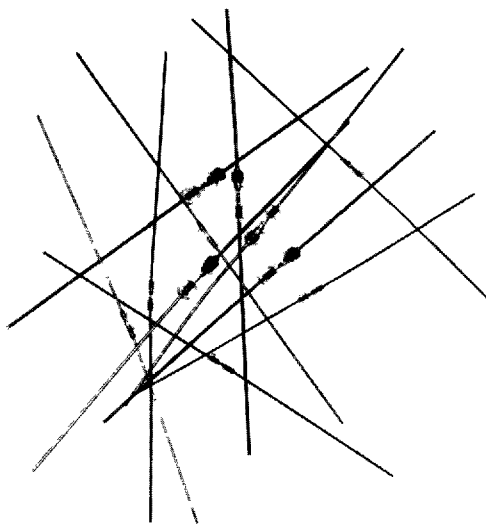


Silicon Hyperabrupt Tuning Varactors

DKV6510 Series

ALPHA IND/ SEMICONDUCTOR 48E D ■ 0585443 0001316 492 ■ ALP



Features

T-07-19

- Medium to High Frequency Operation
- Guaranteed 10:1 Tuning Ratio from 2 to 10 Volts
- Q of 500 at 1 MHz Typical

Types

- DKV 6510 Series
- CKV 2020 Series
- CKV 3802 Series
- DKV 3803 Series
- DKV 3804 Series

Description

Alpha uses ion implantation to provide this series of hyperabrupt tuning diodes with closely controlled characteristics. The highly reproducible capacitance versus voltage behavior of this family permits Alpha to supply matched sets and also assures the customer of long-term availability of parts having uniform electrical properties. Passivated, hermetically-sealed construction allows their use under the most adverse conditions, both in commercial equipment and in high reliability space and military applications.

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.

Applications

Designer oriented families offer types selected and tested with each customer's application in mind. Premium units DKV6510-12 and DKV6515-12 through DKV6518-12 tune up to 30 MHz with frequency ratios as high as 4:1 and can be used up to 300 MHz in oscillators. Alpha's DKV6510-06 and DKV6515-06 through DKV6518-06 diodes tune over 4:1 frequency ratios up to 10 MHz and are also ideal for wide deviation voltage-tuned crystal oscillators. The DKV6510 and DKV6515 through DKV6518 series are suited to applications where economy is a prime consideration and may be used as replacements for devices which are not ion-implanted, with, in most cases, performance advantages. Low frequency oscillators, voltage-tuned filters, VCXO-TCXO modules, and frequency/phase modulators using Alpha's DKV6510 series achieve new levels of frequency swing and linearity.

Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Reverse Voltage	V_R	Same as V_B	Volts
Forward Current	I_F	40	mAdc
Power Dissipation ($T_A=25^\circ\text{C}$)	P_D	200	mW
Operating Temperature	T_{OP}	-55 to +125	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to +175	$^\circ\text{C}$

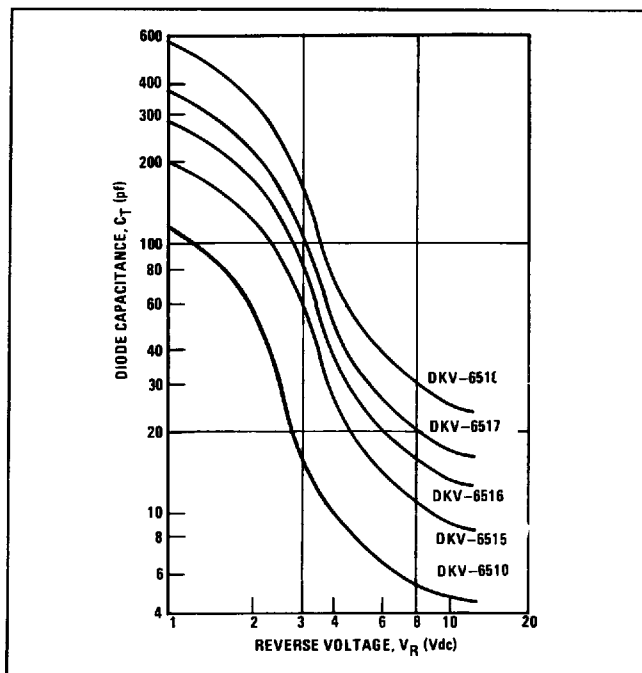


Figure 1. Typical Capacitance vs. Tuning Voltage ($T_A=25^\circ\text{C}$)

