



*Excellence in Electronics*

**TYPE  
CK5670WA**

The CK5670WA is a heater-cathode type, double triode of miniature construction, suitable for high frequency and general purpose amplifier service. It is designed for dependable operation under conditions of shock and vibration usually found in mobile and aircraft applications.

**MECHANICAL DATA**

ENVELOPE: T-6 1/2 Glass

BASE: Miniature Button 9-Pin

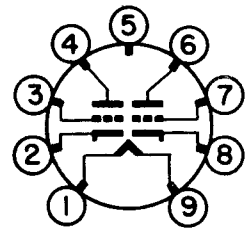
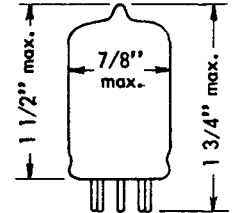
TERMINAL CONNECTIONS:

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

MECHANICAL RATINGS:

- Maximum Impact Acceleration (Shock-Test-Note 3) 630 G
- Maximum Vibrational Acceleration (100 hour Fatigue Test-Note 4) 2.5 G
- Maximum Bulb Temperature 165 °C

MOUNTING POSITION: Any



**ELECTRICAL DATA**

Caution----To Electron Equipment Design Engineers. Special attention should be given to the temperature at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions other than those specified for life test are imposed on the tube and will be reduced appreciably if absolute maximum ratings are exceeded. Both reliability and performance will be jeopardized if filament voltage ratings are exceeded. Life and reliability of performance are directly related to the degree that regulation of the heater voltage is maintained at its center rated value.

Ratings and Normal Operation:	MIL -E- 1B Symbol	Absolute Minimum	Normal Test Conditions (Note 6)	Normal Operation (Note 5)	Absolute Maximum	Mil -E- 1B Units
Heater Voltage (Note 7)	Ef:	5.7	6.3	6.3 6.3	6.9	V
Plate Voltage	Eb:		150	150 300	330	Vdc
Grid Voltage	Ec1:		0	0 0		Vdc
Plate Dissipation (per plate)	Pp/p:			1.23 1.4	1.65	W
Heater-Cathode Voltage	Ehk:	-100			+100	Vdc
Plate Current (Note 9) per Plate	Ib/p:			8.2 4.9	18.0	mAdc
Cathode Resistance (per Cathode)	Rk/k:		240	240 800		ohms

**CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1)**

In the following tests each unit is tested separately.

Test	Conditions	AQL %	MIL -E- 1B Symbol	Min.	LAL	Bogie	UAL	Max.	ALD	MIL -E- 1B Units
<b>Acceptance Tests - Group C</b>										
Continuity and Short:		0.4								
<b>Acceptance Tests - Group D Combined AQL = 1.0%</b>										
Heater Current:		0.65	If:	330		350		370		mA

Tentative Data

**RAYTHEON MANUFACTURING COMPANY**

RECEIVING AND CATHODE RAY TUBE OPERATIONS



CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1) (cont'd)

