

**HF
HYPERABRUPT
GLASS TUNING
DIODE**

D-4020

SDI

Where quality begins...

11 Executive Park Drive
N. Billerica, MA 01862
(617) 667-7700 TLX 95 1592
TWX 710-347-1576

Description

SDI HF hyperabrupt tuning varactors are for tuning LC resonant circuits from audio frequencies up to 30 MHz with frequency ratios as high as 4 to 1; also for wide deviation voltage-tuned crystal oscillators. They are ion-implanted to give superior uniformity. Two volt capacitances from 57 to 225 pf are offered in this family. HF diodes feature exceptionally large capacitance ratios, very high Q, straight-line-frequency performance over a 1.5 to 4 volt tuning range, and are available in closely matched sets.

Features

- Ion Implantation Provides Lot to Lot Reproducibility
- Octave Tuning
- Ultra-High Q
- Large Signal Handling Capability
- 2 to 1 Capacitance Ratio

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_R	Reverse Voltage	Same as V_{BR}	
I_F	Forward Current	200	mAdc
P_d	Power Dissipation ($T_A = 25^\circ\text{C}$)	250	mW
T_J	Junction Temperature	-65 to +125	$^\circ\text{C}$
T_{Stg}	Storage Temperature	-65 to +175	$^\circ\text{C}$

- DTH2411, DTH2511, DTH2611, DTH2711, for HF tuning where high Q is required
- DTH2412, DTH2512, DTH2612, DTH2712, for medium-frequency tuning applications
- DTH2413, DTH2513, DTH2613, DTH2713, for low-cost applications