Silicon Hyperabrupt Tuning Diodes

DKV6510 Series

ALPHA IND/ SEMICONDUCTOR

48E D

0585443 0001317 329 ALP T-07-19

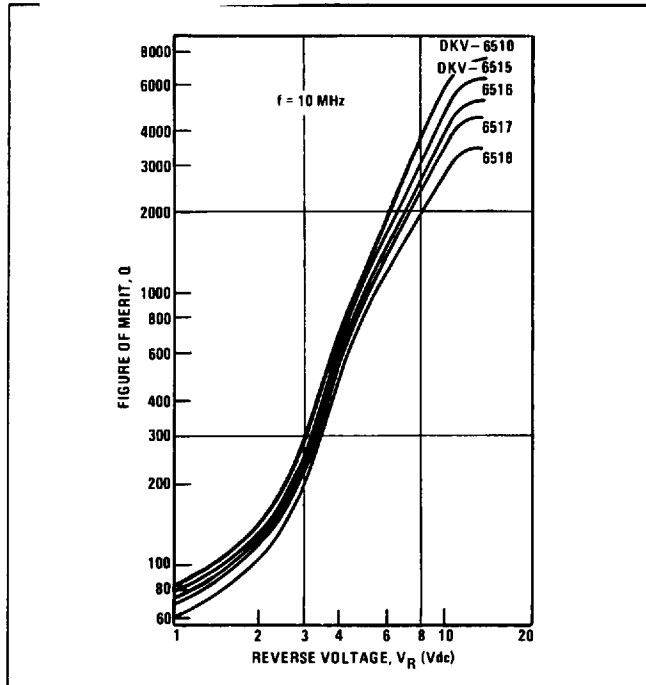


Figure 2. Typical Q vs. Tuning Voltage ($T_A = 25^\circ\text{C}$)

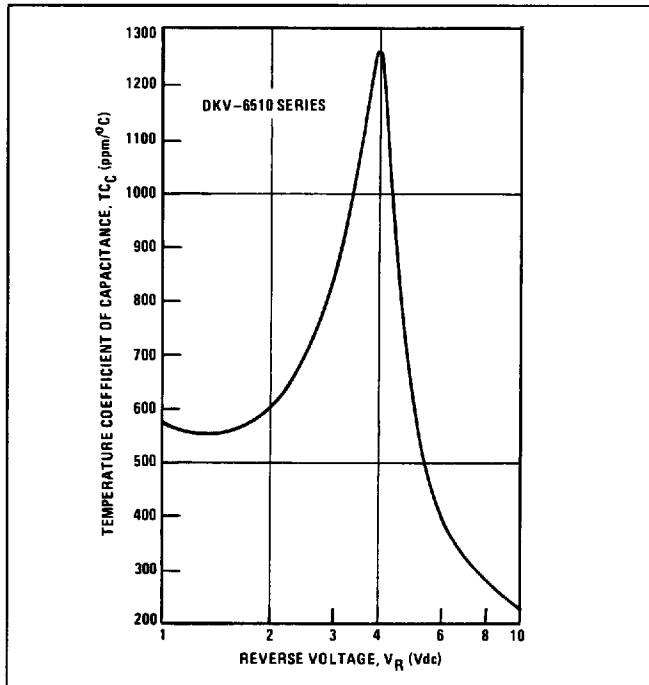


Figure 3. Temperature Coefficient of Capacitance vs. Tuning Voltage ($T_A = 25^\circ\text{C}$)

