To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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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RENESAS

ZENER DIODES
RD2.0E to RD120E

500 mW PLANAR TYPE SILICON ZENER DIODES

DESCRIPTION

These products are zener diodes with an allowable dissipation of 500 mW and a planar type glass sealed DHD (double heatsink diode) structure.

FEATURES

- The zener voltage series has a wide voltage range of 2 to 120 V and is ideal for standardization.
- The E24 series is employed for the zener voltage nominal value.

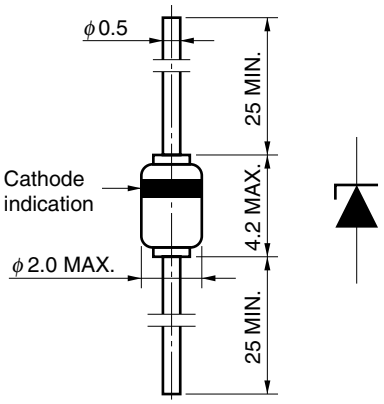
ORDERING INFORMATION

Any of the B1 to B7 voltage classifications are available for customers who request the B grade product of the RD2.0E to RD39E.

APPLICATIONS

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

PACKAGE DRAWING (Unit: mm)



Marking color: Black
JEDEC: DO-35

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Ratings	Unit	Remarks
Power dissipation	P	500	mW	
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}	100 (t = 100 μs)	W	Refer to Figure 6.

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The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Type Number	Suffix	Zener Voltage Vz (V) Note 1			Dynamic Impedance Z_Z (Ω) Note 2		Knee Dynamic Impedance Z_{ZK} (Ω) Note 2		Reverse Current I_R (μA)		Zener Voltage Temperature Coefficient γ_Z (mV/°C)		★
		MIN.	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	Iz (mA)	TYP.	Iz (mA)	
RD2.0E	B	1.88	2.20	20	140	20	2000	1	120	0.5	–1.0	20	
	B1	1.88	2.10										
	B2	2.02	2.20										
RD2.2E	B	2.12	2.41	20	120	20	2000	1	120	0.7	–1.5	20	
	B1	2.12	2.30										
	B2	2.22	2.41										
RD2.4E	B	2.33	2.63	20	100	20	2000	1	120	1.0	–1.5	20	
	B1	2.33	2.52										
	B2	2.43	2.63										
RD2.7E	B	2.54	2.91	20	100	20	1000	1	100	1.0	–1.5	20	
	B1	2.54	2.75										
	B2	2.69	2.91										
RD3.0E	B	2.85	3.22	20	80	20	1000	1	50	1.0	–2.0	20	
	B1	2.85	3.07										
	B2	3.01	3.22										
RD3.3E	B	3.16	3.53	20	70	20	1000	1	20	1.0	–2.0	20	
	B1	3.16	3.38										
	B2	3.32	3.53										
RD3.6E	B	3.47	3.83	20	60	20	1000	1	10	1.0	–2.0	20	
	B1	3.47	3.68										
	B2	3.62	3.83										
RD3.9E	B	3.77	4.14	20	50	20	1000	1	5	1.0	–2.0	20	
	B1	3.77	3.98										
	B2	3.92	4.14										
RD4.3E	B	4.05	4.53	20	40	20	1000	1	5	1.0	–1.5	20	
	B1	4.05	4.26										
	B2	4.20	4.40										
	B3	4.34	4.53										
RD4.7E	B	4.47	4.91	20	25	20	900	1	5	1.0	–1.0	20	
	B1	4.47	4.65										
	B2	4.59	4.77										
	B3	4.71	4.91										
RD5.1E	B	4.85	5.35	20	20	20	800	1	5	1.5	0.5	20	
	B1	4.85	5.03										
	B2	4.97	5.18										
	B3	5.12	5.35										
RD5.6E	B	5.29	5.88	20	13	20	500	1	5	2.5	1.5	20	
	B1	5.29	5.52										
	B2	5.46	5.70										
	B3	5.64	5.88										
RD6.2E	B	5.81	6.40	20	10	20	300	1	5	3.0	2.0	20	
	B1	5.81	6.06										
	B2	5.99	6.24										
	B3	6.16	6.40										

