ABRUPT TUNING VARACTORS

MBT series of Abrupt PN-Junction Tuning Varactors utilize the lowest resistance & highest Q characteristics of optimized tuning circuit performance. Applications include both narrow and wideband frequency tuning through 12GHz. These devices are designed so the capacitance-voltage relationship closely approximates Square Law (n=0.5).

ABSOLUTE MAXIMUM RATINGS:

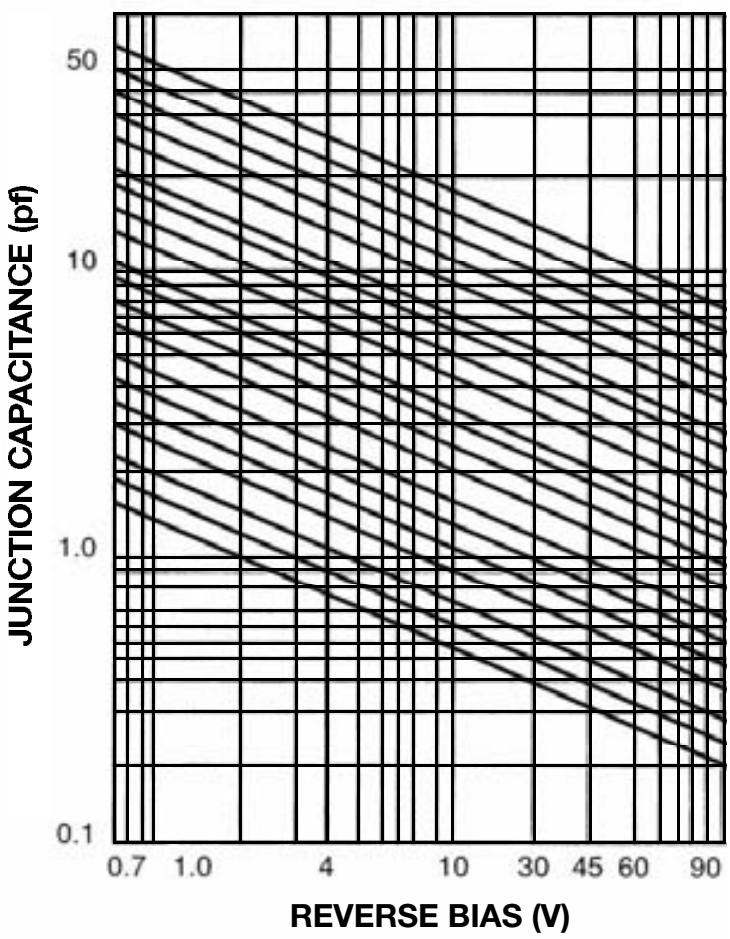
Storage Temperature:

-65°C to +175°C

$$C_T = C_p + C_J = C_p + \frac{C_{J0}}{\frac{(1\text{-}VBIAS)^N}{\theta}}$$

C_T = TOTAL CAPACITANCE
C_P = PACKAGE CAPACITANCE
C_{JU} = JUNCTION CAPACITANCE AT ZERO BIAS
V_{BIAS} = APPLIED REVERSE VOLTAGE
θ = CONTACT POTENTIAL OF THE DIODE (0.6 - 0.8 VOLTS)
n= SLOPE OF DIODE C-V CURVE (0.5 FOR ABRUPT JUNCTION)

TYPICAL JUNCTION CAPACITANCE VS REVERSE BIAS



These diodes are suitable for Transistor, Gunn and Impatt Voltage Controlled Oscillators; AFC Loops and Amplifiers; Tunable Filters; and Linear Frequency and Phase Modulators.

All of the abrupt tuning varactors meet or exceed the military environmental specifications of MIL-S-19500, MIL-STD-202 and methods from MIL-STD-750 that specify mechanical, electrical, thermal and environmental tests.