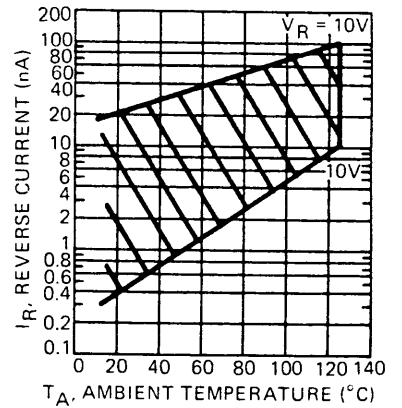
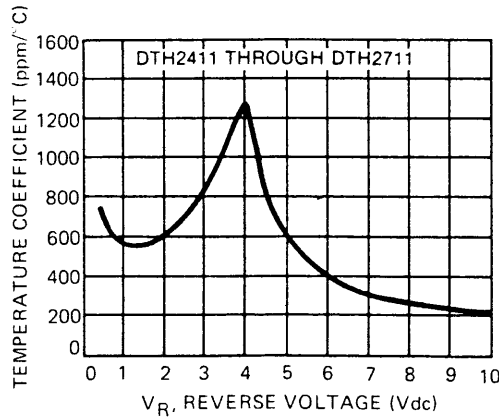
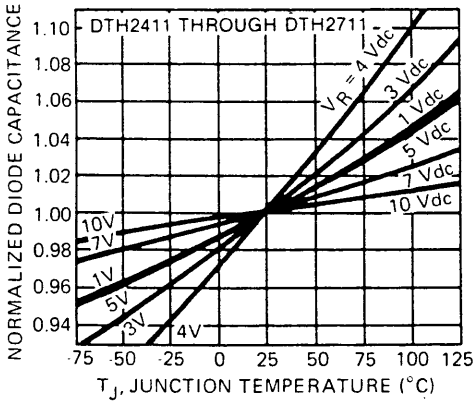
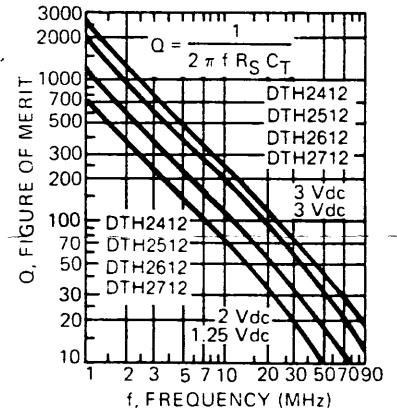
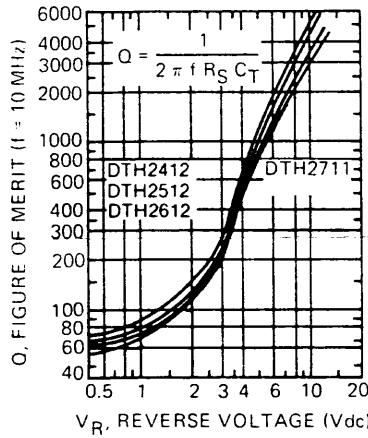
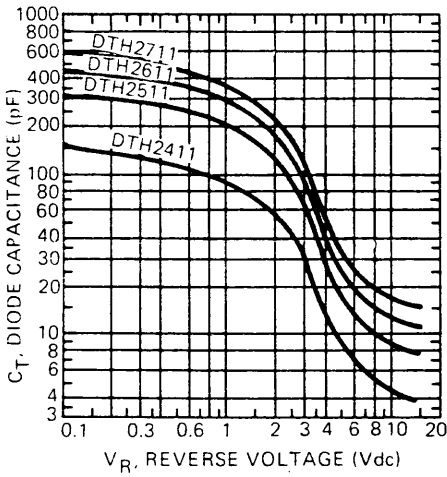
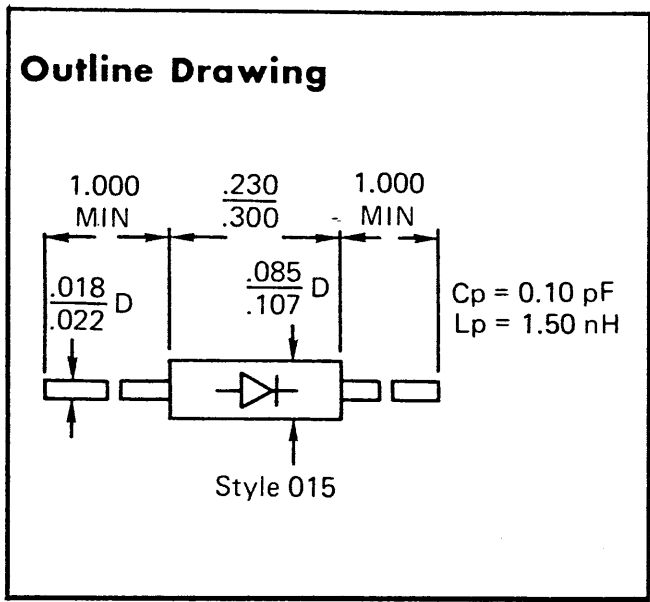
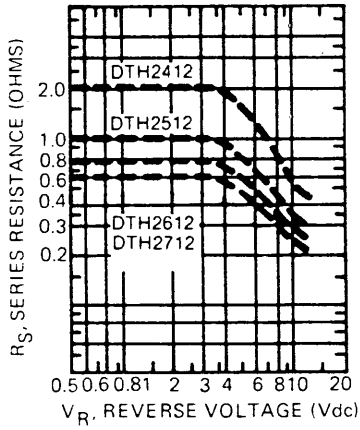
Electrical Characteristics ($T_A = 25^\circ\text{C}$)

