RAYTHEON

TECHNICAL INFORMATION SERVICE

Technical Information

6HD5
21HD5
28HD5

BEAM PENTODES

The types 6HD5, 21HD5, and 28HD5 are heater–cathode type beam pentodes for use as horizontal deflection amplifiers in television receivers. They have been designed to meet the circuit requirements of low B supply receivers and color applications where high peak plate currents and high perveance are necessary.

Structural features of this type include a single–ended T–12 envelope and an integral all–glass twelve–pin base. The large diameter internal leads to the base of this tube assure firm support for the mount structure. The design permits cool operation of both grids and additional cooling of grids #1 & #2 can be obtained by employing connections to the dual base pins.

ELECTRICAL DATA

HEATER CHARACTERISTICS:

	6HD5	21HD5	28HD5	
Heater Voltage	6.3±10%	21.5 ●●	28.0	volts ●●
Heater Current	2.25 ●	0.6±6% □	0.45±6%	amps. □
Heater Warm–Up Time		11	11	sec.
Maximum Heater Cathode Voltages:				
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

DESIGN MAXIMUM RATINGS – HORIZONTAL DEFLECTION AMPLIFIER: **

Plate Supply Voltage (boost + DC power supply)	770	volts
Grid #2 Voltage	220	volts
Plate Dissipation	24	watts
Grid #2 Dissipation	6.0	watts
Grid #2 Dissipation (Warm up Surge) +	12	watts
Average Cathode Current	280	ma
Peak Cathode Current	1000	ma
Peak Positive Plate Voltage	7000	volts
Peak Negative Plate Voltage	1500	volts
Peak Negative Grid #1 Voltage	330	volts
Grid #1 Circuit Resistance	1.0	meg.
Bulb Temperature (at hottest point on bulb surface)	240	°C

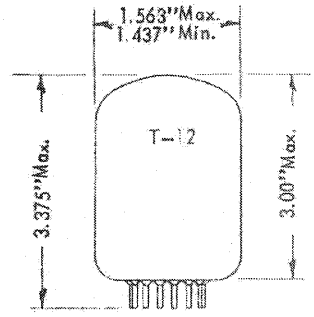
AVERAGE CHARACTERISTICS:

Plate Voltage	60	60	135	volts
Grid #2 Voltage	110	135	135	volts
Grid #1 Voltage	0	0	–22	volts
Plate Current	410 ++	540 ++	65	ma
Grid #2 Current	28 ++	48 ++	4	ma
Triode Amplification Factor			4.2	
Transconductance			10000	μmhos
Plate Resistance			5000	ohms
Grid #1 Voltage (approx.) for Ib=1 ma (Ep=3 KV)			–60	volts

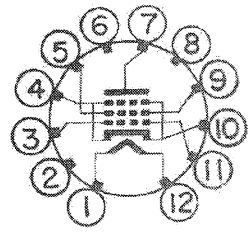
MECHANICAL DATA

ENVELOPE . . . . . T–12 Glass
BASE . . . . 12–Pin Button E12–74
MOUNTING POSITION . . . . . Any

PHYSICAL DIMENSIONS



BASING 12 ES



BOTTOM VIEW

TERMINAL CONNECTIONS

Pin 1	Heater
Pin 2	No Connection
Pin 3	Grid #1
Pin 4	Cathode & Grid #3
Pin 5	Grid #2
Pin 6	Internal Conn. *
Pin 7	Plate
Pin 8	Internal Conn. *
Pin 9	Grid #2
Pin 10	Cathode & Grid #3
Pin 11	Grid #1
Pin 12	Heater

* Do not use – It is suggested that socket clips for these pins be omitted to improve insulation factor of socket.

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ELECTRICAL DATA (cont'd.)

** For operation in a 525 line, 30–frame system as described in "Standards of Good Engineering Practice for Television Broadcasting stations; Federal Communications Commission". The duty cycle of the voltage pulse not to exceed 15% of a scanning cycle and its duration is limited to 10 micro seconds.

Design–Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey tube of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable servicability of the tube, taking responsibility for the effects of changes in operating conditions due to variations in tube characteristics.

The equipment manufacturer should design so that initially and throughout life no design–maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply–voltage variations, equipment component variation, equipment control adjustment, load variation, signal variation, and environmental conditions.

\+ Surge not to exceed 15 seconds duration.

++ Instantaneous values.

● Heater current at bogie heater voltage.

●● Heater voltage at bogie heater current.

□ The equipment designer shall design equipment so that the heater voltage for the 6HD5 and the heater current for the 21HD5 and 28HD5 are centered at the specified bogey value with heater supply variations restricted to maintain heater voltage (or current) within the specified tolerance.

AVERAGE PLATE CHARACTERISTICS
E_f = rated, E_{c2} = 135 Volts