

## RD2.0ES to RD39ES

## 400 mW DHD ZENER DIODE

(DO-34)

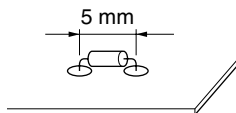
## DESCRIPTION

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.

## 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
- Vz Applied E24 standard

## ORDERING INFORMATION

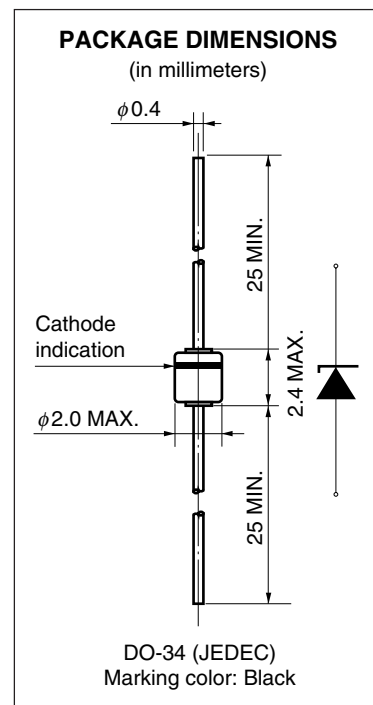
RD2.0ES to RD39ES with suffix "AB1", "AB2", or "AB3" should be applied for orders for suffix "AB".

## APPLICATIONS

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

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Forward Current	$I_F$	150 mA	
Power Dissipation	$P$	400 mW	to see Fig. 6
Surge Reverse Power	$P_{RSM}$	100 W ( $t = 10 \mu\text{s}$ )	to see Fig. 10
Junction Temperature	$T_j$	$175^\circ\text{C}$	
Storage Temperature	$T_{stg}$	$-65$ to $+175^\circ\text{C}$	



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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

Type Number	Suffix	Zener Voltage V <sub>Z</sub> (V) <sup>Note 1</sup>			Dynamic Impedance Z <sub>Z</sub> (Ω) <sup>Note 2</sup>		Knee Dynamic Impedance Z <sub>ZK</sub> (Ω) <sup>Note 2</sup>		Reverse Current I <sub>R</sub> (μA)	
		MIN.	MAX.	I <sub>Z</sub> (mA)	MAX.	I <sub>Z</sub> (mA)	MAX.	I <sub>Z</sub> (mA)	MAX.	V <sub>R</sub> (V)
RD2.0ES	AB	1.88	2.20	5	100	5	1000	0.5	120	0.5
	AB1	1.88	2.10							
	AB2	2.02	2.20							
RD2.2ES	AB	2.12	2.41	5	100	5	1000	0.5	120	0.7
	AB1	2.12	2.30							
	AB2	2.22	2.41							
RD2.4ES	AB	2.33	2.63	5	100	5	1000	0.5	120	1.0
	AB1	2.33	2.52							
	AB2	2.43	2.63							
RD2.7ES	AB	2.54	2.91	5	110	5	1000	0.5	100	1.0
	AB1	2.54	2.75							
	AB2	2.69	2.91							
RD3.0ES	AB	2.85	3.22	5	120	5	1000	0.5	50	1.0
	AB1	2.85	3.07							
	AB2	3.01	3.22							
RD3.3ES	AB	3.16	3.53	5	120	5	1000	0.5	20	1.0
	AB1	3.16	3.38							
	AB2	3.32	3.53							
RD3.6ES	AB	3.47	3.83	5	120	5	1100	0.5	10	1.0
	AB1	3.47	3.68							
	AB2	3.62	3.83							
RD3.9ES	AB	3.77	4.14	5	120	5	1200	0.5	5	1.0
	AB1	3.77	3.98							
	AB2	3.92	4.14							
RD4.3ES	AB	4.05	4.53	5	120	5	1200	0.5	5	1.0
	AB1	4.05	4.26							
	AB2	4.20	4.40							
	AB3	4.34	4.53							
RD4.7ES	AB	4.47	4.91	5	100	5	1200	0.5	5	1.0
	AB1	4.47	4.65							
	AB2	4.59	4.77							
	AB3	4.71	4.91							
RD5.1ES	AB	4.85	5.35	5	70	5	1200	0.5	5	1.5
	AB1	4.85	5.03							
	AB2	4.97	5.18							
	AB3	5.12	5.35							
RD5.6ES	AB	5.29	5.88	5	40	5	900	0.5	5	2.5
	AB1	5.29	5.52							
	AB2	5.46	5.70							
	AB3	5.64	5.88							
RD6.2ES	AB	5.81	6.40	5	30	5	500	0.5	5	3.0
	AB1	5.81	6.06							
	AB2	5.99	6.24							
	AB3	6.16	6.40							
RD6.8ES	AB	6.32	6.97	5	25	5	150	0.5	2	3.5
	AB1	6.32	6.59							
	AB2	6.52	6.79							
	AB3	6.70	6.97							
RD7.5ES	AB	6.88	7.64	5	25	5	120	0.5	0.5	4.0
	AB1	6.88	7.19							
	AB2	7.11	7.41							
	AB3	7.33	7.64							
RD8.2ES	AB	7.56	8.41	5	20	5	120	0.5	0.5	5.0
	AB1	7.56	7.90							
	AB2	7.82	8.15							
	AB3	8.07	8.41							
RD9.1ES	AB	8.33	9.29	5	20	5	120	0.5	0.5	6.0
	AB1	8.33	8.70							
	AB2	8.61	8.99							
	AB3	8.89	9.29							
RD10ES	AB	9.19	10.30	5	20	5	120	0.5	0.2	7.0
	AB1	9.19	9.59							
	AB2	9.48	9.90							
	AB3	9.82	10.30							