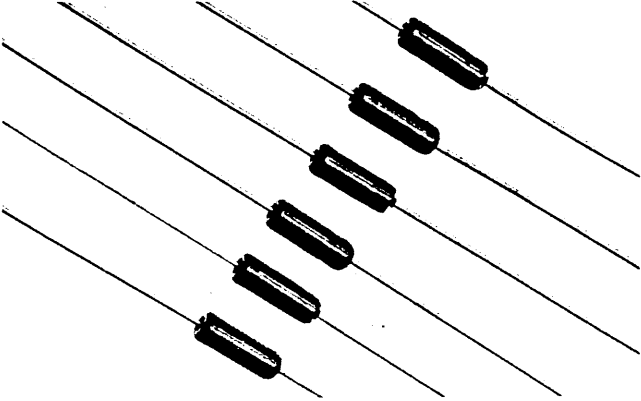
TYPE	CT DIODE CAPACITANCE (pF) f = 1 MHz				TR TUNING RATIO f = 1 MHz		Q				V_{BR} (Vdc)	I_R (nAdc)
	$V_R = 1.25 \text{ Vdc}$		$V_R = 2 \text{ Vdc}$		C(1.25V)/C(7V)	C(2V)/C(10V)	$V_R = 1.25 \text{ Vdc}$		$V_R = 2 \text{ Vdc}$		$I_R = 10 \mu\text{Adc}$	$V_R = 10 \text{ Vdc}$
	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX			f = 1 MHz	f = 10 MHz	f = 1 MHz	f = 10 MHz		
DTH2411	-/81.5/-	46/57/68	-/6.1/-	4.2/4.7/5.2	-/13/-	10/12/17				150/300	12/20	10/50
DTH2412	-/81.5/-	46/57/68	-/6.1/-	4.2/4.7/5.2	-/13/-	10/12/17			750/1400		12/20	10/50
DTH2413	-/81.5/-	46/57/-	-/6.1/-	-/4.7/5.2	-/13/-	10/12/-			750/1400		12/20	100/1000
DTH2511	-/180/-	100/125/150	-/13/-	8.6/9.6/10.6	-/14/-	10/13/17.5				120/230	12/20	10/50
DTH2512	-/180/-	100/125/150	-/13/-	8.6/9.6/10.6	-/14/-	10/13/17.5			500/1300		12/20	50/100
DTH2513	-/180/-	100/125/-	-/13/-	-/9.6/10.6	-/14/-	10/13/-			500/1300		12/20	100/1000
DTH2611	-/255/-	140/175/210	-/18.5/-	12.6/14.0/15.4	-/14/-	10/12.5/17				100/140	12/20	10/50
DTH2612	-/255/-	140/175/210	-/18.5/-	12.6/14.0/15.4	-/14/-	10/12.5/17			500/1200		12/20	50/100
DTH2613	-/255/-	140/175/-	-/18.5/-	-/14.0/15.4	-/14/-	10/12.5/-			500/1200		12/20	100/1000
DTH2711	-/325/-	180/225/270	-/24/-	16.2/18.0/19.8	-/14/-	10/12.5/17				90/140	12/20	10/50
DTH2712	-/325/-	180/225/270	-/24/-	16.2/18.0/19.8	-/14/-	10/12.5/17			500/1200		12/20	50/100
DTH2713	-/325/-	180/225/-	-/24/-	-/18.0/19.8	-/14/-	10/12.5/-			500/1200		12/20	100/1000

Specifications subject to change without notice

TYPICAL PERFORMANCE CURVES

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





**VHF
HYPERABRUPT
GLASS TUNING
DIODE**

D-4021

SDI Where quality begins...
11 Executive Park Drive
N. Billerica, MA 01862
(617) 667-7700 TLX 95 1592
TWX 710-347-1576

Description

SDI VHF hyperabrupt tuning varactors are ion-implanted, highly reproducible, diodes which allow octave tuning of LC tanks up to 500 MHz or, with a reduced 1.5 to 1 frequency ratio, straight-line-frequency tuning over a 3 to 8 volt tuning range are offered in this family which, with the DHF diodes, give the designer a full capacitance range of 10 to 200 pf at 4 volts of bias. Ultra-high Q and excellent large signal handling capabilities, along with a 2 to 1 capacitance ratio, is obtained by tuning from 9 to 20 volts of reverse bias. Linear, wide-deviation tuning of VCXO/TCXO's and frequency modulators results when these diodes are tuned over a 3 to 8 volt bias range. Closely matched sets of all VHF diodes are available along with "A" suffix versions having $\pm 5\%$ capacitance tolerances at 4 volts of reverse bias.