In the following tests each unit is tested separately

Test	Conditions	AQL %	MIL - E - 1B Symbol	Min.	LAL	Bogie	UAL	Max.	ALD	MIL - E - 1B Units
Heater - Cathode Leakage :	Ehk= 100 Vdc Heater Positive	0.65	Ihk :					10		$\mu$ Adc
	Ehk= - 100 Vdc Heater Negative		Ihk :					10		$\mu$ Adc
Grid Current (1):	Rp= 0.5 Meg.	0.65	Ic (1):					- 0.3		$\mu$ Adc
Plate Current (1):		0.65	Ib (1):	5.9	7.3	8.2	9.1	10.5	2.0	mAdc
Plate Current (2):		0.65	Ib (2):					45		$\mu$ Adc
Transconductance (1):	Ec= - 10 Vdc; Rp= 0.25 Meg; Rk= 0	0.65	Sm (1):	4500	5125	5500	5875	6500	850	$\mu$ hos
<b>Acceptance Tests - Group E</b>										
Insulation of Electrodes :	Ef= 6.3 V	2.5	Rg - all :	100						Meg.
	Eg - all= - 100 Vdc		Rp - all :	100						Meg.
Plate Current (1):	Ep - all= - 300 Vdc	2.5	$\Delta$ Ib (1):					2.0		mAdc
Transconductance (2):	Ef= 5.7V (Note 8) Eb= 250Vdc; Ecal= 1.1 mVac; Ck= 0.2 uf. Units Connected in parallel; Rk= 240 ohms:	2.5	$\Delta$ Sm (2):					15		%
Rf Noise :			2.5						3.0	
Noise and Microphonics :	Ef= 6.3 Vac; Eb= 250 Vdc; Rp= 10,000 ohms, Units connected in parallel; Rk= 240 ohms.	2.5	Ep :					200		mVac
Grid Current (2):	After 5 minutes at Ef= 7.0V; measure grid current at Ef= 7.0V; 3 min. test not permitted.	2.5	Ic (2):					- 0.5		$\mu$ Adc
<b>Acceptance Tests - Group F</b>										
Vibration (2):	F= 25 cps; G= 2.5; Ec= - 3 Vdc; Rk= 0; Rp= 2000 ohms; Units connected in parallel	6.5	Ep :					100		mVac
Amplification Factor :		6.5	Mu :	26	30	35	40	44	11.0	
Capacitance :			Cgp :	0.8				1.4		$\mu$ ft
Capacitance :	Note 2	6.5	Cin :	1.7				2.7		$\mu$ ft
Capacitance :			Cout :	0.7				1.3		$\mu$ ft
Capacitance :			Cp - p :					0.10		$\mu$ ft
Low Pressure Voltage Break-down :		6.5		500						Vac
<b>Acceptance Tests - Group A</b>										
Shock :	Hammer Angle= 42°; Note 3									
Fatigue :	96 Hours; Note 4	6.5								
Post Shock and Fatigue Test End Points :										
Vibration (2):	F= 25 cps; G= 2.5; Rp= 2000 ohms units connected in parallel.		Ep :					300		mVac
Heater - Cathode Leakage :	Ehk= + 100 Vdc		Ihk :					30		$\mu$ Adc
	Ehk= - 100 Vdc		Ihk :					30		$\mu$ Adc
Transconductance (1):	Units connected in parallel.		Sm (1):	3850						$\mu$ hos
Grid Current (1):			Ic (1):					- 0.6		$\mu$ Adc



RELIABLE DOUBLE TRIODE

CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1) (cont'd)

In the following tests each unit is tested separately.

Test	Conditions	AQL %	MIL - E - 1B Symbol	Min.	Max.	MIL - E - 1B Units
<b>Acceptance Tests - Group B</b>						
Glass Strain:	(thermal shock)	2.5				
<b>Acceptance Life Tests</b>						
Heater Cycling:	Ef= 7.5 V; Ehk= 135 Vac; Eb= Ec= 0 Vdc; 1 min. on, 1 min. off			2000		cycles
Heater Cycling Life Test End Point:						
Heater - Cathode Leakage:	Heater Positive Heater Negative		lhk: lhk:		20 20	$\mu$ Adc $\mu$ Adc
1 Hour Stability Life Test:	TA= Room; Ehk=+ 135 Vdc; Rg1= 0.5 meg.					
1 Hour Stability Life Test End Points:						
Transconductance (1) Change of Individual Tubes from initial:	(Typical sample size= 50 tubes)	1.0	$\Delta$ Sm (1):		10	%
100 Hour Survival Rate Life Test:	TA= Room; Ehk=+ 135 Vdc; Rg1= 0.5 Meg.					
100 Hour Survival Rate Life Test end points:						
Inoperative:	(Typical Sample Size= 200 tubes)	0.65				
500 and 1000 Hour Intermittent High Temperature Life Test:	T Bulb= 165 °C; Ehk=+ 135 Vdc; Rg1= 0.5 Meg.					

Test	Conditions	AQL %	MIL - E - 1B Symbol	Min.	Max.	MIL - E - 1B Units	Max. defects per Characteristic 1st Sample	Max. defects Combined Sample
500 Hour Intermittent High Temperature Life Test End Points:	(Typical sample sizes= 20 tubes 1st sample, 40 tubes 2nd sample) (Total allowable combined defects= 4 tubes 1st sample; 8 tubes 1st and 2nd samples)							
Inoperatives:							1	3
Heater Current:			If:	330	370	mA	1	3
Heater - Cathode Leakage:			lhk:		10	$\mu$ Adc	1	3
Grid Current (1):			lc (1):		- 0.3	$\mu$ Adc	1	3
Transconductance (1):			Sm (1):	3850	6500	$\mu$ mhos	1	3
Average change (Note 10):			Avg. $\Delta$ Sm (1):		15	%		
Electrode Insulation:								
(g - all)			Rg - all:	50		Meg	} 2	5
(p - all)			Rp - all:	50		Meg.		
Transconductance (2) (Note 8):			$\Delta$ Sm (2)		15	%		
1000 Hour Intermittent High Temperature Life Test End Points:	(Typical Sample Size= 20 tubes 1st sample 40 tubes 2nd sample)							
Inoperatives:							2	5
Heater Current:			If:	330	370	mA	2	5
Heater - Cathode Leakage:			lhk:		10	$\mu$ Adc	2	5
Grid Current (1):			lc (1):		- 0.3	$\mu$ Adc	2	5
Transconductance (1):			Sm (1):	3550	6500	$\mu$ mhos	2	5

NOTES

Note 1: Characteristics, Quality Control Test Procedures, and Inspection Levels are made according to the appropriate paragraphs of MIL - E - 1B "Inspection Instructions for Electron Tubes", and MIL - STD - 105A.



