Technical Data of Ceramic Resonator

Type CSB400P

Applied to M34513M4

TOYAMA MURATA MANUFACTURING CO., LTD.

Product Engineering Service Section I

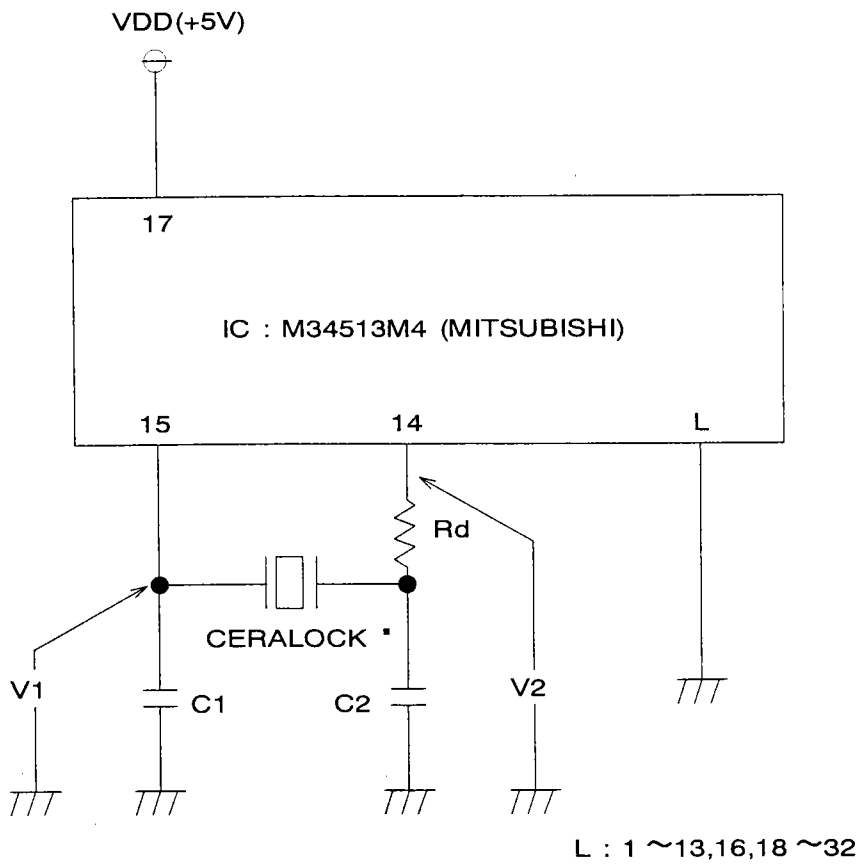
Engineering Service Department

Piezoelectric Components Group

Approved by	Checked by	Checked by	Issued by	Issued Date	TCD No.
S.Iwasaki	K.Kuramoto	M.Kurosaka	T.Ishizuka	Oct 28, 1998	TCD-98-5x39