Type Number	Suffix	Zener Voltage V <sub>Z</sub> (V) <sup>Note 1</sup>			Dynamic Impedance Z <sub>Z</sub> (Ω) <sup>Note 2</sup>			Knee Dynamic Impedance Z <sub>ZK</sub> (Ω) <sup>Note 2</sup>		Reverse Current I <sub>R</sub> (μA)	
		MIN.	MAX.	I <sub>Z</sub> (mA)	MAX.	I <sub>Z</sub> (mA)	MAX.	I <sub>Z</sub> (mA)	MAX.	V <sub>R</sub> (V)	
RD11ES	AB	10.18	11.26	5	20	5	120	0.5	0.2	8.0	
	AB1	10.18	10.63								
	AB2	10.50	10.95								
	AB3	10.82	11.26								
RD12ES	AB	11.13	12.30	5	25	5	110	0.5	0.2	9.0	
	AB1	11.13	11.63								
	AB2	11.50	11.92								
	AB3	11.80	12.30								
RD13ES	AB	12.18	13.62	5	25	5	110	0.5	0.2	10	
	AB1	12.18	12.71								
	AB2	12.59	13.16								
	AB3	13.03	13.62								
RD15ES	AB	13.48	15.02	5	25	5	110	0.5	0.2	11	
	AB1	13.48	14.09								
	AB2	13.95	14.56								
	AB3	14.42	15.02								
RD16ES	AB	14.87	16.50	5	25	5	150	0.5	0.2	12	
	AB1	14.87	15.50								
	AB2	15.33	15.96								
	AB3	15.79	16.50								
RD18ES	AB	16.34	18.30	5	30	5	150	0.5	0.2	13	
	AB1	16.34	17.06								
	AB2	16.90	17.67								
	AB3	17.51	18.30								
RD20ES	AB	18.14	20.45	5	30	5	200	0.5	0.2	15	
	AB1	18.14	18.96								
	AB2	18.80	19.68								
	AB3	19.52	20.45								
RD22ES	AB	20.23	22.61	5	30	5	200	0.5	0.2	17	
	AB1	20.23	21.08								
	AB2	20.76	21.65								
	AB3	21.22	22.09								
	AB4	21.68	22.61								
RD24ES	AB	22.26	24.81	5	35	5	200	0.5	0.2	19	
	AB1	22.26	23.12								
	AB2	22.75	23.73								
	AB3	23.29	24.27								
	AB4	23.81	24.81								
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<sub>Z</sub> and Z<sub>ZK</sub> are measured at I<sub>Z</sub> by given a very small A.C. current signal.

