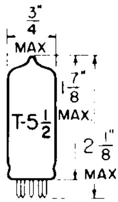
TENTATIVE DATA 3BE6

TUNG-SOL

HEPTODE

MINIATURE TYPE

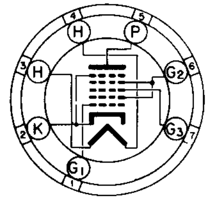


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
3.15 VOLTS 0.6 AMP.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE
7CH

THE 3BE6, A PENTAGRID CONVERTER USING THE 7 PIN MINIATURE CONSTRUCTION, IS DESIGNED FOR USE IN 600 MA. SERIES HEATER OPERATED SUPERHETERODYNE RECEIVERS. IT IS INTENDED FOR SERVICE AS A COMBINED OSCILLATOR AND MIXER. THERMAL CHARACTERISTICS OF THE HEATER ARE CONTROLLED SUCH THAT HEATER VOLTAGE SURGES DURING THE WARM-UP CYCLE ARE MINIMIZED PROVIDED IT IS USED WITH OTHER TYPES WHICH ARE SIMILARLY CONTROLLED. WITH THE EXCEPTION OF HEATER RATINGS, ITS CHARACTERISTICS ARE IDENTICAL TO TYPE 6BE6.

DIRECT INTERELECTRODE CAPACITANCES

	WITH SHIELD[A]	WITHOUT SHIELD	
MIXER GRID TO PLATE: (G_3 TO P) MAX.	0.25	0.30	μμf
MIXER GRID TO OSCILLATOR GRID: (G_3 TO G_1) MAX.	0.15	0.15	μμf
RF INPUT: G_3 TO ($H+K+G_1+G_{2\&4}+G_5+P$)	7.0	7.0	μμf
OSCILLATOR INPUT: G_1 TO ($H+K+G_{2\&4}+G_3+G_5+P$)	5.5	5.5	μμf
MIXER OUTPUT: P TO ($H+K+G_1+G_{2\&4}+G_3+G_5$)	13	8.0	μμf
OSCILLATOR GRID TO CATHODE: (G_1 TO $K+G_5$)	3.0	3.0	μμf
OSCILLATOR OUTPUT: K TO ($H+G_{2\&4}+G_3+P$)	20	15	μμf
OSCILLATOR GRID TO PLATE: (G_1 TO P) MAX.	0.05	0.1	μμf

[A] EXTERNAL SHIELD #316 CONNECTED TO PIN #2.

RATINGS

INTERPRETED ACCORDING TO DESIGN CENTER SYSTEM

HEATER VOLTAGE	3.15	VOLTS
→ MAXIMUM HEATER-CATHODE VOLTAGE:		
HEATER NEGATIVE WITH RESPECT TO CATHODE		
TOTAL DC AND PEAK	200	VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE		
DC	100	VOLTS
TOTAL DC AND PEAK	200	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRIDS #2 AND #4 VOLTAGE	100	VOLTS
MAXIMUM GRIDS #2 AND #4 SUPPLY VOLTAGE	300	VOLTS
MAXIMUM NEGATIVE DC GRID #3 VOLTAGE	-50	VOLTS
MAXIMUM POSITIVE DC GRID #3 VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM GRIDS #2 AND #4 DISSIPATION	1.0	WATT
MAXIMUM CATHODE CURRENT	14	MA.
HEATER WARM-UP TIME (APPROX.)*	11.0	SECONDS

*HEATER WARM-UP TIME IS DEFINED AS THE TIME REQUIRED FOR THE VOLTAGE ACROSS THE HEATER TO REACH 80% OF ITS RATED VOLTAGE AFTER APPLYING 4 TIMES RATED HEATER VOLTAGE TO A CIRCUIT CONSISTING OF THE TUBE HEATER IN SERIES WITH A RESISTANCE OF VALUE 3 TIMES THE NOMINAL HEATER OPERATING RESISTANCE.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE.

