	AB3	5.09	5.37							
RD5.6ES	AB	5.28	5.91	5	40	5	900	0.5	5	2.5
	AB1	5.28	5.55							
	AB2	5.45	5.73							
	AB3	5.61	5.91							
RD6.2ES	AB	5.78	6.44	5	30	5	500	0.5	5	3.0
	AB1	5.78	6.09							
	AB2	5.96	6.27							
	AB3	6.12	6.44							
RD6.8ES	AB	6.29	7.01	5	25	5	150	0.5	2	3.5
	AB1	6.29	6.63							
	AB2	6.49	6.83							
	AB3	6.66	7.01							
RD7.5ES	AB	6.85	7.67	5	25	5	120	0.5	0.5	4.0
	AB1	6.85	7.22							
	AB2	7.07	7.45							
	AB3	7.29	7.67							
RD8.2ES	AB	7.53	8.45	5	20	5	120	0.5	0.5	5.0
	AB1	7.53	7.92							
	AB2	7.78	8.19							
	AB3	8.03	8.45							
RD9.1ES	AB	8.29	9.30	5	20	5	120	0.5	0.5	6.0
	AB1	8.29	8.73							
	AB2	8.57	9.01							
	AB3	8.83	9.30							
RD10ES	AB	9.12	10.39	5	20	5	120	0.5	0.2	7.0
	AB1	9.12	9.65							
	AB2	9.46	10.02							
	AB3	9.82	10.39							

Type Number	Suffix	Zener Voltage V_Z (V)**Note 1**			Dynamic Impedance Z_Z (Ω)**Note 2**		Knee Dynamic Impedance Z_{ZK} (Ω)**Note 2**		Reverse Current I_R (μA)	
		MIN.	MAX.	I_Z(mA)	MAX.	I_Z(mA)	MAX.	I_Z(mA)	MAX.	V_R(V)
RD11ES	AB	10.18	11.38	5	20	5	120	0.5	0.2	8.0
	AB1	10.18	10.71							
	AB2	10.50	11.05							
	AB3	10.82	11.38							
RD12ES	AB	11.13	12.35	5	25	5	110	0.5	0.2	9.0
	AB1	11.13	11.71							
	AB2	11.44	12.03							
	AB3	11.74	12.35							
RD13ES	AB	12.11	13.66	5	25	5	110	0.5	0.2	10
	AB1	12.11	12.75							
	AB2	12.55	13.21							
	AB3	12.99	13.66							
RD15ES	AB	13.44	15.09	5	25	5	110	0.5	0.2	11
	AB1	13.44	14.13							
	AB2	13.89	14.62							
	AB3	14.35	15.09							
RD16ES	AB	14.80	16.51	5	25	5	150	0.5	0.2	12
	AB1	14.80	15.57							
	AB2	15.25	16.04							
	AB3	15.69	16.51							
RD18ES	AB	16.22	18.33	5	30	5	150	0.5	0.2	13
	AB1	16.22	17.06							
	AB2	16.82	17.70							
	AB3	17.42	18.33							
RD20ES	AB	18.14	20.45	5	30	5	200	0.5	0.2	15
	AB1	18.14	19.07							
	AB2	18.80	19.76							
	AB3	19.45	20.45							
RD22ES	AB	20.15	22.63	5	30	5	200	0.5	0.2	17
	AB1	20.15	21.20							
	AB2	20.64	21.71							
	AB3	21.08	22.17							
	AB4	21.52	22.63							
RD24ES	AB	22.05	24.85	5	35	5	200	0.5	0.2	19
	AB1	22.05	23.18							
	AB2	22.61	23.77							
	AB3	23.12	24.31							
	AB4	23.63	24.85							
RD27ES	AB	24.26	27.64	5	45	5	250	0.5	0.2	21
	AB1	24.26	25.52							
	AB2	24.97	26.26							
	AB3	25.63	26.95							
	AB4	26.29	27.64							
RD30ES	AB	26.99	30.51	5	55	5	250	0.5	0.2	23
	AB1	26.99	28.39							
	AB2	27.70	29.13							
	AB3	28.36	29.82							
	AB4	29.02	30.51							
RD33ES	AB	29.68	33.11	5	65	5	250	0.5	0.2	25
	AB1	29.68	31.22							
	AB2	30.32	31.88							
	AB3	30.90	32.50							
	AB4	31.49	33.11							
RD36ES	AB	32.14	35.77	5	75	5	250	0.5	0.2	27
	AB1	32.14	33.79							
	AB2	32.79	34.49							
	AB3	33.40	35.13							
	AB4	34.01	35.77							
RD39ES	AB	34.68	38.52	5	85	5	250	0.5	0.2	30
	AB1	34.68	36.47							
	AB2	35.36	37.19							
	AB3	36.00	37.85							
	AB4	36.63	38.52							