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

TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

Fig. 1 ZENER CURRENT vs. ZENER VOLTAGE

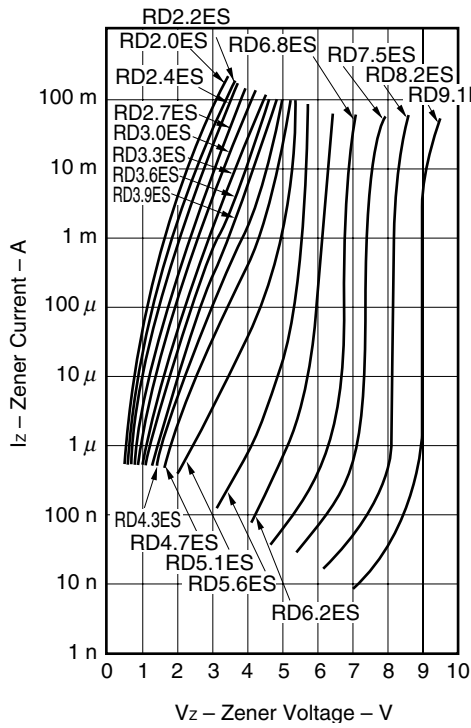


Fig. 2 ZENER CURRENT vs. ZENER VOLTAGE

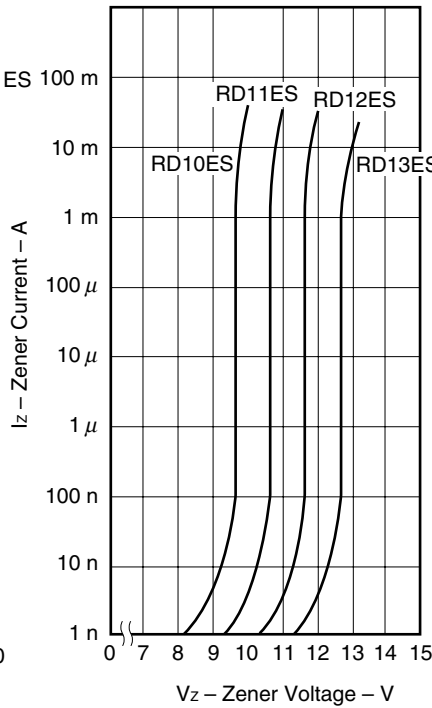


