

## 500 mW DO-35 Hermetically Sealed Glass Zener Voltage Regulators



### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Parameter	Value	Units
Power Dissipation	500	mW
Storage Temperature Range	-65 to +175	$^\circ\text{C}$
Operating Junction Temperature	+175	$^\circ\text{C}$

These ratings are limiting values above which the serviceability of the diode may be impaired.

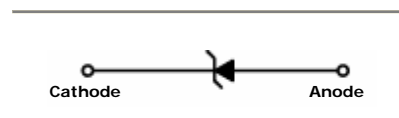
DEVICE MARKING DIAGRAM



L : Logo  
Voltage Code : TCRDXXX  
T : VZ tolerance A, B, C or D

### Specification Features:

- Zener Voltage Range 2.0 to 39 Volts
- DO-35 Package (JEDEC)
- Through-Hole Device Type Mounting
- Hermetically Sealed Glass
- Compression Bonded Construction
- All External Surfaces Are Corrosion Resistant And Leads Are Readily Solderable
- RoHS Compliant
- Solder Hot Dip Tin (Sn) Terminal Finish
- Cathode Indicated By Polarity Band



ELECTRICAL SYMBOL

### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Device Type	VZ Tolerance	VZ@IZT			Izt (mA)	Zzt@Izt (Ohms) Max	Zzk@Izk (Ohms) Max	Izk (mA)	I <sub>R</sub> @V <sub>R</sub> (uA) Max	V <sub>R</sub> (V)
		Min	Nom	Max						
TCRD2V2	A	2.12	2.21	2.30	20	35	400	1	55	0.7
	B	2.22	2.32	2.41						
TCRD2V4	A	2.33	2.42	2.51	20	35	400	1	84	1
	B	2.44	2.53	2.62						
TCRD2V7	A	2.54	2.64	2.74	20	35	450	1	70	1
	B	2.69	2.80	2.91						
TCRD3V0	A	2.85	2.96	3.06	20	35	450	1	35	1
	B	3.01	3.12	3.22						
TCRD3V3	A	3.16	3.27	3.37	20	35	450	1	14	1
	B	3.32	3.43	3.53						
TCRD3V6	A	3.47	3.57	3.67	20	48	850	1	2.8	1
	B	3.63	3.73	3.82						
TCRD3V9	A	3.77	3.88	3.98	20	40	850	1	1.4	1
	B	3.92	4.03	4.13						
TCRD4V3	A	4.06	4.15	4.24	20	32	850	1	0.47	1
	B	4.21	4.30	4.38						
	C	4.33	4.44	4.54						
TCRD4V7	A	4.46	4.56	4.66	20	21	770	1	0.19	1
	B	4.58	4.68	4.77						
	C	4.71	4.81	4.91						

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Device Type	T Tolerance	$V_Z@I_{ZT}$			$I_{ZT}$ (mA)	$Z_{ZT}@I_{ZT}$ (Ohms) Max	$Z_{ZK}@I_{ZK}$ (Ohms) Max	$I_{ZK}$ (mA)	$I_R@V_R$ (uA) Max	$V_R$ (V)
		Min	Nom	Max						
TCRD5V1	A	4.84	4.94	5.04	20	17	685	1	0.19	1.5
	B	4.97	5.08	5.18						
	C	5.11	5.23	5.35						
TCRD5V6	A	5.29	4.41	5.52	20	10.5	425	1	0.75	2.5
	B	5.46	5.58	5.70						
	C	5.64	5.76	5.88						
TCRD6V2	A	5.81	5.94	6.06	20	8.5	255	1	3.30	3.0
	B	5.99	6.12	6.24						
	C	6.16	6.28	6.40						
TCRD6V8	A	6.31	6.45	6.59	20	6.6	123	0.5	1.10	3.5
	B	6.52	6.66	6.79						
	C	6.70	6.83	6.95						
TCRD7V5	A	6.88	7.04	7.20	20	6.6	95	0.5	0.30	4.0
	B	7.11	7.26	7.42						
	C	7.32	7.49	7.65						
TCRD8V2	A	7.55	7.73	7.91	20	6.6	95	0.5	0.30	5.0
	B	7.81	7.99	8.16						
	C	8.06	8.24	8.42						
TCRD9V1	A	8.31	8.51	8.71	20	6.6	95	0.5	0.30	6.0
	B	8.60	8.80	9.00						
	C	8.88	9.09	9.30						
TCRD10V	A	9.18	9.39	9.60	20	6.6	95	0.5	0.11	7.0
	B	9.47	9.69	9.91						
	C	9.81	10.06	10.32						
TCRD11V	A	10.16	10.41	10.65	10	8.5	95	0.5	0.133	8.0
	B	10.49	10.73	10.96						
	C	10.81	11.04	11.27						
TCRD12V	A	11.12	11.38	11.64	10	9.5	95	0.5	0.133	9.0
	B	11.49	11.71	11.93						
	C	11.79	12.05	12.31						
TCRD13V	A	12.17	12.45	12.72	10	11.4	95	0.5	0.133	10
	B	12.58	12.87	13.17						
	C	13.02	13.33	13.63						
TCRD15V	A	13.47	13.79	14.10	10	13.3	95	0.5	0.133	11
	B	13.94	14.26	14.57						
	C	14.40	14.72	15.04						
TCRD16V	A	14.85	15.19	15.52	10	15.2	132	0.5	0.133	12
	B	15.30	15.65	15.99						
	C	15.77	16.14	16.51						
TCRD18V	A	16.32	16.70	17.08	10	19.4	123	0.5	0.133	13
	B	16.90	17.29	17.67						
	C	17.50	17.90	18.30						
TCRD20V	A	18.11	18.52	18.93	10	23.5	170	0.5	0.133	15
	B	18.71	19.13	19.55						
	C	19.35	19.80	20.25						
	D	19.86	20.30	20.74						
TCRD22V	A	20.21	20.66	21.10	5	25.6	170	0.5	0.133	17
	B	20.75	21.21	21.67						
	C	21.22	21.66	22.10						
	D	21.67	22.15	22.62						

