

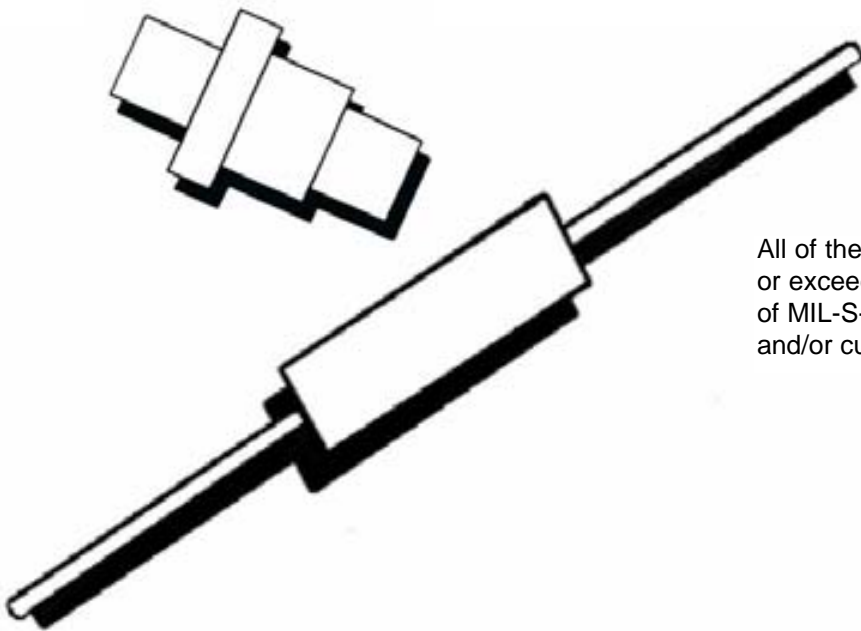


# HYPERABRUPT TUNING VARACTORS

MBT's silicon Hyperabrupt Tuning Varactors are highly reproducible ion-implanted devices for use at HF, VHF, UHF and MICROWAVE frequencies.

**Applications Include:**

- HF** - For tuning LC resonant circuits up to 100 MHz and wide deviation voltage tuned crystal oscillators.
- VHF** - Octave tuning of LC tank circuits up to 500 MHz and straight line frequency tuning over a 3 to 8 volt tuning range.
- UHF** - Octave tuning of LC tank circuits up to 800 MHz and above and straight line tuning over 3 to 8 volt tuning range.
- Microwave** - Linear wideband tuning of microwave filters, resonators and local oscillators.



All of the Hyperabrupt Tuning Varactor Diodes meet or exceed the Military Environmental Specifications of MIL-S-19500 and Methods from MIL-STD-750 and/or customer specifications.

