JEDEC DATA
JOINT ELECTRON DEVICE ENGINEERING COUNCIL
COMMITTEE ON RECEIVING TUBES

JEDEC TYPE 6GK7

PENTODE

The 6GK7 is a new type of high gain pentode, developed for application in the video intermediate frequency amplifying stages of television receivers. The dual control feature of the tube permits operation as a sharp cut off pentode with a 135 volt or a 270 volt B supply, a semi-remote cut off pentode with a 135 volt B supply or a remote cut off pentode with a 270 volt B supply.

For semi-remote and remote cut off operation the automatic gain control voltage is applied to the number 3 grid. A fully bypassed cathode resistor is used to increase gain through the elimination of cathode degeneration. Neutralization is unnecessary because of the very low control grid to plate capacitance.

Many unique circuit advantages can be realized through utilization of the dual control feature of this new type of pentode.

MECHANICAL DATA

Cathode ..... Coated unipotential
Outline ..... see drawing Bulb ..... T $6\frac{1}{2}$
Base ..... E9-1, Small button 9-Pin
Basing 9AQ
Maximum diameter ..... 7/8"
Maximum overall length ..... 2 13/32"
Maximum seated height ..... 2 5/32"
Pin Connections:

Pin #1 - Cathode	Pin #6 - Internal Shield
Pin #2 - Grid #1	Pin #7 - Plate
Pin #3 - Cathode	Pin #8 - Grid #2 and Grid #2 Shield
Pin #4 - Heater	Pin #9 - Grid #3
Pin #5 - Heater	

Mounting Position ..... Any

from JEDEC release #3990, Nov. 26, 1962

ELECTRICAL DATA

Heater Characteristics

Heater Voltage (ac or dc)	6.3±10%	Volts
Heater Current	300	ma

Direct Interelectrode Capacitances

Grid #1 to plate (g1 to p) max.	.005	uuf
Grid #1 to cathode, internal shield, grid #3, grid #2 and heater	8.5	uuf
Plate to cathode, internal shield, grid #3, grid #2 and heater	3.3	uuf

Ratings (Design Maximum Rating System)

Maximum plate voltage	330	Volts
Maximum grid #2 voltage	See JT-C4-2	
Maximum grid #2 supply voltage	330	Volts
Maximum plate dissipation	2.8	Watts
Maximum grid #2 and grid #2 shield dissipation	1.1	Watts
Maximum positive D.C. grid #1 voltage	0	Volts
Maximum Grid #3 circuit Resistance	0.5	Megohms
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

TYPICAL OPERATING CONDITIONS

S H A R P C U T O F F

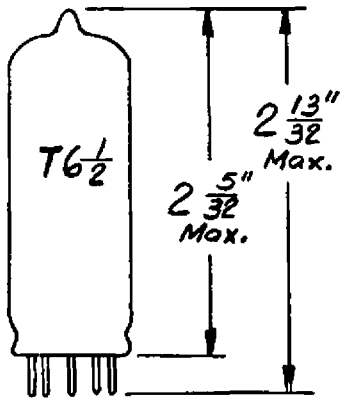
Plate Voltage	135	270	Volts
Grid #2 Supply Voltage	135	270	Volts
Grid #2 Series Resistor	0	22	Kohms
Cathode Bias Resistor	82	100	ohms
Grid #1 Voltage	0	0	Volts
Grid #3 Voltage	+15	+15	Volts
Plate Resistance(approx.)	275	750	Kohms
Transconductance	9500	9500	umhos
Plate Current	7.0	8.0	mAmps
Grid #2 Current	3.5	3.75	mAmps
Grid #3 Current	400	400	uAmps
Grid #1 Voltage for Ip = 20 uAmps	-3.25	-5.75	Volts
Input Grid #1 Capacitance at 40 m.c.	13	12.75	uufarads
Input Grid #1 Resistance at 40 m.c.	55	55	Kohms

TYPICAL OPERATING CONDITIONS -- Cont'd

	SEMI-REMOTE CUTOFF				REMOTE CUTOFF				
Plate Voltage	135				270				Volts
Grid #2 Supply Voltage	135				270				Volts
Grid #2 Series Resistor	3.3				27				Kohms
Cathode Bias Resistor	22				47				ohms
Grid #1 Voltage	Note 1				Note 1				
Grid #3 Voltage (Note 2)	+5	0	-5	-10	+5	0	-7.5	-17.5	Volts
Plate Current	9.25	6.5	3.0	0.2	9.5	7.5	3.0	0.3	mAmps
Grid #2 Current	5.5	6.5	7.5	7.5	5.5	5.5	5.5	5.0	mAmps
Transconductance	10500	8000	3500	300	10500	9500	5000	250	umhos
Plate Resistance	140	65	40	170	300	175	100	270	Kohms
Grid #3 Transconductance	120	450	590	80	60	200	450	5	umhos
Grid #3 Current	550	0	0	0	450	0	0	0	uAmps

