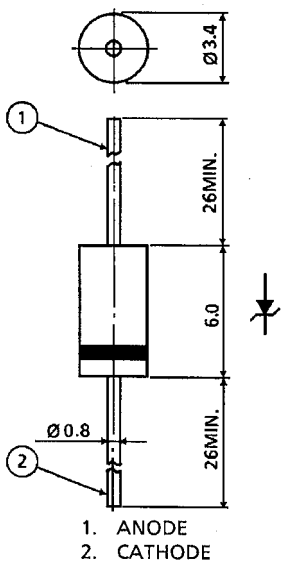
TOSHIBA ZENER DIODE SILICON DIFFUSED JUNCTION TYPE

1Z6.2~1Z390, 1Z6.8A~1Z30A

CONSTANT VOLTAGE REGULATION
TRANSIENT SUPPRESSORS

- Average Power Dissipation : P = 1 W
- Peak Reverse Power Dissipation : P_{RSM} = 200 W at t_w = 200 μs
- Zener Voltage : V_Z = 6.2 V ~ 390 V
- Tolerance of Zener Voltage
  1Z6.2 Series : ±10%
  1Z6.8A Series : ±5%
- Plastic Mold Package

Unit: mm



JEDEC	DO−15
JEITA	SC−39
TOSHIBA	3−3B1A

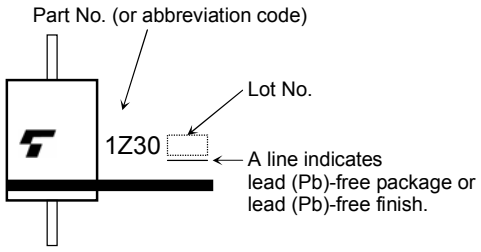
Weight: 0.42g

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Dissipation	P	1	W
Junction Temperature	T_j	−40~150	°C
Storage Temperature Range	T_{stg}	−40~150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

MARKING



Abbreviation Code	Part No.
1Z30	1Z30

ELECTRICAL CHARACTERISTICS (Ta=25°C)

TYPE	ZENER CHARACTERISTICS					TEMPERATURE COEFFICIENT OF ZENER VOLTAGE		FORWARD VOLTAGE		REVERSE CURRENT	
	ZENER VOLTAGE V_Z (V)			ZENER IMPEDANCE r_d (Ω)	MEASURE-MENT CURRENT I_Z (mA)	α_T (mV / °C)		V_F (V)	MEASURE-MENT CURRENT I_F (A)	I_R (μA)	MEASURE-MENT VOLTAGE V_R (V)
	MIN.	TYP.	MAX.	MAX.		TYP.	MAX.	MAX.		MAX	
1Z6.2	5.6	6.2	6.8	60	10	1.5	2	1.2	0.2	10	3
1Z6.8	6.2	6.8	7.4	60	10	3	4	1.2	0.2	10	2
1Z6.8A	6.45	6.8	7.14								
1Z7.5	6.8	7.5	8.3	30	10	4	5	1.2	0.2	10	4.5
1Z7.5A	7.13	7.5	7.87								
1Z8.2	7.4	8.2	9.1	30	10	4	6	1.2	0.2	10	4.9
1Z8.2A	7.79	8.2	86.1								
1Z9.1	8.2	9.1	10.1	30	10	5	8	1.2	0.2	10	5.5
1Z9.1A	8.65	9.1	9.55								
1Z10	9.0	10	11.0	30	10	6	9	1.2	0.2	10	6
1Z10A	9.5	10	10.5								
1Z11	9.9	11	12.1	30	10	7	11	1.2	0.2	10	7
1Z11A	10.5	11	11.5								
1Z12	10.8	12	13.2	30	10	8	13	1.2	0.2	10	8
1Z12A	11.4	12	12.6								
1Z13	11.7	13	14.3	30	10	9	14	1.2	0.2	10	9
1Z13A	12.4	13	13.6								
1Z15	13.5	15	16.5	30	10	11	17	1.2	0.2	10	10
1Z15A	14.3	15	15.8								
1Z16	14.4	16	17.6	30	10	12	19	1.2	0.2	10	11
1Z16A	15.2	16	16.8								
1Z18	16.2	18	19.8	30	10	14	23	1.2	0.2	10	13
1Z18A	17.1	18	18.9								
1Z20	18.0	20	22.0	30	10	16	26	1.2	0.2	10	14
1Z20A	19.0	20	21								
1Z22	19.8	22	24.2	30	10	18	28	1.2	0.2	10	16
1Z22A	20.9	22	23.1								
1Z24	21.6	24	26.4	30	10	20	32	1.2	0.2	10	17
1Z24A	22.8	24	25.2								
1Z27	24.3	27	29.7	30	10	23	36	1.2	0.2	10	19
1Z27A	25.7	27	28.3								
1Z30	27.0	30	33.0	30	10	25	40	1.2	0.2	10	21
1Z30A	28.5	30	31.5								
1Z33	29.7	33	36.3	30	10	26	41	1.2	0.2	10	26.4
1Z36	32.4	36	39.6	30	9	28	45	1.2	0.2	10	28.8
1Z43	38.7	43	47.3	40	7	33	53	1.2	0.2	10	34.4
1Z47	42.3	47	51.7	65	6	38	60	1.2	0.2	10	37.6