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TUNING VARACTORS

BREAKDOWN VOLTAGE VB@10μA				C_T(-4V[1])	C_{TO}/C_{TVB}[5]	Q(-4V[2])	Suggested	Tuning
30V	45V	60V	90V	PF		MIN.	MIN.	FREQ. (GHz)
MBT3000	MBT4500	MBT6000	MBT9000	0.4		(30 V) 3.0:1 (45 V) 4.0:1 (60 V) 4.7:1 (90 V) 5.4:1	(30 V) 4000 (45 V) 2600 (60 V) 1700 (90 V) 1100	(30 V) 10.0-12.0 (45 V) 8.0-10.0 (60 V) 6.0-8.0 (90 V) 4.0-6.0
MBT3001	MBT4501	MBT6001	MBT9001	0.8		(30 V) 3.2:1 (45 V) 4.2:1 (60 V) 4.8:1 (90 V) 5.6:1	(30 V) 3800 (45 V) 2500 (60 V) 1600 (90 V) 1000	(30 V) 8.0-10.0 (45 V) 6.0-8.0 (60 V) 4.0-6.0 (90 V) 2.0-4.0
MBT3002	MBT4502	MBT6002	MBT9002	1.0		(30 V) 3.2:1 (45 V) 4.4:1 (60 V) 4.9:1 (90 V) 6.0:1	(30 V) 3800 (45 V) 2500 (60 V) 1600 (90 V) 1000	(30 V) 7.0-9.0 (45 V) 5.0-7.0 (60 V) 4.0-6.0 (90 V) 2.0-4.0
MBT3003	MBT4503	MBT6003	MBT9003	1.2		(30 V) 3.5:1 (45 V) 4.5:1 (60 V) 5.0:1 (90 V) 6.2:1	(30 V) 3600 (45 V) 2300 (60 V) 1500 (90 V) 950	(30 V) 6.0-8.0 (45 V) 4.0-6.0 (60 V) 2.0-4.0 (90 V) 2.0-4.0
MBT3004	MBT4504	MBT6004	MBT9004	1.5		(30 V) 3.6:1 (45 V) 4.7:1 (60 V) 5.2:1 (90 V) 6.8:1	(30 V) 3600 (45 V) 2300 (60 V) 1500 (90 V) 950	(30 V) 6.0-8.0 (45 V) 4.0-6.0 (60 V) 2.0-4.0 (90 V) 2.0-4.0
MBT3005	MBT4505	MBT6005	MBT9005	1.8		(30 V) 3.6:1 (45 V) 4.8:1 (60 V) 5.4:1 (90 V) 7.2:1	(30 V) 3600 (45 V) 2300 (60 V) 1400 (90 V) 900	(30 V) 5.0-7.0 (45 V) 3.0-5.0 (60 V) 2.0-4.0 (90 V) 2.0-4.0
MBT3006	MBT4506	MBT6006	MBT9006	2.2		(30 V) 3.7:1 (45 V) 5.0:1 (60 V) 5.6:1 (90 V) 7.8:1	(30 V) 3400 (45 V) 2100 (60 V) 1400 (90 V) 900	(30 V) 5.0-7.0 (45 V) 3.0-5.0 (60 V) 1.5-3.0 (90 V) 1.5-3.0
MBT3007	MBT4507	MBT6007	MBT9007	2.7		(30 V) 3.8:1 (45 V) 5.1:1 (60 V) 5.8:1 (90 V) 8.2:1	(30 V) 3200 (45 V) 2100 (60 V) 1300 (90 V) 850	(30 V) 4.0-6.0 (45 V) 2.0-4.0 (60 V) 1.5-3.0 (90 V) 1.5-3.0
MBT3008	MBT4508	MBT6008	MBT9008	3.3		(30 V) 3.9:1 (45 V) 5.3:1 (60 V) 6.0:1 (90 V) 8.4:1	(30 V) 3000 (45 V) 2000 (60 V) 1300 (90 V) 850	(30 V) 4.0-6.0 (45 V) 2.0-4.0 (60 V) 1.5-3.0 (90 V) 1.5-3.0
MBT3009	MBT4509	MBT6009	MBT9009	3.9		(30 V) 4.0:1 (45 V) 5.3:1 (60 V) 6.2:1 (90 V) 8.6:1	(30 V) 2800 (45 V) 2000 (60 V) 1200 (90 V) 800	(30 V) 3.0-5.0 (45 V) 1.5-3.0 (60 V) 1.0-2.0 (90 V) 1.0-2.0
MBT3010	MBT4510	MBT6010	MBT9010	4.7		(30 V) 4.1:1 (45 V) 5.4:1 (60 V) 6.4:1 (90 V) 8.6:1	(30 V) 2600 (45 V) 1800 (60 V) 1200 (90 V) 800	(30 V) 3.0-5.0 (45 V) 1.0-2.0 (60 V) 1.0-2.0 (90 V) 1.0-2.0
MBT3011	MBT4511	MBT6011	MBT9011	5.6		(30 V) 4.1:1 (45 V) 5.6:1 (60 V) 6.6:1 (90 V) 8.8:1	(30 V) 2600 (45 V) 1800 (60 V) 1200 (90 V) 750	(30 V) 2.0-4.0 (45 V) 1.0-2.0 (60 V) 1.0-2.0 (90 V) 1.0-2.0
MBT3012	MBT4512	MBT6012	MBT9012	6.8		(30 V) 4.2:1 (45 V) 5.6:1 (60 V) 6.8:1 (90 V) 8.8:1	(30 V) 2400 (45 V) 1800 (60 V) 1100 (90 V) 750	(30 V) 2.0-4.0 (45 V) 1.0-2.0 (60 V) 0.5-1.0 (90 V) 0.5-1.0
