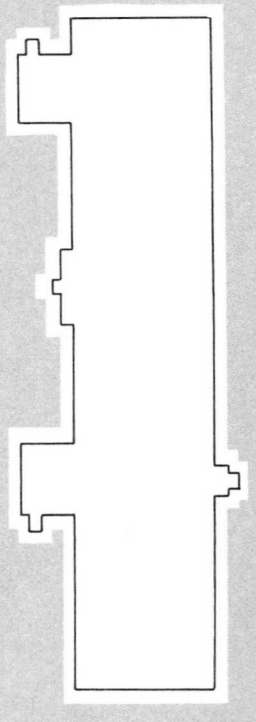
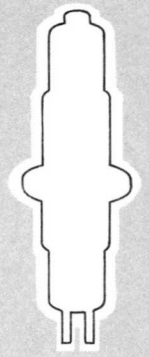
CTP1

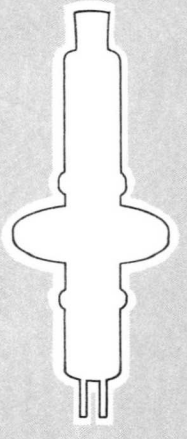
MICROWAVE DEVICES



PENCIL TUBE

CLASSIFICATION CHARTS





RCA | Electronic Components and Devices | Harrison, N.J. 07029

RCA

MWD-102B 1-68
Printed in U.S.A.

RCA PENCIL TUBES

RCA first introduced pencil tubes in 1949 to provide moderate power outputs at microwave frequencies. Since that time there has been an unending advance which has resulted in pencil tubes that have a number of unique electrical and mechanical features. RCA pencil tubes not only meet requirements as to minimum transit time, low lead inductance, and low interelectrode capacitances, but also provide other desirable design features, such as sturdiness, small size, light weight, low heater power, fast warmup time, good thermal stability and convenience in equipment design. These design features are especially suited in applications required to meet the stringent grid-pulse specifications of AIMS/FAA interrogators and transponders. In addition, the disk-seal type of electrode termination inherent in the design of pencil tubes, permits the utilization of closed-cavity resonators which minimize power loss through radiation, besides giving much lower inductance values and higher resonant frequencies than are obtainable with wire leads. Although designed for use in circuits of the coaxial-cylinder type, pencil tubes are also suitable for use in circuits of the parallel-line type and lumped-circuit type. RCA has two types of pencil tubes—ceramic-metal types and glass-metal types, and a line of specialized integral cavities that incorporate these pencil tubes.

RCA pencil tubes are designed for use in both grid-pulsed and plate-pulsed circuits as well as in cw applications.

Ceramic-Metal Pencil Tubes provide design features which permit a small, sturdy tube, and high operating temperatures. Furthermore, evidence indicates that the ceramic-metal construction has a great endurance to nuclear radiation.

The coaxial-electrode structure is of the double-ended type in which the plate cylinder extends outward from one side of the grid flange and the cathode cylinder extends outward from the other side. The latter is particularly effective in permitting isolation of the plate circuit from the cathode circuit in cathode-drive service. The relatively large area of the plate cylinder allows fast heat dissipation—a significant advantage in compact equipment. Electrode surfaces are silver plated and are separated from each other by ceramic bushings.

Glass-Metal Pencil Tubes incorporate most of the same features as the ceramic-metal pencil tubes. The more economical glass-metal pencil tubes are useful in applications where specifications regarding tube size, ruggedness, operating temperatures or endurance to nuclear radiation are not as rigid.

Integral-Cavity Pencil Tubes reflect precision control of both tube and cavity. RCA offers the recognized performance advantages of the pencil tubes in designs that combine pencil tubes with a mechanically tuned cavity to produce a complete circuit package ready to have the power applied. No further electrical or mechanical design is required; input/output impedance levels match those of normal microwave systems.

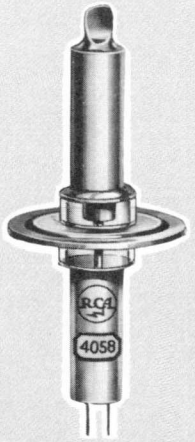
RCA types employing the integral design have improved efficiency in pulse applications for better life, and also have improved stability, less weight, and small size. Integral design also greatly simplifies maintenance and logistic requirements.

Information furnished by RCA is believed to be accurate and reliable. However, no responsibility is assumed by RCA for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of RCA.

