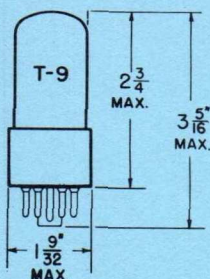


TUNG-SOL

TWIN TRIODE



GLASS BULB
INTERMEDIATE SHELL
8 PIN OCTAL
LOW LOSS BB-6
OUTLINE DRAWING
JEDEC 9-11

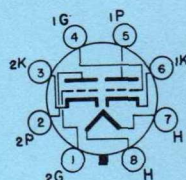
COATED UNIPOTENTIAL CATHODE

HEATER

 6.3 ± 0.6 VOLTS 0.30 AMP.^A

AC OR DC

ANY MOUNTING POSITION

^A AT 6.3 VOLTS**BOTTOM VIEW**

BASING DIAGRAM
JEDEC 88D

THE 6188 IS A RUGGEDIZED, HIGH-MU, TWIN TRIODE INTENDED ESPECIALLY FOR BALANCED HIGH GAIN DC AMPLIFIER SERVICE, WHERE GOOD STABILITY, LOW GRID CURRENT AND BALANCED PLATE CURRENT ARE REQUIRED. EACH TRIODE SECTION IS ELECTRICALLY INDEPENDENT EXCEPT FOR A COMMON HEATER, WHOSE SECTIONS ARE SERIES CONNECTED INTERNALLY.

RATINGS

ABSOLUTE MAXIMUM SYSTEM

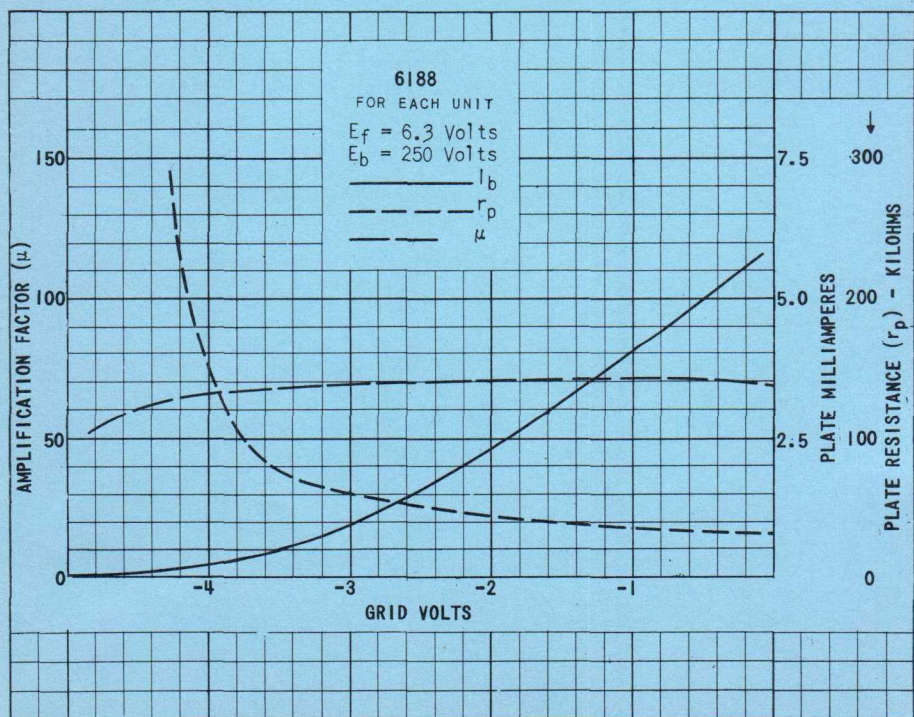
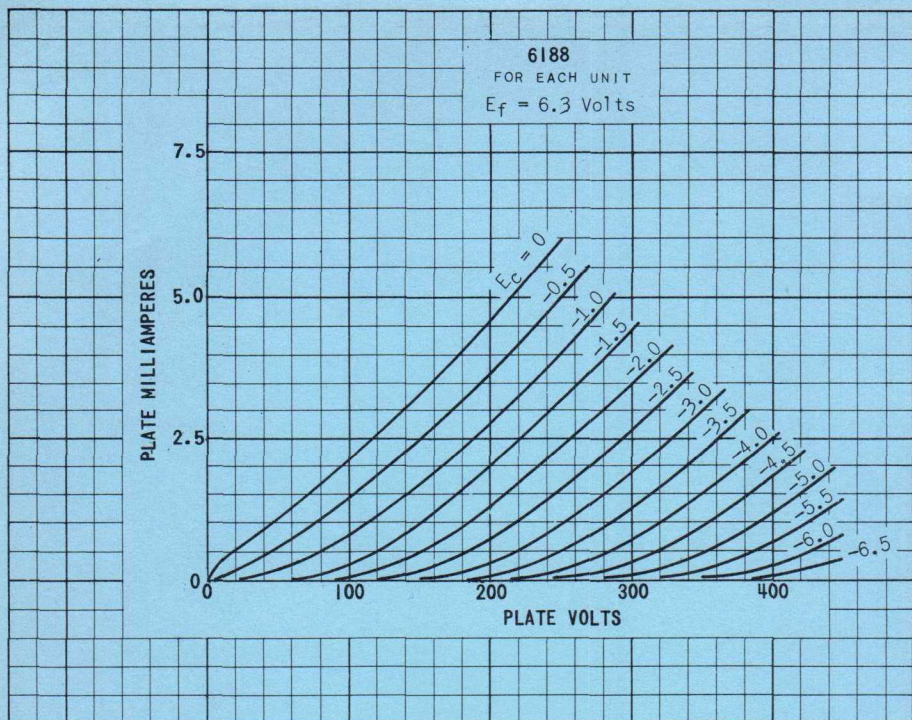
HEATER VOLTAGE	6.3 ± 0.6	VOLTS
MAXIMUM PLATE VOLTAGE	275	VOLTS
MAXIMUM PLATE DISSIPATION — EACH PLATE	1.1	WATTS
BULB TEMPERATURE	165	°C
MAXIMUM HEATER-CATHODE VOLTAGE, POSIT. OR NEGAT.	100	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICSCLASS A₁ AMPLIFIER