Contents

Test Circuit



L : 1 ~13,16,18 ~32

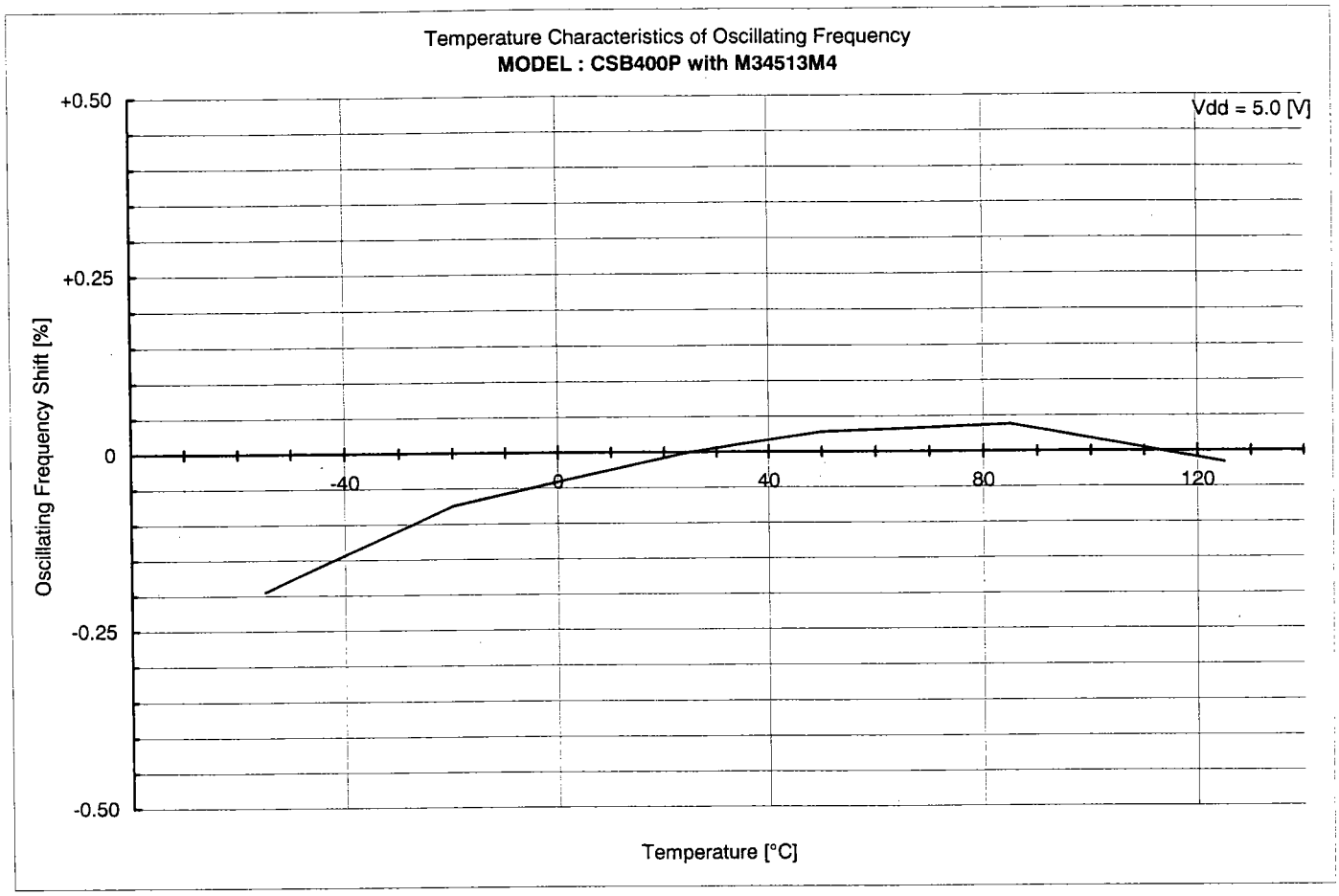
Recommendable Value

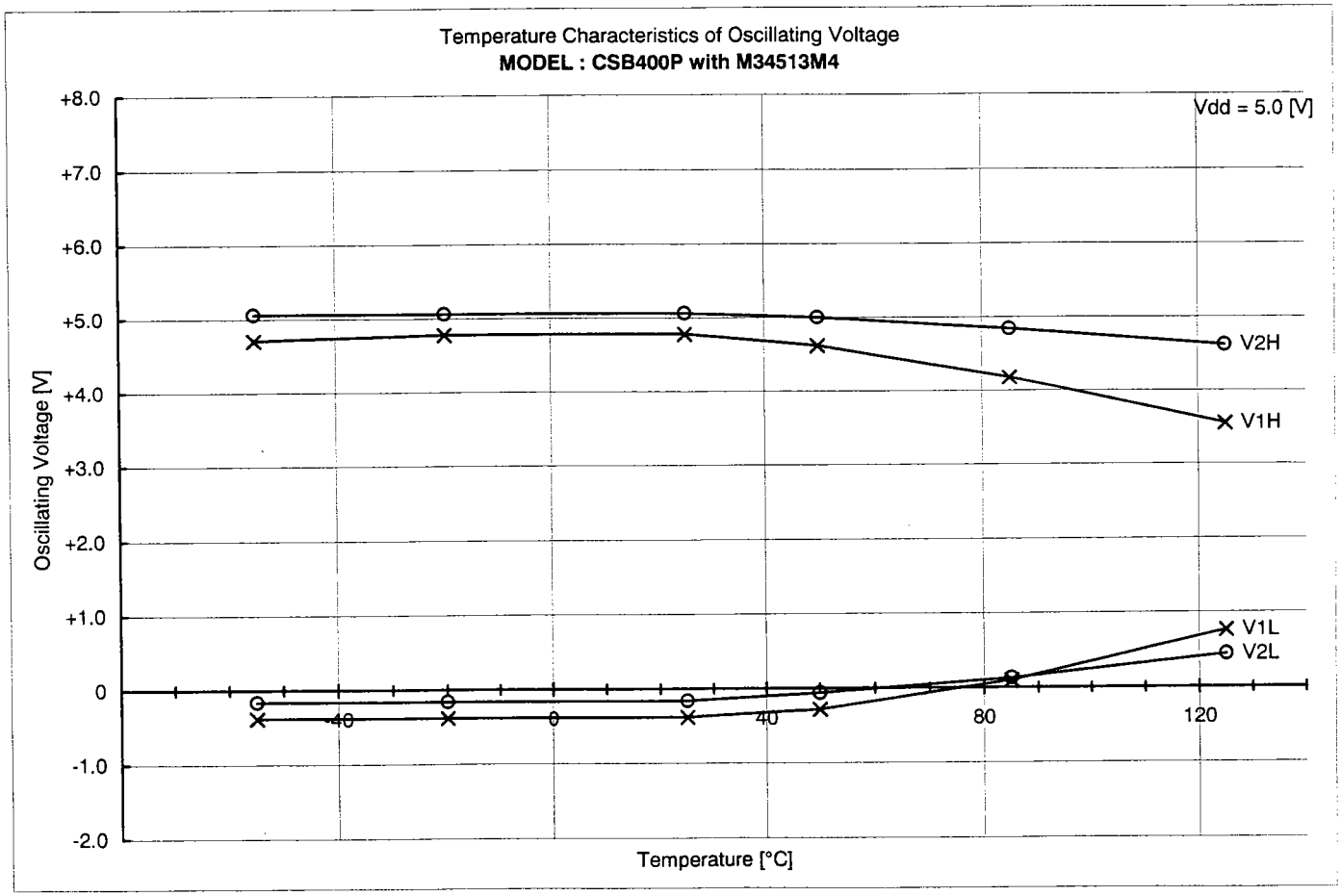
CERALOCK® : CSB400P

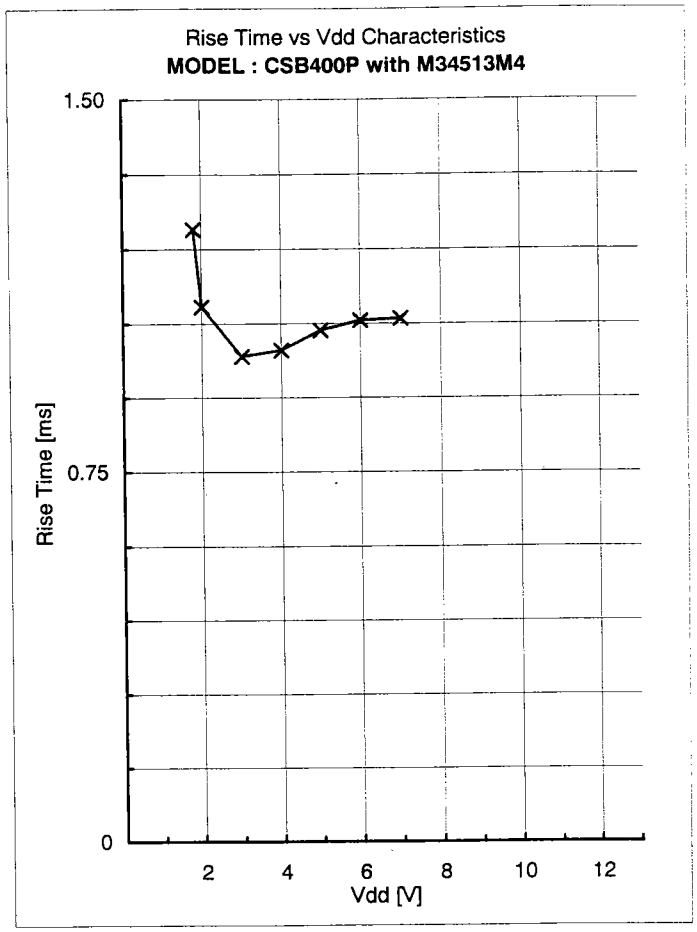
C1 = 220 [pF]