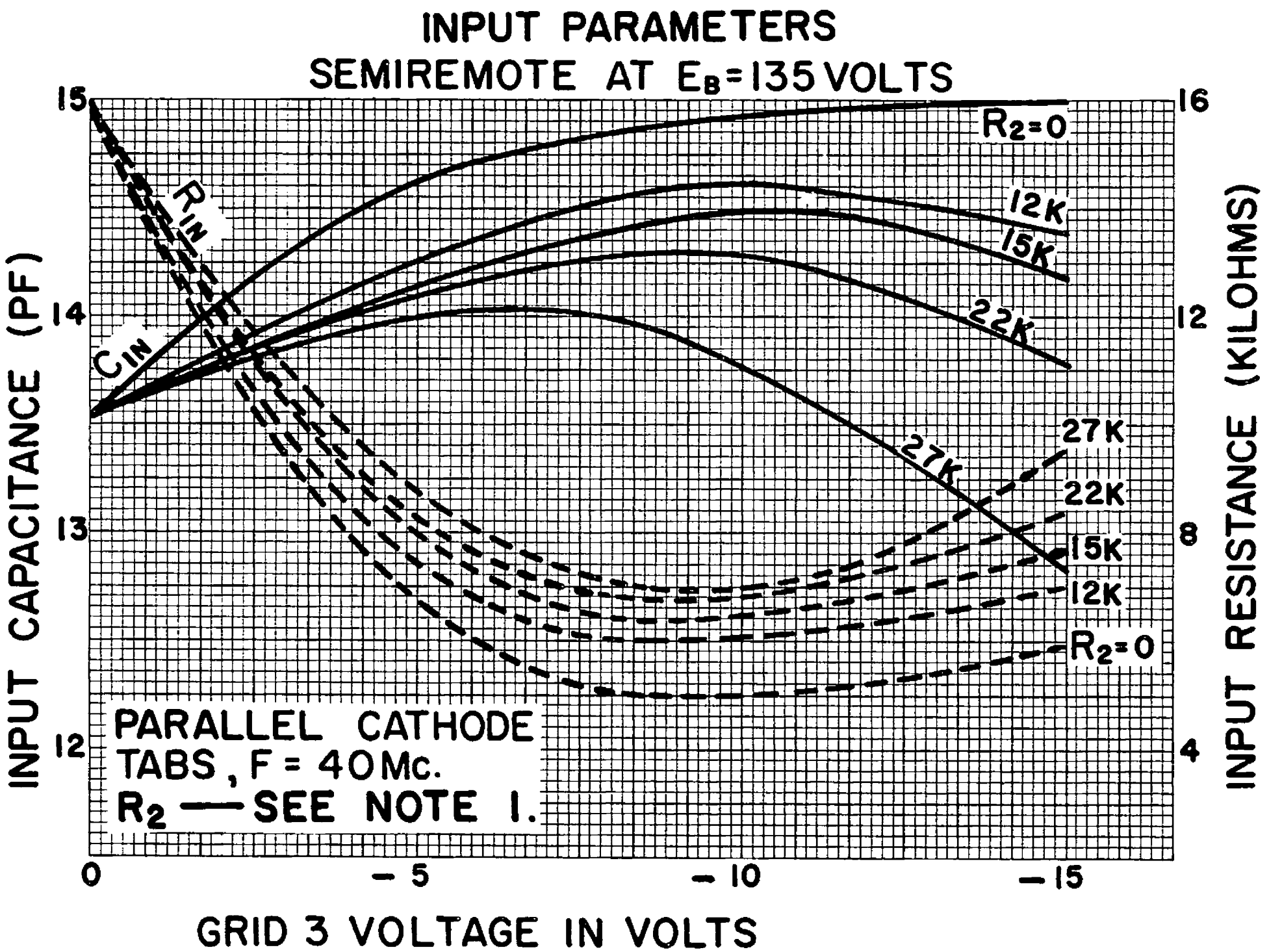
Notes: 1. Approximately 6% of the #3 Grid voltage is applied to the #1 grid through a feedback resistor network consisting of a 330 Kohm resistor connected between Grid 3 and Grid 1 and a 22 Kohm resistor connected between Grid 1 and ground.