Type Number	Suffix	Zener Voltage Vz (V) Note 1			Dynamic Impedance Z_Z (Ω) Note 2		Knee Dynamic Impedance Z_{ZK} (Ω) Note 2		Reverse Current I_R (μA)		Zener Voltage Temperature Coefficient γ_Z (mV/°C)		★
		MIN.	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	Iz (mA)	TYP.	Iz (mA)	
RD6.8E	B	6.32	6.97	20	8	20	150	0.5	2	3.5	2.5	20	
	B1	6.32	6.59										
	B2	6.52	6.79										
	B3	6.70	6.97										
RD7.5E	B	6.88	7.64	20	8	20	120	0.5	0.5	4.0	3.0	20	
	B1	6.88	7.19										
	B2	7.11	7.41										
	B3	7.33	7.64										
RD8.2E	B	7.56	8.41	20	8	20	120	0.5	0.5	5.0	4.0	20	
	B1	7.56	7.90										
	B2	7.82	8.15										
	B3	8.07	8.41										
RD9.1E	B	8.33	9.29	20	8	20	120	0.5	0.5	6.0	4.5	20	
	B1	8.33	8.70										
	B2	8.61	8.99										
	B3	8.89	9.29										
RD10E	B	9.19	10.30	20	8	20	120	0.5	0.2	7.0	5.5	20	
	B1	9.19	9.59										
	B2	9.48	9.90										
	B3	9.82	10.30										
RD11E	B	10.18	11.26	10	10	10	120	0.5	0.2	8.0	6.5	10	
	B1	10.18	10.63										
	B2	10.50	10.95										
	B3	10.82	11.26										
RD12E	B	11.13	12.30	10	12	10	110	0.5	0.2	9.0	7.5	10	
	B1	11.13	11.63										
	B2	11.50	11.92										
	B3	11.80	12.30										
RD13E	B	12.18	13.62	10	14	10	110	0.5	0.2	10	8.5	10	
	B1	12.18	12.71										
	B2	12.59	13.16										
	B3	13.03	13.62										
RD15E	B	13.48	15.02	10	16	10	110	0.5	0.2	11	10	10	
	B1	13.48	14.09										
	B2	13.95	14.56										
	B3	14.42	15.02										
RD16E	B	14.87	16.50	10	18	10	150	0.5	0.2	12	11	10	
	B1	14.87	15.50										
	B2	15.33	15.93										
	B3	15.79	16.50										
RD18E	B	16.34	18.30	10	23	10	150	0.5	0.2	13	13	10	
	B1	16.34	17.06										
	B2	16.90	17.67										
	B3	17.51	18.30										

Type Number	Suffix	Zener Voltage Vz (V) Note 1			Dynamic Impedance Zz (Ω) Note 2		Knee dynamic Impedance Zzk (Ω) Note 2		Reverse Current IR (μA)		Zener Voltage Temperature Coefficient γz (mV/°C)		★
		MIN.	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	Iz (mA)	TYP.	Iz (mA)	
RD20E	B	18.11	20.72	10	28	10	200	0.5	0.2	15	15	10	
	B1	18.11	18.92										
	B2	18.73	19.57										
	B3	19.38	20.22										
	B4	19.88	20.72										
RD22E	B	20.23	22.61	5	30	5	200	0.5	0.2	17	17	5	
	B1	20.23	21.08										
	B2	20.76	21.65										
	B3	21.22	22.09										
	B4	21.68	22.61										
RD24E	B	22.26	24.81	5	35	5	200	0.5	0.2	19	19	5	
	B1	22.26	23.12										
	B2	22.75	23.73										
	B3	23.29	24.27										
	B4	23.81	24.81										
RD27E	B	24.26	27.64	5	45	5	250	0.5	0.2	21	21	5	
	B1	24.26	25.52										
	B2	24.97	26.26										
	B3	25.63	26.95										
	B4	26.29	27.64										
RD30E	B	26.99	30.51	5	55	5	250	0.5	0.2	23	24	5	
	B1	26.99	28.39										
	B2	27.70	29.13										
	B3	28.36	29.82										
	B4	29.02	30.51										
RD33E	B	29.68	33.11	5	65	5	250	0.5	0.2	25	26	5	
	B1	29.68	31.22										
	B2	30.32	31.88										
	B3	30.90	32.50										
	B4	31.49	33.11										
RD36E	B	32.14	35.77	5	75	5	250	0.5	0.2	27	29	5	
	B1	32.14	33.79										
	B2	32.79	34.49										
	B3	33.40	35.13										
	B4	34.01	35.77										
R39E	B	34.68	40.80	5	85	5	250	0.5	0.2	30	32	5	
	B1	34.68	36.47										
	B2	35.36	37.19										
	B3	36.00	37.85										
	B4	36.63	38.52										
	B5	37.36	39.29										
	B6	38.14	40.11										
	B7	38.94	40.80										