EACH SECTION

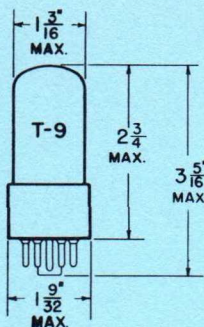
PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2.0	VOLTS
PLATE CURRENT	2.3	MA.
TRANSCONDUCTANCE	1600	μMHOS
AMPLIFICATION FACTOR	70	
PLATE RESISTANCE	44,000	OHMS

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TUNG-SOL

TWIN TRIODE



GLASS BULB

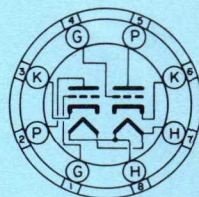
COATED UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMP.

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

INTERMEDIATE SHELL
8 PIN OCTAL
LOW LOSS PHENOLIC

880

THE 6188/6SU7WGT IS A RUGGEDIZED, HIGH MU, TWIN TRIODE IN THE OCTAL BASE, BANTAM CONSTRUCTION. THE TWO TRIODES ARE ELECTRICALLY INDEPENDENT, ALLOWING SIMULTANEOUS USE OF THE TWO IN COMPLETELY DIFFERENT APPLICATIONS. TIGHT GAS AND LEAKAGE CONTROLS ON THE TUBE INCREASE STABILITY AND A SPECIAL PLATE CURRENT BALANCE TEST BETWEEN SECTIONS IS SPECIFIED. THEREFORE, IN ADDITION TO GENERAL PURPOSE APPLICATIONS SUCH AS VOLTAGE AMPLIFIERS, OSCILLATORS AND MULTIVIBRATORS, THE 6188/6SU7WGT MAY BE USED IN APPLICATIONS REQUIRING EXTREME STABILITY SUCH AS BALANCED AMPLIFIERS, AND WHERE LARGE GRID RESISTORS MAY BE NECESSARY. CONTROLS ON THE PRODUCT AVERAGE FOR SUCH CHARACTERISTICS AS PLATE CURRENT, TRANSCONDUCTANCE AND AMPLIFICATION FACTOR ASSURE THAT THESE CRITICAL CHARACTERISTICS WILL REMAIN WELL CENTERED. SINCE IT MUST BE ABLE TO WITHSTAND SEVERE MECHANICAL TESTS TO MEET TEST SPECIFICATION, THE 6188/6SU7WGT IS ESPECIALLY SUITED FOR USE IN MILITARY AND INDUSTRIAL AIRBORNE EQUIPMENT WHICH MAY BE SUBJECTED TO SEVERE SHOCK AND VIBRATION.

