

These ratings represent those of current samples of this type. Refer to the Objective Technical Information sheet for design-objective ratings.

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PTI-117
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This technical information is proprietary and is furnished only as a service to customers.

ZM-3189

TRAVELING-WAVE TUBE

5 Milliwatts Power Output
10 db Gain
 ± 2 db Gain Matching

2400 to 8000 Megacycles
Metal-Ceramic
Periodic Permanent Magnet

The ZM-3189 is a ruggedized, low-power, very broadband traveling-wave tube for use in the 2400-to-8000-megacycle frequency range. It has a minimum gain of 10 decibels and power output of 5 milliwatts across the entire band. This tube can be supplied in ± 2 db matched-gain pairs, i.e., with the gain characteristics of a pair of tubes matched to each other within ± 2 db over the frequency band.

The tube is of metal-and-ceramic construction and is supplied as a completely packaged assembly which includes a periodic-permanent-magnet focusing structure, connectors and housing. The entire assembly weighs approximately 2.0 pounds.

The very broad bandwidth, freedom from tuning adjustments, and rugged construction are important features for application in military systems. Applications include radar transmitters and receivers, electronic counter-measures equipment, microwave relay systems, radiometry and instrumentation.

Since this tube is periodic-permanent-magnet focused, it is well suited to applications requiring close physical spacing with magnetic materials or other tubes.

ELECTRICAL	Minimum	Nominal	Maximum	
Frequency	2400	--	8000	Megacycles
Heater				
Voltage	--	6.3	--	Volts
Current	--	0.7	--	Amperes
Focusing Method - Periodic Permanent Magnet				
Noise Figure	--	--	25	Decibels
Small Signal Gain*	10	--	--	Decibels
Saturation Power Output*	5	--	--	Milliwatts
Collector Dissipation	--	2	--	Watts
Impedance, Coaxial	--	50	--	Ohms
Input, VSWR			2.5	
Output, VSWR			2.5	

MECHANICAL

Mounting Position - Any

Connectors

 DC Socket - Winchester PM6P-LS or equivalent

 RF Connectors

 Input - Type N, Female

 Output - Type N, Female

Over-all Dimensions

 Length 11.0 Inches

 Diameter 1.0 Inches

Weight (Complete Assembly), approximate 2.0 Pounds

THERMAL

Cooling - Convection

ENVIRONMENTAL

Shock (energized)	30 g for 11 milliseconds on each of three mutually perpendicular axes.
Vibration (operating)	0.062 inches double amplitude from 5 to 55 cycles per second and 15 g from 55 to 2000 cycles per second, with sweep over 5 to 2000 cycles per second for 100 minutes on each of three mutually perpendicular axes.
Humidity (non-operating)	MIL-E-5272 C, Paragraph 4.4.1 (Procedure I); i.e., non-operating tube in 95 percent relative humidity atmosphere for 10 days with temperature cycled slowly from approximately 30 C to 71 C each day.
Acoustic noise (operating)	150 decibels above 2×10^{-4} dynes/second ² , 25 to 12,000 cycles per second random noise.
Altitude (operating)	100,000 feet mean sea level.
Operating Temperature, ambient	-65 to +100 C.

