TOSHIBA VARIABLE CAPACITANCE DIODE   SILICON EPITAXIAL PLANAR TYPE
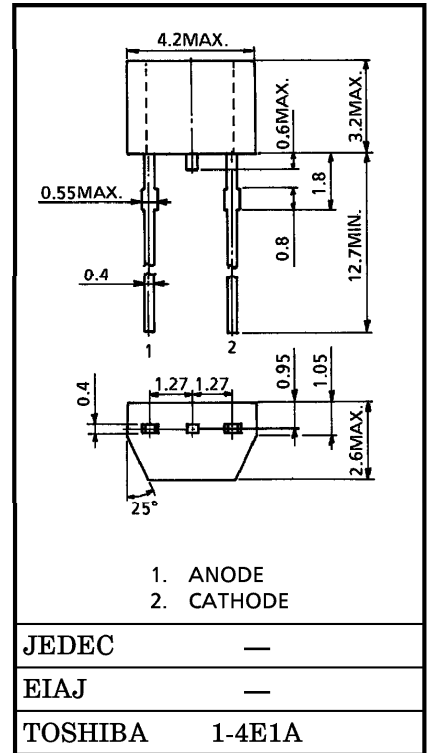
1SV101

FM TUNER APPLICATIONS   Unit in mm

- High Capacitance Ratio   : $C_{3V} / C_{9V} = 2.0\sim2.7$

- Low Series Resistance   : $r_S = 0.3\,\Omega$ (Typ.)

- Small Package.

- Low Tuning Voltage Range   : 3 V-9 V

1. ANODE
2. CATHODE

JEDEC	—
EIAJ	—
TOSHIBA	1-4E1A

Weight : 0.9 g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Reverse Voltage	V_R	15	V
Junction Temperature	T_j	125	°C
Storage Temperature Range	T_{stg}	$-55\sim125$	°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reverse Voltage	V_R	$I_R = 10\,\mu A$	15	—	—	V
Reverse Current	I_R	$V_R = 15\,V$	—	—	10	nA
Capacitance	C_{3V}	$V_R = 3\,V, f = 1\,MHz$	28	—	32	pF
Capacitance	C_{9V}	$V_R = 9\,V, f = 1\,MHz$	12	—	14	pF
Capacitance Ratio	C_{3V} / C_{9V}	—	2.0	—	2.7	
Series Resistance	r_S	$C = 30\,pF, f = 50\,MHz$	—	0.3	0.5	Ω

(Note) : Units are compounded in one package and are matched to 3%.

$$\frac{C\,(\text{Max.}) - C\,(\text{Min.})}{C\,(\text{Min.})} \leqq 0.03 \quad (V_R = 3\,V\text{-}9\,V)$$

and capacitance is classified as Table 1.

Table 1 : Address classification of capacitance
TEST CONDITION : f = 1 MHz, Ta = 25°C   Unit : pF

No.	C_{3V}	C_{5V}	C_{7V}	C_{9V}
1	28.20~29.04	20.50~21.11	15.65~16.11	12.066~12.427
2	28.85~29.71	20.97~21.59	16.01~16.49	12.343~12.713
3	29.51~30.39	21.44~22.08	16.38~16.87	12.627~13.005
4	30.19~31.09	21.94~22.59	16.76~17.26	12.917~13.304
5	30.89~31.81	22.45~23.12	17.15~17.66	13.214~13.610
6		22.97~23.65	17.54~18.06	13.518~13.923
7		23.49~24.19	17.94~18.47	

(1) The capacitance value of address classification is shown with confidence to at least ±0.5% accuracy.

(2) The address is specified in the compounded package (or label).

Example $4 - 3 - 2 - 1$
          $(C_{3V}) (C_{5V}) (C_{7V}) (C_{9V})$

$I_R - V_R$

REVERSE CURRENT I_R (A)

10^{-9}

10^{-10} — Ta = 60°C

10^{-11} — 25°C

10^{-12}

10^{-13}

REVERSE VOLTAGE V_R (V)

0 2 4 6 8 10 12 14 16

$C - V_R$

CAPACITANCE C (pF)

50

30

10

5

f = 1 MHz
Ta = 25°C

REVERSE VOLTAGE V_R (V)

0 4 8 12 16 20

$Q - V_R$

FIGURE OF MERIT Q

2000

1000

500

200

f = 50 MHz
Ta = 25°C

REVERSE VOLTAGE V_R (V)

0 4 8 12 16 20

$\delta C \,(\text{Temp.}) / C\,(25) - Ta$

VARIATION OF CAPACITANCE $\delta C_{(Temp.)}/C_{(25)}$ (%)

5
4
3
2
1
0
−1
−2
−3
−4
−5

f = 1 MHz

$V_R = 1\ V$

3
5
9
15

AMBIENT TEMPERATURE Ta (°C)

−50 −25 0 25 50 75 100

$f / f_{MAX} - V_R$

NORMALIZED TUNING FREQUENCY f/f_{MAX} (%)

1.0

0.9

0.8

0.7

0.6

0.5

Ta = 25°C

10pF
5pF
C = 0

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REVERSE VOLTAGE V_R (V)

2 4 6 8 10