RATINGS

ABSOLUTE MAXIMUM VALUES

HEATER VOLTAGE	6.3±0.6	VOLTS
MAXIMUM DC PLATE VOLTAGE	275	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	±100	VOLTS
MAXIMUM PLATE DISSIPATION (EACH SECTION)	1.1	WATTS
MAXIMUM BULB TEMPERATURE	+165	°C

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A₁ AMPLIFIER (EACH SECTION)

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	2.3	mA
PLATE RESISTANCE	44 000	OHMS
TRANSCONDUCTANCE	1 600	μMHOS
AMPLIFICATION FACTOR	70	

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CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

$E_f = 6.3V$, $E_b = 250Vdc$, $E_c = -2.0Vdc$

EXCEPT AS MODIFIED BELOW

	INITIAL		PROD. MIN.	AVG. MAX.	500 HOUR LIFE TEST		
	INDIVIDUAL MIN.	MAX.			INDIVIDUAL MIN.	MAX.	
HEATER CURRENT	275	325	---	---	275	325	mA
HEATER CATHODE LEAKAGE ($E_{hk} = \pm 100Vdc$)	---	5.0	---	---	---	5.0	μA dc
GRID CURRENT (1) ^A	0	-0.5	---	---	0	-0.5	μA dc
PLATE CURRENT (1)	1.55	3.05	2.00	2.60	---	---	mA
AC AMPLIFICATION ^{BP} ($E_{bb} = 200Vdc$, $E_c = 0$, $E_{sig} = 0.2Vac$, $R_g = 2000$)	8.6	---	---	---	---	---	Vac
PLATE CURRENT (2) ($E_c = 4.50Vdc$)	---	200	---	---	---	---	μA dc
PLATE CURRENT (3) ($E_c = 4.25dc$)	5	---	---	---	---	---	μA dc
INSULATION OF ELECTRODES ^C							
R(g-a11)	100	---	---	---	---	50	MEGOHM
R(p-a11)	100	---	---	---	---	50	MEGOHM
TRANSCONDUCTANCE (1)	1325	1875	1500	1700	---	---	$\mu MHOS$
Δ TRANSCONDUCTANCE ^D ($E_f = 5.7V$)	---	15	---	---	---	---	PERCENT
AMPLIFICATION FACTOR ^E	55	85	62	78	---	---	
PLATE CURRENT DIFFERENCE ^F	---	± 0.1	---	---	---	---	Vdc
GRID CURRENT DIFFERENCE ^F	---	± 1.5	---	---	---	---	Vdc

SPECIAL REQUIREMENTS

	MIN.	MAX.	
NOISE AND MICROPHONICS ^{AG} ($E_f = 6.3Vac$, $E_{hk} = 0$, $E_b = 200Vdc$, $E_c = 0$, $R_L = 0.1 meg.$)	---	50	mVac
LOW PRESSURE VOLTAGE BREAKDOWN ^H (PRESSURE = $55 \pm 5mm Hg.$, voltage = $500Vac$)	---	---	
LOW FREQUENCY VIBRATION ^{JA} ($R_p = 10,000$)	---	50	mVac
SHOCK ^K (HAMMER ANGLE = $30^\circ C$, $E_{hk} = \pm 100Vdc$)	---	---	
VIBRATIONAL FATIGUE ^L	---	---	
POST SHOCK AND VIBRATIONAL FATIGUE TEST END POINTS			
VIBRATION	---	200	mVac
HEATER CATHODE LEAKAGE ($E_{hk} = \pm 100Vdc$)	---	± 10	μA dc
GRID CURRENT (1)	---	0	μA dc
AC AMPLIFICATION	---	8.0	Vac
1 HOUR STABILITY LIFE TEST ($E_b = 250Vdc$, $E_c = 1.0Vdc$, $E_{hk} = \pm 100Vdc$, $R_g = 1.0 meg.$, TA = Room)	---	---	
STABILITY LIFE TEST END POINTS			
Δ TRANSCONDUCTANCE (1) OF INDIVIDUAL TUBES	---	10	PERCENT
INTERMITTENT LIFE TEST ^N (STABILITY LIFE TEST CONDITIONS OR EQUIVALENT ENVELOPE TEMPERATURE = $+165^\circ C$)			