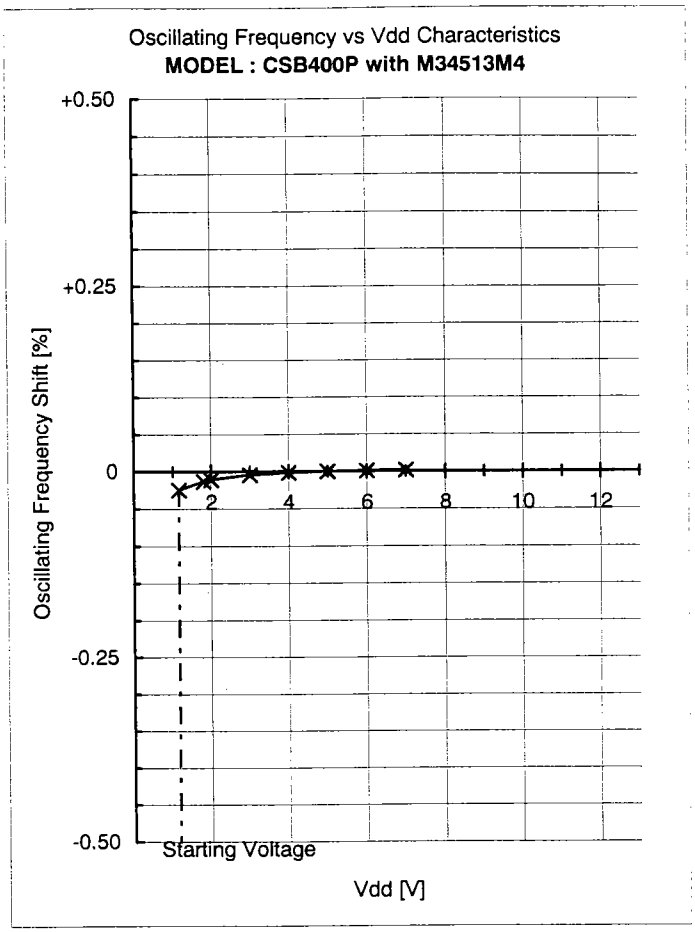
C2 = 220 [pF]

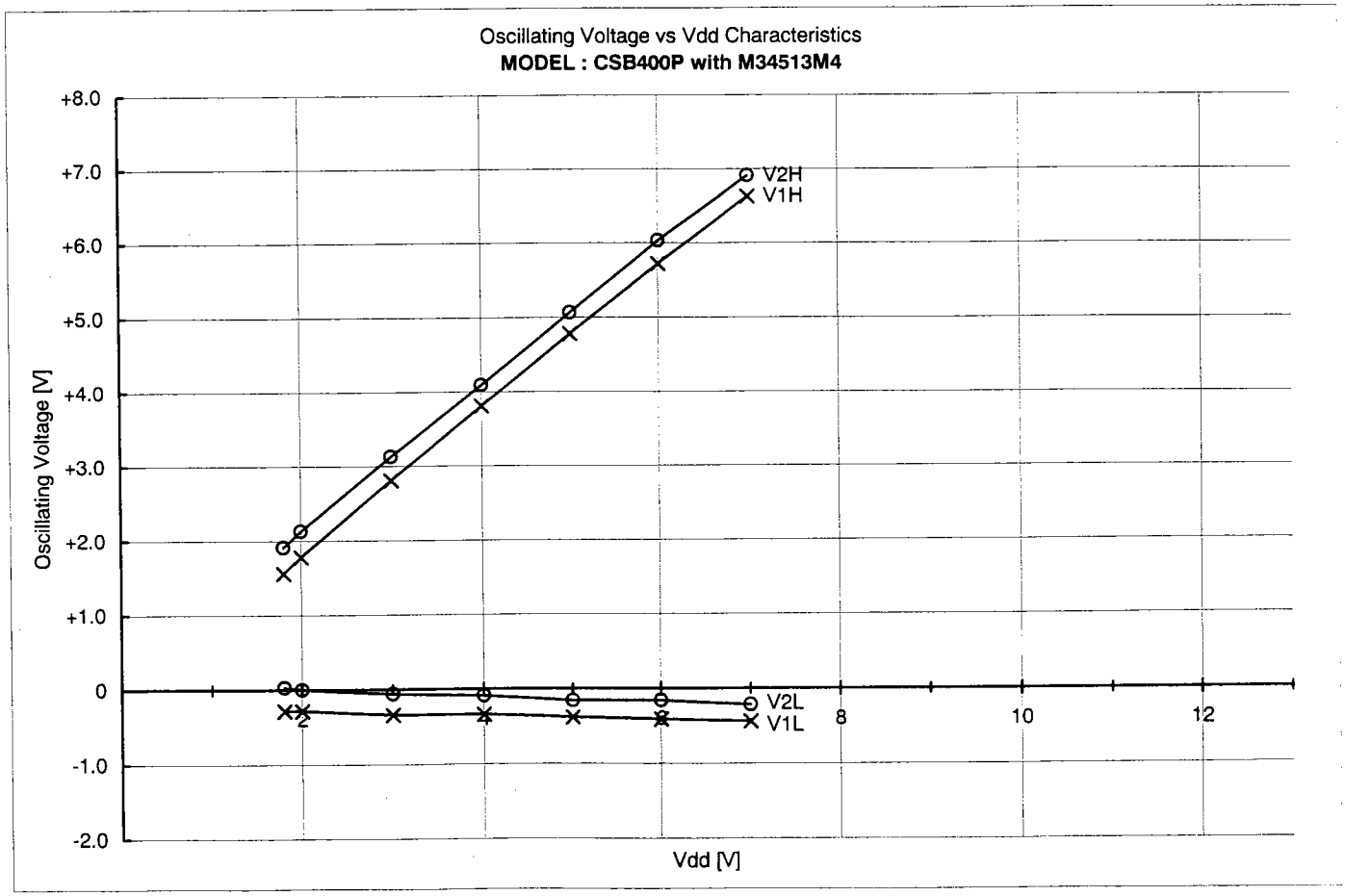
Rd = 2.2 [k ohm]