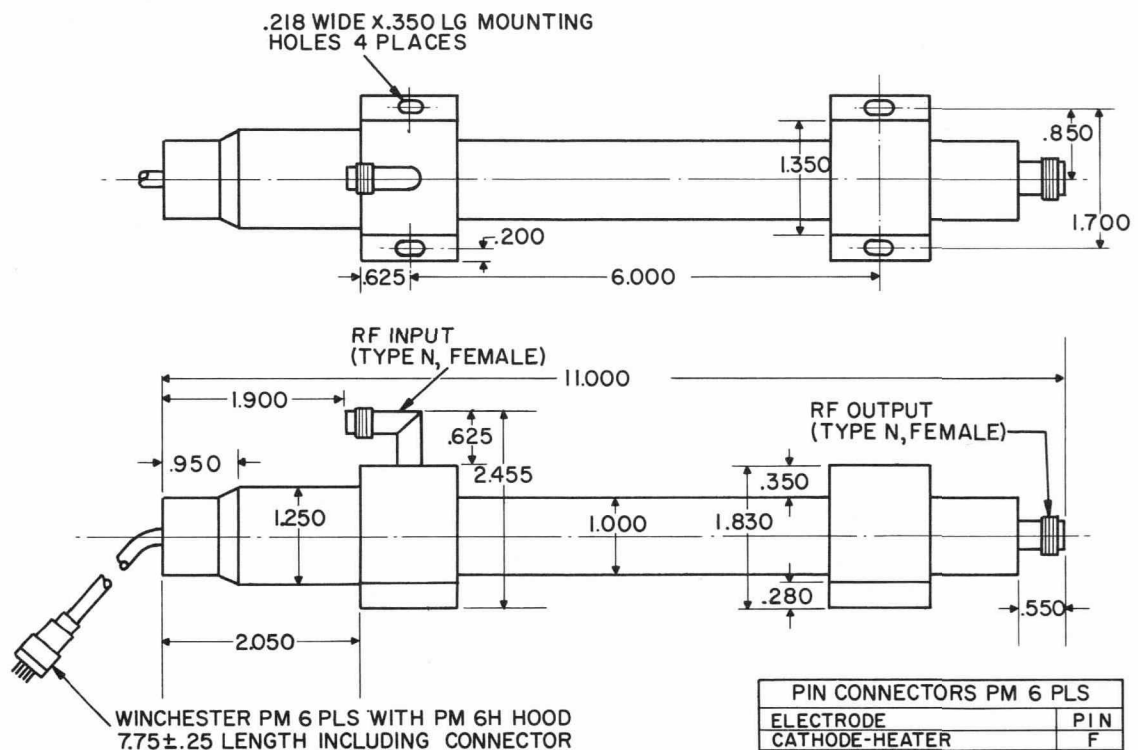
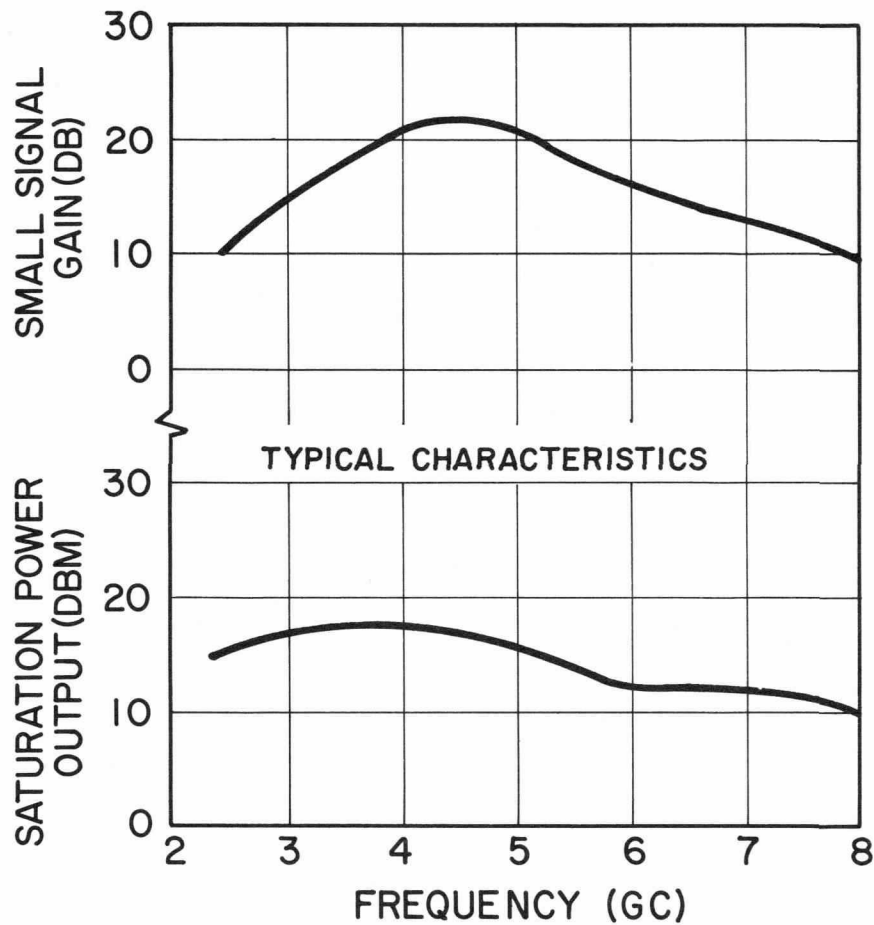
OPERATING CONDITIONS†

	Minimum	Nominal	Maximum	
Cathode Voltage (with respect to ground)	-700	--	-900	Volts
Cathode Current	2	3	5	Milliamperes
Focus-electrode voltage (with respect to cathode)	0	--	-50	Volts
Anode Voltage (with respect to cathode)	200	--	500	Volts
Helix-collector-package‡ - Connect to Ground				

* Increased gain and power are possible when this tube is optimized for a narrow frequency band. If requirements exist for such increased ratings over a narrow band, consult the nearest Power Tube Department sales office.