4062A

H-1524

Actual Size



4058

H-1452

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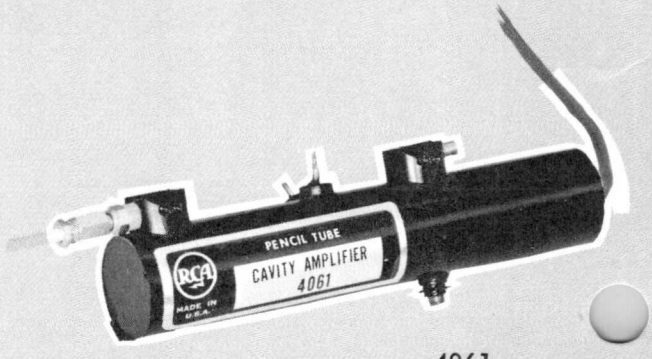

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H-1575

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CLASSIFICATION CHARTS

INTEGRAL-CAVITY TRIODES – For Pulsed Oscillator Service

Type No.[a]	CHARACTERISTICS									
			Typical Operating Conditions		Maximum Plate Ratings[b]		Heater		Maximum Dimensions In	
	Center Frequency	Tuning Range	Frequency	Useful Peak Power Output	Peak Voltage	Dissipation	Voltage	Current	Length[c]	Diameter[d]
	GHz	MHz	GHz	W	V	W	V	A		
J2041V3[e]	1.03	–	1.03	200[k]	1100	20	6.3	1.32	8.26 x 3.77 x 1.27	
J2041V4[f]	1.03	–	1.03	6[k]	1100	5	6.3	0.33	4.25 x 1.46 x 1.25	
J2041V6[e]	1.03	–	1.03	300[k]	1100	20	6.3	1.32	5.26 x 4.26 x 1.25	
J2041V7[g]	1.03	±12.5	1.03	15[k]	1100	10	6.3	0.66	5.26 x 2.8 x 1.25	
4060-4061[h]	1.09	±15	1.09	500[k]	1100	18	6.3 6.3	0.66	4.062 4.375	0.88 0.88
A15215A	2.424	±15	2.424	250[m]	1100	7	6.3	0.280	2.5	1
A15220	0.9 - 1.05[p]	±25	0.975	800[m]	1100	9	6.3	0.300	5.5	1
A15222	1 - 1.3[p]	±25	1.15	600[m]	1100	9	6.3	0.300	4.5	1
A15224	1.25 - 1.6[p]	±25	1.425	500[m]	1100	9	6.3	0.300	4.5	1
A15226	1.55 - 1.9[p]	±25	1.725	450[m]	1100	9	6.3	0.300	2.5	1
A15228	1.85 - 2.2[p]	±50	2.025	425[m]	1100	9	6.3	0.300	2.5	1
A15230	2.15 - 2.5[p]	±50	2.325	400[m]	1100	9	6.3	0.300	6.5	1
A15232	2.45 - 2.8[p]	±50	2.625	300[m]	1100	9	6.3	0.300	6.5	1
A15234	2.75 - 3.1[p]	±50	2.925	200[m]	1100	9	6.3	0.280	5.5	1
A15236	3.05 - 3.4[p]	±50	3.225	100[m]	1100	9	6.3	0.280	5.5	1
A15481	3.6	±15	3.6	105[n]	1000	6	6.3	0.25	1.75	0.75
A15487V8	1.09	±15	1.09	500[k]	1540	15	6.3	0.33	4.375 x 1.406 x 0.94	
A15550	1.03	±15	1.03	50[k]	1000	6	12	0.085	9.5	0.88
A15573-A15574[h]	1.09	±15	1.09	1000[k]	1300	36	6.3 6.3	0.66	4.375 4.25	0.88 0.88
A15581-A15582[h]	0.66 - 0.7	±20	0.68	1000[k]	1300	36	6.3 6.3	0.66	7.0 7.0	0.88 0.88

INTEGRAL-CAVITY TRIODES – For CW Oscillator Service

Type No.[a]	CHARACTERISTICS									
			Typical Operating Conditions		Maximum Plate Ratings[b]		Heater		Maximum Dimensions In	
	Center Frequency	Tuning Range	Frequency	Useful Power Output	Voltage	Dissipation	Voltage	Current	Length[c]	Diameter[d]
	GHz	MHz	GHz	W	V	W	V	A		
6562/5794A	1.68	±12	1.68	0.6	120	3.6	6.0	0.16	3.256	0.98
7533	1.68	±20	1.68	0.575	130	3.6	6.0	0.16	3.23	0.98
A15219	0.9 - 1.05[p]	±25	0.975	1.1	360	6.25	6.3	0.135	5.5	1
A15221	1 - 1.3[p]	±25	1.15	1.1	360	6.25	6.3	0.135	4.5	1
A15223	1.25 - 1.6[p]	±25	1.425	1.0	360	6.25	6.3	0.135	4.5	1
A15225	1.55 - 1.9[p]	±25	1.725	1.0	360	6.25	6.3	0.135	2.5	1
A15227	1.85 - 2.2[p]	±50	2.025	0.6	360	6.25	6.3	0.225	2.5	1
A15229	2.15 - 2.5[p]	±50	2.325	0.4	360	6.25	6.3	0.225	6.5	1
A15231	2.45 - 2.8[p]	±50	2.625	0.3	360	6.25	6.3	0.225	6.5	1
A15233	2.75 - 3.1[p]	±50	2.925	0.12	360	6.25	6.3	0.225	5.5	1
A15235	3.05 - 3.4[p]	±50	3.225	0.1	360	6.25	6.3	0.225	5.5	1
A15314[q]	0.9 - 3.4	±25	1.88	0.25	175	3.6	6.0	0.160	3	1

FOOTNOTES

[a] Type numbers with prefix A and J are developmental types. Each of these numbers identifies a particular laboratory design but the number and the identifying data are subject to change. No obligations are assumed as to future manufacture unless otherwise arranged. Inquiries are invited about new types or variants of prototypes for specific equipment designs. Application assistance is readily available.