## HF Hyperabrupt Tuning Varactors

### Features:

Medium to HF operation

Ultra high Q

10:1 tuning ratio from 2 to 10 volts

Linear frequency performance versus voltage

## Electrical Specifications (T<sub>A</sub>=25°C)

TYPE	C <sub>T</sub> Diode Capacitance (pF) f=1 MHz				TR Tuning Ratio f=1 MHz		Q FIGURE OF MERIT				V <sub>BR</sub> (Vdc)	I <sub>R</sub> (nAdc)		
	V <sub>R</sub> =1.25 Vdc		V <sub>R</sub> =2 Vdc		V <sub>R</sub> =7 Vdc		V <sub>R</sub> =10 Vdc		V <sub>R</sub> =1.25 Vdc		V <sub>R</sub> =2 Vdc		I <sub>R</sub> =10μAdc	V <sub>R</sub> =10 Vdc
	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	C(1.25V)/C(7V) MIN/TYP/MAX	C(2V)/C(10V) MIN/TYP/MAX	f=1 MHz MIN	f=10 MHz MIN	f=1 MHz MIN	f=10 MHz MIN	MIN/TYP	MIN/TYP	MIN/TYP	MIN/TYP
MBV7401	-/81.5/-	46/47/68	-/6.1/-	4.2/4.7/5.2	-/13/-	10/12/17	-	-	-	140	12/20	50		
MBV7402	-/81.5/-	46/57/68	-/6.1/-	4.2/4.7/5.2	-/13/-	10/12/17	-	-	700	-	12/20	100		
MBV7403	-/81.5/-	46/57/-	-/6.1/-	-4.7/5.2	-/13/-	10/12/-	-	-	700	-	12/20	1000		
MBV7501	-/180/-	100/125/150	-/13/-	8.6/9.6/10.6	-/14/-	10/13/17.5	-	-	-	130	12/20	50		
MBV7502	-/180/-	100/125/150	-/13/-	8.6/9.6/10.6	-/14/-	10/13/17.5	-	-	500	-	12/20	100		
MBV7503	-/180/-	100/125/-	-/13/-	-9.6/10.6	-/14/-	10/13/-	-	-	500	-	12/20	1000		
MBV7601	-/255/-	140/175/210	-/18.5/-	12.6/14.0/15.4	-/14/-	10/12.5/17	-	-	-	120	12/20	50		
MBV7602	-/255/-	140/175/210	-/18.5/-	12.6/14.0/15.4	-/14/-	10/12.5/17	-	-	500	-	12/20	100		
MBV7603	-/255/-	140/175/-	-/18.5/-	-14.0/15.4	-/14/-	10/12.5/-	-	-	500	-	12/20	1000		
MBV7701	-/325/-	180/225/270	-/24/-	16.2/18.0/19.8	-/14/-	10/12.5/17	-	-	-	115	12/20	50		
MBV7702	-/325/-	180/225/270	-/24/-	16.2/18.0/19.8	-/14/-	10/12.5/17	-	-	500	-	12/20	100		
MBV7703	-/325/-	180/225/-	-/24/-	-18.0/19.8	-/14/-	10/12.5/-	-	-	500	-	12/20	1000		
MBV7801	450/500/550	-/350/-	30.5/35.0/37.5	-/26.5/-	12/14/18	-/13/-	-	70	-	-	12/20	50		
MBV7802	450/500/550	-/350/-	30.5/35.0/37.5	-/26.5/-	12/14/18	-/13/-	300	-	-	-	12/20	100		
MBV7803	450/500/-	-/350/-	-/35.0/37.5	-/26.5/-	12/14/-	-/13/-	300	-	-	-	12/20	2000		