- DTH3011, DTH3211, DTH3311, DTH3411, DTH3511, for octave tuning or ultra-high Q applications
- DTH3012, DTH3212, DTH3312, DTH3412, DTH3512, for straight-line-frequency applications over the 3 to 8 volt bias range
- DTH3014, DTH3214, DTH3314, DTH3414, DTH3514, for low cost applications

Features

- Ion Implantation Provides Lot to Lot Reproducibility
- Octave Tuning
- Ultra-High Q
- Large Signal Handling Capability
- 2 to 1 Capacitance Ratio

Absolute Maximum Ratings

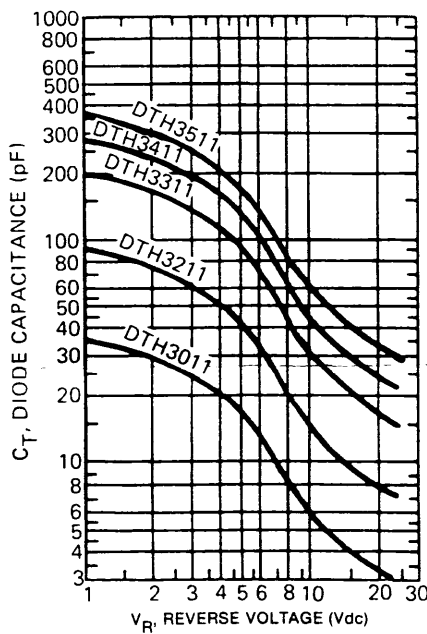
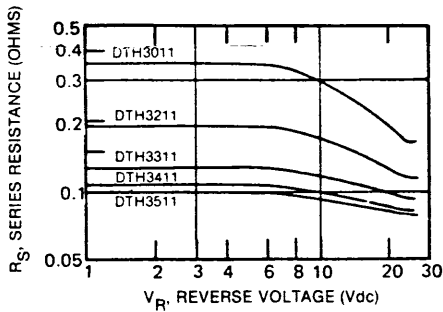
Symbol	Parameter	Value	Unit
V_R	Reverse Voltage	Same as V_{BR}	
I_F	Forward Current	200	mAdc
P_d	Power Dissipation ($T_A = 25^\circ\text{C}$)	250	mW
T_J	Junction Temperature	-65 to +125	$^\circ\text{C}$
T_{Stg}	Storage Temperature	-65 to +175	$^\circ\text{C}$

Type	C_T Diode Capacitance (pF) $f = 1 \text{ MHz}$			TR Tuning Ratio $f = 1 \text{ MHz}$		Q $V_R = 4 \text{ Vdc}$ $f = 50 \text{ MHz}$	V_{BR} (Vdc) $I_R = 10 \mu\text{Adc}$	I_R (nAdc)		
	$V_R = 4 \text{ Vdc}$ MIN/TYP/MAX	$V_R = 8 \text{ Vdc}$ MIN/TYP/MAX	$V_R = 20 \text{ Vdc}$ MIN/TYP/MAX	C(4V)/C(8V) MIN/TYP/MAX	C(4V)/C(20V) MIN/TYP/MAX	MIN/TYP	MIN/TYP	$V_R = 6 \text{ Vdc}$ TYP/MAX	$V_R = 10 \text{ Vdc}$ TYP/MAX	$V_R = 20 \text{ Vdc}$ TYP/MAX
DTH3011	18/20/22	7.5/8.5/10.5	3.1/3.5/3.9	—	5.4/6.0/6.6	350/470	22/30	—	—	15/100
