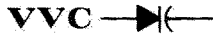


**1N5441A,B**  
 thru  
**1N5456A,B**



**SILICON EPICAP DIODES**

... epitaxial passivated abrupt junction tuning diodes designed for electronic tuning, FM, AFC and harmonic-generation applications in AM through UHF ranges, providing solid-state reliability to replace mechanical tuning methods.

- Excellent Q Factor at High Frequencies
- Guaranteed Capacitance Change — 2.0 to 30 V
- Guaranteed Temperature Coefficient
- Capacitance Tolerance — 10% and 5.0%
- Complete Typical Design Curves

**VOLTAGE-VARIABLE  
 CAPACITANCE DIODES**

6.8 — 100 pF  
 30 VOLTS

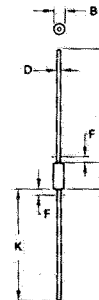


**DO-204AA GLASS**

**\* MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Reverse Voltage	$V_R$	30	Volts
Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	400 2.67	mW mW/ $^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	+175	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +200	$^\circ\text{C}$

\* Indicates JEDEC Registered Data.



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.84	7.62	0.230	0.300
B	2.16	2.72	0.085	0.107
D	0.46	0.56	0.018	0.022
F	—	1.27	—	0.050
K	25.40	38.10	1.000	1.500

All JEDEC dimensions and notes apply

**CASE 51-02**  
**DO-204AA**

6

# 1N5441A,B thru 1N5456A,B

## \*ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic--All Types	Test Conditions	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage	$I_R = 10 \mu\text{A dc}$	$V_{(BR)R}$	30	—	—	Vdc
Reverse Voltage Leakage Current	$V_R = 25 \text{ Vdc}, T_A = 25^\circ\text{C}$ $V_R = 25 \text{ Vdc}, T_A = 150^\circ\text{C}$	$I_R$	—	—	0.02 20	$\mu\text{A dc}$
Series Inductance	$f = 250 \text{ MHz}, \text{lead length} \approx 1/16''$	$L_S$	—	4.0	10	nH
Case Capacitance	$f = 1.0 \text{ MHz}, \text{lead length} \approx 1/16''$	$C_C$	0.1	0.17	0.25	pF
Diode Capacitance Temperature Coefficient (Note 6)	$V_R = 4.0 \text{ Vdc}, f = 1.0 \text{ MHz}$	$TC_C$	—	300	400	ppm/ $^\circ\text{C}$

Device	$C_T$ , Diode Capacitance (1) $V_R = 4.0 \text{ Vdc}, f = 1.0 \text{ MHz}$ pF			TR, Tuning Ratio $C_2/C_{30}$ $f = 1.0 \text{ MHz}$		Q, Figure of Merit $V_R = 4.0 \text{ Vdc}$ $f = 50 \text{ MHz}$
	Min (Nom -10%)	Nom	Max (Nom +10%)	Min	Max	Min
1N5441A	6.1	6.8	7.5	2.5	3.1	450
1N5442A	7.4	8.2	9.0	2.5	3.1	450
1N5443A	9.0	10.0	11.0	2.6	3.1	400
1N5444A	10.8	12.0	13.2	2.6	3.1	400
1N5445A	13.5	15.0	16.5	2.6	3.1	400
1N5446A	16.2	18.0	19.8	2.6	3.1	350
1N5447A	18.0	20.0	22.0	2.6	3.1	350
1N5448A	19.8	22.0	24.2	2.6	3.2	350
1N5449A	24.3	27.0	29.7	2.6	3.2	350
1N5450A	29.7	33.0	36.3	2.6	3.2	350
1N5451A	35.1	39.0	42.9	2.6	3.2	300
1N5452A	42.3	47.0	51.7	2.6	3.2	250
1N5453A	50.4	56.0	61.6	2.6	3.3	200
1N5454A	61.2	68.0	74.8	2.7	3.3	175
1N5455A	73.8	82.0	90.2	2.7	3.3	175
1N5456A	90.0	100.0	110.0	2.7	3.3	175

(1) To order devices with  $C_T$  Nom  $\pm 5.0\%$  add Suffix B.

\*Indicates JEDEC Registered Data.

### PARAMETER TEST METHODS

#### 1. $L_S$ , Series Inductance

$L_S$  is measured on a shorted package at 250 MHz using an impedance bridge (Boonton Radio Model 250A RX Meter or equivalent).

#### 2. $C_C$ , Case Capacitance

$C_C$  is measured on an open package at 1.0 MHz using a capacitance bridge (Boonton Electronics Model 75A or equivalent).

#### 3. $C_T$ , Diode Capacitance

( $C_T = C_C + C_J$ ).  $C_T$  is measured at 1.0 MHz using a capacitance bridge (Boonton Electronics Model 75A or equivalent).

#### 4. TR, Tuning Ratio

TR is the ratio of  $C_T$  measured at 2.0 Vdc divided by  $C_T$  measured at 30 Vdc.