## VHF Hyperabrupt Tuning Varactors

### Features:

HF to VHF operation

Octave tuning from 4 to 20 volts

Ultra high Q

Linear frequency performance versus voltage

## Electrical Specifications (T<sub>A</sub>=25°C)

TYPE	C <sub>T</sub> Diode Capacitance (pF) f=1 MHz			TR Tuning Ratio f=1 MHz		Q V <sub>R</sub> =4 Vdc f=50 MHz	V <sub>BR</sub> (Vdc) I <sub>R</sub> =10μAdc	I <sub>R</sub> (nAdc)		
	V <sub>R</sub> =4 Vdc	V <sub>R</sub> =8 Vdc	V <sub>R</sub> =20 Vdc	C(4V)/C(8V)	C(4V)/C(20V)	MIN	MIN/TYP	V <sub>R</sub> =6 Vdc MAX	V <sub>R</sub> =10 Vdc MAX	V <sub>R</sub> =20 Vdc MAX
	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN/TYP/MAX	MIN	MIN/TYP	MIN	MAX	MAX
MBV8001	18/20/22	7.5/8.5/10.5	3.1/3.5/3.9	-	5.4/6.0/6.6	220	22/30	-	-	100
MBV8002	19/20/21	7.8/8.5/9.2	3.1/3.5/9.2	-	5.4/6.0/6.6	230	22/30	-	-	100
MBV8003	18/20/22	7.5/8.5/10.5	-	1.8/2.4/2.7	-	220	15/18	-	100	-
MBV8004	19/20/21	7.8/8.5/9.2	-	2.0/2.4/2.7	-	220	15/18	-	100	-
MBV8005	18/20/22	7.0/8.5/11.0	-	-	-	120	8/12	250	-	-
MBV8101	45/50/55	18/20/25	7.3/8.0/9.2	-	5.6/6.3/6.9	165	22/30	-	-	100
MBV8102	47.5/50/52.5	18/20/25	7.3/8.0/9.2	-	5.6/6.3/6.9	165	22/30	-	-	100
MBV8103	45/50/55	18/20/25	-	1.8/2.5/2.8	-	165	15/18	-	100	-
MBV8104	47.5/50/52.5	18.4/20/21.6	-	2.2/2.5/2.8	-	165	15/18	-	100	-
MBV8105	45/50/55	17/20/26	-	-	-	100	8/12	250	-	-
MBV8201	100/110/120	39/45/55	15/17/19	-	5.9/6.6/7.3	110	22/30	-	-	100
MBV8202	105/110/115	41.4/45/48.6	15/17/19	-	5.9/6.6/7.3	110	22/30	-	-	100
MBV8203	100/110/120	39/45/55	-	1.8/2.5/2.8	-	110	15/18	-	100	-
MBV8204	105/110/115	41.4/45/48.6	-	2.15/2.5/2.8	-	110	15/18	-	100	-
MBV8205	100/110/120	36/45/58	-	-	-	60	8/12	250	-	-
MBV8301	140/155/170	55/65/80	22.5/25/28	-	5.8/6.4/7.1	90	22/30	-	-	500
MBV8302	147/155/163	59.8/65/70.2	22.5/25/28	-	5.8/6.4/7.1	90	22/30	-	-	500
MBV8303	140/155/170	55/65/80	-	1.8/2.4/2.8	-	90	15/18	-	500	-
MBV8304	147/155/163	59.8/65/70.2	-	2.1/2.4/2.7	-	90	15/18	-	500	-
MBV8305	140/155/170	50/65/85	-	-	-	50	8/12	500	-	-
MBV8401	180/200/220	70/85/105	29/32/36	-	5.8/6.4/7.1	80	22/30	-	-	500
MBV8402	190/200/210	78/85/92	92/32/36	-	5.8/6.4/7.1	80	22/30	-	-	500
MBV8403	180/200/220	70/85/105	-	1.8/2.5/2.8	-	80	15/18	-	500	-
MBV8404	190/200/210	78/85/92	-	2.0/2.5/2.7	-	80	15/18	-	500	-
MBV8405	180/200/220	65/85/110	-	-	-	45	8/12	500	-	-

## UHF Hyperabrupt Tuning Varactors

Features:  
 VHF to UHF operation  
 Octave tuning from 3 to 20 volts  
 Ultra high Q  
 Linear frequency performance versus voltage