Notes 1. The zener voltage (Vz) of the B and B1 to B7 grades is tested for 40 ms after power ON.

2. The operation resistance (Zz, Zzk) is tested by superimposing a micro AC on the standard current (Iz).

Remark The B grade is a composition of the B1 to B7 grades. Any of the B1 to B7 voltage classifications are available for customers who request the B grade product.

Type Number	Suffix	Zener Voltage Vz (V) Note 1			Dynamic Impedance Zz (Ω) Note 2		Reverse Current IR (μA)		Zener Voltage Temperature Coefficient γz (mV/°C)		★
		MIN.	MAX.	Iz (mA)	MAX.	Iz (mA)	MAX.	Iz (mA)	TYP.	Iz (mA)	
RD43E	B	40	45	5	90	5	0.2	33	37	5	
RD47E	B	44	49	5	90	5	0.2	36	41	5	
RD51E	B	48	54	5	110	5	0.2	39	45	5	
RD56E	B	53	60	5	110	5	0.2	43	51	5	
RD62E	B	58	66	2	200	2	0.2	47	56	2	
RD68E	B	64	72	2	200	2	0.2	52	62	2	
RD75E	B	70	79	2	300	2	0.2	57	69	2	
RD82E	B	77	87	2	300	2	0.2	63	76	2	
RD91E	B	85	96	2	400	2	0.2	69	85	2	
RD100E	B	94	106	2	400	2	0.2	76	95	2	
RD110E	B	104	116	1	750	1	0.2	84	105	1	
RD120E	B	114	126	1	900	1	0.2	91	115	1	

Notes 1. The zener voltage (Vz) is tested for 40 ms after power ON.

2. The operation resistance (Zz) is tested by superimposing a micro AC on the standard current (Iz).

TYPICAL CHARACTERISTICS (T_A = 25°C)