RELIABLE DOUBLE TRIODE

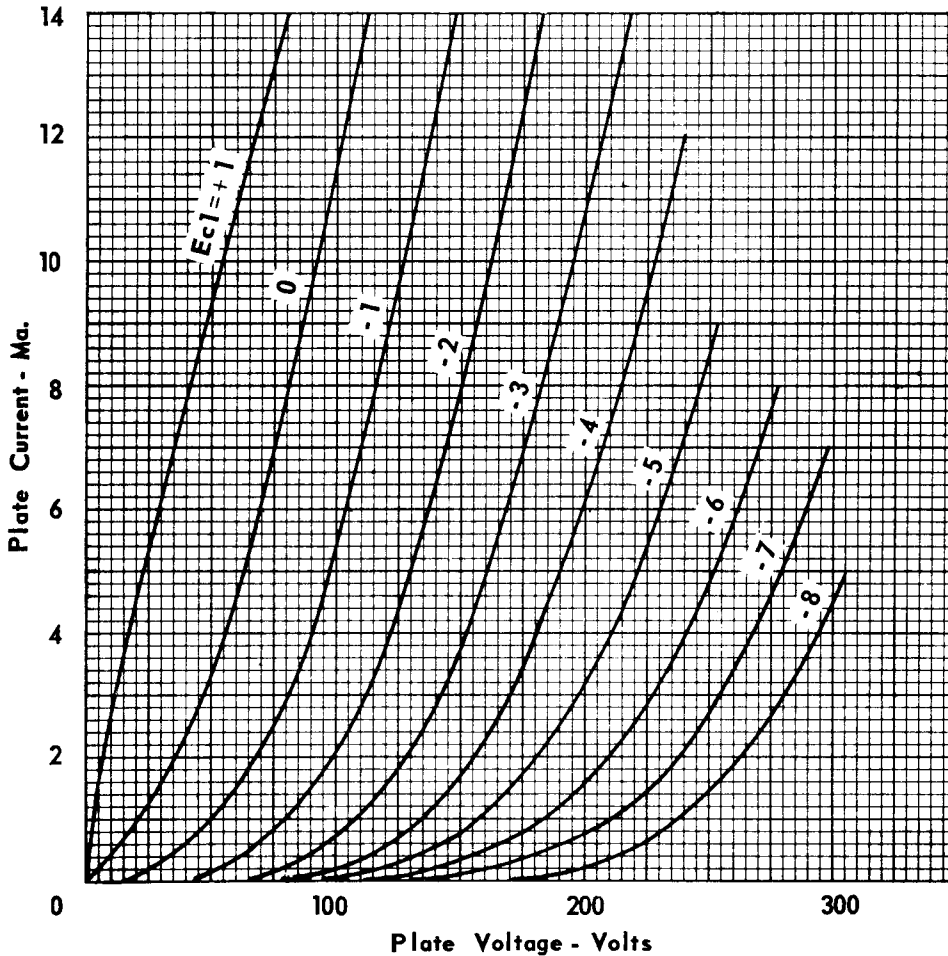
CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1) (cont'd)

In the following tests each unit is tested separately.

NOTES (cont'd)

- Note 2: Without Shield
- Note 3: Test conditions and acceptance criteria per Shock Test procedures of MIL-E-1B basic specifications.
- Note 4: Test Conditions and acceptance criteria per Fatigue Test procedures of MIL-E-1B basic specifications.
- Note 5: These normal values represent conditions at which control of reliability may be expected.
- Note 6: These normal test conditions are used for all characteristics unless otherwise stated under the individual test item.
- Note 7: For most applications the performance will not be adversely affected by + 10% heater voltage variation, but when the application can provide a closer control of heater voltage, an improvement in reliability will be realized.
- Note 8: Change of transconductance for individual tubes from that value measured at  $E_f = 6.3V$  to that value measured at  $E_f = 5.7V$ .
- Note 9: Difficulty may be encountered if this tube is operated for long periods of time with very small values of cathode current.
- Note 10: The average percentage change shall be ascertained from the determination of the individual changes for each tube (inoperatives excluded) from the zero hour value for the referenced characteristics

AVERAGE PLATE CHARACTERISTICS



RAYTHEON MANUFACTURING COMPANY



RELIABLE DOUBLE TRIODE

AVERAGE CHARACTERISTICS