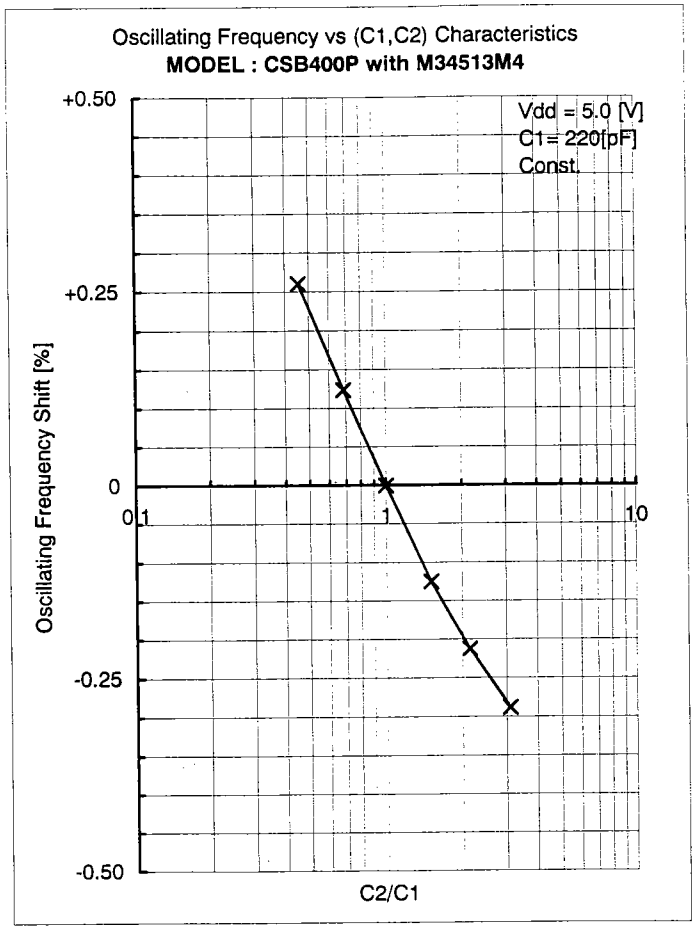

Temperature Characteristics of Oscillating Frequency
MODEL : CSB400P with M34513M4
Vdd = 5.0 [V]
+0.50
+0.25
0
-0.25
-0.50
Oscillating Frequency Shift [%]
-40
0
40
80
120
Temperature [°C]

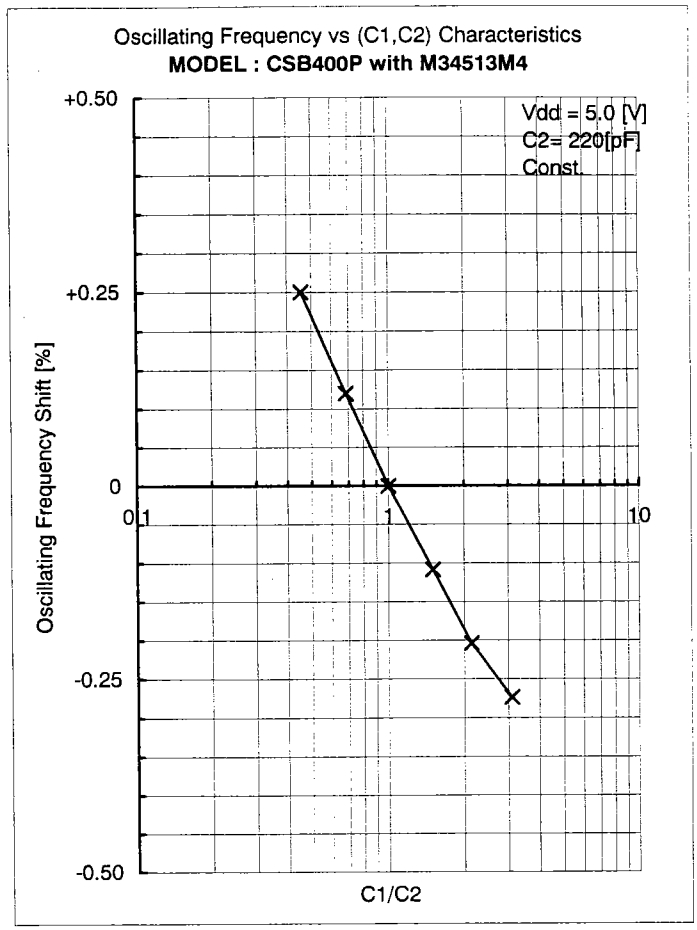

Temperature Characteristics of Oscillating Voltage
MODEL : CSB400P with M34513M4
Vdd = 5.0 [V]
+8.0
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
0
-1.0
-2.0
Oscillating Voltage [V]
V2H
V1H
V1L
V2L
-40
0
40
80
120
Temperature [°C]