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE – SEPARATE EXCITATION[B]

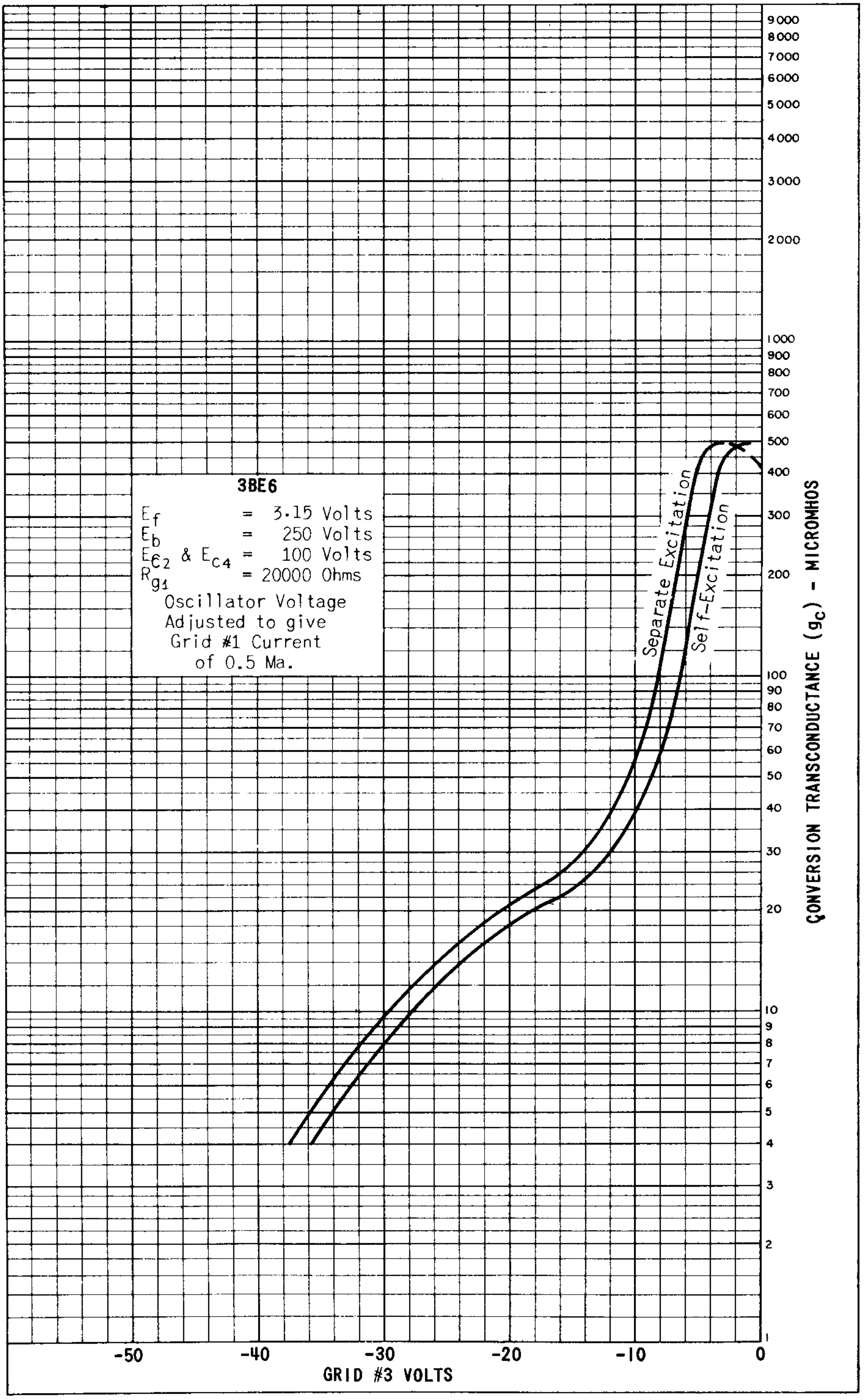
HEATER VOLTAGE	3.15	3.15	VOLTS
HEATER CURRENT	0.6	0.6	AMP.
PLATE VOLTAGE	100	250	VOLTS
GRID #3 VOLTAGE	−1.5	−1.5	VOLTS
GRIDS #2 AND #4 VOLTAGE	100	100	VOLTS
GRID #1 VOLTAGE (OSCILLATOR GRID) RMS	10	10	VOLTS
GRID #1 RESISTANCE (OSCILLATOR GRID)	20 000	20 000	OHMS
PLATE RESISTANCE (APPROX.)	0.4	1.0	MEGOHMS
GRID #1 CURRENT (OSCILLATOR GRID)	0.5	0.5	MA.
CONVERSION TRANSCONDUCTANCE	455	475	µMHOS
PLATE CURRENT	2.6	2.9	MA.
GRIDS #2 AND #4 CURRENT	7.0	6.8	MA.
CATHODE CURRENT	10.1	10.2	MA.
GRID #3 VOLTAGE FOR G_C = 10 µMHOS (APPROX.)	−30	−30	VOLTS
GRID #3 VOLTAGE FOR G_C = 100 µMHOS (APPROX.)	−6	−6	VOLTS