† For rated performance the operating voltages of each tube must be set at specific values within the above ranges. These specific values are supplied with each tube.

‡ The helix, collector, and tube package are connected together within the tube and should be grounded when the tube is operated.



PIN CONNECTORS PM 6 PLS	
ELECTRODE	PIN
CATHODE-HEATER	F
HEATER	A
FOCUS	B
ANODE	C
HELIX-COLLECTOR-PACKAGE	D

DIMENSIONS ARE IN INCHES AND ARE APPROXIMATE

Traveling-Wave Tubes

Technical Information

RF PERFORMANCE

Tube Type	Frequency Range (Gc)	Maximum Noise Figure (db)	Minimum SS Gain* (db)	Minimum Saturation Power Output* (mw)	Data Group
ZM-3189	2.4 - 8.0	25	10	5	S
ZM-3190	7.0 - 11.0	30	28	7	X
ZM-3191	11.0 - 20.0	30	20	10	K

- MATCHED GAIN
- S- TO K-BAND
- PPM FOCUSING

THESE TUBES CAN BE SUPPLIED IN MATCHED GAIN PAIRS WITH ONLY ± 2 DB GAIN VARIATION ACROSS THE FREQUENCY BAND.

FEATURES

± 2 db matched gain
broadband
periodic permanent magnet focused
metal ceramic construction
military environments
lightweight
crystal mixer protection

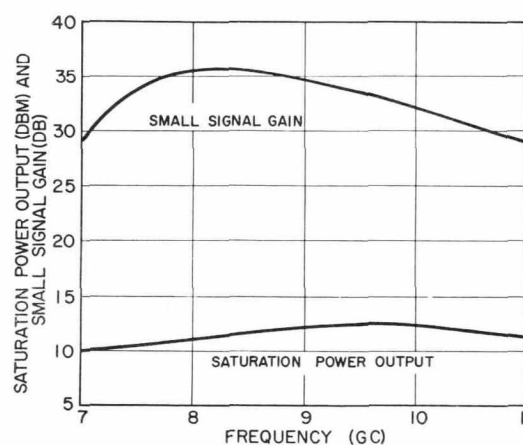
APPLICATIONS

radar
ecm
instrumentation
communications
radiometry

MECHANICAL & MISCELLANEOUS

Data Group	S	X	K
VSWR, max			
Input.....	2.5	2.5	3.0
Output.....	2.5	2.5	3.0
Mounting Position....	Any	Any	Any
Weight, lb.....	2.0	2.0	3.0
Overall Length, in....	11.0	10.0	8.5
Cooling.....	Conv.	Conv.	Conv.
RF Connectors.....	Type N	Type N	RG-419/U WG
DC Connectors.....	Winch'r. PM6PLS	Winch'r. PM6PLS	Flying Leads

TYPICAL CHARACTERISTICS



OPERATING CONDITIONS†

Data Group	S	X	K
Htr, vac or vdc	6.3	6.3	6.3
Htr, amp (max)	0.75	0.35	0.35
Cathode, vdc#	-700 to -900	-900 to -1000	-1400 to -1600
Cathode, ma	3.0 (nom.)	1.0 (nom.)	3.0 (nom.)
Focus Elect., vdc**	0 to -50	0 to -50	0 to -15
Anode, vdc**	200 to 500	650 to 850	300 to 400
Helix, collector, pkg	Ground	Ground	Ground

with respect to ground ** with respect to cathode

ENVIRONMENTAL

Data Group	S
Shock (energized)	30G, 11 ms, 3 axes
Vibration (operating)	15G, 55 to 2000 cps
Temp. Ambient (operating)	-65 C to +100 C
Acoustic Noise (operating)	150 db, 25 - 12000 cps
Altitude (operating)	100,000 ft.