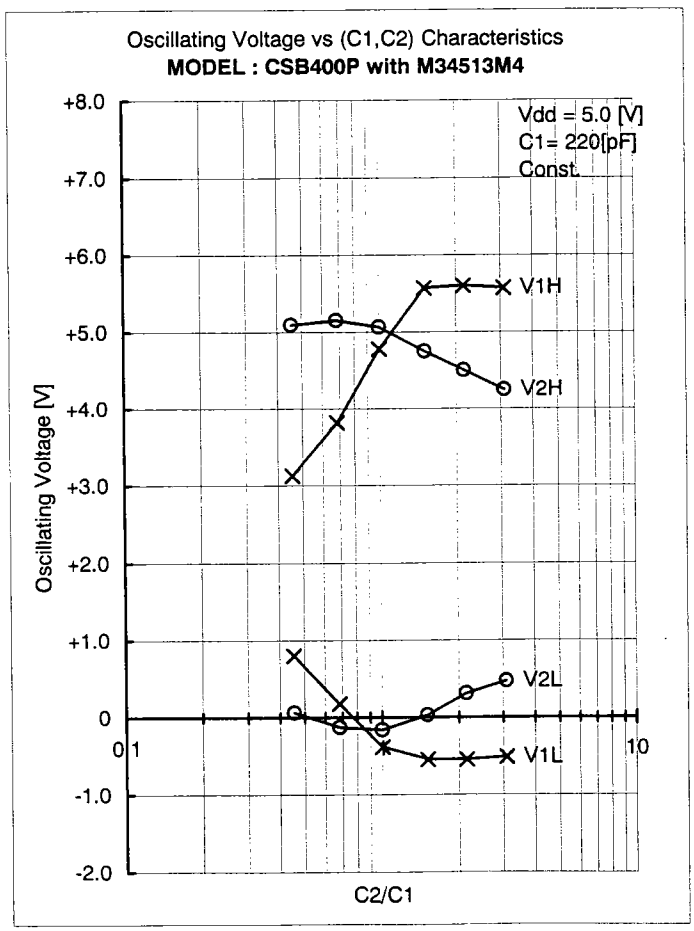

Rise Time vs Vdd Characteristics
MODEL : CSB400P with M34513M4
Rise Time [ms]
1.50
0.75
0
2
4
6
8
10
12
Vdd [V]

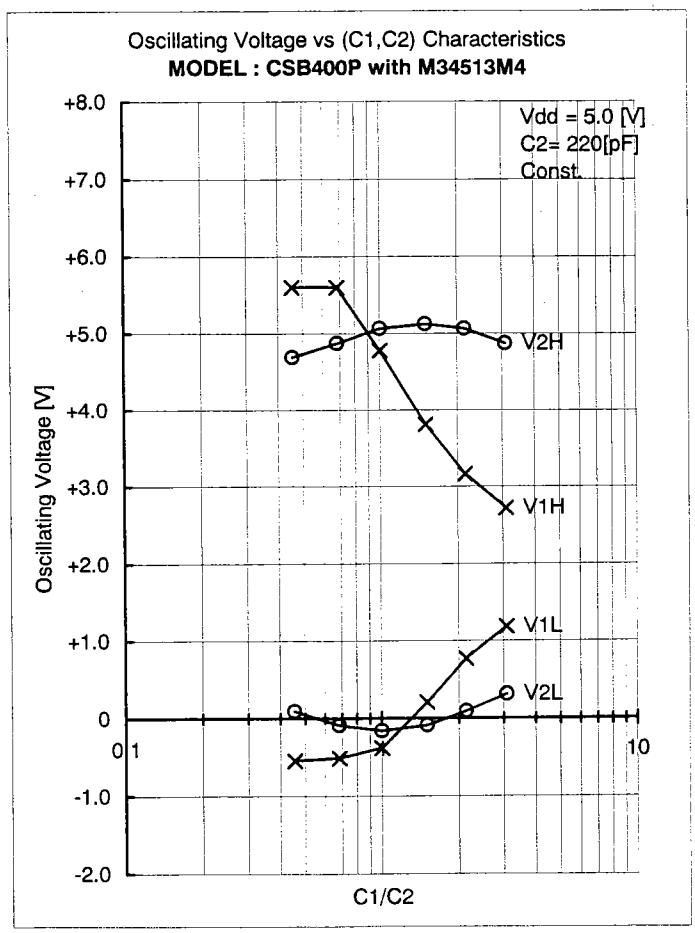

Oscillating Frequency vs Vdd Characteristics
MODEL : CSB400P with M34513M4
Oscillating Frequency Shift [%]
+0.50
+0.25
0
-0.25
-0.50
2
4
6
8
10
12
Starting Voltage
Vdd [V]


Oscillating Voltage vs Vdd Characteristics
MODEL : CSB400P with M34513M4
Oscillating Voltage [V]
+8.0
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
0
-1.0
-2.0
V2H
V1H
V2L
V1L
2
8
10
12
Vdd [V]