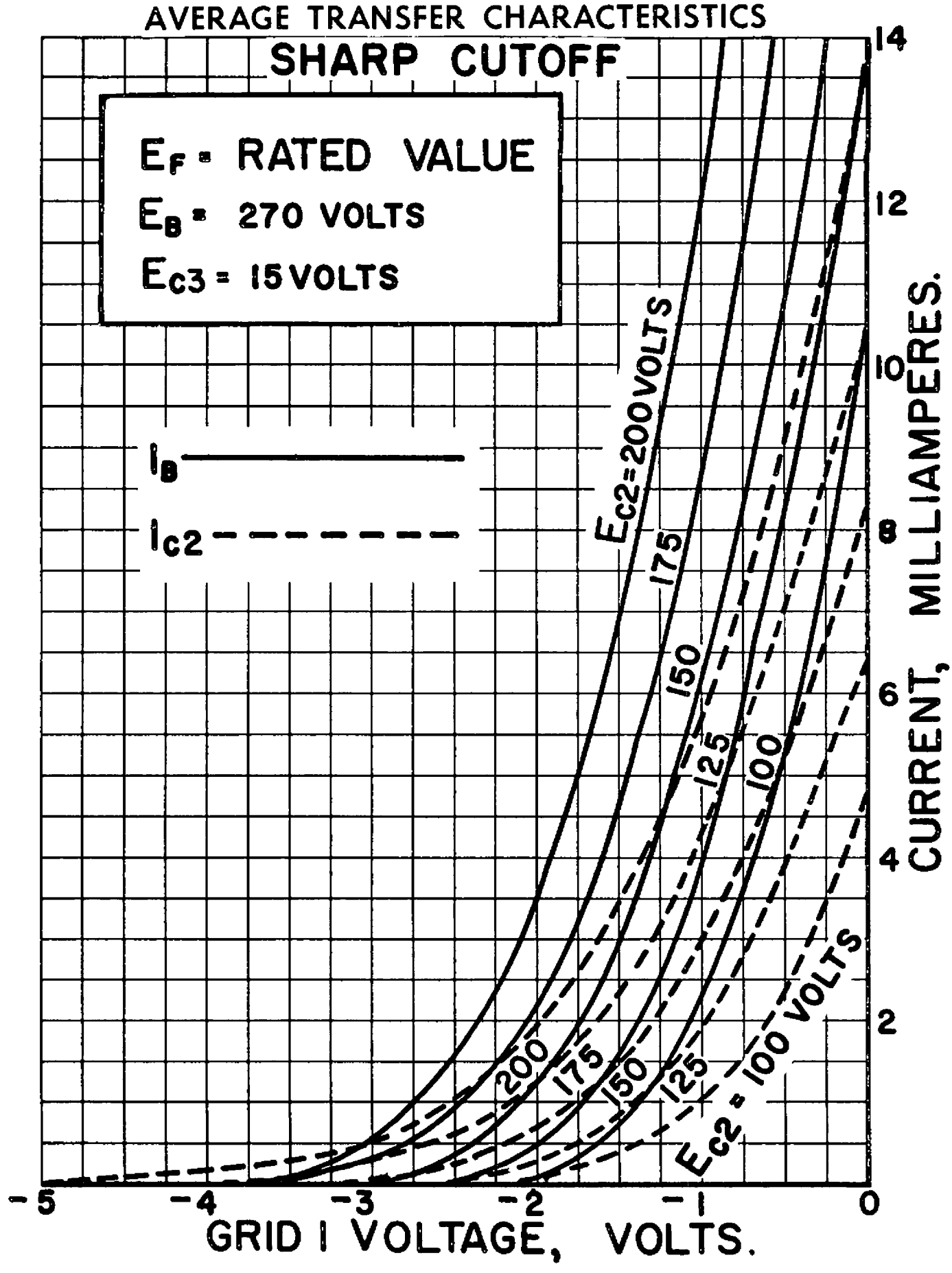
2. When 6GK7 is used as a video I.F. amplifier operating at 45 Mc/sec., approximately 3.5 db increase in gain over that with grid three grounded can be obtained by placing an inductor between the A.C. ground and the suppressor grid, and tuning it to resonate with grid three to ground capacitance at approximately 60 mc/sec.