Notes 1. tested with pulse (40 ms)

2. Z_Z and Z_{ZK} are measured at Iz by given a very small A.C. current signal.

3. Suffix AB is Suffix AB1, AB2, AB3 or AB4.

TYPICAL CHARACTERISTICS (T_A = 25 °C)

Fig. 1 ZENER CURRENT vs. ZENER VOLTAGE

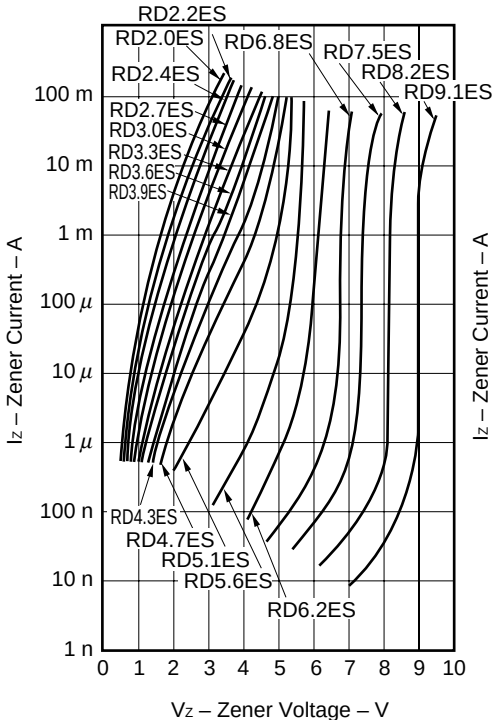


Fig. 2 ZENER CURRENT vs. ZENER VOLTAGE

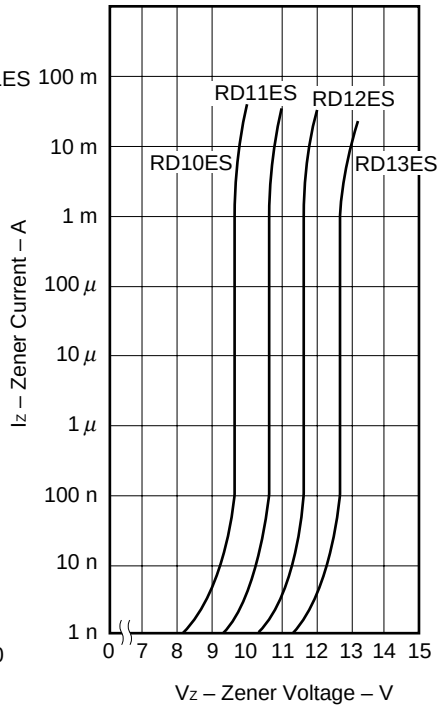


Fig. 3 ZENER CURRENT vs. ZENER VOLTAGE