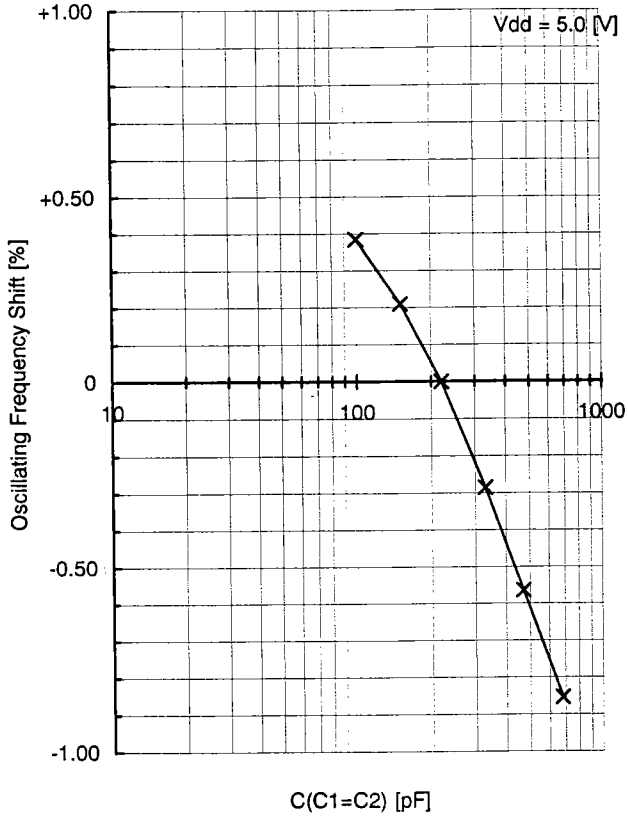

Oscillating Frequency vs (C1,C2) Characteristics
MODEL : CSB400P with M34513M4
Vdd = 5.0 [V]
C1= 220[pF]
Const.
+0.50
+0.25
0
-0.25
-0.50
0.1
1
10
Oscillating Frequency Shift [%]
C2/C1


Oscillating Frequency vs (C1,C2) Characteristics
MODEL : CSB400P with M34513M4
Vdd = 5.0 [V]
C2= 220[pF]
Const.
+0.50
+0.25
0
-0.25
-0.50
0.1
1
10
Oscillating Frequency Shift [%]
C1/C2

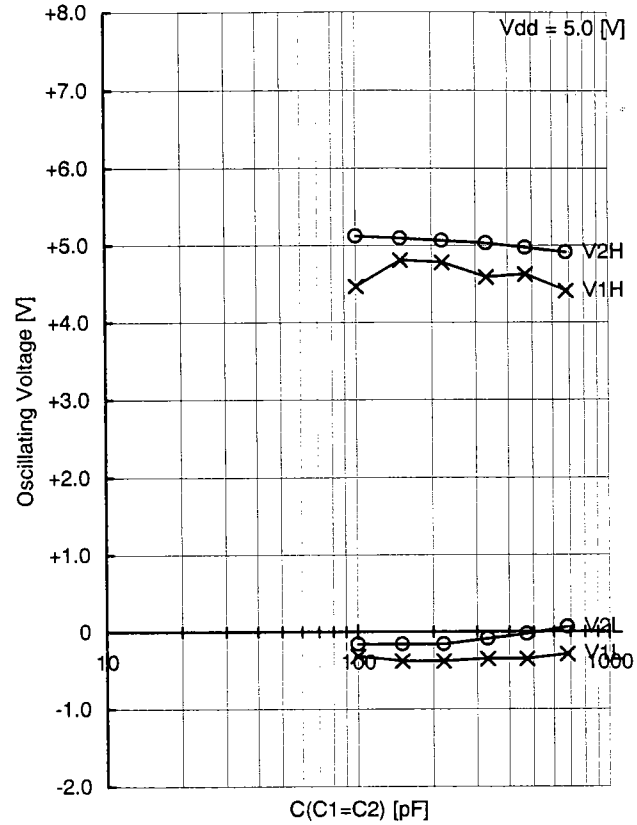

Oscillating Voltage vs (C1,C2) Characteristics
MODEL : CSB400P with M34513M4
Vdd = 5.0 [V]
C1= 220[pF]
Const.
+8.0
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
0
-1.0
-2.0
0.1
10
V1H
V2H
V2L
V1L
Oscillating Voltage [V]
C2/C1


Oscillating Voltage vs (C1,C2) Characteristics
MODEL : CSB400P with M34513M4
Vdd = 5.0 [V]
C2= 220[pF]
Const.
+8.0
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
0
-1.0
-2.0
0.1
10
V2H
V1H
V1L
V2L
Oscillating Voltage [V]
C1/C2

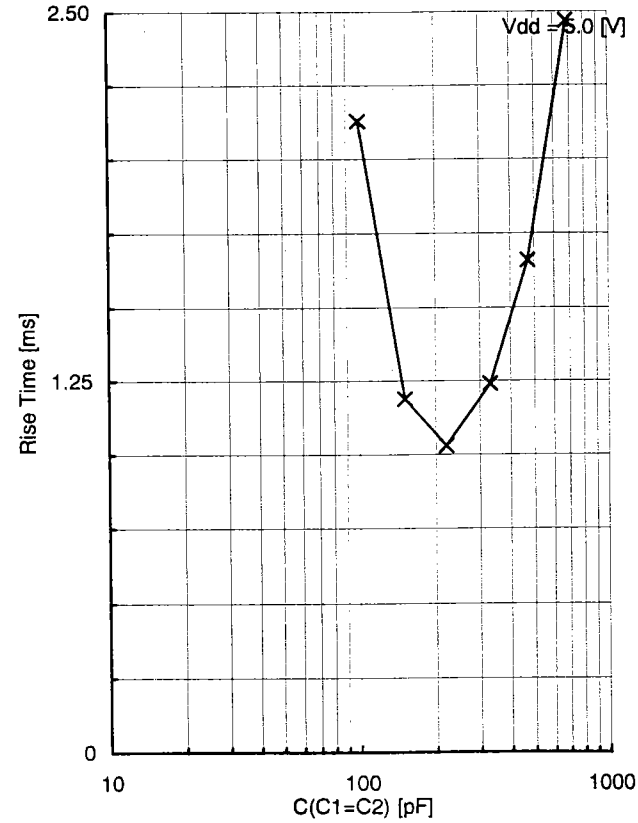
Oscillating Frequency vs C(C1=C2) Characteristics
MODEL : CSB400P with M34513M4