Figure 1. P vs. T_A Rating

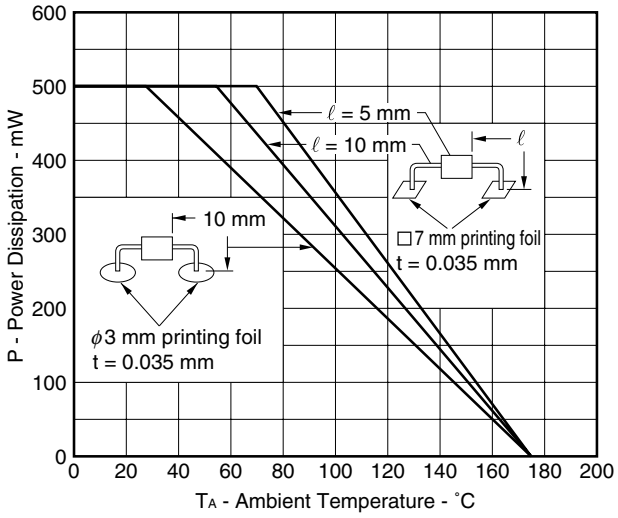


Figure 2. R_{th} vs. S Example of Characteristics

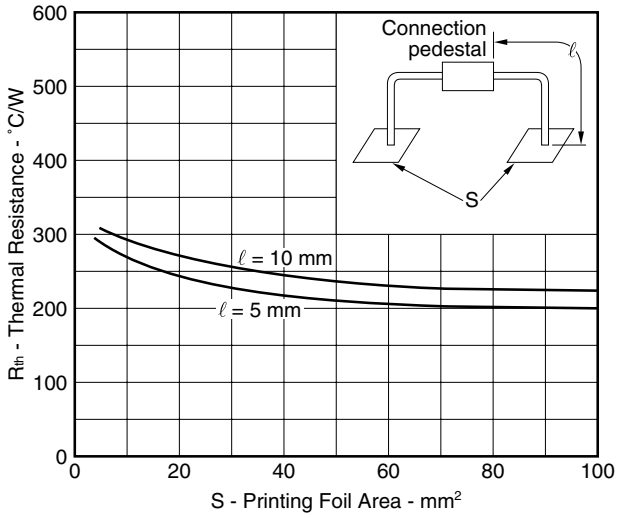
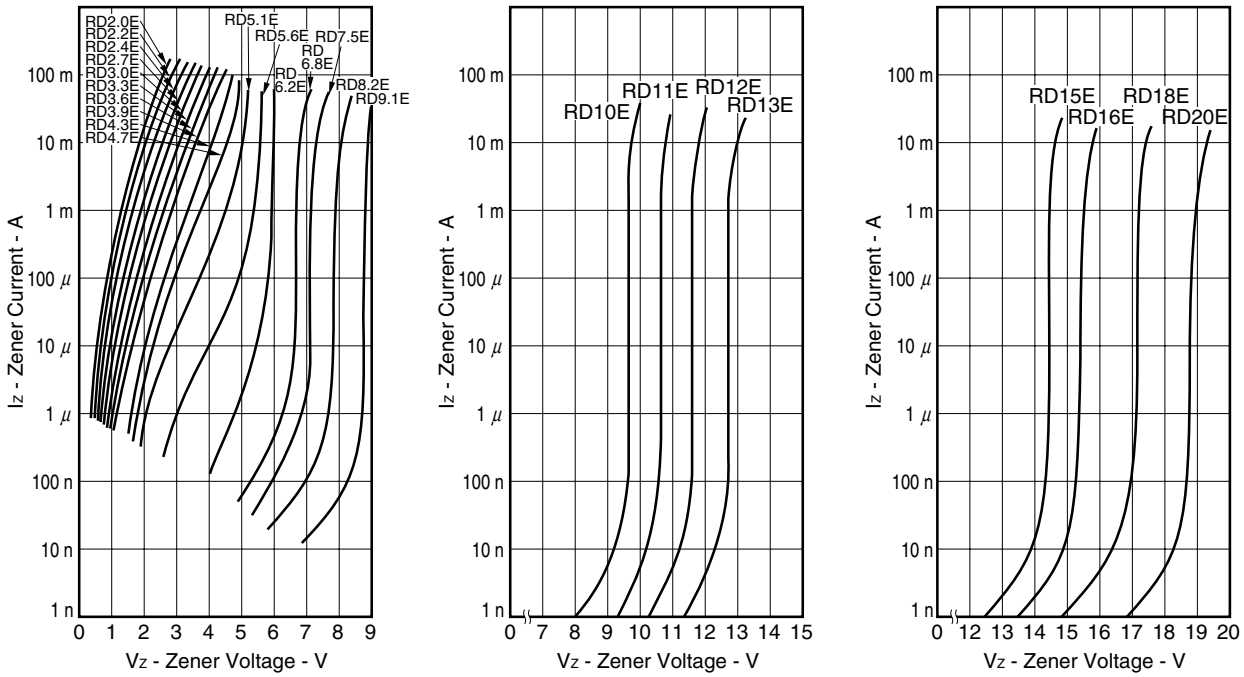


Figure 3. I_Z vs. V_Z Rating



(a) (b) (c)