[B]CHARACTERISTICS SHOWN ARE OBTAINED IN THE STANDARD RMA CONVERSION CONDUCTANCE TEST SET WHICH USES SEPARATE EXCITATION. THE CHARACTERISTICS UNDER THESE CONDITIONS CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATORY CIRCUIT OPERATING WITH ZERO BIAS.

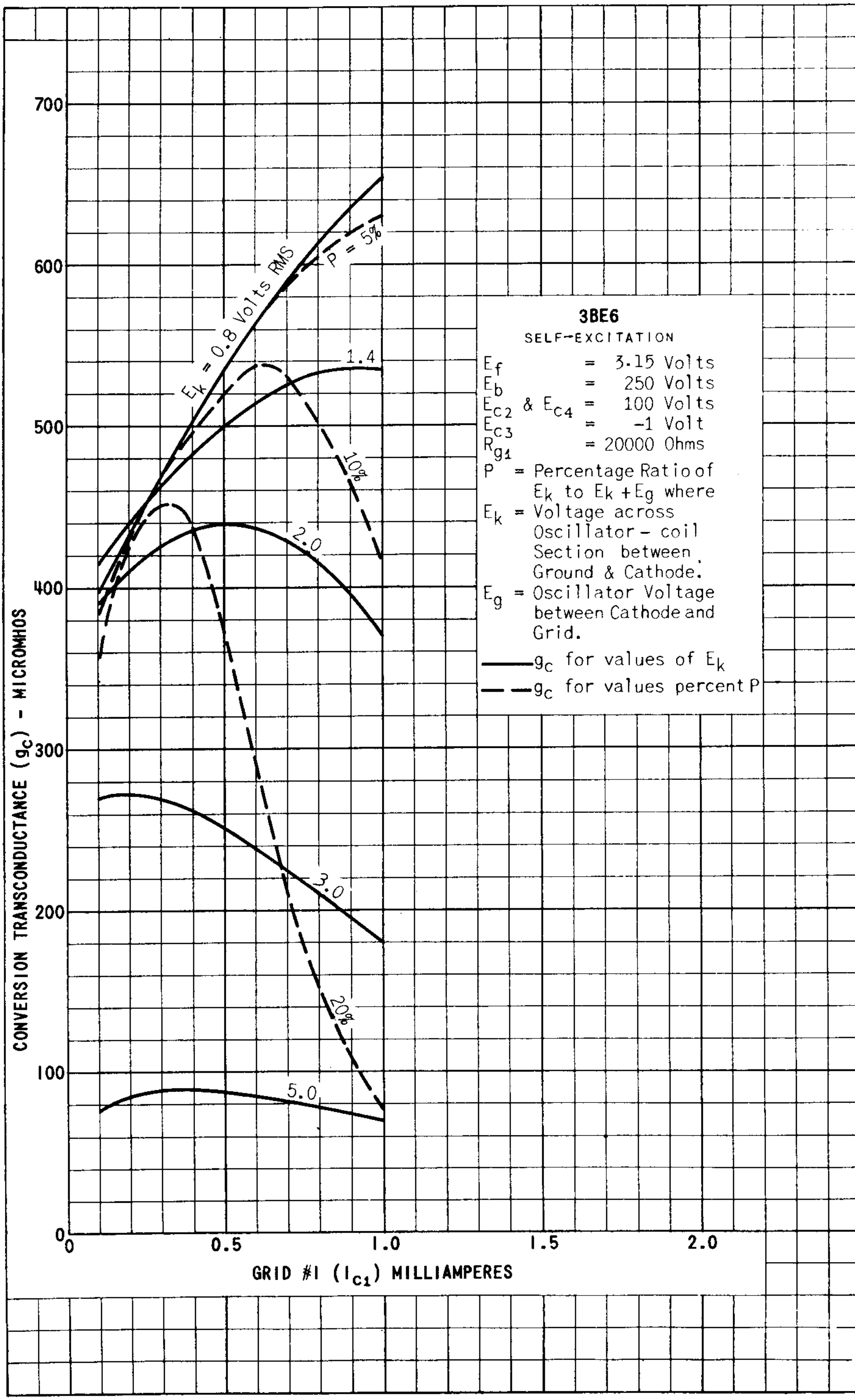
OSCILLATOR CHARACTERISTICS

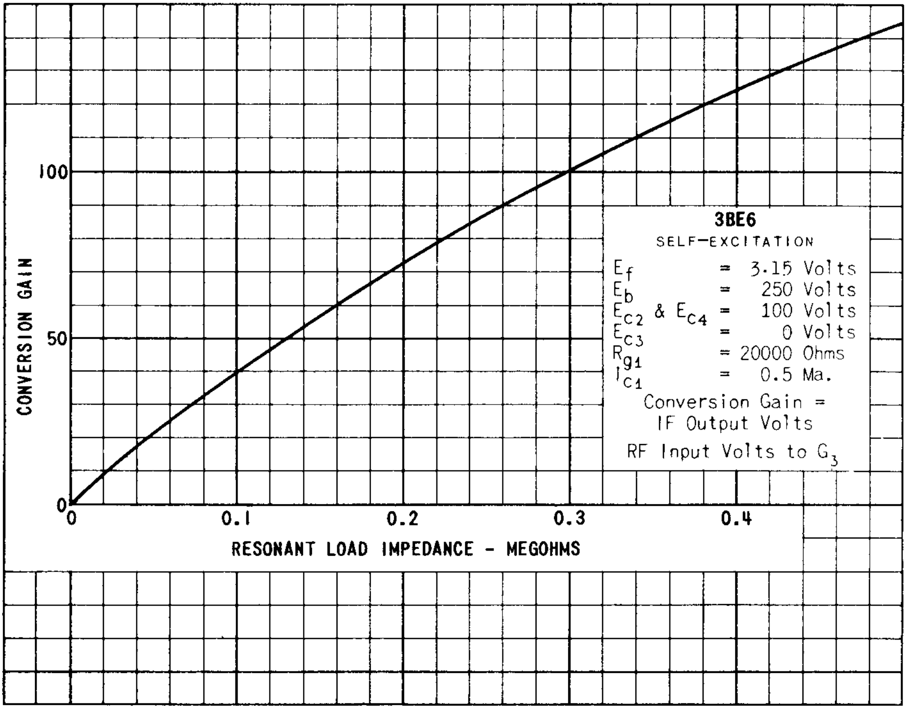
NOT OSCILLATING

GRID #3 VOLTAGE	0	VOLTS
GRID #1 VOLTAGE (OSCILLATOR GRID)	0	VOLTS
GRIDS #2 AND #4 CONNECTED TO PLATE	100	VOLTS
TRANSCONDUCTANCE BETWEEN GRID #1 AND GRIDS #2 AND #4 CONNECTED TO PLATE	7 250	µMHOS
AMPLIFICATION FACTOR BETWEEN GRID #1 AND GRIDS #2 AND #4 CONNECTED TO PLATE	20	
CATHODE CURRENT	25	MA.
GRID #1 VOLTAGE (APPROX.) FOR I_b = 10 µA	−11	VOLTS