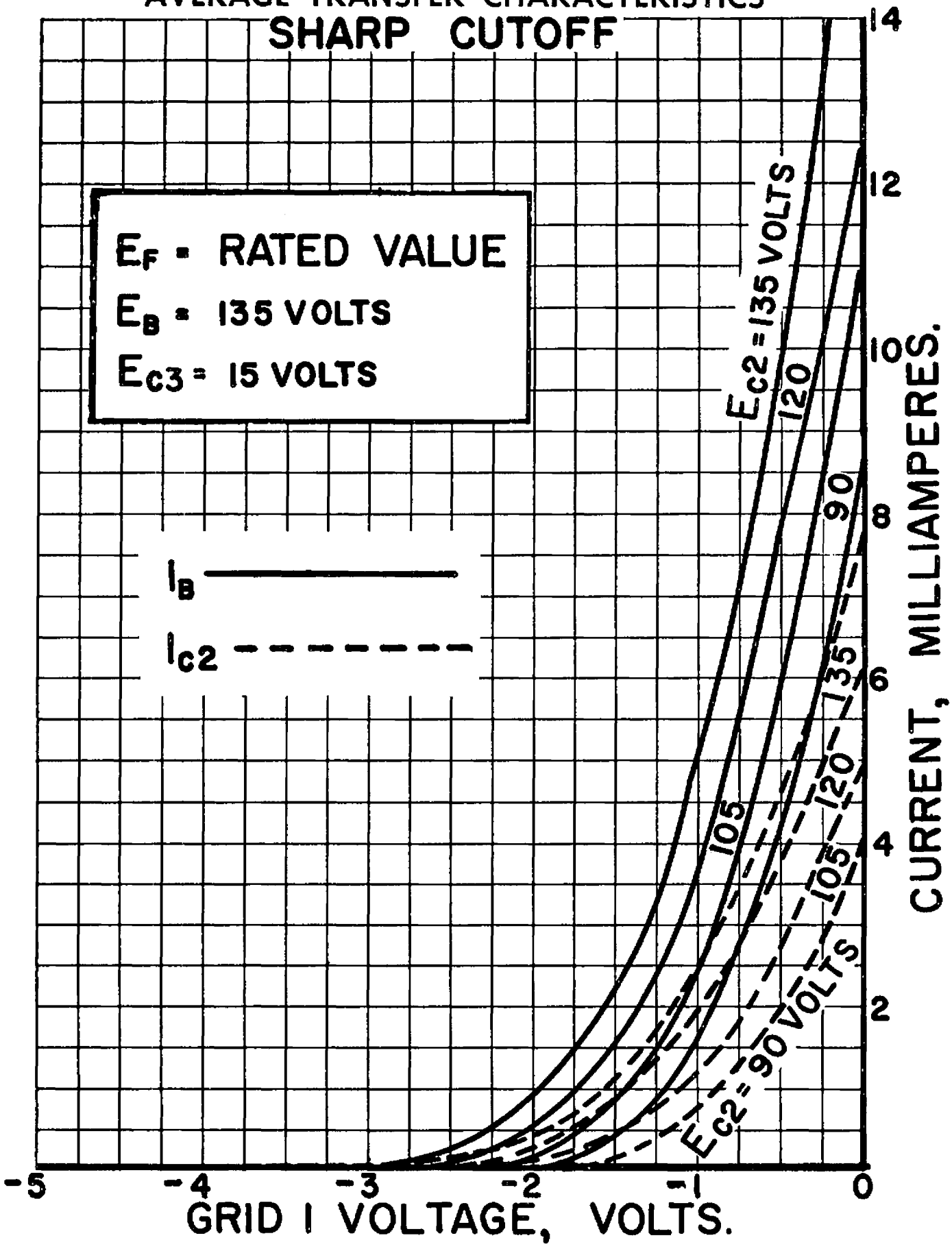


OUTLINE DRAWING

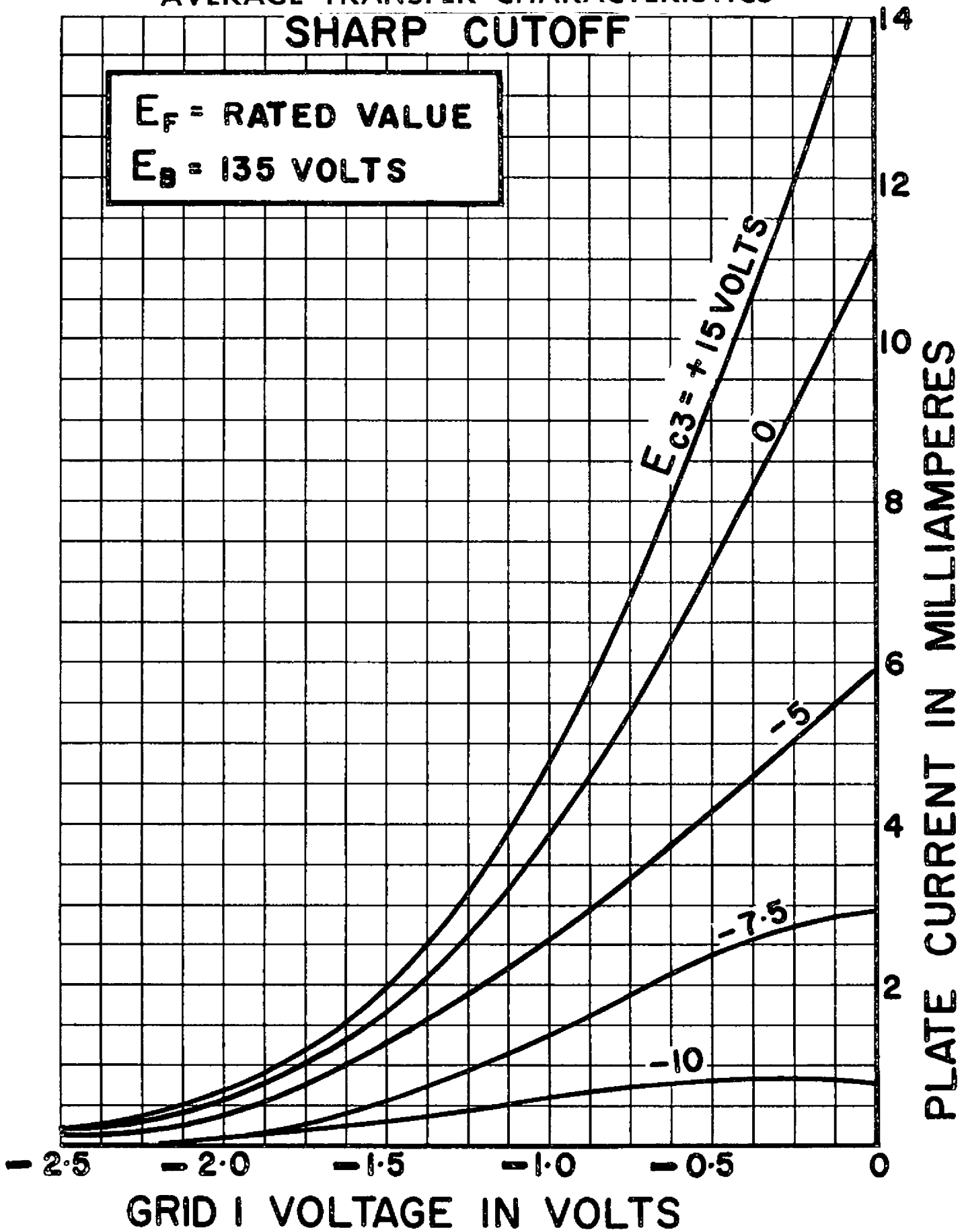
Design Maximum Ratings are the limiting values expressed with respect to bogie tubes at which satisfactory tube life can be expected to occur in the types of service for which the tube is rated. Therefore, the equipment designer must establish the circuit design so that initially and throughout equipment life no design maximum value is exceeded with a bogie tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation and environmental conditions.

