

TOSHIBA ZENER DIODE SILICON EPITAXIAL PLANAR TYPE

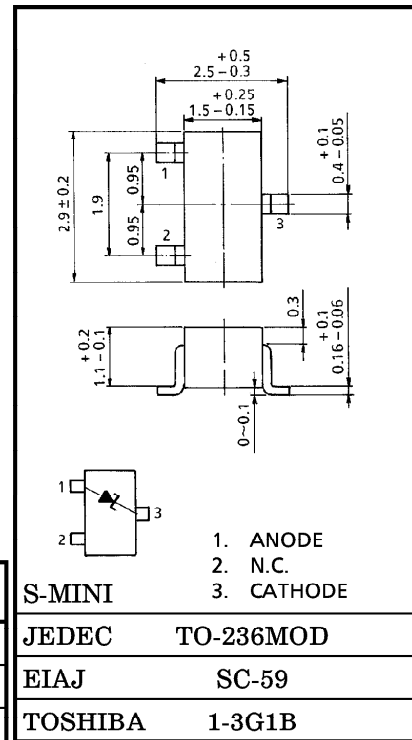
02CZ2.0~02CZ47

CONSTANT VOLTAGE REGULATION APPLICATIONS.

REFERENCE VOLTAGE APPLICATIONS.

- Small Package : SC-59
- Nominal Voltage Tolerance About $\pm 2.5\%$ (4.3V~24V)

Unit in mm

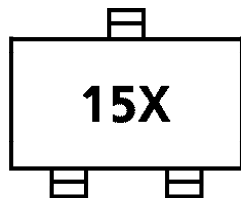


MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

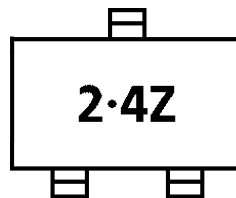
CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Dissipation	P	200	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55~150	$^\circ\text{C}$

Weight : 0.012g

MARKING



(02CZ15-X)



(02CZ2.4-Z)

961001EAA2

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

TYPE No.	ZENER VOLTAGE			DYNAMIC IMPEDANCE		KNEE DYNAMIC IMPEDANCE		REVERSE CURRENT	
	(*) V _Z (V)		I _Z (mA)	Z _Z (Ω)	I _Z (mA)	Z _{ZK} (Ω)	I _Z (mA)	I _R (μA)	V _R (V)
	MIN.	MAX.		MAX.		MAX.		MAX.	
02CZ2.0 (**)	1.85	2.15	5	100	5	1000	0.5	120	1.0
02CZ2.2 (**)	2.05	2.38	5	100	5	1000	0.5	120	1.0
02CZ2.4	2.28	2.60	5	100	5	1000	0.5	120	1.0
02CZ2.7	2.50	2.90	5	110	5	1000	0.5	120	1.0
02CZ3.0	2.80	3.20	5	120	5	1000	0.5	50	1.0
02CZ3.3	3.10	3.50	5	130	5	1000	0.5	20	1.0
02CZ3.6	3.40	3.80	5	130	5	1000	0.5	10	1.0
02CZ3.9	3.70	4.10	5	130	5	1000	0.5	10	1.0
02CZ4.3	4.00	4.50	5	130	5	1000	0.5	5	1.0
02CZ4.7	4.40	4.90	5	120	5	1000	0.5	5	1.0
02CZ5.1	4.80	5.40	5	70	5	1000	0.5	1	1.5
02CZ5.6	5.30	6.00	5	40	5	900	0.5	1	2.5
02CZ6.2	5.80	6.60	5	30	5	500	0.5	1	3.0
02CZ6.8	6.40	7.20	5	25	5	150	0.5	0.5	5.0
02CZ7.5	7.00	7.90	5	23	5	120	0.5	0.5	6.0
02CZ8.2	7.70	8.70	5	20	5	120	0.5	0.5	6.5
02CZ9.1	8.50	9.60	5	18	5	120	0.5	0.5	7.0
02CZ10	9.40	10.60	5	15	5	120	0.5	0.5	8.0
02CZ11	10.40	11.60	5	15	5	120	0.5	0.5	8.5
02CZ12	11.40	12.60	5	15	5	110	0.5	0.5	9.0
02CZ13	12.40	14.10	5	15	5	110	0.5	0.5	10
02CZ15	13.80	15.60	5	15	5	110	0.5	0.5	11
02CZ16	15.30	17.10	5	18	5	150	0.5	0.5	12
02CZ18	16.80	19.10	5	20	5	150	0.5	0.5	14
02CZ20	18.80	21.20	5	25	5	200	0.5	0.5	15
02CZ22	20.80	23.30	5	30	5	200	0.5	0.5	17
02CZ24	22.80	25.60	5	40	5	200	0.5	0.5	19
02CZ27	25.10	28.90	2	70	2	250	0.5	0.5	21
02CZ30	28.00	32.00	2	80	2	250	0.5	0.5	23
02CZ33	31.00	35.00	2	80	2	250	0.5	0.5	25
02CZ36	34.00	38.00	2	90	2	250	0.5	0.5	27
02CZ39	37.00	41.00	2	100	2	250	0.5	0.5	30
02CZ43	40.00	45.00	2	130	2	—	—	0.5	33
02CZ47	44.00	49.00	2	150	2	—	—	0.5	36

