1N5441A,B,C (SILICON)
thru
1N5456A,B,C

VVC

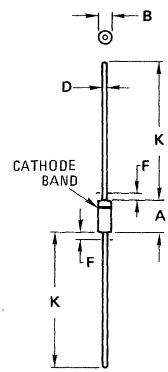
SILICON EPICAP DIODES

. . . 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%, 5.0%, and 2.0%
- Complete Typical Design Curves

VOLTAGE-VARIABLE CAPACITANCE DIODES

6.8 – 100 pF
30 VOLTS



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES 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	–	1.000	–

All JEDEC dimensions and notes apply

CASE 51-02
DO-7

** MAXIMUM RATINGS

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

**Indicates JEDEC Registered Data.

**ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic—All Types	Test Conditions	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage	I_R = 10 μAdc	BV_R	30	–	–	Vdc
Reverse Voltage Leakage Current	V_R = 25 Vdc, T_A = 25°C V_R = 25 Vdc, T_A = 150°C	I_R	– –	– –	0.02 20	μAdc
Series Inductance	f = 250 MHz, lead length≈1/16"	L_S	–	4.0	10	nH
Case Capacitance	f = 1.0 MHz, lead length≈1/16"	C_C	0.1	0.17	0.25	pF
Diode Capacitance Temperature Coefficient (Note 6)	V_R = 4.0 Vdc, f = 1.0 MHz	TC_c	–	300	400	ppm/°C

Device	C_T, Diode Capacitance* V_R = 4.0 Vdc, f = 1.0 MHz pF			TR, Tuning Ratio C_2/C_{30} f = 1.0 MHz		Q, Figure of Merit V_R = 4.0 Vdc f = 50 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

*To order devices with C_T Nom ±5.0% or ±2.0% add Suffix B or C respectively.

**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:

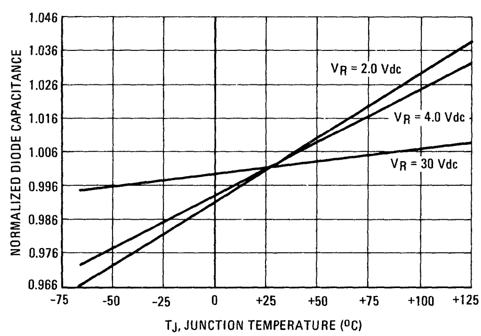
$$Q = \frac{2\pi f C}{G}$$

   (Boonton Electronics Model 33AS8 or equivalent).
6. **TC_c, Diode Capacitance Temperature Coefficient**
   TC_c is guaranteed by comparing C_T at V_R = 4.0 Vdc, f = 1.0 MHz, T_A = -65°C with C_T at V_R = 4.0 Vdc, f = 1.0 MHz, T_A = +85°C in the following equation, which defines TC_c:

$$TC_c = \left| \frac{C_T(+85°C) - C_T(-65°C)}{85 + 65} \right| \frac{10^6}{C_T(25°C)}$$

   Accuracy limited by C_T measurement to ±0.1 pF.

FIGURE 1 — NORMALIZED DIODE CAPACITANCE versus JUNCTION TEMPERATURE



TYPICAL DEVICE PERFORMANCE

FIGURE 2 – DIODE CAPACITANCE versus REVERSE VOLTAGE

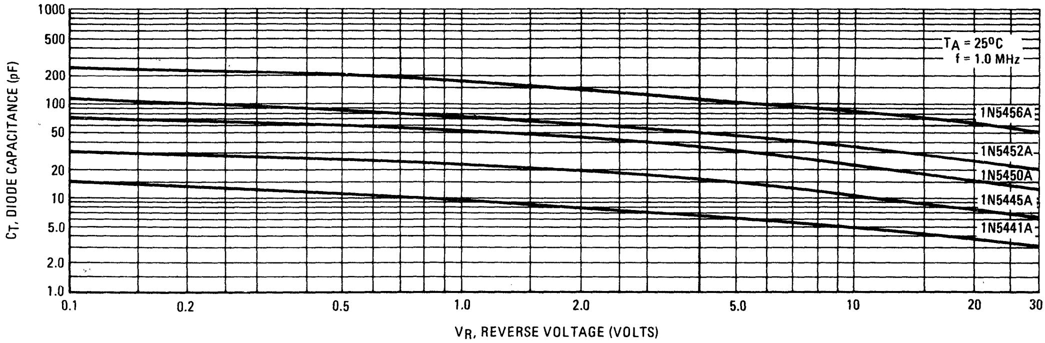


FIGURE 3 – FIGURE OF MERIT versus REVERSE VOLTAGE

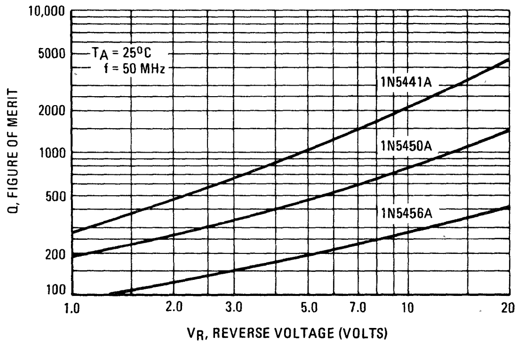


FIGURE 4 – FIGURE OF MERIT versus FREQUENCY

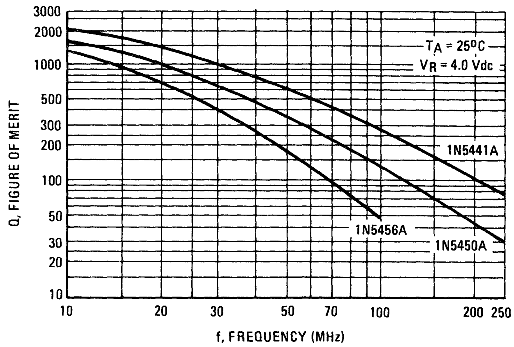


FIGURE 5 – REVERSE CURRENT versus REVERSE BIAS VOLTAGE

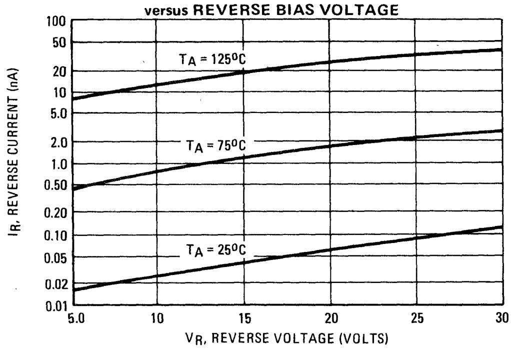


FIGURE 6 – FORWARD VOLTAGE versus FORWARD CURRENT