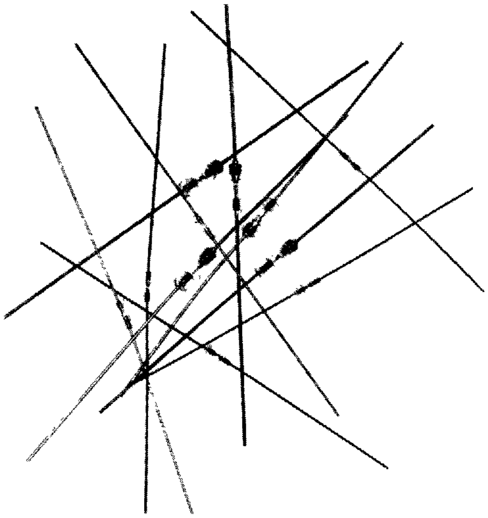
Silicon Hyperabrupt Tuning Diodes
DKV6550 Series

T-07-19



Features

- Octave Frequency Tuning from 0 to 10 Volts
- ±1.5% Linearity for a 1.7:1 Tuning Ratio without Compensation Network

Types

- DKV6550 Series
- CKV2010 Series
- DKV3801 Series
- DKV3802 Series
- DKV3803 Series
- DKV3804 Series

Description

Alpha microwave hyperabrupt diodes are designed for linear wideband tuning of microwave filters, resonators, and local oscillators. Linear tuning, not possible with conventional abrupt-junction tuning diodes, is accomplished by maintaining an accurate silicon doping profile using ion-implantation precision control techniques.

The DKV6550 series hyperabrupt diodes offer wide bandwidth linear tuning with low bias voltage. For example, a 20-volt hyperabrupt diode can provide the same tuning variation as a 90-volt abrupt-junction diode, as illustrated in Figure 3.

When capacitance and tuning ratio values are equal, a hyperabrupt diode will have a Q (measured at -4 volts, 50 MHz) approximately 1/2 to 1/3 that of an abrupt-junction diode. This inherent Q reduction is often outweighed by the advantages of linearity and low bias requirements of hyperabrupt diodes.

These diodes are available in most of the Alpha ceramic and glass packages. See table on next page. They can be supplied in chip form or mounted on a variety of chip carriers. All chips are passivated with silicon dioxide for high reliability, low leakage current and low post tuning drift.

The characteristics of the model DKV6550 diodes in the standard Alpha 023-001 ceramic package (C_P=0.22 pF) are shown in Figures 1, 2 and 3.

Hyperabrupt diodes are offered in various package styles to suit current applications. See the following tables for further details. Capacitance values may change slightly due to variations in package parasitics.

Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Reverse Voltage	V_R	22	Volts
Forward Current	I_F	40	mAdc
Power Dissipation (T_A=25°C)	P_D	250	mW
Operating Temperature	T_{OP}	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +175	°C

Electrical Characteristics at 25°C

Package Outline 023-001

Symbol	V_{BR}	I_R	C_T				Q
Parameter	**Reverse Breakdown Voltage**	**Reverse Leakage Current**	**Diode Capacitance (C_p=0.22pF)**				**Figure of Merit**
Unit	V_{DC}	**nADC**	**pF**				
Test Condition	I_R=10μAdc	V_R=20Vdc	f=1 MHz V_R=4Vdc		V_R=20Vdc		f=50 MHz VR=4Vdc
Type Number	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**
DKV6550-06	22	50	.90	1.10	.35	.45	500
DKV6550-12	22	50	1.35	1.65	.45	.55	500
DKV6550-18	22	50	1.80	2.20	.55	.70	400
DKV6550-24	22	50	2.70	3.30	.70	.90	400
DKV6550-30	22	50	4.50	5.50	1.00	1.30	400

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Type Numbers for Various Package Styles

023-001 Package (C_p = 0.22 pF)	Chip Outline	075-001 Package (C_p = 0.1 pF)	168-001 Package (C_p = 0.18 pF)	325-011 Package (C_p = 0.12 pF)	130-011 Package (C_p = 0.15 pF)
DKV6550-06	CKV2010-19	DKV3801-55	DKV3802-55	DKV3803-55	DKV3804-55
DKV6550-12	CKV2010-20	DKV3801-56	DKV3802-56	DKV3803-56	DKV3804-56
DKV6550-18	CKV2010-21	DKV3801-57	DKV3802-57	DKV3803-57	DKV3804-57
DKV6550-24	CKV2010-22	DKV3801-58	DKV3802-58	DKV3803-58	DKV3804-58
DKV6550-30	CKV2010-23	DKV3801-59	DKV3802-59	DKV3803-59	DKV3804-59