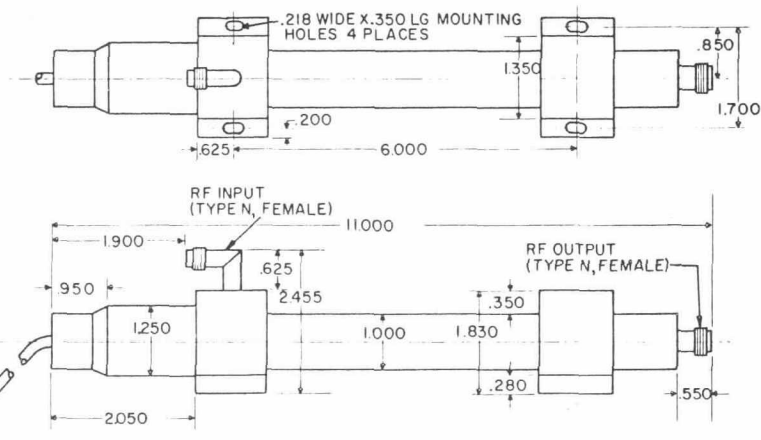
Groups X and K not presently rated.

OUTLINE (GROUP S)

PIN CONNECTORS PM 6 PLS	
ELECTRODE	PIN
CATHODE-HEATER	F
HEATER	A
FOCUS	B
ANODE	C
HELIX-COLLECTOR-PACKAGE	D

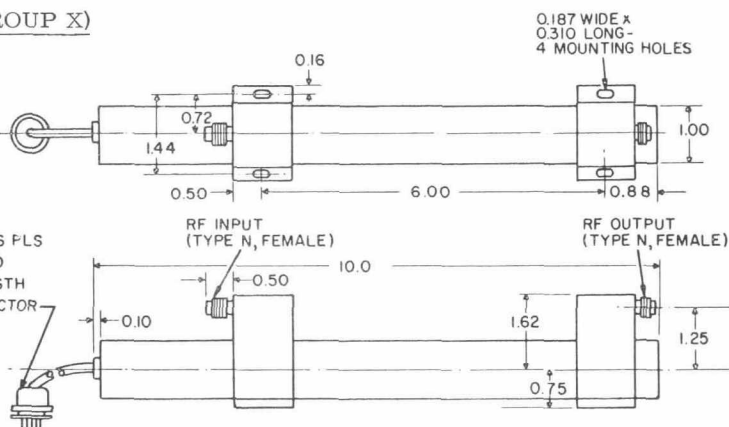
DIMENSIONS ARE IN INCHES

WINCHESTER PM 6 PLS WITH PM 6H HOOD
7.75 ± .25 LENGTH INCLUDING CONNECTOR



OUTLINE (GROUP X)

WINCHESTER PM 6 PLS
WITH PM 6H HOOD
7.75 INCHES LENGTH
INCLUDING CONNECTOR



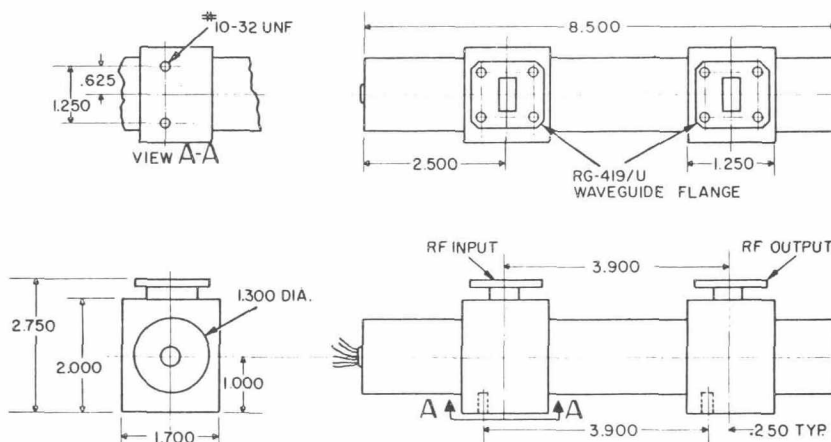
PIN CONNECTORS PM 6 PLS	
ELECTRODE	PIN
CATHODE-HEATER	F
HEATER	A
FOCUS	B
ANODE	C
HELIX-COLLECTOR-PACKAGE	D

DIMENSIONS ARE IN INCHES

OUTLINE (GROUP K)

COLOR CODE OF LEADS	
HEATER	BROWN
HEATER-CATHODE	YELLOW
FOCUS	GREEN
ANODE	BLUE
HELIX-PACKAGE	ORANGE
COLLECTOR	RED

DIMENSIONS ARE IN INCHES



NOTES

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