



*Excellence in Electronics*

**TYPE  
CK5829WA**

The CK5829WA is a heater-cathode type double diode of flat press-flat bulb subminiature construction, designed for use as a general purpose rectifier capable of operation in the UHF region and for use as a low current power rectifier. This type is characterized by low heater power, long life, and stable performance. It is designed for service where severe conditions of high temperature and mechanical shock or vibration are encountered. The flexible terminal leads may be soldered or welded directly to the terminals of circuit components without the use of sockets. Standard inline subminiature sockets may be used by cutting the leads to a suitable length.

**MECHANICAL DATA**

**ENVELOPE:** T-2X3 Glass

**BASE:** None (0.016" tinned flexible leads. Length: 1.5" min. Spacing: 0.048" center-to-center)

**TERMINAL CONNECTIONS:** (Red Dot is adjacent to lead 1)

- Lead 1 Plate, Unit #2
- Lead 2 Cathode, Unit #2
- Lead 3 Heater
- Lead 4 Internal Shield
- Lead 5 Heater
- Lead 6 Plate, Unit #1
- Lead 7 Cathode, Unit #1

**MECHANICAL RATINGS:**

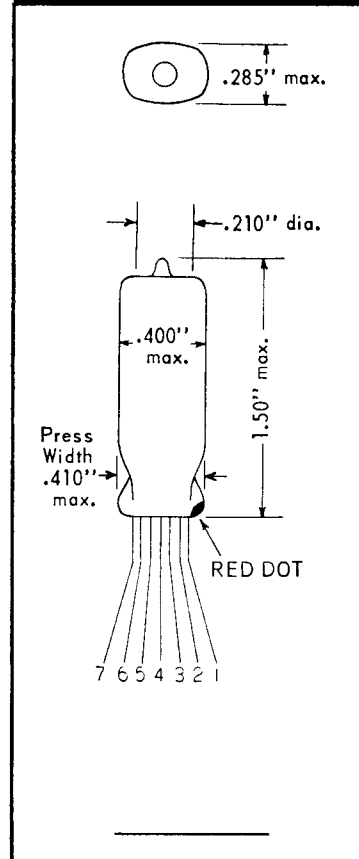
- Maximum Impact Acceleration (Shock Test - Note 2)
- Maximum Uniform Acceleration (Centrifuge Test - Note 3)
- Maximum Vibrational Acceleration (100 Hour Fatigue Test - Note 4)
- Maximum Bulb Temperature

450 G  
1000 G  
2.5 G  
220 °C

**MOUNTING POSITION:** Any

**ELECTRICAL DATA**

**CAUTION-----** To Electronic 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:	6.0	6.3	6.3	6.6	V
Plate Supply Voltage (RMS) (each plate)	Epp / p:	----	117	117	130	Vac
Load Resistance	RL:	----	14,000	14,000	----	ohms
Filter Input Capacitance	CL:	----	8	8	----	µf
Peak Inverse Plate Voltage	epx:	----	----	----	360	v
Steady State Peak Plate Current (each plate)	ib / p:	----	----	25	27.5	ma
DC Output Current (each plate)	lo / p:	----	----	5.0	5.0	mAdc
Peak Transient Plate Current (each plate)	i surge:	----	----	----	175	ma
Heater-Cathode Voltage	Ehk:	----	----	----	360	V

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

TEST	CONDITIONS	AQL %	MIL-E-1B SYMBOL	MIN.	LAL	BOGIE	UAL	MAX.	MIL-E-1B UNITS
Continuity and Tap Shorts:		0.4							
<b>ACCEPTANCE TEST GROUP A- COMBINED AQL = 2.5%</b>									
Heater Current:		0.65	If:	138	----	150	----	162	mA

Tentative Data

**RAYTHEON MANUFACTURING COMPANY**

RECEIVING TUBE AND SEMICONDUCTOR OPERATIONS



RELIABLE SUBMINIATURE DOUBLE DIODE

ELECTRICAL DATA (cont'd)