Fig. 3 ZENER CURRENT vs. ZENER VOLTAGE

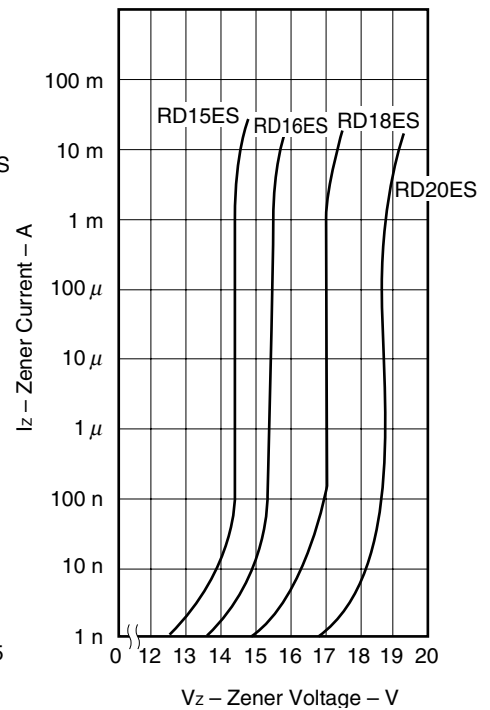


Fig. 4 ZENER CURRENT vs. ZENER VOLTAGE

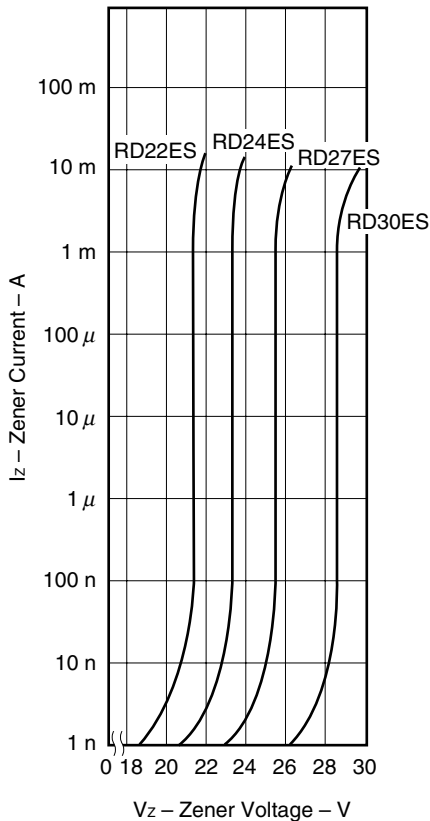
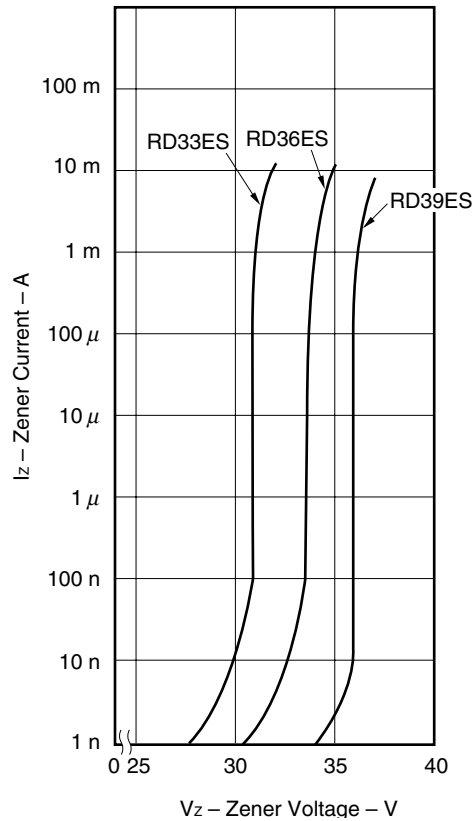
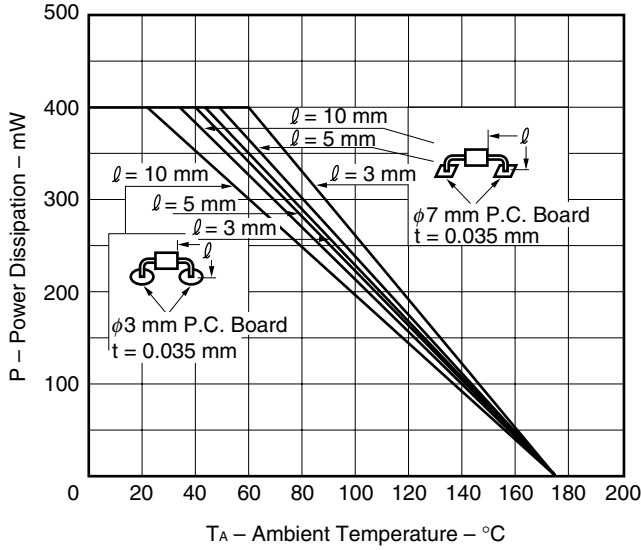