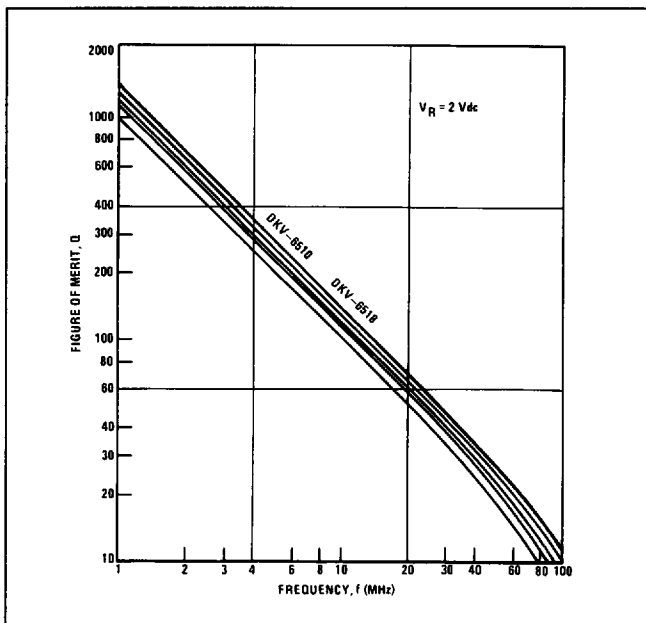


Figure 4. Typical Q vs. Frequency ($T_A = 25^\circ\text{C}$)

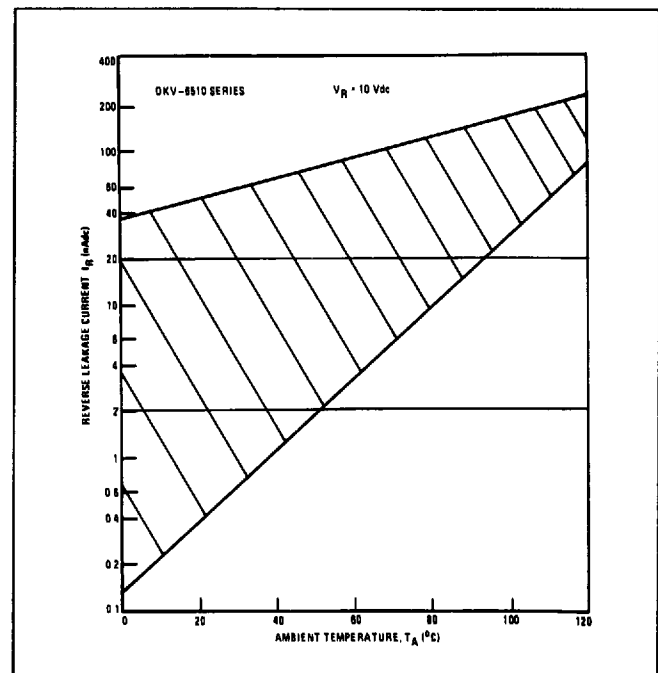


Figure 5. Reverse Leakage Current vs. Ambient Temperature

Silicon Hyperabrupt Tuning Diodes

DKV6510 Series

ALPHA IND/ SEMICONDUCTOR 48E D ■ 0585443 0001318 265 ■ ALP T-07-19'

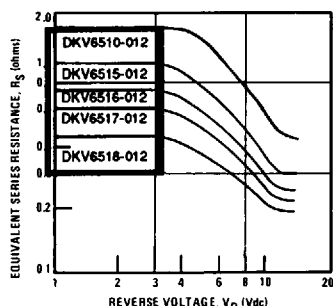


Figure 6. Equivalent Series Resistance vs. Tuning Voltage ($T_A = 25^\circ\text{C}$)