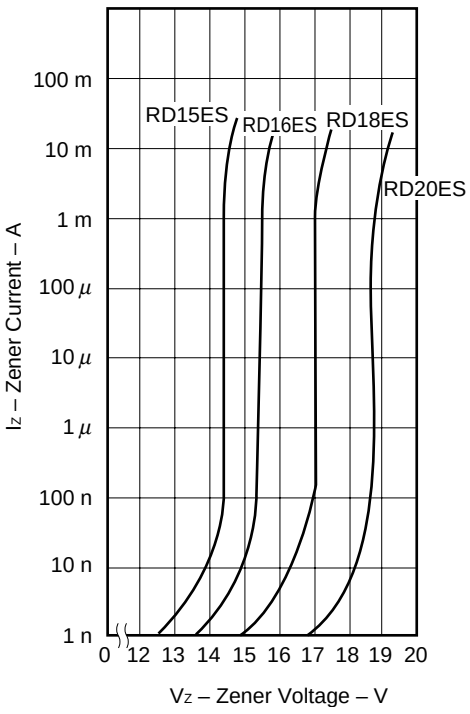


Fig. 4 ZENER CURRENT vs. ZENER VOLTAGE

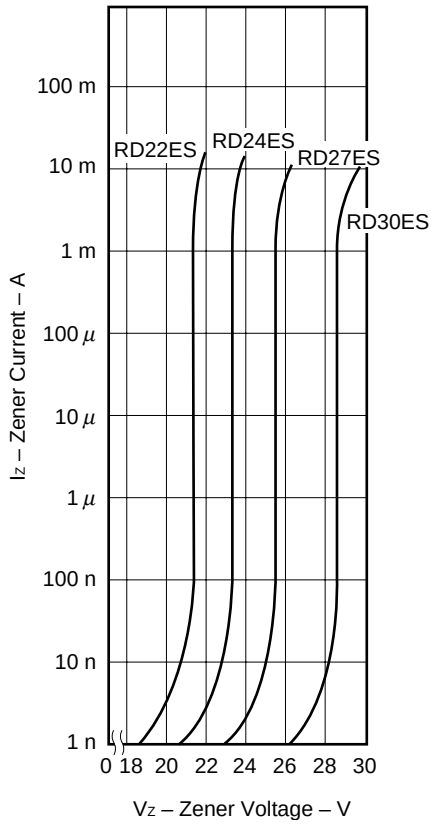


Fig. 5 ZENER CURRENT vs. ZENER VOLTAGE

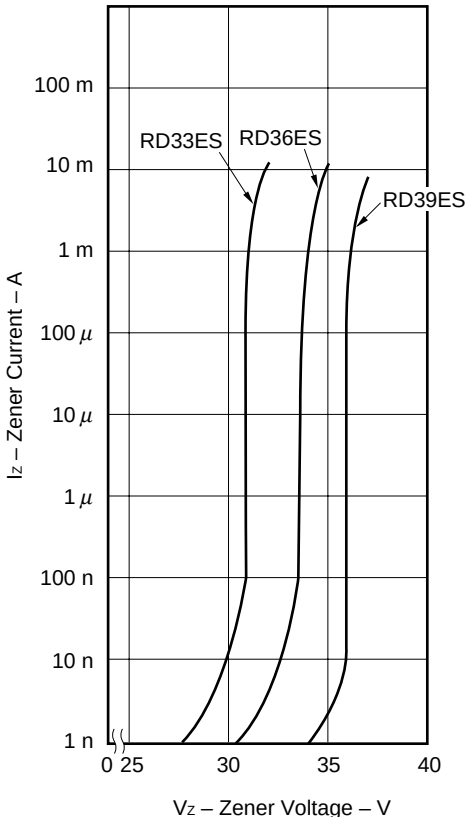


Fig. 6 POWER DISSIPATION vs. AMBIENT TEMPERATURE

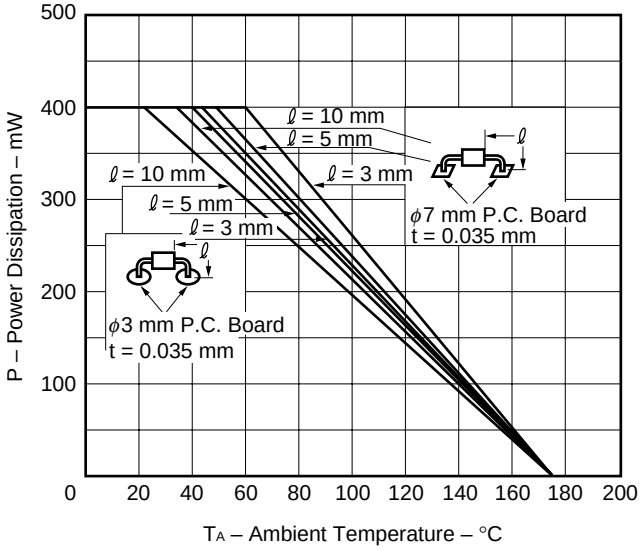


Fig. 7 THERMAL RESISTANCE vs. SIZE OF P.C BOARD

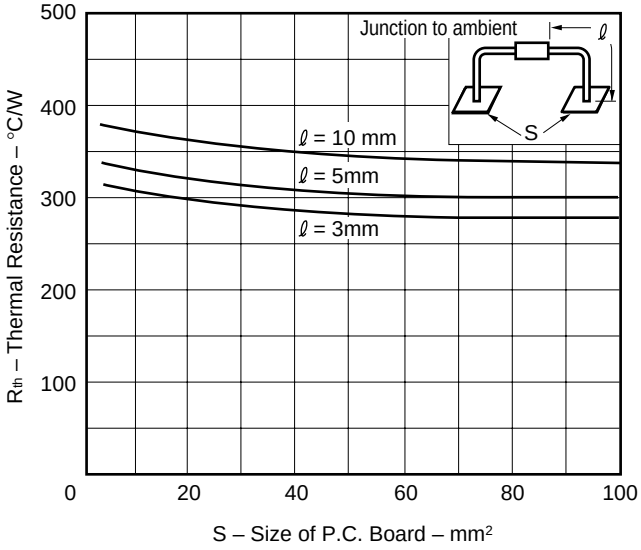


Fig. 8 DYNAMIC IMPEDANCE vs. ZENER CURRENT