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Device Type	T Tolerance	$V_Z@I_{ZT}$			$I_{ZT}$ (mA)	$Z_{zt}@I_{ZT}$ (Ohms) Max	$Z_{zk}@I_{zk}$ (Ohms) Max	$I_{zk}$ (mA)	$I_R@V_R$ (uA) Max	$V_R$ (V)
		Min	Nom	Max						
TCRD24V	A	22.24	22.69	23.14	5	29.0	170	0.5	0.133	19
	B	22.73	23.24	23.75						
	C	23.27	23.78	24.29						
	D	23.79	24.31	24.84						
TCRD27V	A	24.24	24.89	25.54	5	38.0	210	0.5	0.133	21
	B	24.95	25.62	26.28						
	C	25.60	26.29	26.97						
	D	26.28	26.97	27.67						
TCRD30V	A	26.98	27.69	28.41	5	46.0	210	0.5	0.133	23
	B	27.67	28.41	29.15						
	C	28.34	29.09	29.84						
	D	29.00	29.77	30.54						
TCRD33V	A	29.66	30.45	31.25	5	55.0	210	0.5	0.133	25
	B	30.29	31.10	31.91						
	C	30.88	31.70	32.52						
	D	31.46	32.30	33.15						
TCRD36V	A	32.19	32.96	33.74	5	63.0	210	0.5	0.133	27
	B	32.83	33.63	34.42						
	C	33.46	34.27	35.07						
	D	34.07	34.89	35.71						
TCRD39V	A	34.74	35.57	36.41	5	72.0	210	0.5	0.133	30
	B	35.41	36.26	37.12						
	C	36.05	36.92	37.79						
	D	36.69	37.58	38.46						

$V_F$  (forward voltage) = 1.2 V maximum @  $I_F = 200\text{mA}$  for all types

**Notes:**

**1. TOLERANCE AND VOLTAGE DESIGNATION**

The type numbers listed have zener voltage as shown.

**2. SPECIALS AVAILABLE INCLUDE**

Nominal zener voltages between the voltages shown and tighter voltage, for detailed information on price, availability and delivery, contact you nearest Tak Cheong representative.

**3. ZENER VOLTAGE ( $V_Z$ ) MEASUREMENT**

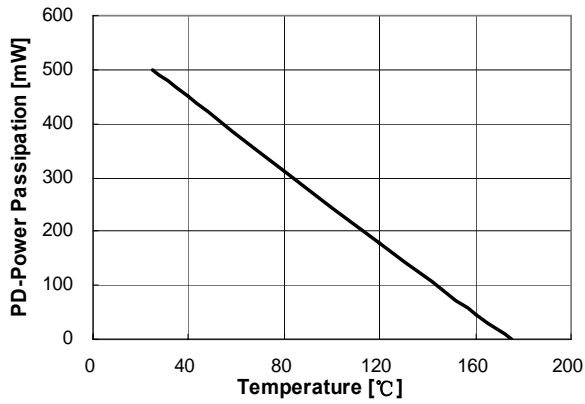
The zener voltage is measured under pulse conditions such that  $T_J$  is no more than  $2^\circ\text{C}$  above  $T_A$ .

