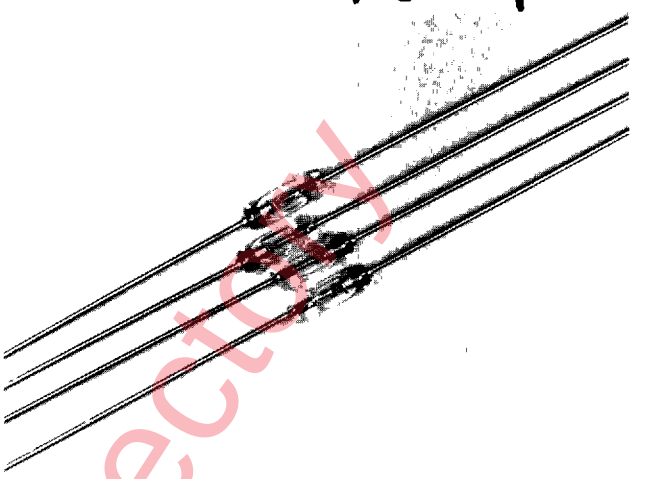
VHF-UHF Abrupt Tuning Diodes

T-07-19

Features

- High Q
- Large Tuning Range
- Standard Capacitance Tolerances - 10%, 5%, 2%
- Computer Matched for Tracking (optional)
- Low Leakage Current
- Meet All MIL-STD-750 Requirements



Types

- 30 Volt Series
  (IN5461A,B,C - IN5476A,B,C)
  (IN5441A,B,C - IN5456A,B,C)
- 60 Volt Series
  IN5139 - IN5148

Description

Alpha UHF-VHF tuning diodes are diffused epitaxial planar-passivated devices housed in the standard Alpha 099-001 glass package (DO-7). Low leakage current is inherent in this process. Shallow diffusions combined with a high degree of control of epitaxial layer doping uniformity results in devices with near abrupt junctions. High Q is maintained by optimizing active layer resistance and by careful control of the metallization process. The devices are also available in chip form and are suitable for mounting into circuits using Au-Sn solder. The top contact can be readily bonded with gold wire or ribbon using conventional thermocompression bonding techniques.

Applications

These devices are designed for electronic tuning applications in the UHF-VHF region to replace mechanical tuners. They can also be used for other frequency control applications. The devices can be matched for capacitance at several bias voltages using computer-aided testing and supplied in multi-unit matched sets.

Maximum Ratings

Parameter	Symbol	Value	Units
Reverse Voltage	V_R	Same as V_{BR}	Volts
Device Dissipation at T_A=25°C		250	mW
Operating Temperature	T_{op}	-65 to +150	°C
Storage Temperature Range	T_{stg}	-65 to +200	°C

Electrical Characteristics (TA = 25°C or as noted)

30 Volt Series

Parameter	Test Conditions	Symbol	Value	Units
Reverse Breakdown Voltage	I_R = 10μAdc	V_{BR}	30	Vdc Min.
Reverse Leakage Current	V_R = 25 Vdc. T_A = 25°C V_R = 25 Vdc. T_A = 150°C	I_R	0.02 20	μAdc Max. μAdc Max.
Diode Capacitance Temperature Coefficient	V_R = 4.0 Vdc. f = 1.0 MHz	TC_C	400	ppm/°C Max.

60 Volt Series

Parameter	Test Conditions	Symbol	Value	Units
Reverse Breakdown Voltage	I_R = 10μAdc	V_{BR}	60	Vdc Min.
Reverse Leakage Current	V_R = 55 Vdc. T_A = 25°C V_R = 55 Vdc. T_A = 150°C	I_R	0.02 20	μAdc Max. μAdc Max.
Diode Capacitance Temperature Coefficient	V_R = 4.0 Vdc. f = 1.0 MHz	TC_C	300	ppm/°C Max.

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30 Volt Series

Device	C_T, Diode Capacitance[1] V_R=4.0 Vdc, f=1.0 MHz pF	TR, Tuning Ratio C_{T2}/C_{T30} = 1.0 MHz		Q[2] V_R=4.0 Vdc f = 50 MHz
	Nom	Min	Max	Min
1N5461	6.8	2.7	3.1	600
1N5462	8.2	2.8	3.1	600
1N5463	10.0	2.8	3.1	550
1N5464	12.0	2.8	3.1	550
1N546	15.0	2.8	3.1	550
1N5466	18.0	2.9	3.1	500
1N5467	20.0	2.9	3.1	500
1N5468	22.0	2.9	3.2	500
1N5469	27.0	2.9	3.2	500
1N5470	33.0	2.9	3.2	500
1N5471	39.0	2.9	3.2	450
1N5472	47.0	2.9	3.2	400
1N5473	56.0	2.9	3.3	300
1N5474	68.0	2.9	3.3	250
1N5475	82.0	2.9	3.3	225
1N5476	100.0	2.9	3.3	200
1N5441	6.8	2.5	3.1	450
1N5442	8.2	2.5	3.1	450
1N5443	10.0	2.6	3.1	400
1N5444	12.0	2.6	3.1	400
1N5445	15.0	2.6	3.1	400
1N5446	18.0	2.6	3.1	350
1N5447	20.0	2.6	3.1	350
1N5448	22.0	2.6	3.2	350
1N544	27.0	2.6	3.2	350
1N5450	33.0	2.6	3.2	350
1N5451	39.0	2.6	3.2	300
1N5452	47.0	2.6	3.2	250
1N5453	56.0	2.6	3.3	200
1N5454	68.0	2.7	3.3	175
1N5455	82.0	2.7	3.3	175
1N5456	100.0	2.7	3.3	175

60 Volt Series

Device	C_T, Diode Capacitance[1] V_R=4.0 Vdc, f=1.0 MHz pF	TR, Tuning Ratio C_{T4}/C_{T60} f = 1 MHz		Q[2] V_R=4.0 Vdc f = 50 MHz
	Nom	Min	Typ.	Min
1N5139	6.8	2.7	2.9	350
1N5140	10.0	2.8	3.0	300
1N5141	12.0	2.8	3.0	300
1N5142	15.0	2.8	3.0	250
1N5143	18.0	2.8	3.0	250
1N5144	22.0	3.2	3.4	200
1N5145	27.0	3.2	3.4	200
1N5146	33.0	3.2	3.4	200
1N5147	39.0	3.2	3.4	200
1N5148	47.0	3.2	3.4	200

Notes:

1. Add suffix -06 for ±10%, or -12 for ±5%, or -18 for ±2 tolerance on C_{T4}.
2. Q is calculated from values of C and G measured on Boonton 33A admittance bridge using the formula $Q = 2\pi fC/G$, f = 50 MHz