DTH3011A	19/20/21	7.8/8.5/9.2	3.1/3.5/3.9	—	5.4/6.0/6.6	350/470	22/30	—	—	15/100
DTH3012	18/20/22	7.5/8.5/10.5	—	1.8/2.4/2.7	—	350/470	15/18	—	15/100	—
DTH3012A	19/20/21	7.8/8.5/9.2	—	2.0/2.4/2.7	—	350/470	15/18	—	15/100	—
DTH3014	18/20/22	7.0/8.5/11.0	—	—	—	160/220	8/12	50/250	—	—
DTH3211	45/50/55	18/20/25	7.3/8.0/9.2	—	5.6/6.3/6.9	250/320	22/30	—	—	20/100
DTH3211A	47.5/50/52.5	18.4/20/21.6	7.3/8.0/9.2	—	5.6/6.3/6.9	250/320	22/30	—	—	20/100
DTH3212	45/50/55	18/20/25	—	1.8/2.5/2.8	—	250/320	15/18	—	20/100	—
DTH3212A	47.5/50/52.5	18.4/20/21.6	—	2.2/2.5/2.8	—	250/320	15/18	—	20/100	—
DTH3214	45/50/55	17/20/26	—	—	—	125/165	8/12	50/250	—	—
DTH3311	100/110/120	39/45/55	15/17/19	—	5.9/6.6/7.3	150/230	22/30	—	—	30/100
DTH3311A	105/110/115	41.4/45/48.6	15/17/19	—	5.9/6.6/7.3	150/230	22/30	—	—	30/100
DTH3312	100/110/120	39/45/55	—	1.8/2.5/2.8	—	150/230	15/18	—	30/100	—
DTH3312A	105/110/115	41.4/45/48.6	—	2.15/2.5/2.8	—	150/230	15/18	—	30/100	—
DTH3314	100/110/120	36/45/58	—	—	—	80/110	8/12	50/250	—	—
DTH3411	140/155/170	55/65/80	22.5/25/28	—	5.8/6.4/7.1	125/160	22/30	—	—	50/500
DTH3411A	147/155/163	59.8/65/70.2	22.5/25/28	—	5.8/6.4/7.1	125/160	22/30	—	—	50/500
DTH3412	140/155/170	55/65/80	—	1.8/2.4/2.8	—	125/160	15/18	—	50/500	—
DTH3412A	147/155/163	59.8/65/70.2	—	2.1/2.4/2.7	—	125/160	15/18	—	50/500	—
DTH3414	140/155/170	50/65/85	—	—	—	70/90	8/12	50/500	—	—

