S6F17F

SPECIAL QUALITY PULSE BEAM TETRODE

Indirectly heated

GENERAL

The S6F17F is an indirectly heated, special quality, pulse beam tetrode with flying leads, for use in pulse and r.f. amplifiers where dependable performance is required under shock and vibration conditions.
A special shock resistant construction is employed which gives increased reliability and life expectancy.
Quality tests are performed on electrical characteristics, vibration noise, lead fragility, glass strain, electrode resonance, vibration fatigue, shock resistance, heater cycling, stability and life.

RATING‡

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·3	A
Maximum Anode Voltage	$V_{a(max)}$	600	V
Maximum Screen Voltage	$V_{g2(max)}$	600	V
Mutual Conductance	g_m	8·3*	mA/V
Maximum Anode Dissipation	$P_{a(max)}$	3·5†	W
Maximum Screen Dissipation	$P_{g2(max)}$	0·7	W
Maximum Heater/Cathode Voltage d.c.	$V_{h\text{-}k(max)}$	100	V
Maximum Bulb Temperature	$T_{bulb(max)}$	165	°C
Maximum Shock (short duration)		500	g
Maximum Acceleration (continuous operation)		2·5	g

* $V_a = V_{g2} = 250V$, $V_{g1} = -6{\cdot}25V$. Tested under pulse conditions.

† If used in a can at maximum rating, the can must be matt black both internally and externally.

‡ All limiting values are Absolute Values, not Design Centres.

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LIMITS OF CHARACTERISTICS

The test limits are for guidance in equipment design. The quality is controlled statistically to ensure that only a small percentage are outside these limits. The quality control levels are related to the importance of the characteristic being tested.

Test	Conditions V_h (V)	V_a (V)	V_{g2} (V)	I_a (mA)	Life Period	Limits Min.	Limits Max.	Units
Heater Current	6·3	.	.	.	Initial	0·27	0·33	A
					500 hrs.	0·27	0·33	A
					1,000 hrs.	0·27	0·33	A
Negative Grid Voltage	6·3	200	200	17	Initial	8·4	15·8	V
					500 hrs.	7·4	15·8	V
					1,000 hrs.	6·6	15·8	V
Screen Current	6·3	200	200	17	Initial	2·05	5·1	mA
Mutual Conductance	6·3	200	200	17	Initial	2·6	5·0	mA/V
Pulse Anode Current	6·3	300	300	.	Initial	133	.	mA
$V_{g1} = -100V$, Pulse Amp. $= +100V$					500 hrs.	100	.	mA
$t_p = 10 - 15\mu s$, Duty cycle ·0025					1,000 hrs.	90	.	mA
Change in Pulse Anode Current	6·3	300	300	.	Initial to 1 hr.	.	20	%
Inner Amplification Factor	6·3	200	200	17	Initial	7·5	12·5	
V_{g1} (sig.) $= +2V$	6·3	200	200	0·1	Initial	.	38	V
Anode Current Cut-off	6·3	200	200	17	Initial	.	0·75	μA
Reverse Grid Current					500 hrs.	.	1·0	μA
$R_{g1} = 500\ k\Omega$ (max)					1,000 hrs.	.	1·5	μA

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LIMITS OF CHARACTERISTICS—*Cont.*

Test	Conditions Vh (V)	Va (V)	Vg2 (V)	Ia (mA)	Life Period	Limits Min.	Max.	Units
Reverse Grid Current $R_{g1}=500\,k\Omega$, $V_{g1}=-38V$	7·0	200	200	.	Initial	.	−1·5	μA
Heater/Cathode Leakage Current $V_{h\text{-}k}=\pm100V$	6·3	.	.	.	Initial	.	10	μA
					500 hrs.	.	10	μA
					1,000 hrs.	.	10	μA
Inter-electrode Leakage Resistance V_{g1} to all $=-100V$	6·3	.	.	.	Initial	100	.	MΩ
					500 hrs.	50	.	MΩ
V_{g2} to all $=-300V$	6·3	.	.	.	Initial	100	.	MΩ
					500 hrs.	50	.	MΩ
V_a to all $=-300V$	6·3	.	.	.	Initial	100	.	MΩ
					500 hrs.	50	.	MΩ
Vibration Noise Output Voltage $V_{a(b)}=250V$, $V_{g1}=-17V$, $R_L=2k\,\Omega$	6·3	.	250	.	Initial	.	60	mV(p-p)
Life Test Conditions $R_{g1}=500k\,\Omega$, $V_{h\text{-}k}=100V$, $R_k=1k\Omega$	6·3	250	200	.				
Capacitances measured in fully shielded socket but with holder capacity balanced out.	Electrodes		g1 to E a to E a to g1			5·2 4·4 .	7·1 6·1 0·05	pF pF pF

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INTER-ELECTRODE CAPACITANCES **

Anode/Grid 1	$c_{a\text{-}g1}$	0·03 pF
Grid 1/Earth	c_{in}	6·2 pF
Anode/Earth	c_{out}	5·2 pF

** Measured with cylindrical screen but with holder capacity balanced out.

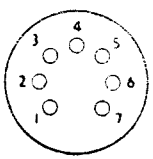
"Earth" denotes the remaining earthy potential electrodes, heater and shields connected to cathode.

DIMENSIONS

Minimum Lead Length	38 mm
Maximum Diameter	19 mm
Maximum Seated Height	47·5 mm

MOUNTING POSITION—Unrestricted.

BASE—B7G F



Viewed from free end.

CONNECTIONS

Pin 1	Grid 1	g1
Pin 2	Cathode	k
Pin 3	Heater	h
Pin 4	Heater	h
Pin 5	Anode	a
Pin 6	Beam Plates	bp
Pin 7	Grid 2	g2

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SPECIAL TESTS

Glass Envelope Strain Test

A statistical sample is tested to control glass quality. No voltages are applied to the electrodes.
The valves are completely immersed in boiling water at a temperature between 97°C and 100°C for 15 seconds and then immediately plunged into ice cold water for 5 seconds. The valves are then examined for glass cracks.

Base Strain Test

A Lead Fragility Test is carried out in place of the Base Strain Test.

Fatigue Test

A statistical sample is tested to control heater failures and other mechanical defects. The heaters are successively run at 6·9V for one minute and switched off for three minutes, no other voltages applied. The valves are rigidly mounted on a vibrating machine and vibrated for at least 100 hours, for not less than 30 hours in each of three mutually perpendicular planes at a frequency of 170 c/s with a minimum peak acceleration of 5g.

Shock Test

A statistical sample is tested to control mechanical defects likely to be caused by shock. No voltages are applied to the electrodes. The valves are subjected to five blows of approximately 500g acceleration in each of four directions.

Holding Period—Inoperatives Control

After completing the test specification the valves are held for at least 28 days and are then retested to ensure that there has been no deterioration on storage.

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