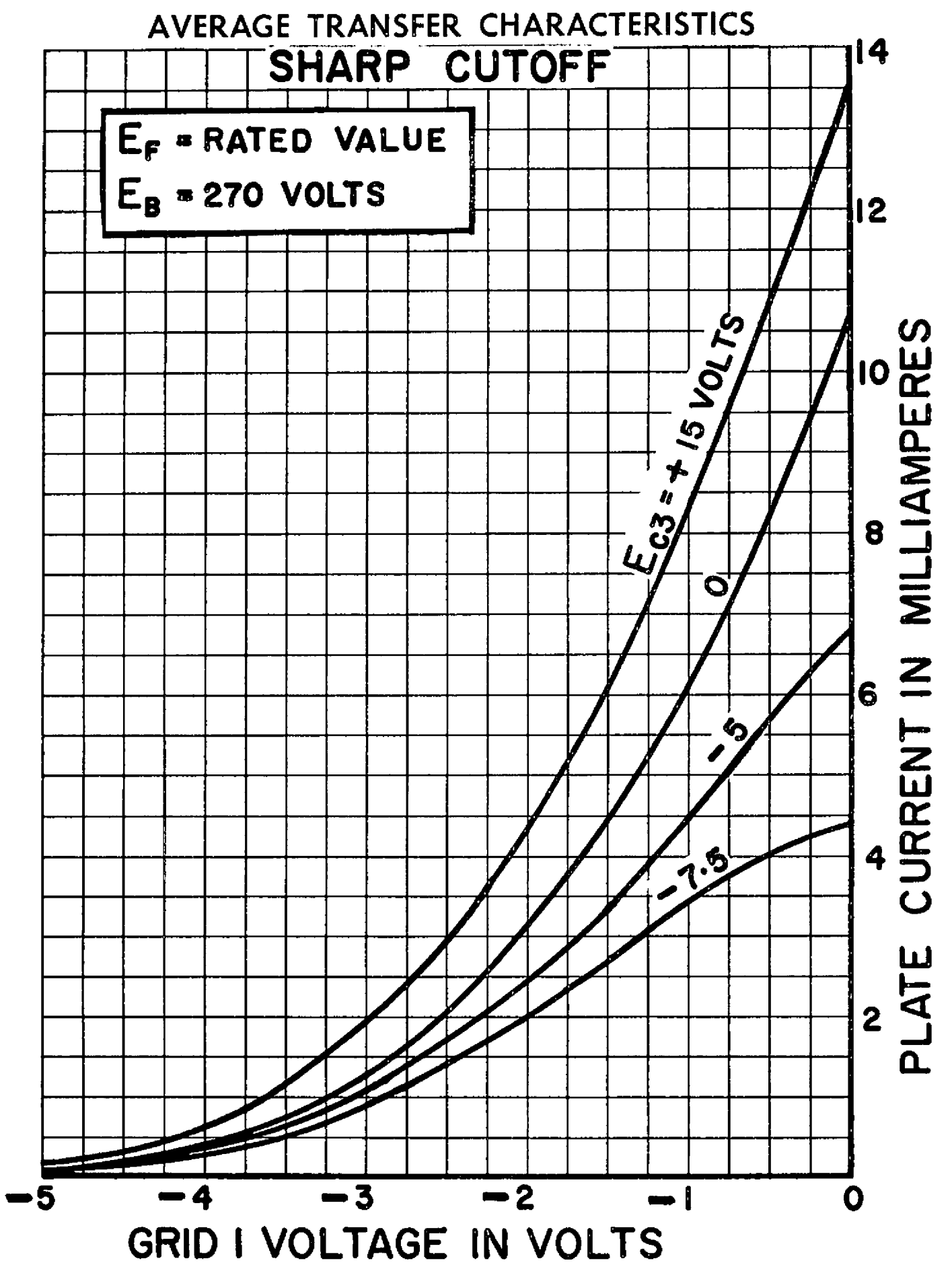

INPUT PARAMETERS
SEMIREMOTE AT E_B=135 VOLTS
INPUT CAPACITANCE (PF)
INPUT RESISTANCE (KILOHMS)
GRID 3 VOLTAGE IN VOLTS
15
14
13
12
16
12
8
4
0
−5
−10
−15
R_{IN}
C_{IN}
R_2=0
12K
15K
22K
27K
27K
22K
15K
12K
R_2=0
PARALLEL CATHODE
TABS, F = 40Mc.
R_2 — SEE NOTE 1.