(*) Test time : t=30ms (**) Product by order

ZENER VOLTAGE CLASSIFICATION

TYPE No.		ZENER VOLTAGE V_Z (V) $t=30\text{ms}$					
		REFERENCE					
		$I_Z=0.5\text{mA}$		$I_Z=1\text{mA}$		$I_Z=5\text{mA}$	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
02CZ2.0-X	X	1.28	1.46	1.40	1.62	1.85	2.05
02CZ2.0-Z	Z	1.38	1.52	1.52	1.69	1.95	2.15
02CZ2.2-X	X	1.45	1.60	1.59	1.78	2.05	2.26
02CZ2.2-Z	Z	1.52	1.67	1.68	1.92	2.16	2.38
02CZ2.4-X	X	1.64	1.81	1.82	2.03	2.28	2.50
02CZ2.4-Z	Z	1.72	1.89	1.87	2.10	2.40	2.60
02CZ2.7-X	X	1.81	2.00	2.00	2.21	2.50	2.75
02CZ2.7-Z	Z	1.92	2.12	2.11	2.33	2.65	2.90
02CZ3.0-X	X	2.04	2.23	2.23	2.46	2.80	3.05
02CZ3.0-Z	Z	2.16	2.35	2.36	2.58	2.95	3.20
02CZ3.3-X	X	2.27	2.47	2.48	2.73	3.10	3.35
02CZ3.3-Z	Z	2.39	2.60	2.63	2.86	3.25	3.50
02CZ3.6-X	X	2.51	2.74	2.76	3.00	3.40	3.65
02CZ3.6-Z	Z	2.65	2.89	2.90	3.16	3.55	3.80
02CZ3.9-X	X	2.79	3.06	3.06	3.33	3.70	3.97
02CZ3.9-Z	Z	2.95	3.20	3.23	3.46	3.87	4.10
02CZ4.3-X	X	3.06	3.35	3.36	3.63	4.00	4.23
02CZ4.3-Y	Y	3.23	3.46	3.53	3.75	4.13	4.35
02CZ4.3-Z	Z	3.35	3.72	3.65	3.93	4.25	4.50
02CZ4.7-X	X	3.56	3.92	3.83	4.10	4.40	4.63
02CZ4.7-Y	Y	3.74	4.05	4.00	4.25	4.53	4.76
02CZ4.7-Z	Z	3.90	4.22	4.15	4.44	4.66	4.90
02CZ5.1-X	X	4.08	4.48	4.34	4.66	4.80	5.07
02CZ5.1-Y	Y	4.32	4.73	4.56	4.90	4.97	5.24
02CZ5.1-Z	Z	4.56	4.96	4.80	5.12	5.14	5.40
02CZ5.6-X	X	4.80	5.36	5.02	5.43	5.30	5.63
02CZ5.6-Y	Y	5.00	5.63	5.23	5.65	5.43	5.81
02CZ5.6-Z	Z	5.30	5.90	5.45	5.90	5.61	6.00

