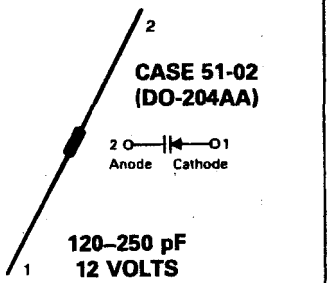
MV1403
MV1404
MV1405

SILICON HYPER-ABRUPT TUNING DIODES

. . . designed with high capacitance and a capacitance change of greater than TEN TIMES for a bias change from 2.0 to 10 volts. Provides tuning over broad frequency ranges; tunes AM radio broadcast band, general AFC and tuning applications in lower RF frequencies.

- High Capacitance: 120–250 pF
- Large Capacitance Change with Small Bias Change
- Guaranteed High Q
- Available in Standard Axial Glass Packages



CASE 51-02
(DO-204AA)

120–250 pF
12 VOLTS

HIGH TUNING RATIO
VOLTAGE-VARIABLE
CAPACITANCE DIODES

MAXIMUM RATINGS

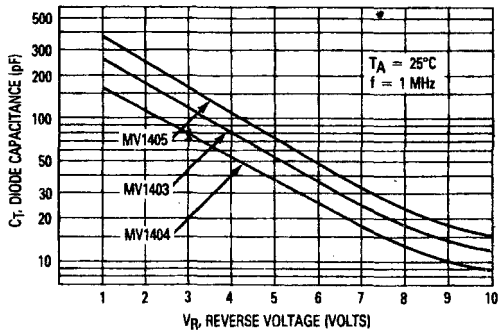
Rating	Symbol	Value	Unit
Reverse Voltage	V_R	12	Volts
Forward Current	I_F	250	mA
Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	400 2.67	mW mW/°C
Junction Temperature	T_J	+125	°C
Storage Temperature Range	T_{stg}	−65 to +200	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage (I_R = 10 μAdc)	$V_{(BR)R}$	12	—	—	Vdc
Leakage Current at Reverse Voltage (V_R = 10 Vdc, T_A = 25°C)	I_R	—	—	0.1	μAdc
Series Inductance (f = 250 MHz, Lead Length ≈ 1/16")	L_S	—	5.0	—	nH
Case Capacitance (f = 1.0 MHz, Lead Length ≈ 1/16")	C_C	—	0.25	—	pF

	C_T, Diode Capacitance			Q, Figure of Merit	TR, Tuning Ratio	
	V_R = 2.0 Vdc, f = 1.0 MHz pF			V_R = 2.0 Vdc, f = 1.0 MHz	C_1/C_{10} f = 1.0 MHz	C_2/C_{10} f = 1.0 MHz
Device	Min	Nom	Max	Min	Min	Min
MV1403	140	175	210	200	—	10
MV1404	96	120	144	200	—	10
MV1405	200	250	300	200	—	10

FIGURE 1 — DIODE CAPACITANCE versus REVERSE VOLTAGE



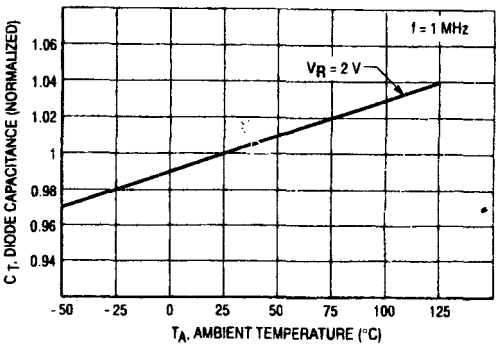


Figure 2. Diode Capacitance versus Ambient Temperature

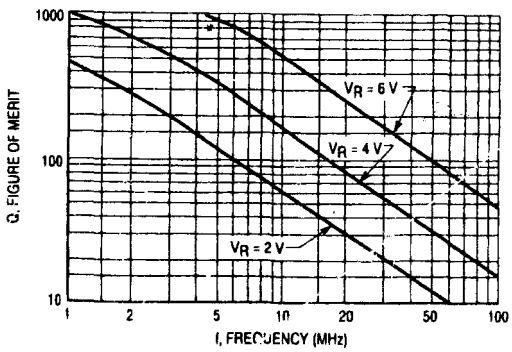
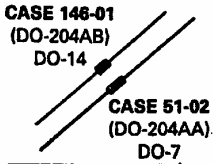


Figure 3. Figure of Merit versus Frequency

High Capacitance Hyper-Abrupt Junction Tuning Diodes

This next section covers High Capacitance and/or Hyper-Abrupt Junction Tuning Diodes, which are designed for AM/FM tuning, general frequency control, and tuning and detuning for minimum signal distortion.



CASE 146-01
(DO-204AB)
DO-14

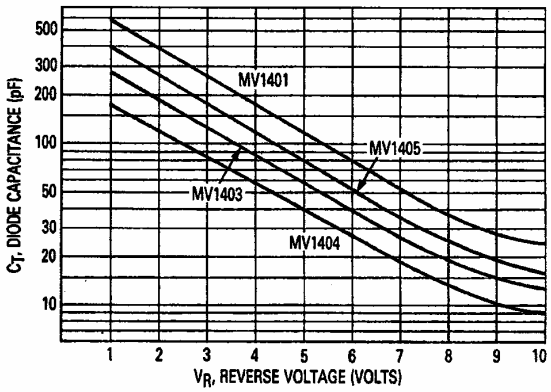
CASE 51-02
(DO-204AA)
DO-7

- Hyper-Abrupt
- High Tuning Ratio
- High Rel — Suffix H

C_T, Nominal Capacitance pF @ V_R Volts		Cap Ratio C2/C10 Min	Q @ 2 V 1 MHz Min	Maximum Working Voltage 12 Volts Device Type	
Nom ± 20%	Volts				
120	2	10	200	MV1404,H**	
175	2	10	200	MV1403,H**	
250	2	10	200	MV1405,H**	
550***	1	14(2)	200		MV1401,H*

*Case 146 **Case 51 ***±15% (2)Cap Ratio @ C1/C10 V

TYPICAL CHARACTERISTICS
Diode Capacitance versus Reverse Voltage



100% Screening On "H" Devices for High Reliability

Internal Visual Inspection
per 12M53957B — DO-7 only

High Temperature Storage
T_A = 200°C, t ≥ 48 hours

Thermal Shock (Temperature Cycling)
MIL-STD-202, Method 107, Condition C except 10 cycles continuously performed
t(extremes) = 15 minutes

Constant Acceleration
MIL-STD-750, Method 2006
20,000 G's Y1 axis only

Hermetic Seal
MIL-STD-750, Method 1071
Fine Leak — Condition G
Gross Leak — Condition C, Step 1

Electrical Test
I_R and C_T

High Temperature Reverse Bias
T_A = 120°C ±5°C, t ≥ 96 hours
V_R = approximately 80% of MWV
Lower temperature till T_A = 30 ±5°C.
Maintain this temperature prior to removal of Reverse Bias Voltage. Perform Limit 2 Electrical Test within 24 hours following bias removal.

Electrical Test
I_R and C_T