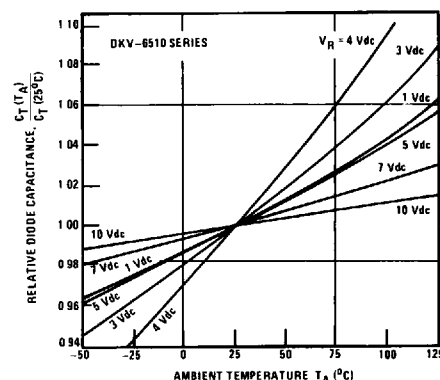


Figure 7. Capacitance vs. Ambient Temperature

Electrical Characteristics ($T_A = 25^\circ\text{C}$)

DKV6510 Series, Package Style 099-001

Symbol	V_{BR}	I_R	C_T^1				T_R				Q^2
Parameter	Reverse Breakdown Voltage	Reverse Leakage Current	Diode Capacitance				Tuning Ratio				Figure of Merit
Unit	Vdc	nAdc	pf								
Test Conditions	$I_R = 10\mu\text{Adc}$	$V_R = 10\text{Vdc}$	$f = 1\text{ MHz}$				$f = 1\text{ MHz}$				$f = 1\text{ MHz}$
Type Number	Min.	Max.	$V_R = 2\text{Vdc}^4$		$V_R = 10\text{Vdc}^4$		$C(1.25\text{v})/C(7\text{v})$		$C(2\text{v})/C(10\text{v})$		$V_R = 2\text{Vdc}^3$
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
DKV6510	12	1000	45		4				10		500
DKV6510-06	12	100	45	75	4	7			10	17	500
DKV6510-12	12	50	45	75	4	7			10	17	750
DKV6515	12	1000	100			13			10		200
DKV6515-06	12	100	100	150	8	12			10	17	200
DKV6515-12	12	50	100	150	8	13			10	17	500
DKV6516	12	1000	140			18			10		200
DKV6516-06	12	100	140	210	11	18			10	17	200
DKV6516-12	12	50	140	210	11	18			10	17	500
DKV6517	12	1000	180			22			10		200
DKV6517-06	12	100	180	270	14	22			10	17	200
DKV6517-12	12	50	180	270	14	22			10	17	500
DKV6518 ⁽²⁾	12	2000	450			40	12				150
DKV6518-06	12	200	450	550	25	40	12	20			150
DKV6518-12	12	100	450	550	25	40	12	20			300

Type Numbers for Various Package Styles

099-001 Package	Chip Outline	168-001 Package	325-011 Package	130-011 Package
DKV6510-00	CKV2020-01	DKV3802-01	DKV3803-01	DKV3804-01
DKV6510-06	CKV2020-02	DKV3802-02	DKV3803-02	DKV3804-02
DKV6510-12	CKV2020-03	DKV3802-03	DKV3803-03	DKV3804-03
DKV6515-00	CKV2020-04	DKV3802-04		
DKV6515-06	CKV2020-05	DKV3802-05		
DKV6515-12	CKV2020-06	DKV3802-06		
DKV6516-00	CKV2020-07	DKV3802-07		
DKV6516-06	CKV2020-08	DKV3802-08		
DKV6516-12	CKV2020-09	DKV3802-09		
DKV6517-00	CKV2020-10	DKV3802-10		
DKV6517-06	CKV2020-11	DKV3802-11		
DKV6517-12	CKV2020-12	DKV3802-12		
DKV6518-00	CKV2020-13	DKV3802-13		
DKV6518-06	CKV2020-14	DKV3802-14		
DKV6518-12	CKV2020-15	DKV3802-15		

Notes:

- Chip styles
CKV2020-01 through 03 are 149-803.
DKV2020-04 through 12 are 149-804.
DKV2020-013 through 015 are 149-806.
- DKV6518 series are in 287-001 package outline.
- Q is measured at 1.25 volts for DKV6518 series.
- C_T is tested at 1.25 volts and 7 volts for DKV6518 series.