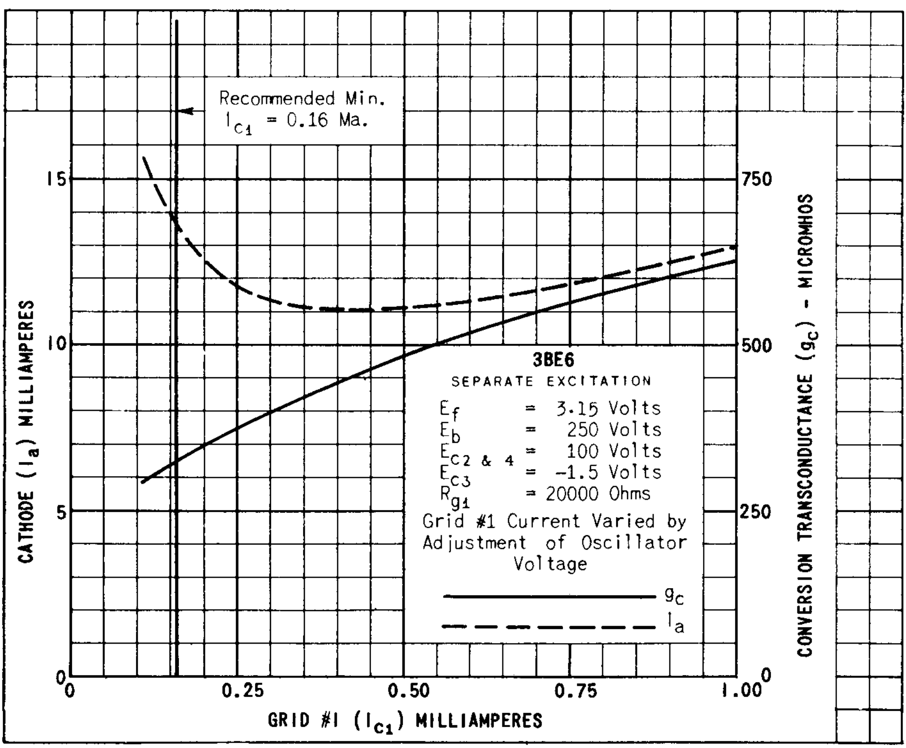


3BE6
E_f = 3.15 Volts
E_b = 250 Volts
E_{c2} & E_{c4} = 100 Volts
R_{g1} = 20000 Ohms
Oscillator Voltage
Adjusted to give
Grid #1 Current
of 0.5 Ma.
Separate Excitation
Self-Excitation
CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
GRID #3 VOLTS
-50
-40
-30
-20
-10
0
9000
8000
7000
6000
5000
4000
3000
2000
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1


3BE6
SELF-EXCITATION
Ef = 3.15 Volts
Eb = 250 Volts
Ec2 & Ec4 = 100 Volts
Ec3 = -1 Volt
Rg1 = 20000 Ohms
P = Percentage Ratio of Ek to Ek + Eg where
Ek = Voltage across Oscillator - coil Section between Ground & Cathode.
Eg = Oscillator Voltage between Cathode and Grid.
gc for values of Ek
gc for values percent P
Ek = 0.8 Volts RMS
1.4
2.0
3.0
5.0
P = 5%
10%
20%
CONVERSION TRANSCONDUCTANCE (gc) - MICROMHOS
GRID #1 (Ic1) MILLIAMPERES
0
100
200
300
400
500
600
700
0.5
1.0
1.5
2.0



CONVERSION GAIN
100
50
0
0
0.1
0.2
0.3
0.4
RESONANT LOAD IMPEDANCE - MEGOHMS
3BE6
SELF-EXCITATION
E_f = 3.15 Volts
E_b = 250 Volts
E_{c2} & E_{c4} = 100 Volts
E_{c3} = 0 Volts
R_{g1} = 20000 Ohms
I_{c1} = 0.5 Ma.
Conversion Gain = IF Output Volts / RF Input Volts to G_3



Recommended Min. I_{c1} = 0.16 Ma.
CATHODE (I_a) MILLIAMPERES
15
10
5
0
750
500
250
0
CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
0
0.25
0.50
0.75
1.00
GRID #1 (I_{c1}) MILLIAMPERES
3BE6
SEPARATE EXCITATION
E_f = 3.15 Volts
E_b = 250 Volts
$E_{c2 \& 4}$ = 100 Volts
E_{c3} = -1.5 Volts
R_{g1} = 20000 Ohms
Grid #1 Current Varied by Adjustment of Oscillator Voltage
g_c
I_a