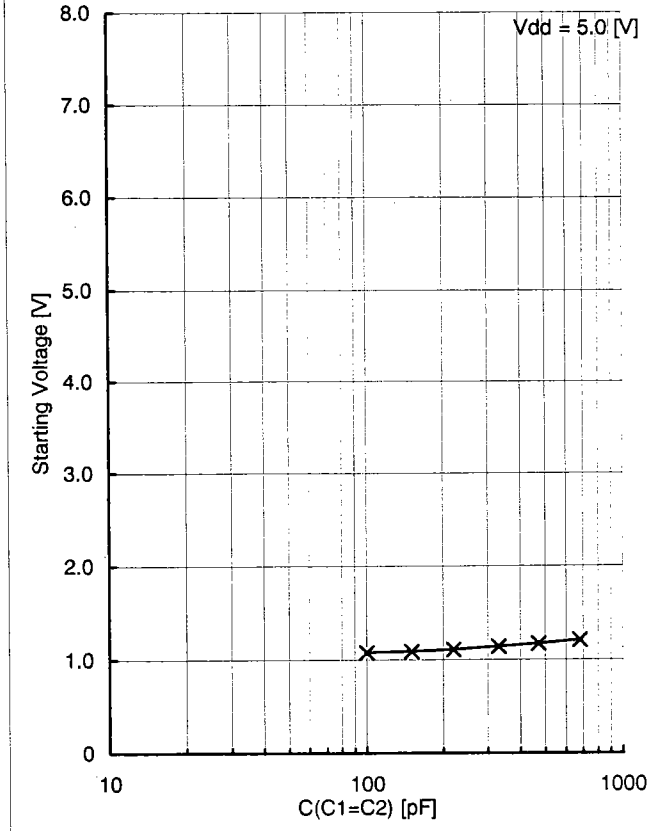
Oscillating Voltage vs C(C1=C2) Characteristics
MODEL : CSB400P with M34513M4



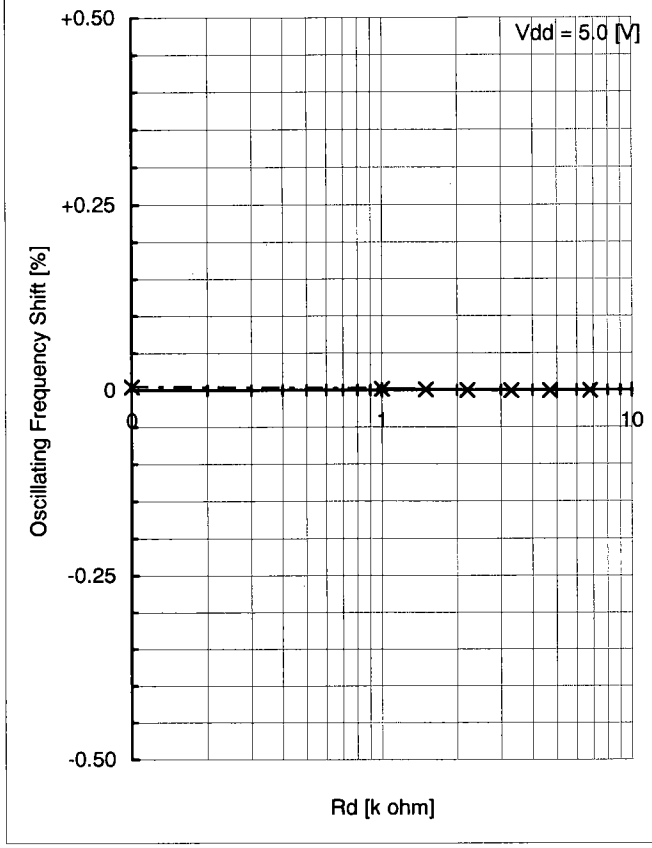
Rise Time vs C(C1=C2) Characteristics
MODEL : CSB400P with M34513M4



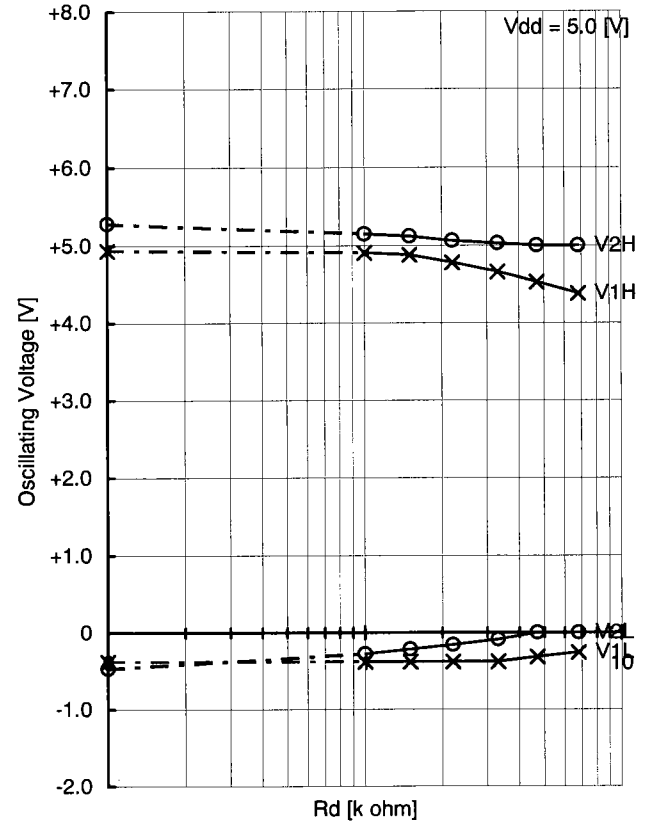
Starting Voltage vs C(C1=C2) Characteristics
MODEL : CSB400P with M34513M4