#### 5. Q, Figure of Merit

Q is calculated by taking the G and C readings of an admittance bridge at the specified frequency and substituting in the following equations:

$$Q = \frac{2\pi f C}{G}$$

(Boonton Electronics Model 33ASB or equivalent).

#### 6. $TC_C$ , Diode Capacitance Temperature Coefficient

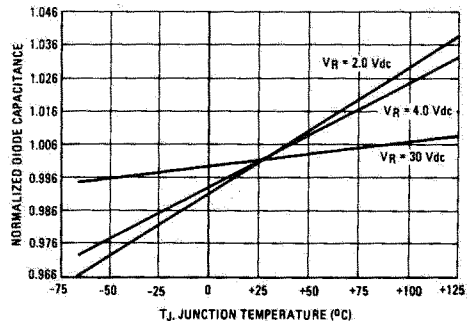
$TC_C$  is guaranteed by comparing  $C_T$  at  $V_R = 4.0 \text{ Vdc}, f = 1.0 \text{ MHz}, T_A = -65^\circ\text{C}$  with  $C_T$  at  $V_R = 4.0 \text{ Vdc}, f = 1.0 \text{ MHz}, T_A = +85^\circ\text{C}$

in the following equation, which defines  $TC_C$ :

$$TC_C = \left[ \frac{C_T(+85^\circ\text{C}) - C_T(-65^\circ\text{C})}{85 + 65} \right] \frac{10^6}{C_T(25^\circ\text{C})}$$

Accuracy limited by  $C_T$  measurement to  $\pm 0.1 \text{ pF}$ .

FIGURE 1 — NORMALIZED DIODE CAPACITANCE versus JUNCTION TEMPERATURE



TYPICAL DEVICE PERFORMANCE

FIGURE 2 – DIODE CAPACITANCE versus REVERSE VOLTAGE

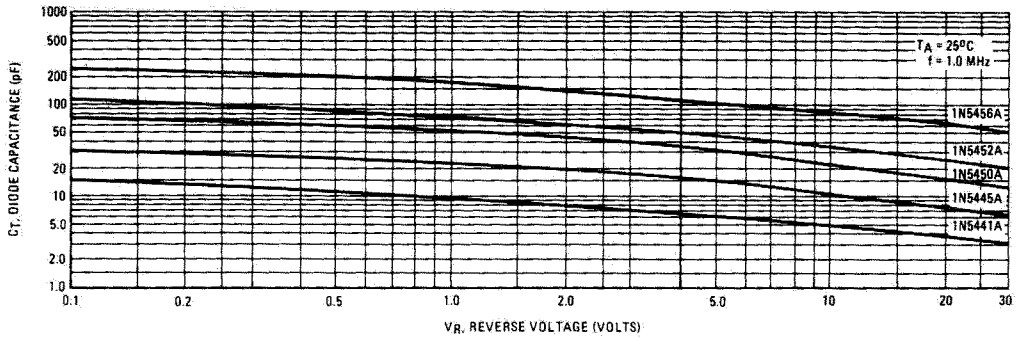


FIGURE 3 – FIGURE OF MERIT versus REVERSE VOLTAGE

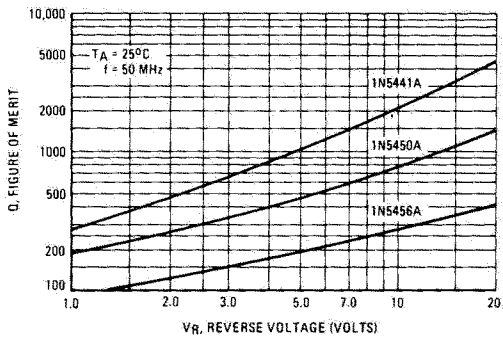


FIGURE 4 – FIGURE OF MERIT versus FREQUENCY

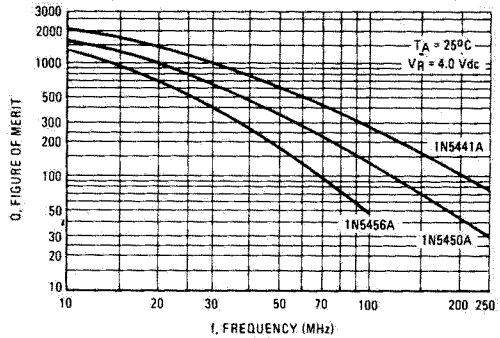


FIGURE 5 – REVERSE CURRENT versus REVERSE BIAS VOLTAGE

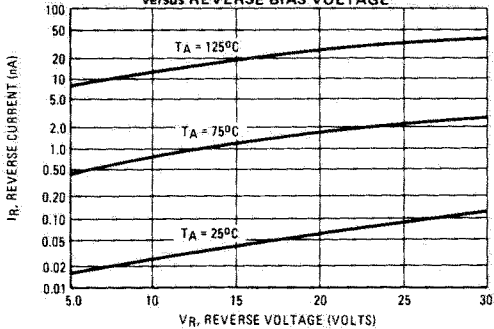


FIGURE 6 – FORWARD VOLTAGE versus FORWARD CURRENT