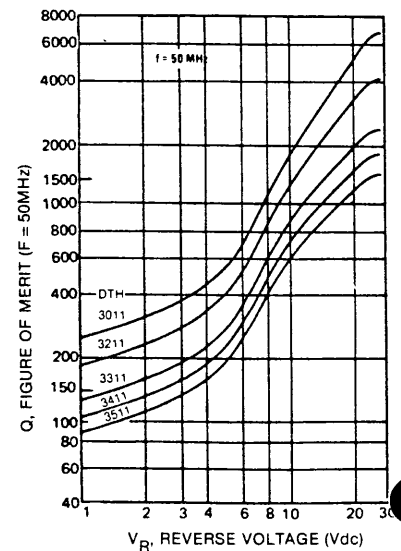
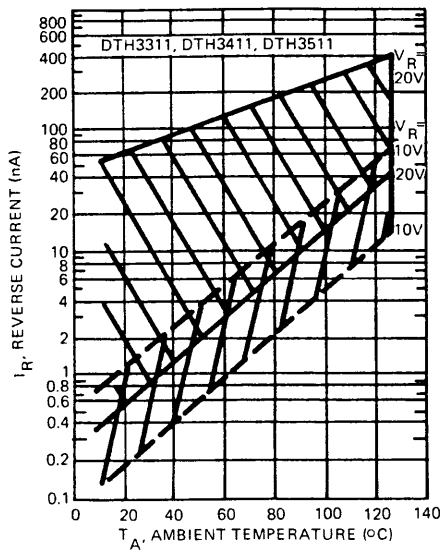
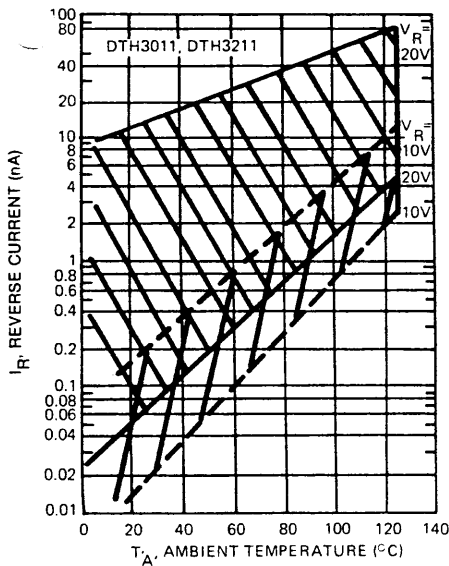
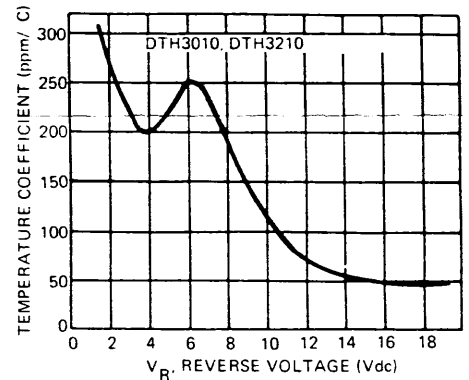
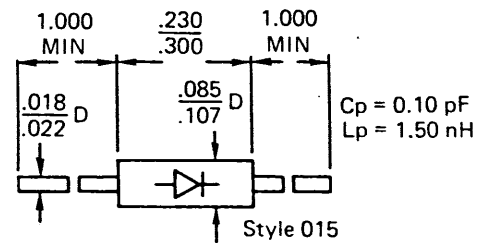
Type	C _T Diode Capacitance (pF) f = 1 MHz			TR Tuning Ratio f = 1 MHz		Q V _R = 4 Vdc f = 50 MHz	V _{BR} (Vdc) I _R = 10μ Adc	I _R (nAdc)		
	V _R = 4 Vdc	V _R = 8 Vdc	V _R = 20 Vdc	C(4V)/C(8V)	C(4V)/C(20V)	MIN/TYP	MIN/TYP	V _R = 6 Vdc	V _R = 10 Vdc	V _R = 20 Vdc
	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP	MIN/TYP	TYP/MAX	TYP/MAX	TYP/MAX
DTH3511	180/200/220	70/85/105	29/32/36	—	5.8/6.4/7.1	100/140	22/30	—	—	70/500
DTH3511A	190/200/210	78/85/92	29/32/36	—	5.8/6.4/7.1	100/140	22/30	—	—	70/500
DTH3512	180/200/220	70/85/105	—	1.8/2.5/2.8	—	100/140	15/18	—	70/500	—
DTH3512A	190/200/210	78/85/92	—	2.0/2.5/2.7	—	100/140	15/18	—	70/500	—
DTH3514	180/200/220	65/85/110	—	—	—	60/80	8/12	50/500	—	—