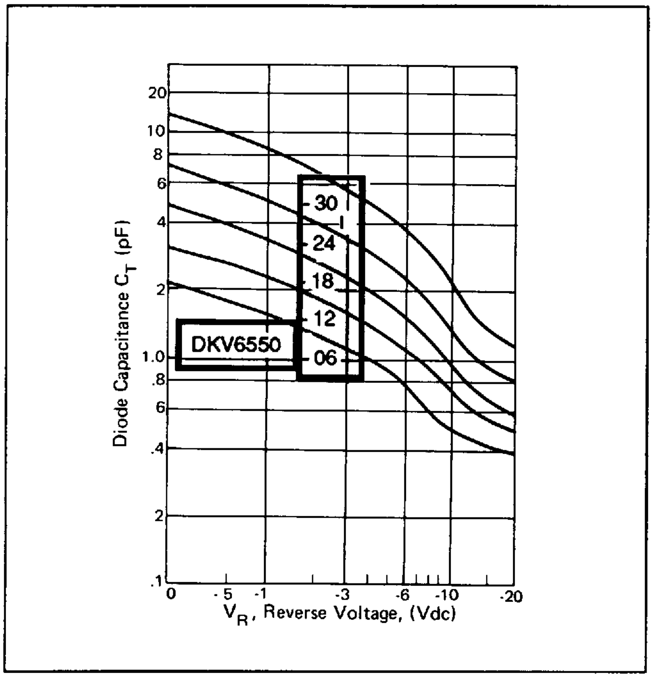

Figure 1. Typical Diode Capacitance vs. Tuning Voltage

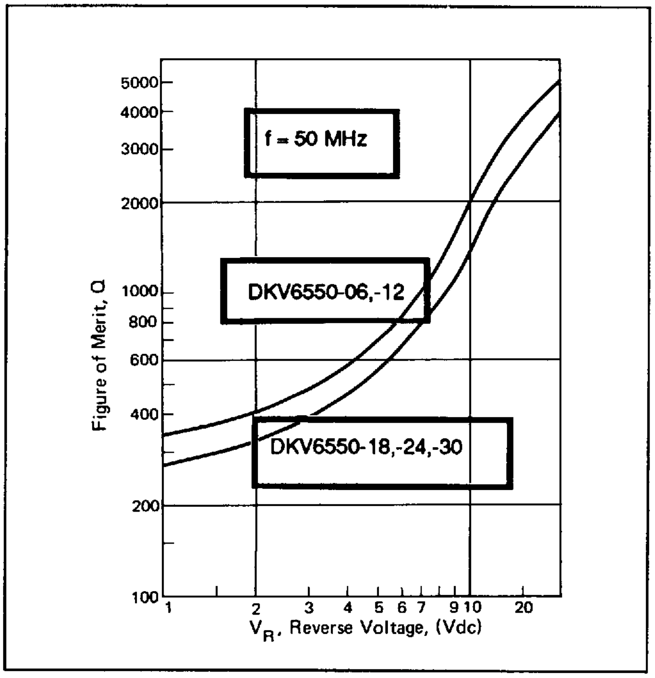

Figure 2. Typical Q vs. Tuning Voltage

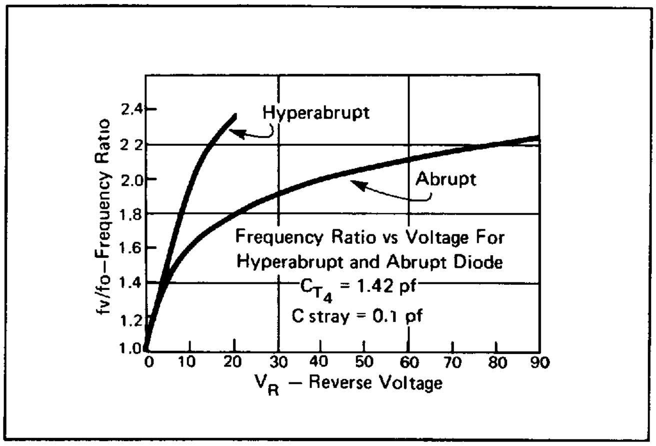

Figure 3. Frequency Ratio vs. Tuning Voltage