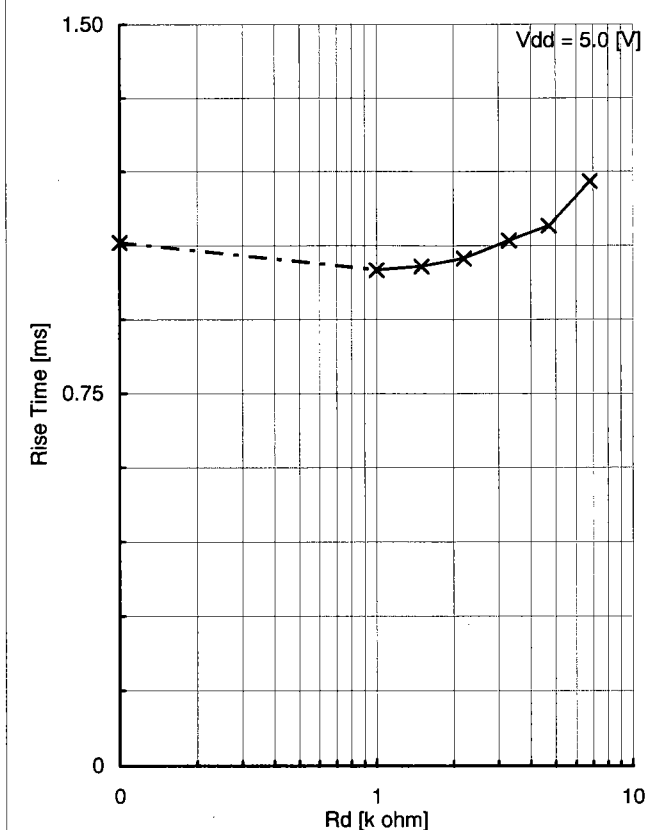
Oscillating Frequency vs Rd Characteristics
MODEL : CSB400P with M34513M4



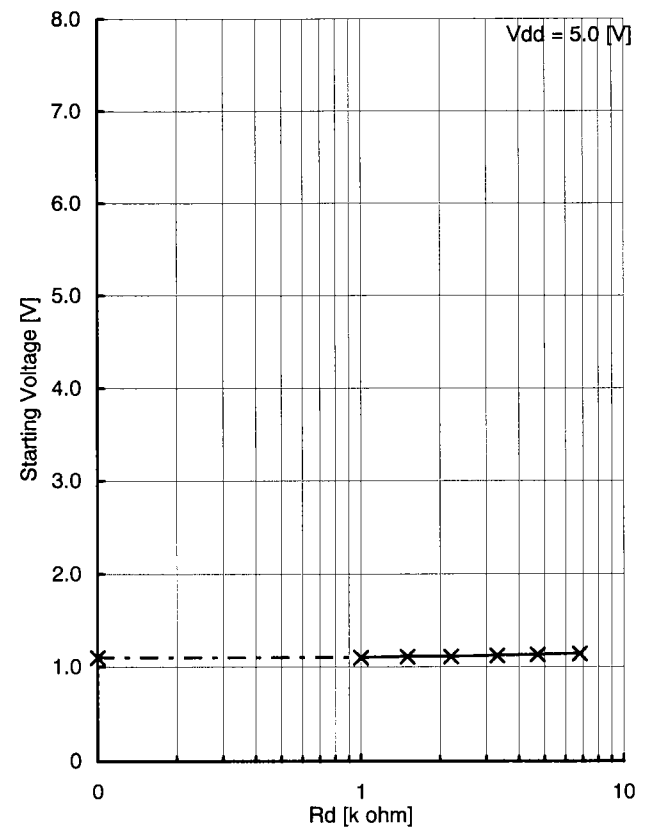
Oscillating Voltage vs Rd Characteristics
MODEL : CSB400P with M34513M4



Rise Time vs Rd Characteristics
MODEL : CSB400P with M34513M4



Starting Voltage vs Rd Characteristics
MODEL : CSB400P with M34513M4



Appendixes

Comparison Table

IC : No	V1H [V]	V1L [V]	V1p-p [V]	V2H [V]	V2L [V]	V2p-p [V]	Fosc [kHz]	Trise [ms]	Vstart [V]
029	4.78	-0.34	5.12	5.00	-0.16	5.16	399.223	0.928	1.14
030	4.78	-0.38	5.16	5.06	-0.16	5.22	399.220	1.010	1.12
031	4.84	-0.28	5.12	5.13	-0.06	5.19	399.225	1.112	1.01

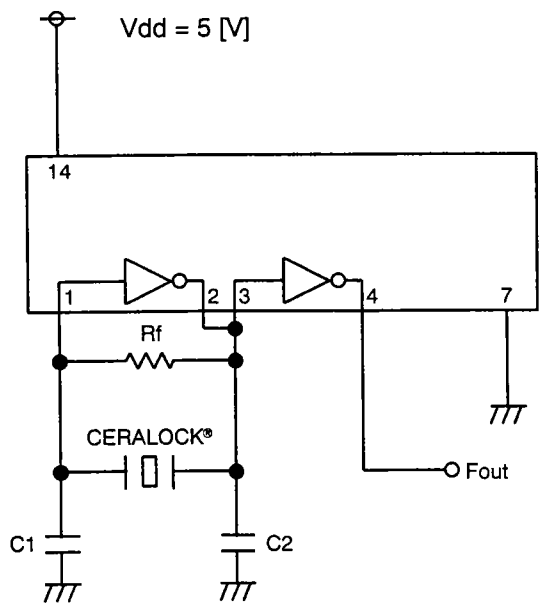
Ref.

Performance described page 2 to 6 were measured with IC No. MM

Frequency Correlation Data

Sample No.	M34513M4 Fosc [kHz]	CD4069UBE Fosc [kHz]	Shift [%]
1	399.220	399.805	-0.1464
2	398.815	399.405	-0.1479
3	399.392	399.989	-0.1491
4	398.351	398.902	-0.1380
5	398.983	399.581	-0.1497
$\bar{X}$	398.952	399.536	-0.1462

muRata Standard Circuit



CERALOCK® : CSB400P
C1 = 120 [pF]
C2 = 470 [pF]
Rf = 1 [Mohm]