TYPE	ZENER CHARACTERISTICS					TEMPERATURE COEFFICIENT OF ZENER VOLTAGE α_T (mV / °C)		FORWARD VOLTAGE		REVERSE CURRENT	
	ZENER VOLTAGE V_Z (V)			ZENER IMPEDANCE r_d (Ω)	MEASURE-MENT CURRENT I_Z (mA)			V_F (V)	MEASURE-MENT CURRENT I_F (A)	I_R (μA)	MEASURE-MENT VOLTAGE V_R (V)
	MIN.	TYP.	MAX.	MAX.		TYP.	MAX.	MAX.		MAX	
1Z51	45.9	51	56.1	65	6	43	68	1.2	0.2	10	40.8
1Z68	61.2	68	74.8	120	4	57	90	1.2	0.2	10	54.4
1Z75	67.5	75	82.5	150	4	66	104	1.2	0.2	10	60
1Z82	73.8	82	90.2	170	3	71	113	1.2	0.2	10	65.4
1Z100	90	100	110	300	3	87	138	1.2	0.2	10	80
1Z110	99	110	121	300	3	96	152	1.2	0.2	10	88
1Z150	135	150	165	450	2	136	212	1.2	0.2	10	120
1Z180	162	180	198	500	1.5	161	255	1.2	0.2	10	144
1Z330	297	330	363	5000	1	297	472	1.2	0.2	10	264
1Z390	351	390	429	10000	0.5	350	555	1.2	0.2	10	312

Handling Precaution

The absolute maximum ratings denote the absolute maximum ratings, which are rated values and must not be exceeded during operation, even for an instant. The following are the general derating methods that we recommend when you design a circuit with a device.

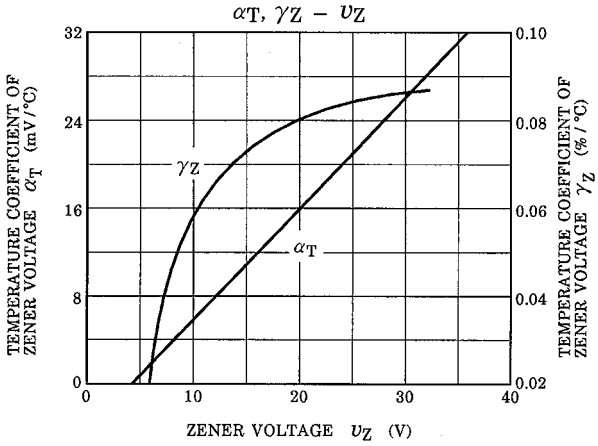
P: We recommend that the worst case power dissipation be no greater than 50% of the absolute maximum rating of power dissipation. Carry out adequate heat design.

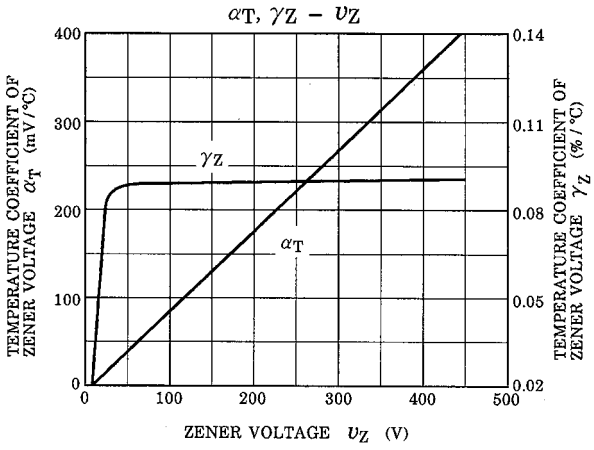
P_{RSM}: We recommend that a device be used within the recommended area in the figure, P_{RSM}-tw.