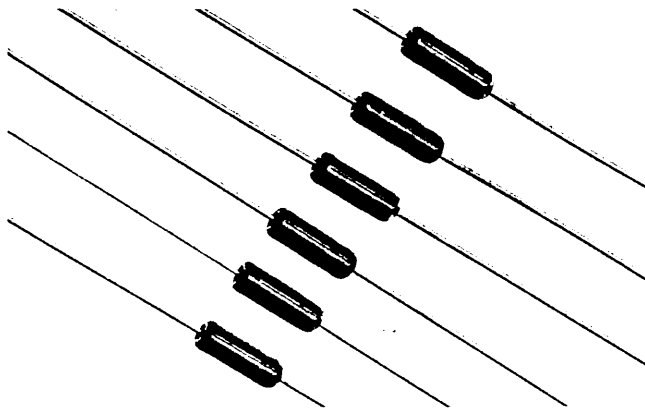
TYPICAL PERFORMANCE CURVES

(T_A = 25°C unless otherwise noted)



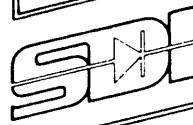
Outline Drawing





**UHF
HYPERABRUPT
GLASS TUNING
DIODE**

D-4022



Where quality begins...

11 Executive Park Drive
N. Billerica, MA 01862
(617) 667-7700 TLX 95 1592
TWX 710-347-1576

Description

SDI UHF hyperabrupt tuning varactors offer higher Q's than their VHF counterparts, but have slightly lower capacitance ratios. Ion implantation results in highly reproducible characteristics. They are excellent for octave tuning up to 800 MHz, for straight-line frequency tuning between 3 and 8 volts of bias, and for exceptionally high Q values and good large signal capabilities when tuned between 9 and 20 volts, which extends their useful range to over 1 GHz. Closely matched sets are available as are the tight tolerance types designated by the suffix "A".

- DTH3111, DTH3811 for octave tuning at UHF
- DTH3112, DTH3812 for octave tuning at VHF
- DTH3113, DTH3813 for straight-line frequency applications over a 3 to 8 volt bias range
- DTH3114, DTH3814 for low cost applications

Features

- Ion Implantation Provides Lot to Lot Reproducibility
- Octave Tuning
- Ultra-High Q
- Large Signal Handling Capability
- 2 to 1 Capacitance Ratio

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_R	Reverse Voltage	Same as V_{BR}	
I_F	Forward Current	200	mAdc
P_d	Power Dissipation ($T_A = 25^\circ\text{C}$)	250	mW
T_J	Junction Temperature	-65 to +125	$^\circ\text{C}$
T_{Stg}	Storage Temperature	-65 to +175	$^\circ\text{C}$

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

Type	C_T Diode Capacitance (pF) $f = 1 \text{ MHz}$			T_R Tuning Ratio $f = 1 \text{ MHz}$		Q $V_R = 3 \text{ Vdc}$ $f = 50 \text{ MHz}$	V_{BR} (Vdc) $I_R = 10 \mu\text{Adc}$	I_R (nAdc)		
	$V_R = 3 \text{ Vdc}$ MIN/TYP/MAX	$V_R = 8 \text{ Vdc}$ MIN/TYP/MAX	$V_R = 20 \text{ Vdc}$ MIN/TYP/MAX	C(3V)/C(20V) MIN/TYP/MAX	C(3V)/C(8V) MIN/TYP/MAX	MIN/TYP	MIN/TYP	$V_R = 6 \text{ Vdc}$ TYP/MAX	$V_R = 10 \text{ Vdc}$ TYP/MAX	$V_R = 20 \text{ Vdc}$ TYP/MAX
DTH3111	10.5/11.5/12.5	4.3/5.0/5.7	2.0/2.15/2.3	5.0/5.5/5.8		450/700	22/30			10/100
DTH3111A	10.9/11.5/12.1	4.6/5.0/5.4	2.0/2.15/2.3	5.0/5.5/5.8		450/700	22/30			10/100
DTH3112	10.5/11.5/12.5	4.3/5.0/5.7	2.0/2.2/2.4	4.7/5.0/5.5		300/350	22/30			10/100
DTH3112A	10.9/11.5/12.1	4.6/5.0/5.4	2.0/2.2/2.4	4.7/5.0/5.5		300/350	22/30			10/100
DTH3113	10.5/11.5/12.5	4.3/5.0/5.7			1.9/2.3/2.7	300/350	15/18		50/500	
DTH3113A	10.9/11.5/12.1	4.6/5.0/5.4			2.0/2.3/2.6	300/350	15/18		50/500	
DTH3114	10.5/11.5/12.5					200/300	8/12	50/500		
DTH3811	25/28/31	10/12/13.5	4.5/4.8/5.1	5.2/5.75/6.1		300/500	22/30			20/100
DTH3811A	26.5/28/29.5	11/12/13	4.5/4.8/5.1	5.2/5.75/6.1		300/500	22/30			20/100
DTH3812	25/28/31	10/12/13.5	4.5/4.8/5.3	4.9/5.2/5.8		200/250	22/30			20/100
DTH3812A	26.5/28/29.5	11/12/13	4.5/4.8/5.3	4.9/5.2/5.8		200/250	22/30			20/100
DTH3813	25/28/31	10/12/13.5			1.9/2.4/2.8	200/250	15/18		50/500	
DTH3813A	26.5/28/29.5	11/12/13			2.0/2.4/2.7	200/250	15/18		50/500	
DTH3814	25/28/31					150/200	8/12	50/500		

TYPICAL PERFORMANCE CURVES

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