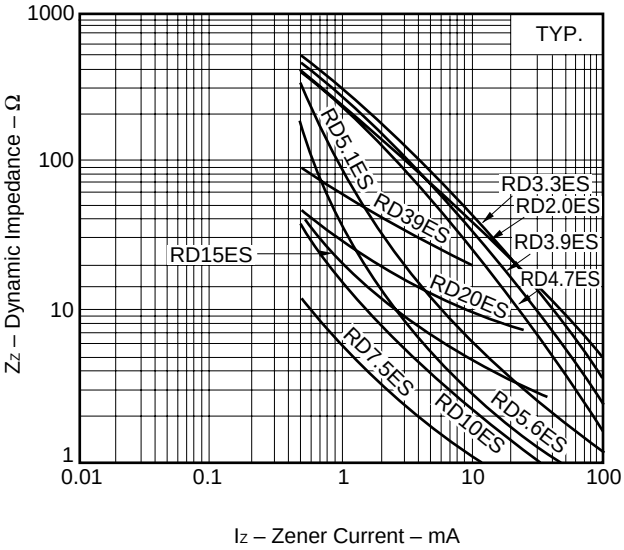


Fig. 9 ZENER VOLTAGE TEMPERATURE COEFFICIENT vs. ZENER VOLTAGE

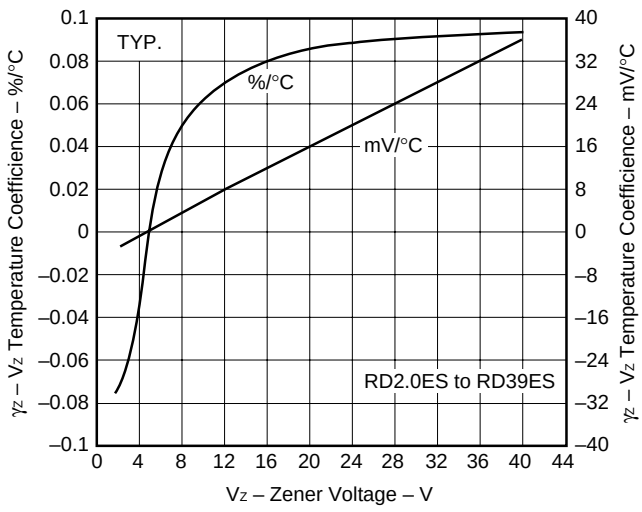


Fig. 10 SURGE REVERSE POWER RATINGS

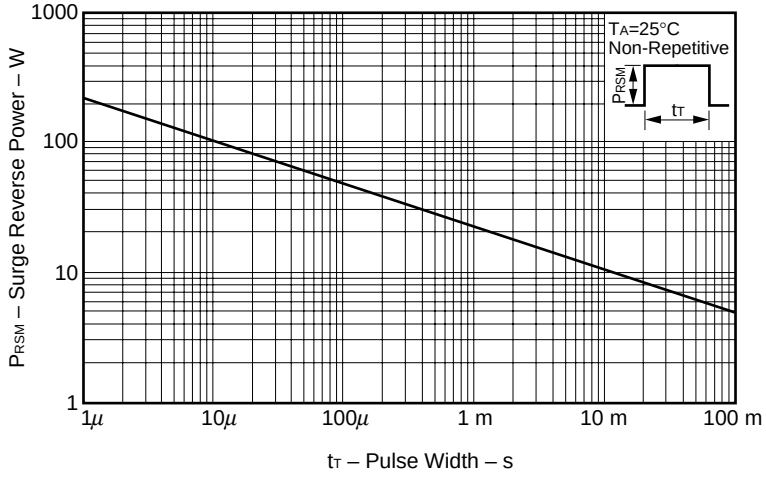
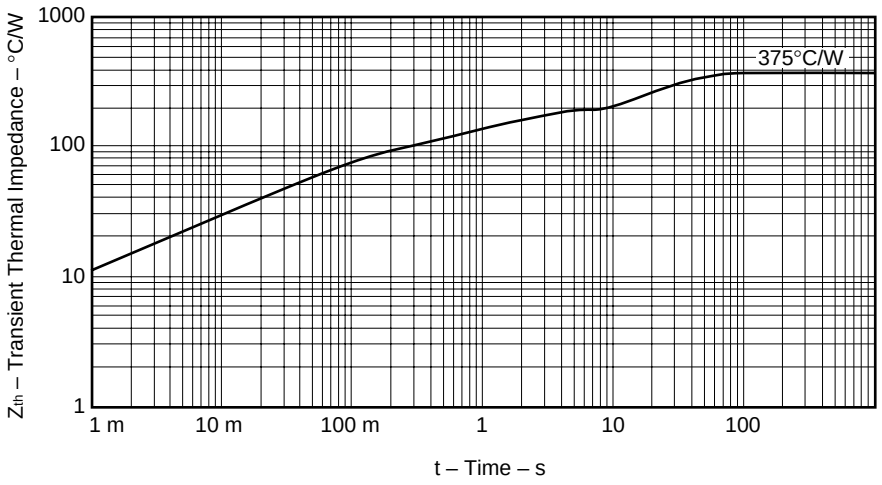


Fig. 11 TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC



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