NOTES

^A TIE 1p to 2p, 1g to 2g, 1k to 2k. (PARASITIC SUPPRESSOR OF 50 OHM MAXIMUM PERMITTED).

^B SEE MIL-E-1C 4.10.11.2

^C SEE MIL-E-1C 4.8.2

^D THE VALUE OF Δ TRANSCONDUCTANCE SHALL APPLY TO INDIVIDUAL TUBES AND IS EXPRESSED:

$$\frac{(SM \text{ AT } 6.3) - (SM \text{ AT } 5.7)}{(SM \text{ AT } 6.3)} \times 100$$

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TUNG-SOL

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NOTES - CONT'D.

^E SEE MIL-E-1C 4.10.11.1

^F THE TEST CIRCUIT TO BE USED IS SHOWN SCHEMATICALLY IN FIGURE 1. WITH SWITCH S1 IN POSITION (1) ADJUST E_c ON SECTION 2 TO GIVE $E = 0$ ON METER M1. MEASURE E_c AT METER M2.

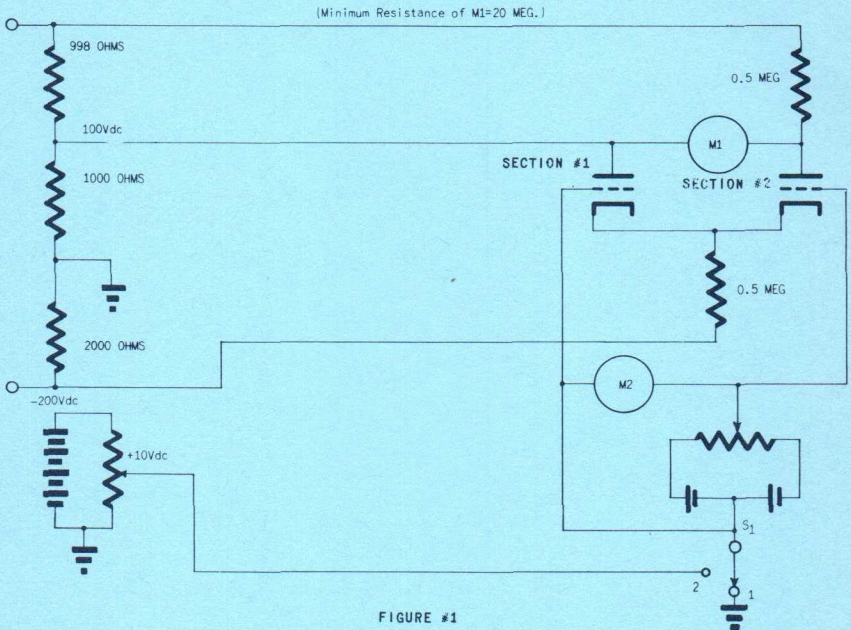


FIGURE #1

^G SEE MIL-E-1C 4.10.3.5

^H BREAKDOWN IS DEFINED AS THE VOLTAGE AT WHICH ARCING OCCURS BETWEEN ANODE BASE PIN AND ADJACENT PINS. TEMP.= $25 \pm 5^\circ\text{C}$, HUMIDITY=0; VOLTAGE SHALL BE OF SINUSOIDAL WAVEFORM AT $f=60$ CPS. PRESSURE = 55 ± 5 mm Hg.