**4. ZENER IMPEDANCE ( $Z_Z$ ) DERIVATION**

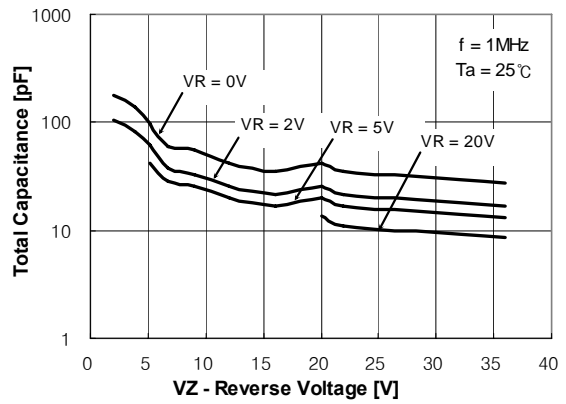
Zener impedance is derived from the 60-cycle ac voltage, which results when an ac current having an RMS value equal to 10% of the dc zener current ( $I_{ZT}$ ) is superimposed to  $I_{ZT}$ .

**5. WHEN ORDERING, PLEASE SPECIFY TOLERANCE A, B, C OR D**

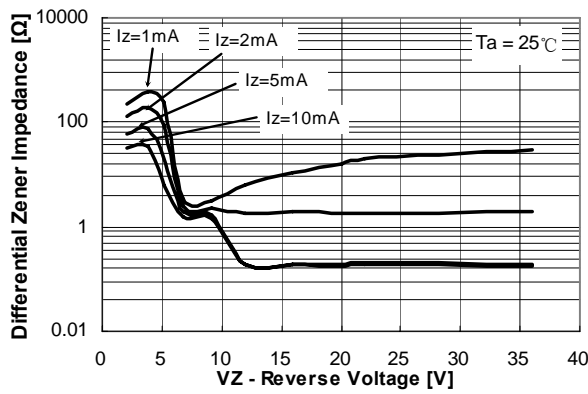
Typical Characteristics



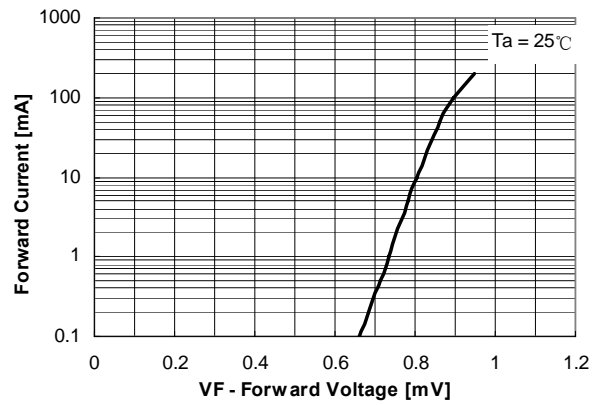
**Figure 1. Power Dissipation vs Ambient Temperature**  
Valid provided leads at a distance of 0.8mm from case are kept at ambient temperature



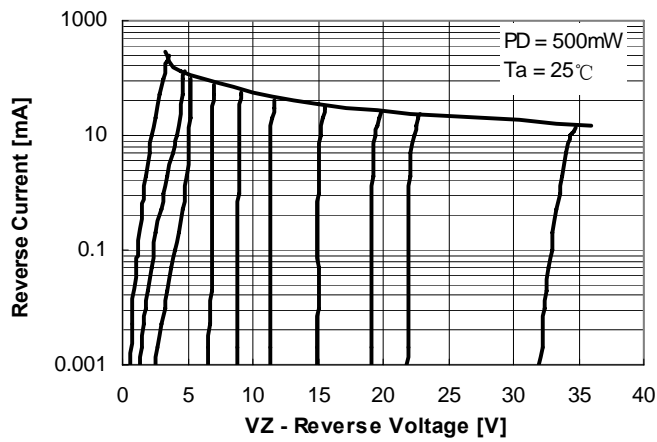
**Figure 2. Total Capacitance**



**Figure 3. Differential Impedance vs. Zener Voltage**

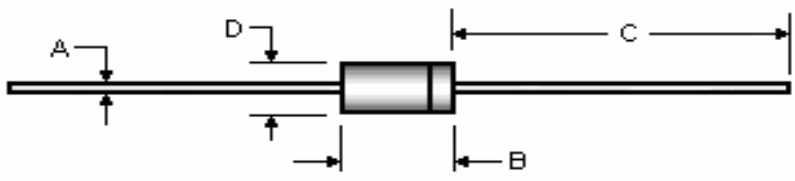


**Figure 4. Forward Current vs. Forward Voltage**



**Figure 5. Reverse Current vs. Reverse Voltage**

Package Outline

Package	Case Outline				
DO-35					
	<b>DO-35</b>				
	<b>DIM</b>	<b>Millimeters</b>		<b>Inches</b>	
		Min	Max	Min	Max
	<b>A</b>	0.46	0.55	0.018	0.022
	<b>B</b>	3.05	5.08	0.120	0.200
<b>C</b>	25.40	38.10	1.000	1.500	
<b>D</b>	1.53	2.28	0.060	0.090	

Notes:

1. All dimensions are within JEDEC standard.
2. DO35 polarity denoted by cathode band.

## **NOTICE**

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