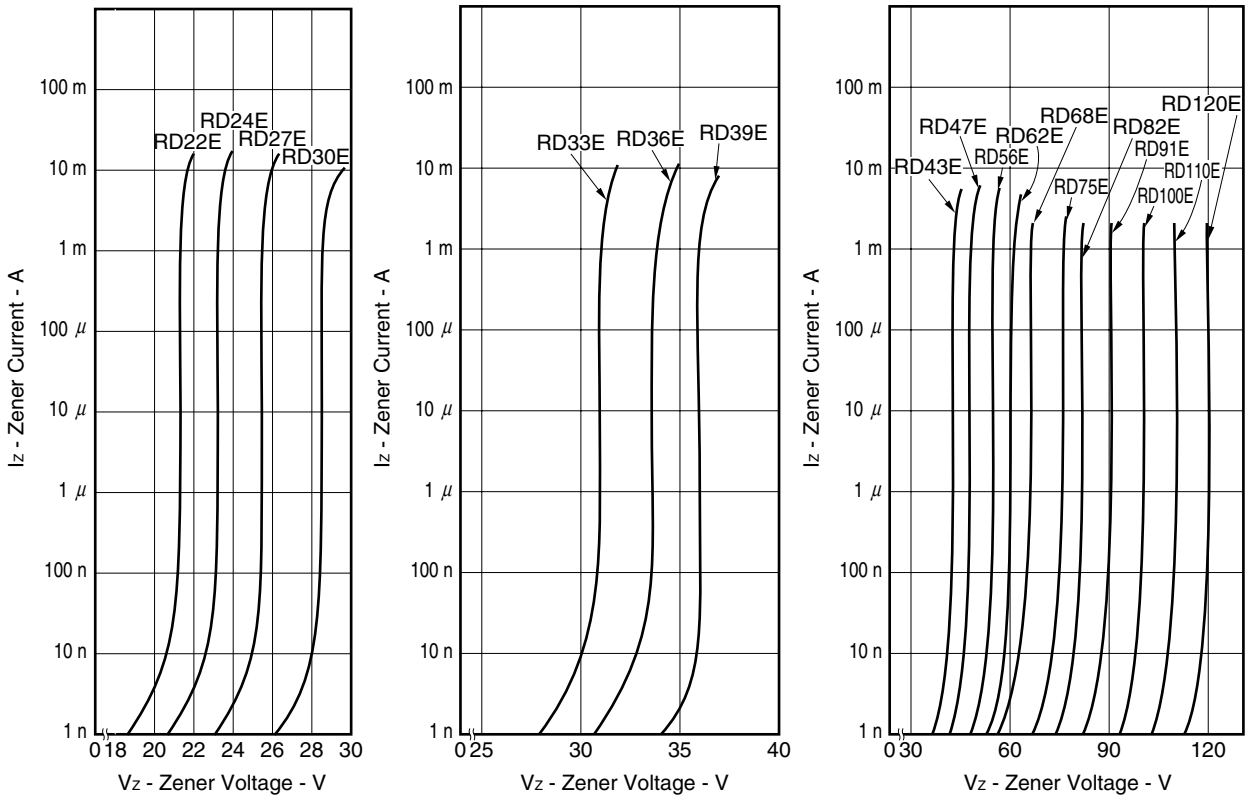


Figure 4. Z_Z vs. I_Z Example of Characteristics

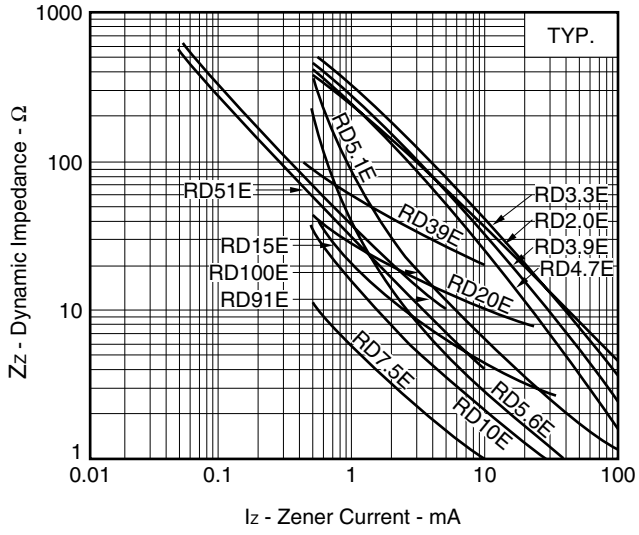
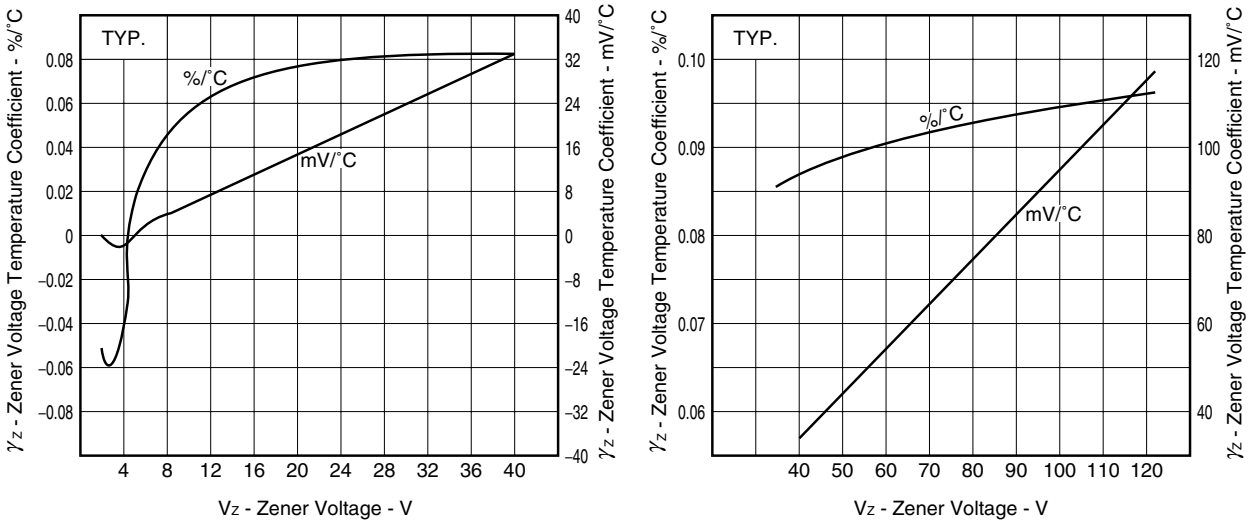