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

TYPE	$C_T$ Diode Capacitance (pF) f=1 MHz			TR Tuning Ratio f=1 MHz		Q $V_R=3\text{ Vdc}$ f=50MHz	$V_{BR}$ (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	MIN/TYP	$V_R=6\text{ Vdc}$ MAX	$V_R=10\text{ Vdc}$ MAX	$V_R=20\text{ Vdc}$ MAX
MBV8501	10.5/11.5/12.5	4.3/5.0/5.7	2.0/2.15/2.3	5.0/5.5/5.8	-	350	22/30	-	-	100
MBV8502	10.9/11.5/12.1	4.6/5.0/5.4	2.0/2.15/2.3	5.0/5.5/5.8	-	350	22/30	-	-	100
MBV8503	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	22/30	-	-	100
MBV8504	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	22/30	-	-	100
MBV8505	10.5/11.5/12.5	4.3/5.0/5.7	-	-	1.9/2.3/2.7	300	15/18	-	500	-
MBV8506	10.9/11.5/12.1	4.6/5.0/5.4	-	-	2.0/2.3/2.6	300	15/18	-	500	-
MBV8507	10.5/11.5/12.5	-	-	-	-	150	8/12	500	-	-
MBV8601	25/28/31	10/12/13.5	4.5/4.8/5.1	5.2/5.75/6.1	-	250	22/30	-	-	100
MBV8602	26.5/28/29.5	11/12/13	4.5/4.8/5.1	5.2/5.75/6.1	-	250	22/30	-	-	100
MBV8603	25/28/31	10/12/13.5	4.5/4.8/5.3	4.9/5.2/5.8	-	200	22/30	-	-	100
MBV8604	26.5/28/29.5	11/12/13	4.5/4.8/5.3	4.9/5.2/5.8	-	200	22/30	-	-	100
MBV8605	25/28/31	10/12/13.5	-	-	1.9/2.4/2.8	200	15/18	-	500	-
MBV8606	26.5/28/29.5	11/12/13	-	-	2.0/2.4/2.7	200	15/18	-	500	-
MBV8607	25/28/31	-	-	-	-	100	8/12	500	-	-

## Microwave Hyperabrupt Tuning Varactors

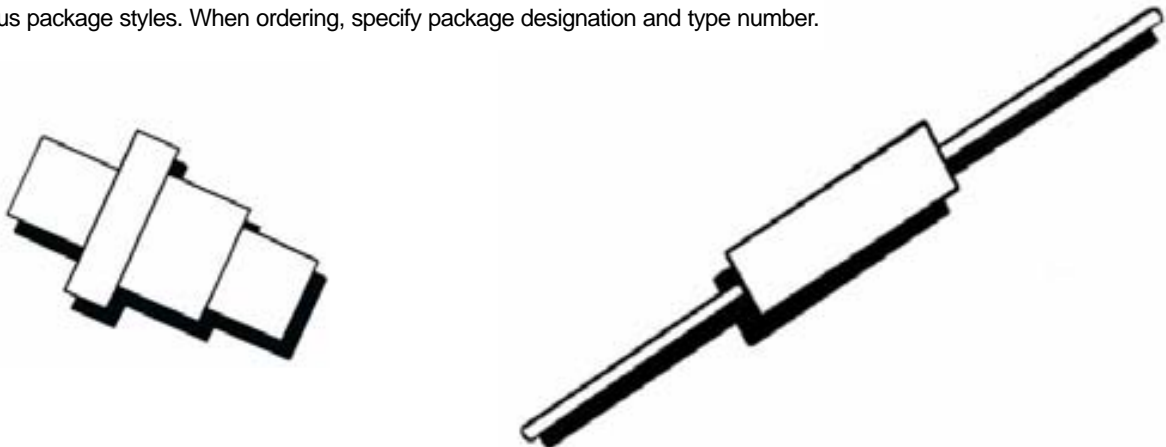
Features:  
 Octave tuning from 0 to 10 volts  
 Ultra high Q  
 Linear frequency performance versus voltage

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

TYPE	$C_T$ Diode Capacitance (pF)				Q $V_R=4\text{V}$	$V_{BR}$ (Vdc) Mv	$I_R$ (nAdc)
	f= 1MHz $V_R= 4\text{ Vdc}$		f= 1MHz $V_R= 20\text{ Vdc}$		f=50MHZ MIN	$I_R=10\mu\text{Adc}$ MIN	$V_R=20\text{ Vdc}$ MAX
	MIN	MAX	MIN	MAX			
MBV8700A	0.90	1.10	0.35	0.45	500	22	50
MBV8700B	1.35	1.65	0.45	0.55	500	22	50
MBV8700C	1.80	2.20	0.55	0.70	400	22	50
MBV8700D	2.70	3.30	0.70	0.90	400	22	50
MBV8700E	4.50	5.50	1.00	1.30	400	22	50