ZENER VOLTAGE CLASSIFICATION

TYPE No.		ZENER VOLTAGE V_Z (V) $t=30ms$					
		REFERENCE					
		$I_Z=0.5mA$		$I_Z=1mA$		$I_Z=5mA$	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
02CZ6.2-X	X	5.60	6.12	5.70	6.13	5.80	6.20
02CZ6.2-Y	Y	5.89	6.34	5.93	6.35	6.00	6.39
02CZ6.2-Z	Z	6.12	6.57	6.15	6.58	6.19	6.60
02CZ6.8-X	X	6.35	6.80	6.38	6.80	6.40	6.80
02CZ6.8-Y	Y	6.59	7.02	6.60	7.02	6.60	7.02
02CZ6.8-Z	Z	6.81	7.20	6.82	7.20	6.82	7.20
02CZ7.5-X	X	6.96	7.43	6.97	7.43	7.00	7.43
02CZ7.5-Y	Y	7.19	7.66	7.20	7.66	7.23	7.66
02CZ7.5-Z	Z	7.42	7.90	7.43	7.90	7.46	7.90
02CZ8.2-X	X	7.66	8.16	7.67	8.16	7.70	8.16
02CZ8.2-Y	Y	7.92	8.43	7.93	8.43	7.96	8.43
02CZ8.2-Z	Z	8.19	8.70	8.20	8.70	8.23	8.70
02CZ9.1-X	X	8.46	9.00	8.47	9.00	8.50	9.00
02CZ9.1-Y	Y	8.76	9.30	8.77	9.30	8.80	9.30
02CZ9.1-Z	Z	9.06	9.60	9.07	9.60	9.10	9.60
02CZ10-X	X	9.36	9.93	9.37	9.93	9.40	9.93
02CZ10-Y	Y	9.69	10.26	9.70	10.26	9.73	10.26
02CZ10-Z	Z	10.02	10.60	10.03	10.60	10.06	10.60
02CZ11-X	X	10.34	10.95	10.36	10.96	10.40	10.98
02CZ11-Y	Y	10.67	11.23	10.69	11.24	10.73	11.26
02CZ11-Z	Z	11.00	11.57	11.02	11.58	11.06	11.60
02CZ12-X	X	11.34	11.90	11.36	11.91	11.40	11.93
02CZ12-Y	Y	11.67	12.23	11.69	12.24	11.73	12.26
02CZ12-Z	Z	12.00	12.57	12.02	12.58	12.06	12.60
02CZ13-X	X	12.34	13.05	12.36	13.06	12.40	13.08
02CZ13-Y	Y	12.82	13.54	12.84	13.55	12.88	13.57
02CZ13-Z	Z	13.31	14.07	13.33	14.08	13.37	14.10

ZENER VOLTAGE CLASSIFICATION

TYPE No.		ZENER VOLTAGE V_Z (V) $t=30\text{ms}$					
		REFERENCE					
		$I_Z=0.5\text{mA}$		$I_Z=1\text{mA}$		$I_Z=5\text{mA}$	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
02CZ15-X	X	13.74	14.60	13.76	14.61	13.80	14.63
02CZ15-Y	Y	14.27	15.08	14.29	15.09	14.33	15.11
02CZ15-Z	Z	14.75	15.54	14.77	15.56	14.81	15.60
02CZ16-X	X	15.15	16.04	15.18	16.06	15.30	16.10
02CZ16-Y	Y	15.65	16.54	15.68	16.56	15.80	16.60
02CZ16-Z	Z	16.15	17.04	16.18	17.06	16.30	17.10
02CZ18-X	X	16.65	17.70	16.68	17.72	16.80	17.76
02CZ18-Y	Y	17.31	18.37	17.34	18.39	17.46	18.43
02CZ18-Z	Z	17.98	19.04	18.01	19.06	18.13	19.10
02CZ20-X	X	18.65	19.72	18.68	19.74	18.80	19.78
02CZ20-Y	Y	19.33	20.40	19.36	20.42	19.48	20.46
02CZ20-Z	Z	19.97	21.14	20.01	21.16	20.16	21.20
02CZ22-X	X	20.61	21.82	20.65	21.84	20.80	21.88
02CZ22-Y	Y	21.29	22.50	21.33	22.52	21.48	22.56
02CZ22-Z	Z	21.97	23.24	22.01	23.26	22.16	23.30
02CZ24-X	X	22.61	24.05	22.65	24.07	22.80	24.11
02CZ24-Y	Y	23.42	24.86	23.46	24.88	23.61	24.92
02CZ24-Z	Z	24.23	25.54	24.27	25.56	24.42	25.60