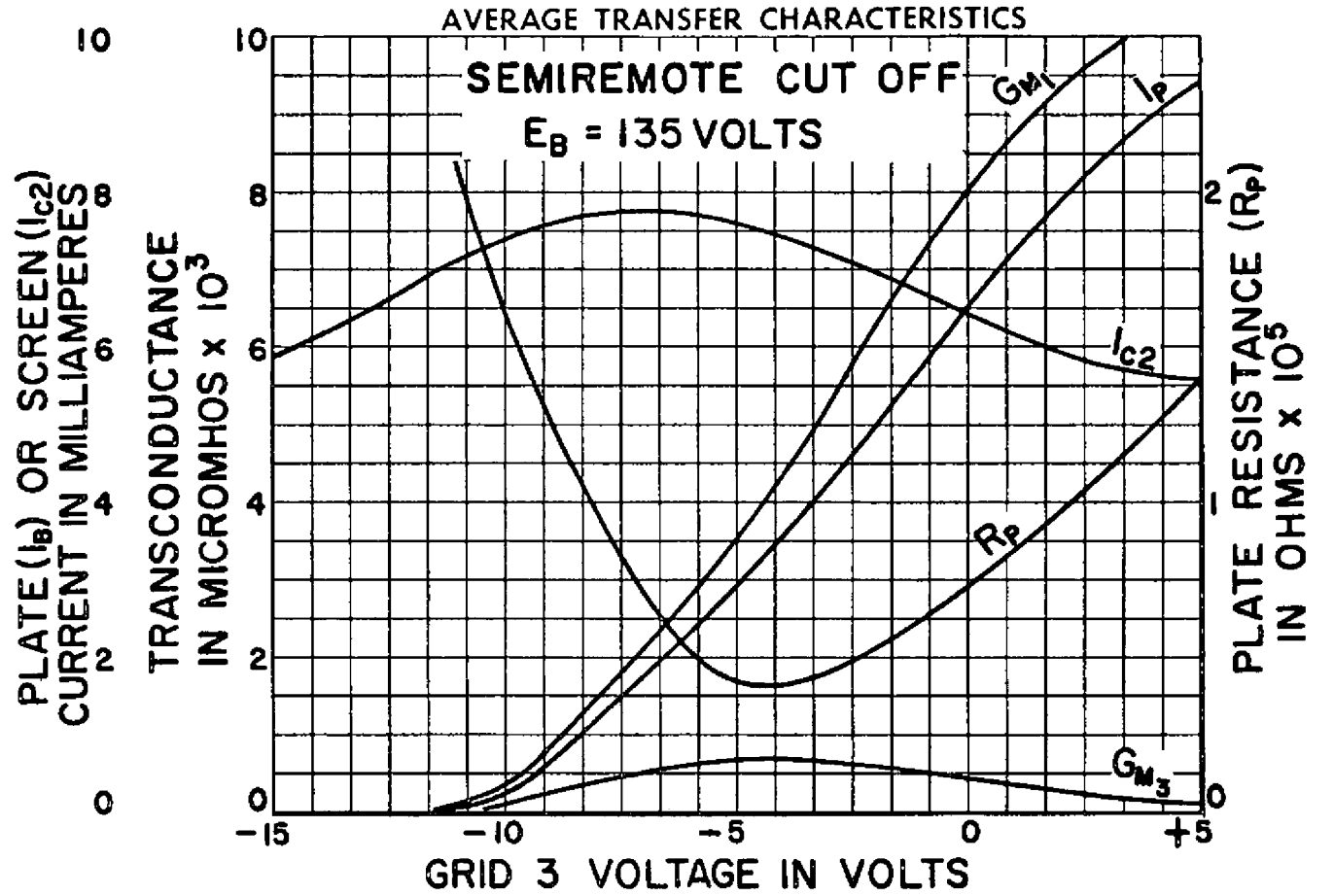

AVERAGE TRANSFER CHARACTERISTICS
SHARP CUTOFF
E_f = RATED VALUE
E_B = 270 VOLTS
E_{c3} = 15 VOLTS
I_B
I_{c2}
E_{c2}=200 VOLTS
175
150
125
100
E_{c2} = 100 VOLTS
200
175
150
125
CURRENT, MILLIAMPERES.
14
12
10
8
6
4
2
0
-5
-4
-3
-2
-1
GRID 1 VOLTAGE, VOLTS.