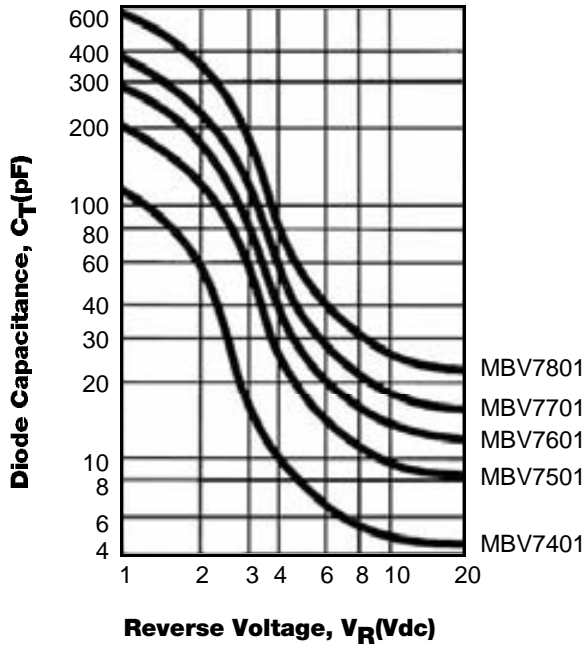
#### NOTES:

1. Available in various package styles. When ordering, specify package designation and type number.

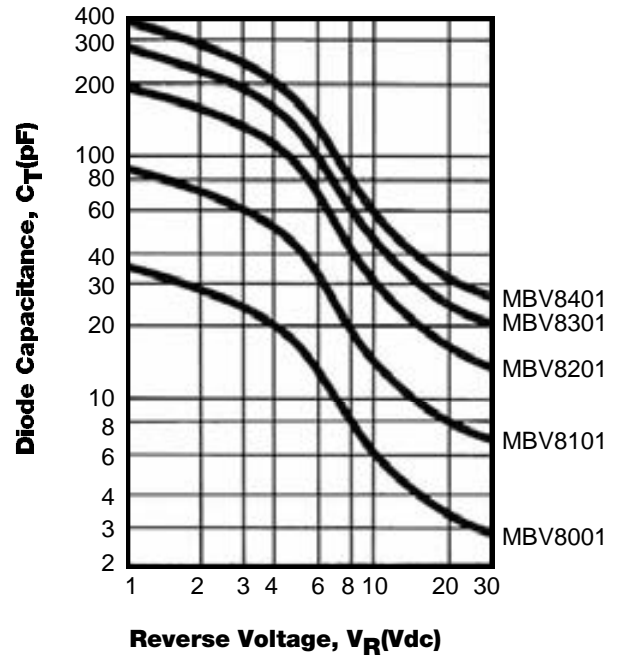


# TYPICAL CAPACITANCE VS. TUNING VOLTAGE

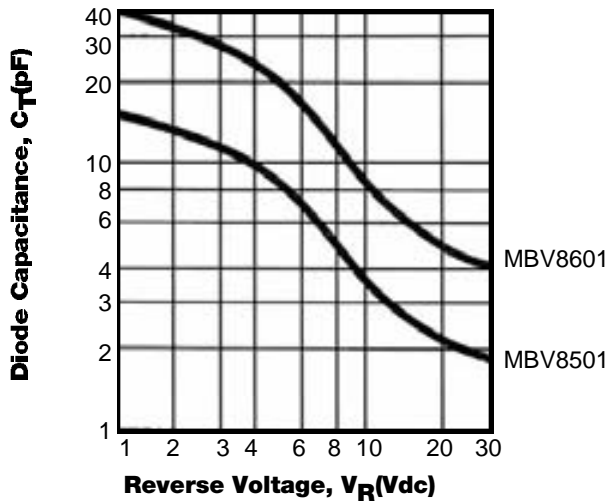
## HF



## VHF



## UHF



## MICROWAVE