[b] Unless otherwise specified, all values shown are for Continuous Commercial Service.

[c] Excludes flexible leads.

[d] Excludes frequency adjustment screws and rf connectors.

[e] Four-stage, low-noise class A amplifier chain.

[f] One-stage, low-noise class A amplifier chain.

[g] Two-stage, low-noise class A amplifier chain.

[h] Oscillator-amplifier combination.

[k] Peak value with duty factor of 0.01.

CERAMIC-METAL TRIODES – For Cathode-Drive Service

Type No.[a]	CHARACTERISTICS											Maximum Dimensions In	
	Max. Frequency for Full Input	Class of Service[r]	Typical Operating Conditions			Ampli-fication Factor	Maximum Plate Ratings[b]		Heater				
			Frequency	Driver Power Output	Useful Power Output		Voltage	Current	Voltage	Current		Length	Diameter
	GHz		GHz	W	W		V	mA	V	A			
4028A	4	P-O	3.3	–	1000[m]	70	2000[s]	3	6.3	0.300		1.622	0.557
4055	4	P-O	3.3	–	1300[m]	70	3500[s]	40	6.3	0.295		1.77	0.557
4062A	4	G-O	1.09	–	500[k]	100	2000[s]	30	6.3	0.295		1.77	0.557
7552	1.5	A_1	0.55	–	16.5[t] 6.5[u]	80	250	25	6.3	0.225		1.620	0.557
7553	1.5	A_1	0.7	–	17[t] 7[u]	80	250	25	6.3	0.225		1.620	0.557
7554	5	C-T-A	1	0.2	1.4	70	250	25	6.3	0.225		1.620	0.557
	5	C-T-O	5	–	0.03		250	25					
	2	C-M-D	1	0.8	0.9		250	25					
8727	5	C-T-A	1	0.2	1.4	70	250	25	6.3	0.225		1.485	0.557
	5	C-T-O	5	–	0.03		250	25					
	2	C-M-D	1	0.8	0.9		250	22					

GLASS-METAL TRIODES – For Cathode-Drive Service

Type No.[a]	CHARACTERISTICS										Maximum Dimensions In	
	Max. Frequency for Full Input	Class of Service[r]	Typical Operating Conditions			Ampli-fication Factor	Maximum Plate Ratings[b]		Heater			
			Frequency	Driver Power Output	Useful Power Output		Voltage	DC Input	Voltage	Current	Length	Diameter
	GHz		GHz	W	W		V	W	V	A		
4058	4	P-O	3.3	–	800[k]	40	2000[s]	–	6.0	0.300	2.297	0.817
5675	1.7	C-T-O	1.7	–	0.475	20	300	5	6.3	0.135	2.252	0.817
			3	–	0.05							
5876A	1.7	C-T-A	0.5	2	5	56	360	9	6.3	0.135	2.252	0.817
	1.7	C-T-O	3	–	0.1		360	9				
5893	4	P-O	3.3	–	1200[m]	27	1750[s]	–	6.0	0.280	2.297	0.817
	2	C-T-A	1	1.9	5.5		320	11				
6263A	0.5	C-T-A	0.5	2.2	7	27	330	13	6.0	0.280	2.63	1.010
	0.5	C-T-O	1.7	–	0.9		330	13				
6264A	0.5	C-T-A	0.5	2.4	7.5	40	330	13	6.0	0.280	2.63	1.010
	0.5	C-M-T	0.51	2.75	2.1		300	9.9				

GLASS-METAL DIODE

Type No.[a]	CHARACTERISTICS				Maximum Dimensions In	
	Maximum Plate Ratings[b]		Heater			
	Pulse Detection Service	Rectifier Service	Voltage V	Current A	Length	Diameter
6173	Peak Inverse Plate Volts, 1000; Peak Pulse Plate Volts, 150; Peak Pulse Plate Amperes, 1; Average Plate mA, 1.	Peak Inverse Plate, Volts, 375; Peak Plate mA, 50; DC Plate mA, 5.5	6.3	0.135	2.227	0.320

FOOTNOTES (Cont'd)

[m] Peak value with duty factor of 0.001.

[n] Peak value with duty factor of 0.0025.

[p] Tubes can be supplied having any specific center frequency within the frequency range shown.

[q] Electronically tuned oscillator.

[r] A_1 = Class A_1 RF Amplifier
C-M-T = Class C Frequency Multiplier (Tripler)
C-T-O = Class C Telegraphy Oscillator
C-M-D = Class C Frequency Multiplier (Doubler)
C-T-A = Class C Telegraphy RF Amplifier
G-O = Grid-Pulsed Oscillator
P-O = Plate-Pulsed Oscillator

[s] Peak value.

[t] Minimum power gain in dB for 5 MHz Bw.

[u] Maximum noise figure in dB for 5 MHz Bw.