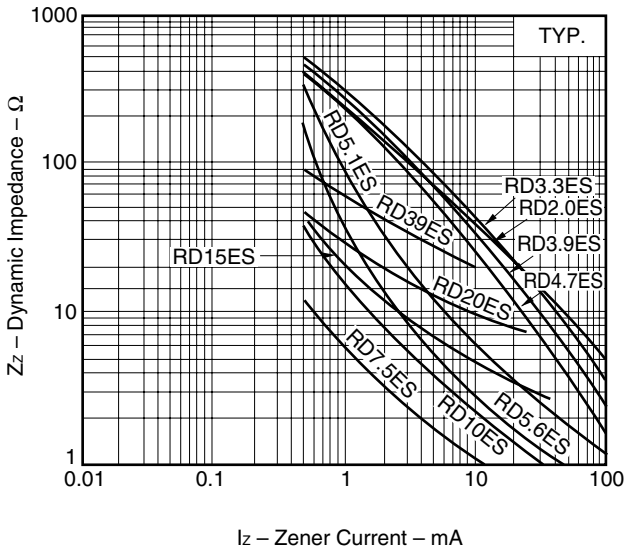
Fig. 5 ZENER CURRENT vs. ZENER VOLTAGE



**Fig. 6 POWER DISSIPATION vs. AMBIENT TEMPERATURE**

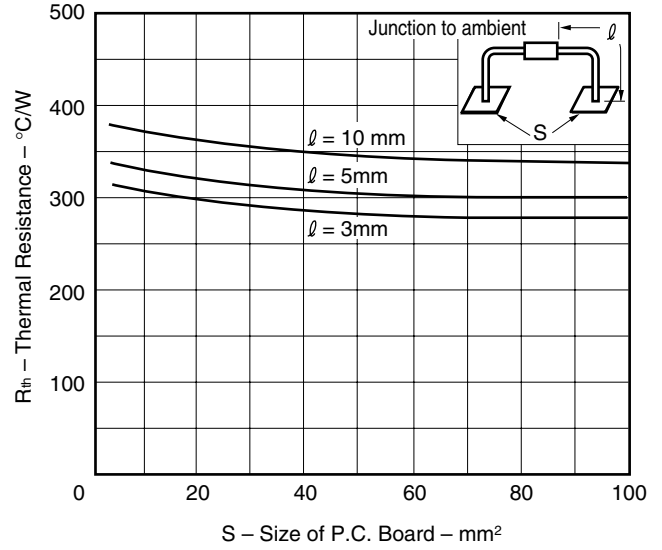


**Fig. 8 DYNAMIC IMPEDANCE vs. ZENER CURRENT**

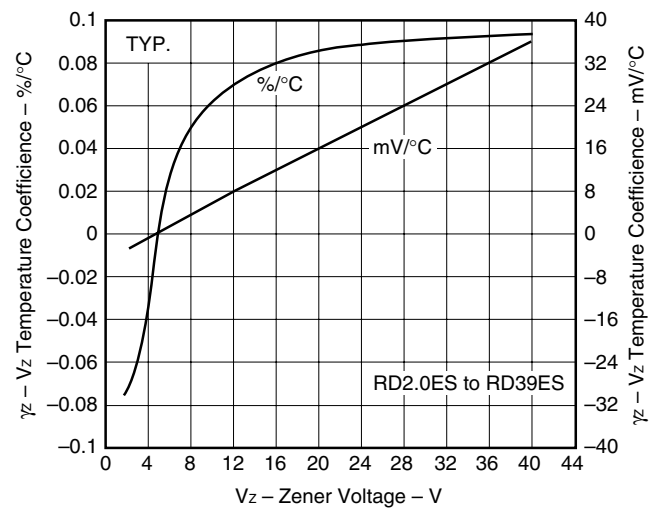


Iz – Zener Current – mA

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



**Fig. 9 ZENER VOLTAGE TEMPERATURE COEFFICIENT vs. ZENER VOLTAGE**



**Fig. 10 SURGE REVERSE POWER RATINGS**

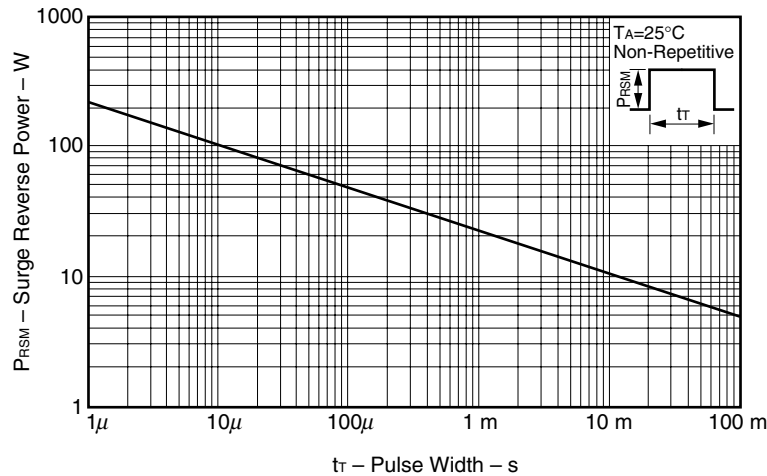
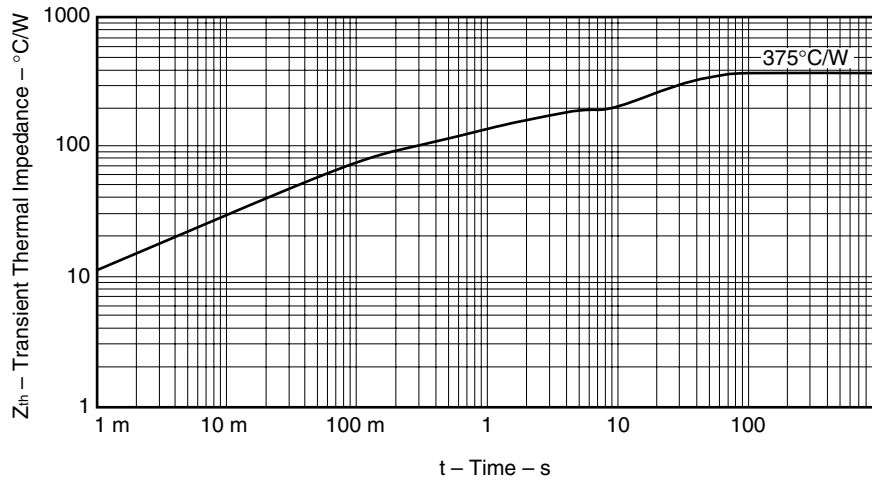


Fig. 11 TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC



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