^J SEE MIL-E-1C 4.9.19.1

^K SEE MIL-E-1C 4.9.20.5

^L SEE MIL-E-1C 4.9.20.6

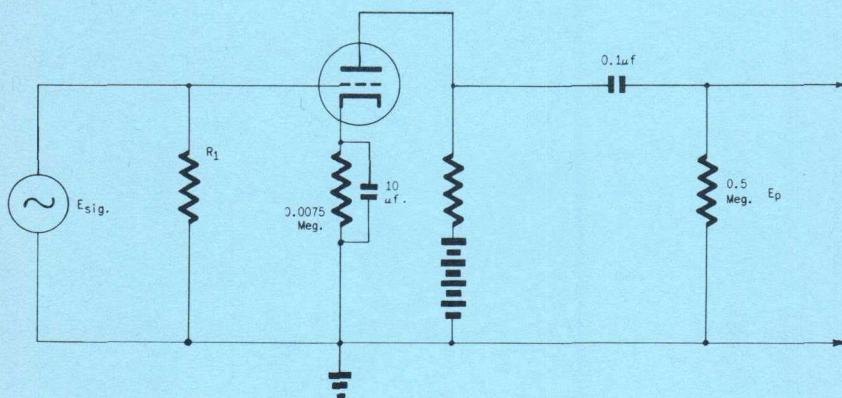
^N ENVELOPE TEMPERATURE IS DEFINED AS THE HIGHEST TEMPERATURE INDICATED WHEN USING A THERMOCOUPLE OF .003 IN. MAX. DIAMETER ELEMENTS WELDED TO A RING OF .025 IN. DIAMETER PHOSPHOR BRONZE PLACED AROUND THE BULB.

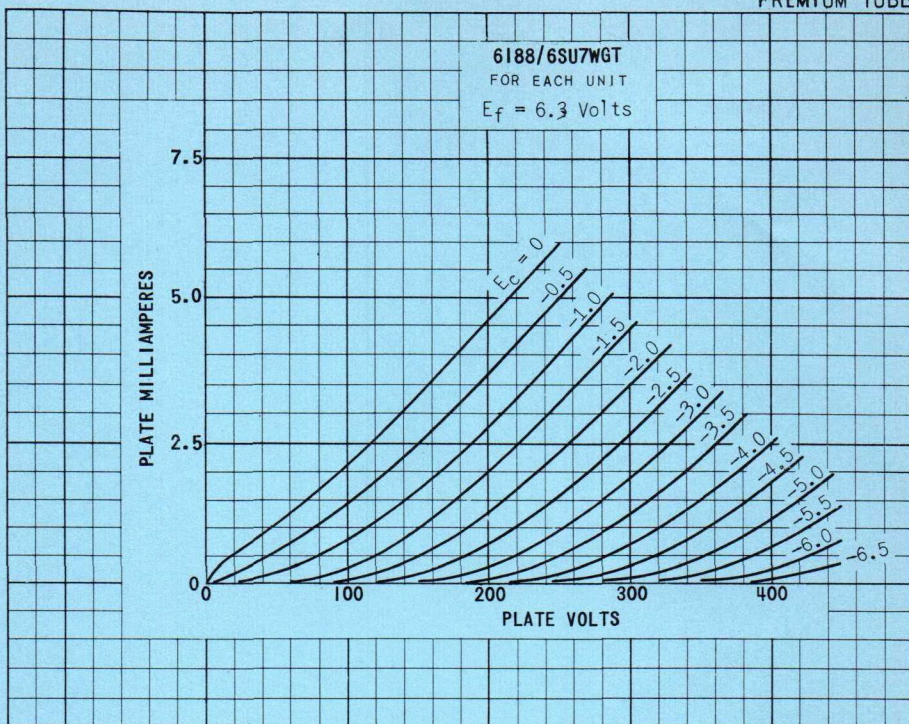
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NOTES - CONT'D.

^P
E_{sig} = SIGNAL GENERATOR WITH INTERNAL RESISTANCE SUCH THAT IN COMBINATION WITH R₁ GIVES 2000 OHMS RESISTANCE BETWEEN #1 GRID AND GROUND.





→ INDICATES A CHANGE.