Figure 5. γ_Z vs. V_Z Example of Characteristics



(a) RD2.0E to RD39E

(b) RD43E to RD120E

Figure 6. Surge Reverse Power Rating

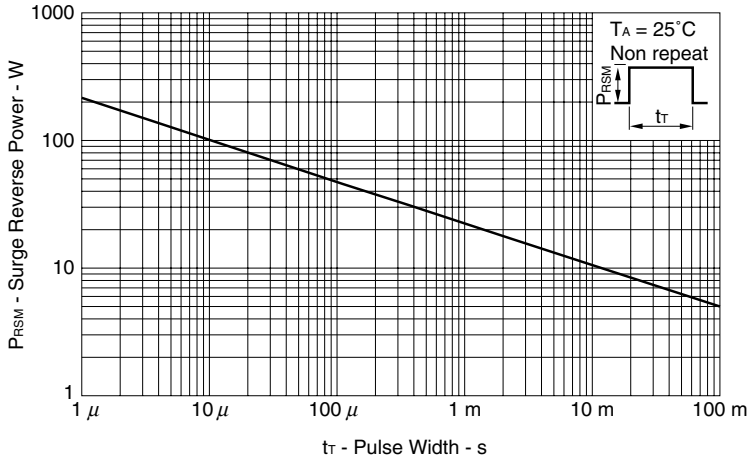
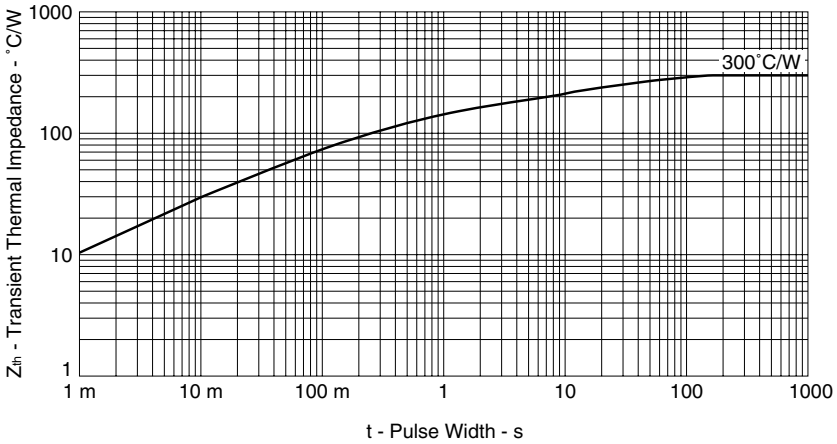


Figure 7. Transient Heat Thermal Impedance



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