MBT3013	MBT4513	MBT6013	MBT9013	8.2		(30 V) 4.2:1 (45 V) 5.8:1 (60 V) 6.8:1 (90 V) 9.0:1	(30 V) 2400 (45 V) 1600 (60 V) 1100 (90 V) 700	(30 V) 1.0-2.0 (45 V) 1.0-2.0 (60 V) 0.5-1.0 (90 V) 0.5-1.0
MBT3014	MBT4514	MBT6014	MBT9014	10		(30 V) 4.4:1 (45 V) 5.8:1 (60 V) 7.0:1 (90 V) 9.2:1	(30 V) 2200 (45 V) 1600 (60 V) 1000 (90 V) 700	(30 V) 1.0-2.0 (45 V) 1.0-2.0 (60 V) 0.5-1.0 (90 V) 0.5-1.0
MBT3015	MBT4515	MBT6015	MBT9015	12		(30 V) 4.4:1 (45 V) 6.0:1 (60 V) 7.0:1 (90 V) 9.2:1	(30 V) 2200 (45 V) 1400 (60 V) 1000 (90 V) 650	(30 V) 0.8-1.0 (45 V) 0.8-1.0 (60 V) 0.4-0.8 (90 V) 0.4-0.8
MBT3016	MBT4516	MBT6016	MBT9016	15		(30 V) 4.6:1 (45 V) 6.0:1 (60 V) 7.0:1 (90 V) 9.4:1	(30 V) 2000 (45 V) 1400 (60 V) 1000 (90 V) 650	(30 V) 0.6-0.8 (45 V) 0.6-0.8 (60 V) 0.4-0.8 (90 V) 0.4-0.8
MBT3017	MBT4517	MBT6017	MBT9017	18		(30 V) 4.6:1 (45 V) 6.2:1 (60 V) 7.2:1 (90 V) 9.4:1	(30 V) 2000 (45 V) 1200 (60 V) 900 (90 V) 600	(30 V) 0.4-0.6 (45 V) 0.4-0.6 (60 V) 0.3-0.5 (90 V) 0.3-0.5
MBT3018	MBT4518	MBT6018	MBT9018	22		(30 V) 4.6:1 (45 V) 6.2:1 (60 V) 7.2:1 (90 V) 9.4:1	(30 V) 1800 (45 V) 1000 (60 V) 900 (90 V) 600	(30 V) 0.4-0.6 (45 V) 0.3-0.5 (60 V) 0.2-0.4 (90 V) 0.2-0.4
MBT3019	MBT4519	MBT6019	MBT9019	27		(30 V) 4.7:1 (45 V) 6.4:1 (60 V) 7.2:1 (90 V) 9.5:1	(30 V) 1700 (45 V) 900 (60 V) 800 (90 V) 500	(30 V) 0.3-0.5 (45 V) 0.2-0.4 (60 V) 0.1-0.3 (90 V) 0.1-0.3
MBT3020	MBT4520	MBT6020	MBT9020	33		(30 V) 4.7:1 (45 V) 6.4:1 (60 V) 7.4:1 (90 V) 9.5:1	(30 V) 1400 (45 V) 800 (60 V) 700 (90 V) 500	(30 V) 0.2-0.4 (45 V) 0.2-0.4 (60 V) 0.1-0.25 (90 V) 0.1-0.25
MBT3021	MBT4521	MBT6021	MBT9021	39		(30 V) 4.7:1 (45 V) 6.4:1 (60 V) 7.4:1 (90 V) 9.5:1	(30 V) 1000 (45 V) 800 (60 V) 700 (90 V) 500	(30 V) 0.15-0.30 (45 V) 0.15-0.30 (60 V) 0.05-0.15 (90 V) 0.05-0.15
MBT3022	MBT4522	MBT6022	MBT9022	47		(30 V) 4.7:1 (45 V) 6.4:1 (60 V) 7.4:1 (90 V) 9.5:1	(30 V) 800 (45 V) 700 (60 V) 600 (90 V) 450	(30 V) 0.10-0.20 (45 V) 0.10-0.20 (60 V) 0.05-0.10 (90 V) 0.05-0.10

NOTES:

1. Total capacitance is measured at 1 MHz and -4 volts on a Boonton capacitance meter. Standard tolerance ± 10%.
2. Quality factor is calculated at -4 volts and 50 MHz, using values of R_S obtained at 1.0GHz and C_{J-4} measured at 1MHz and the following equation: $Q_{-4V}=1/2\pi f\ R_S C_{J-4}$
3. Available in various package styles, when ordering, specify package designation as a suffix to type number.
4. Capacitance temperature coeffiecient: 300ppm/°C max. at -4 Volts. Calculated from the following equation: $TC=[C_T(+85°C)-C_T(-65°C)]10^6/(85+65)C_T(25°C)$ average between -65°C and +85°C and is expressed in parts per million per degree centigrade (ppm/°C).
5. Tuning ratio includes all capacitances, junction, package and all internal fringing capacitance ($C_T=C_J+C_p$), from 0 volts to the rated breakdown voltage.