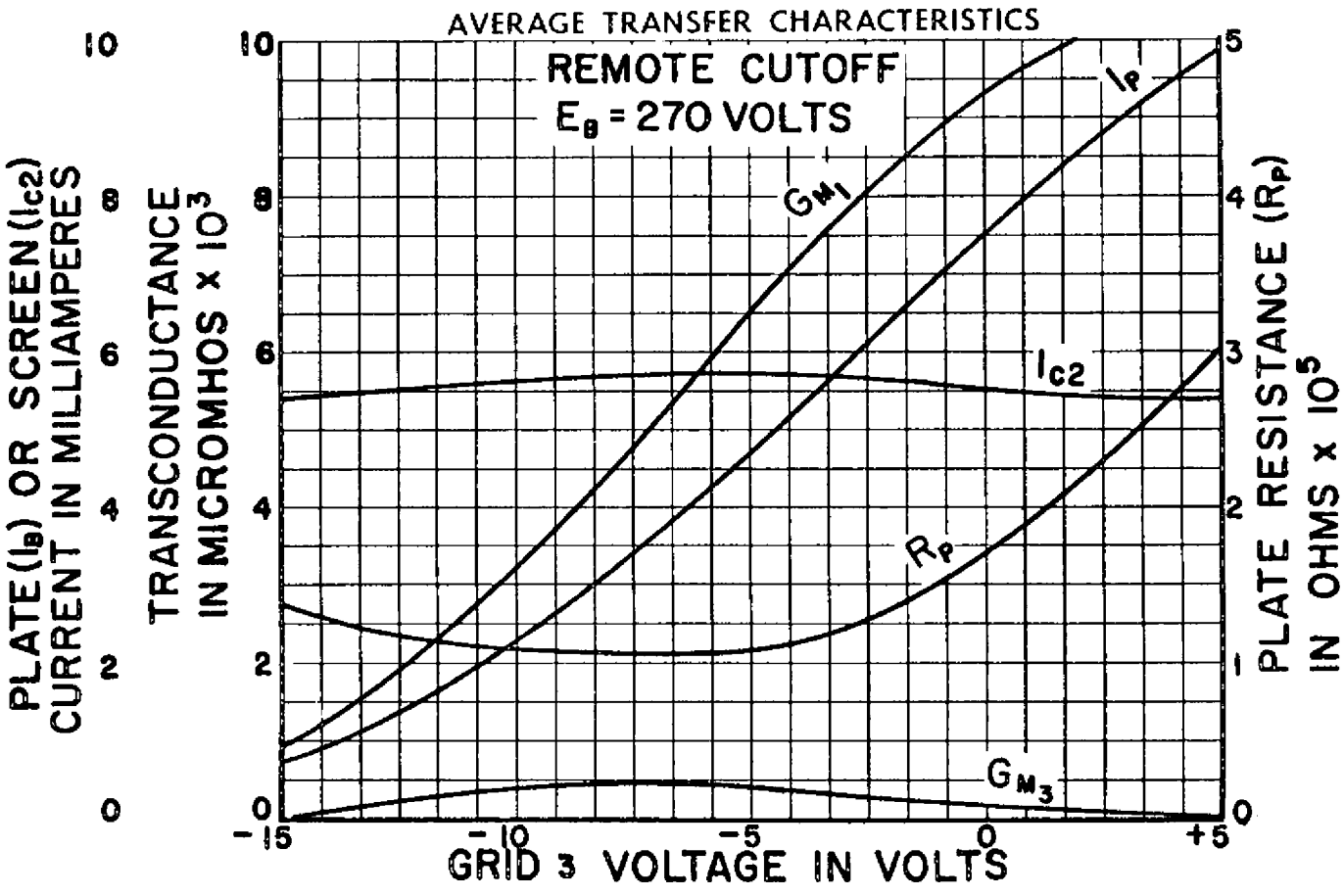

AVERAGE TRANSFER CHARACTERISTICS
SHARP CUTOFF
E_F = RATED VALUE
E_B = 135 VOLTS
E_{c3} = 15 VOLTS
I_B
I_{c2}
E_{c2} = 135 VOLTS
120
105
90
E_{c2} = 90 VOLTS
105
120
135
14
12
10
8
6
4
2
0
-5
-4
-3
-2
-1
CURRENT, MILLIAMPERES.
GRID 1 VOLTAGE, VOLTS.

AVERAGE TRANSFER CHARACTERISTICS




AVERAGE TRANSFER CHARACTERISTICS
SHARP CUTOFF
E_F = RATED VALUE
E_B = 270 VOLTS
E_{C3} = +15 VOLTS
0
-5
-7.5
14
12
10
8
6
4
2
PLATE CURRENT IN MILLIAMPERES
-5
-4
-3
-2
-1
0
GRID 1 VOLTAGE IN VOLTS


AVERAGE TRANSFER CHARACTERISTICS
SEMIREMOTE CUT OFF
E_B = 135 VOLTS
G_{M1}
I_P
I_{C2}
R_P
G_{M3}
PLATE (I_B) OR SCREEN (I_{C2}) CURRENT IN MILLIAMPERES
TRANSCONDUCTANCE IN MICROMHOS x 10^3
PLATE RESISTANCE (R_P) IN OHMS x 10^5
GRID 3 VOLTAGE IN VOLTS
10
8
6
4
2
0
−15
−10
−5
0
+5
1
2


AVERAGE TRANSFER CHARACTERISTICS
REMOTE CUTOFF
E_B = 270 VOLTS
G_{M1}
I_P
I_{C2}
R_P
G_{M3}
PLATE (I_B) OR SCREEN (I_{C2}) CURRENT IN MILLIAMPERES
TRANSCONDUCTANCE IN MICROMHOS x 10^3
PLATE RESISTANCE (R_P) IN OHMS x 10^5
GRID 3 VOLTAGE IN VOLTS
10
8
6
4
2
0
−15
−10
−5
0
+5
1
2
3
4
5