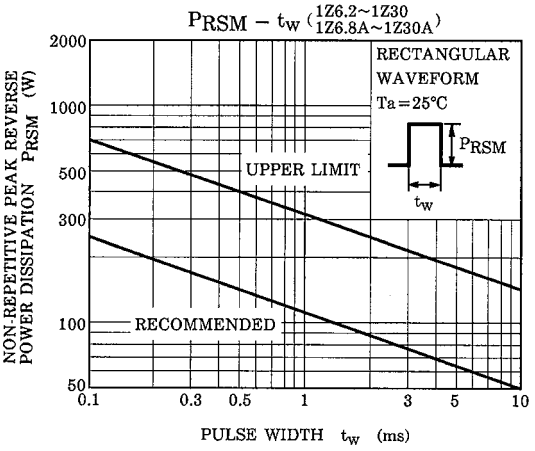
T_j: Derate this rating when using a device in order to ensure high reliability. We recommend that the device be used at a T_j of below 120°C.

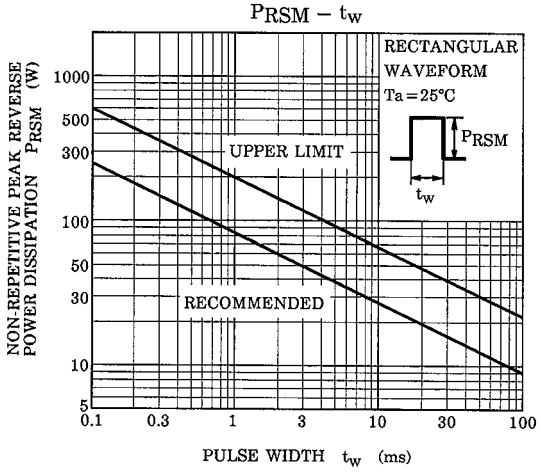
Thermal resistance between junction and ambient fluctuates depending on the device's mounting condition. When using a device, design a circuit board and a soldering land size to match the appropriate thermal resistance value.

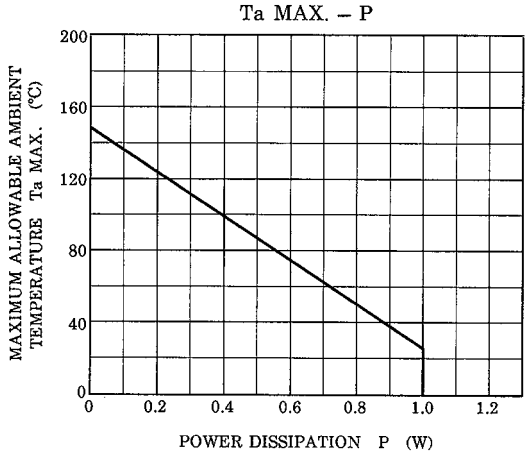
Please refer to the Rectifiers databook for further information.

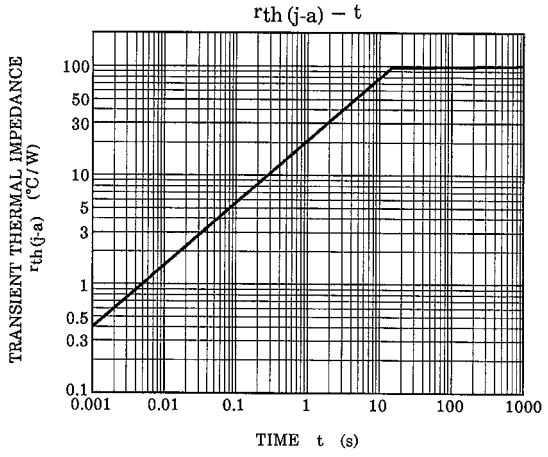

αT, γZ – υZ
TEMPERATURE COEFFICIENT OF ZENER VOLTAGE αT (mV/°C)
TEMPERATURE COEFFICIENT OF ZENER VOLTAGE γZ (%/°C)
γZ
αT
ZENER VOLTAGE υZ (V)


αT, γZ – υZ
TEMPERATURE COEFFICIENT OF ZENER VOLTAGE αT (mV/°C)
TEMPERATURE COEFFICIENT OF ZENER VOLTAGE γZ (%/°C)
γZ
αT
ZENER VOLTAGE υZ (V)


PRSM – tw (1Z6.2~1Z30 / 1Z6.8A~1Z30A)
NON-REPETITIVE PEAK REVERSE POWER DISSIPATION PRSM (W)
RECTANGULAR WAVEFORM
Ta=25°C
PRSM
tw
UPPER LIMIT
RECOMMENDED
PULSE WIDTH tw (ms)


PRSM – tw
NON-REPETITIVE PEAK REVERSE POWER DISSIPATION PRSM (W)
RECTANGULAR WAVEFORM
Ta=25°C
PRSM
tw
UPPER LIMIT
RECOMMENDED
PULSE WIDTH tw (ms)


Ta MAX. – P
MAXIMUM ALLOWABLE AMBIENT TEMPERATURE Ta MAX. (°C)
POWER DISSIPATION P (W)


rth (j-a) – t
TRANSIENT THERMAL IMPEDANCE rth(j-a) (°C/W)
TIME t (s)

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