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

TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN.	LAL	BOGIE	UAL	MAX.	MIL - E - 1B UNITS
<b>ACCEPTANCE GROUP A (cont'd)</b>									
Heater - Cathode Leakage (1):	Ehk = + 100 Vdc	0.65	lhk (1):	----	----	----	2	10	$\mu$ Adc
Heater - Cathode Leakage (2):	Ehk = - 100 Vdc	0.65	lhk (2):	----	----	----	-2	-10	$\mu$ Adc
Operation:	Full Wave Operation	0.65	Io:	9.0	9.5	10.0	----	----	mAdc
Emission:	Es = 6.5 Vdc	0.65	Is:	15	16.5	----	----	----	mAdc
<b>ACCEPTANCE TESTS GROUP B</b>									
Insulation of Electrodes:	Ef = 6.3 V Ep - all = - 300 Vdc	2.5	Rp - all:	100	----	----	----	----	Meg.
Subminiature Lead Fatigue Test:		2.5	----	4.0	----	----	----	----	Arcs.
<b>ACCEPTANCE TESTS GROUP C</b>									
Plate Current:	Ebb = 0; RP = 40,000 ohms	6.5	Ib:	2	----	----	----	20	$\mu$ Adc
Plate Current Difference Between Diodes:	Ebb = 0; RP = 40,000 ohms	6.5	$\Delta$ Ib:	----	----	----	----	5	$\mu$ Adc
Capacitance:	Without Shield:	6.5							
	Plate #1 to Plate #2		C:	0.06	----	0.09	----	0.12	$\mu$ ft
	Plate #1 to all others tied together (except Plate #2)		C:	1.9	----	2.7	----	3.5	$\mu$ ft
	Plate #2 to all others tied together (except Plate #1)		C:	1.7	----	2.5	----	3.3	$\mu$ ft
	Cathode #1 to all others tied together		C:	2.4	----	3.3	----	4.2	$\mu$ ft
	Cathode #2 to all others tied together		C:	2.8	----	3.7	----	4.6	$\mu$ ft
	Cathode #1 to Heater		C:	1.1	----	1.7	----	2.2	$\mu$ ft
	Cathode #2 to Heater		C:	1.3	----	1.9	----	2.5	$\mu$ ft
TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN.	MAX.	MIL - E - 1B UNITS			
<b>ACCEPTANCE TESTS GROUP D</b>									
Shock:	Hammer Angle = 30° (Note 2)								
Post Shock Limits									
Heater - Cathode Leakage (1):	Ehk = + 100 Vdc		lhk (1):	----	15				$\mu$ Adc
Heater - Cathode Leakage (2):	Ehk = - 100 Vdc		lhk (2):	----	-15				$\mu$ Adc
Operation:			Io:	7.0	----				mAdc
Fatigue:	96 Hours (Note 4)								
Post Fatigue Limits									
Heater - Cathode Leakage (1):	Ehk = + 100 Vdc		lhk (1):	----	15				$\mu$ Adc
Heater - Cathode Leakage (2):	Ehk = - 100 Vdc		lhk (2):	----	-15				$\mu$ Adc
Operation:			Io:	7.0	----				mAdc
<b>ACCEPTANCE TESTS GROUP E</b>									
Glass Strain (Thermal Shock):		10							
Visual and Mechanical Inspection	Major Combined	0.4							
	Minor A Combined	2.5							
	Minor B Per Item	6.5							
<b>ACCEPTANCE LIFE TESTS</b>									
Heater Cycling:	Ef = 7.5 V; Eb = 0 V; Ehk = 140 Vac; 1 min. on, 1 min. off			2000	----				cycles
100 Hour Survival	TA = room; Ehk = Eo + 117 Vac								
Rate Life Test:									
100 Hour Survival									
Rate Life Test End Points:									



RELIABLE SUBMINIATURE DOUBLE DIODE

ELECTRICAL DATA (cont'd)

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

TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN.	MAX.	MIL - E - 1B UNITS			
<b>ACCEPTANCE LIFE TESTS (cont'd)</b>									
Inoperatives:	(Typical Sample Size= 200 tubes)	0.65							
Electrode Insulation:	} (Typical Sample Size= 25 tubes)	1.0	} Rp - all:	50	-----	Meg.			
Operation:									
Heater Current:						7.0	-----	mAdc	
Heater - Cathode Leakage (1):						If:	138	162	mA
Heater - Cathode Leakage (2):						Ihk (1):	0	20	μAdc
			Ihk (2):	0	-20	μAdc			

TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN.	MAX.	MIL - E - 1B UNITS	Max. defects per characteristic
500 Hour Intermittent High Temperature Life Test (1):	TA= 175 °C ; Ehk= Eo+ 117 Vac						
500 Hour Intermittent High Temperature Life Test (1) End Points:	(Typical Sample Size= 20 tubes) (Total allowable combined defects= 4 tubes)						
Inoperatives:							1
Electrode Insulation:			Rp - all:	50	-----	Meg.	4
Heater Current:			If:	135	165	mA	4
Heater - Cathode Leakage (1):			Ihk: (1)	0	20	μAdc	} 2
Heater - Cathode Leakage (2):			Ihk: (2)	0	-20	μAdc	
Operation:			Io:	7.0	-----	mAdc	4
1000 Hour Intermittent Life Test (2):	TA= 175 °C Ehk= Eo+ 117 Vac						
1000 Hour Intermittent Life Test (2):	Limits not established. Read for same characteristics as for Life Test (1):						
1000 Hour Intermittent Life Test (2) End Points:	TA= Room Ehk= Eo+ 117 Vac						
5000 Hour Intermittent Life Test (3):	Limits not established Read for same characteristics as for Life Test (1).						
5000 Hour Intermittent Life Test (3) End Points:							

- 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.
- Note 2: Test conditions and acceptance criteria per Shock Test procedures of MIL - E - 1B basic specifications.
- Note 3: Centrifuge Test with forces applied in any direction.
- Note 4: Test conditions and acceptance criteria per Fatigue Test procedures of MIL - E - 1B basic specifications.
- Note 5: These normal values represent conditions of which control of reliability may be expected.
- Note 6: These normal test conditions are used for all characteristic tests unless otherwise stated under the individual test item.
- Note 7: For most applications the performance will not be adversely affected by ± 5% heater voltage variation, but when the application can provide a closer control of heater voltage, an improvement in reliability will be realized.



AVERAGE PLATE CHARACTERISTICS

