

MAGNETRON

JP35-30

Frequency: 'Q' band, fixed.
 Power output: 40kW, pulsed.
 Construction: Packaged, low velocity air-flow cooling.

This data should be read in conjunction with GENERAL OPERATIONAL RECOMMENDATIONS – MICROWAVE DEVICES: INTRODUCTION and RADAR AND COMMUNICATION MAGNETRONS which precede this section of the handbook.

CHARACTERISTICS

	Min.	Max.	
Frequency	34.51	35.21	Gc/s
Fixed within the band	to		kV
Pulse voltage ($I_{\text{pulse}} = 12.5\text{A}$)	13.5	15	
R.F. pulse output power			kW
($I_{\text{pulse}} = 12.5\text{A}$)	30	—	
Frequency pulling factor (v.s.w.r. = 1.5)	—	50	Mc/s
Frequency pushing factor	—	4.0	Mc/s per A
Frequency temperature coefficient	—	-1.0	Mc/s per °C
Position of phase of sink from face of mounting plate out of valve	0.25	0.4	λ_g
Input capacitance	6.0		pF

CATHODE

Indirectly heated, dispenser type

V_h	5.0	V
I_h (at 5.0V)	3.9	A
$I_{h(\text{surge})}$ max.	8.0	A
r_h (cold)	0.16	Ω

Heating time. At ambient temperatures above 0°C the cathode must be heated for at least 3 minutes before the application of h.t.

For mean input powers greater than 20 watts, it is necessary to reduce the heater voltage immediately after the application of h.t.

In many applications involving short pulse lengths and high pulse repetition frequencies the mean current which would be calculated from the duty cycle is increased by a pre-oscillation current.

In determining the heater reduction it is necessary to obtain the mean input power from the measured mean input current $\times 13,500$. The correct value of nominal heater voltage is given by the curve on page C2.

TYPICAL OPERATION

Heater voltage (running)	3.7	3.7	5.0	V
Pulse duration	0.3	0.1	0.02	μs
Pulse repetition frequency	670	2000	5000	p/s
Duty cycle	0.0002	0.0002	0.0001	
Pulse current	12.5	12.5	7.5	A
Pulse voltage	13.7	13.7	13.1	kV
Pulse input power	173	173	98	kW
R.F. pulse output power	40	40	30	kW
*Mean input current	2.5	2.5	1.55	mA
Mean input power	35	35	20	W
Mean r.f. output power	8.0	8.0	3.0	W
Frequency pulling (v.s.w.r. = 1.5)	35	35	35	Mc/s
Rate of rise of pulse voltage	250	250	600	kV/ μs

*Includes pre-oscillation current.

JP35-30

MAGNETRON

COOLING

For normal operating conditions, a low velocity air-flow is sufficient to keep within the maximum temperature limits.

ABSOLUTE MAXIMUM RATINGS

	<i>Min.</i>	<i>Max.</i>	←
Pulse current	6.0	16	A
Pulse voltage	12.5	15.5	kV
Pulse duration	—	0.4	μ s
Duty cycle	—	0.0003	
Mean input power	—	60	W
*Rate of rise of voltage pulse (hard valve modulator)			
pulse duration $> 0.05\mu$ s	200	300	kV/ μ s
pulse duration = 0.02μ s (at duty cycle = 1.0×10^{-4})	—	600	kV/ μ s
Load mismatch (v.s.w.r.)		1.5	
Temperature of anode block		150	$^{\circ}$ C
Temperature of cathode and heater seals		150	$^{\circ}$ C
Pressurisation of waveguide output system	{ —	45	lb/in ²
	{ —	2280	torr
Pressurisation of input system	{ 8.7	—	lb/in ²
	{ 450	—	torr

*For pulse lengths between 0.05μ s and 0.02μ s rates of rise between $300\text{kV}/\mu\text{s}$ and $600\text{kV}/\mu\text{s}$ can be tolerated, depending on the operating conditions. Prior reference should be made to Mullard Ltd. in such instances.

MOUNTING POSITION

Any

PHYSICAL DATA

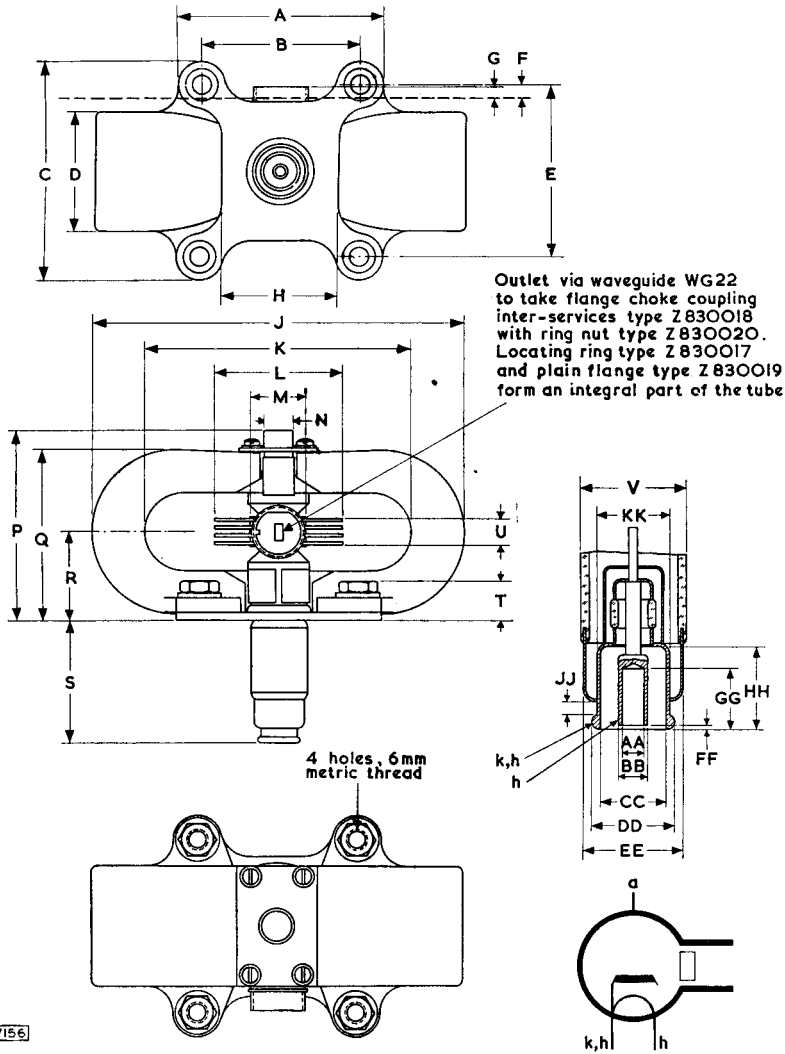
Weight of magnetron	{ 4 lb	3 oz
	{ 1.9	kg
Weight of magnetron in carton	{ 12 lb	13 oz
	{ 5.8	kg
Dimensions of storage carton	{ 7.0 × 9.6 × 11.2	in ←
	{ 178 × 244 × 284.5	mm

MAGNETRON**JP35-30****DIMENSIONS**

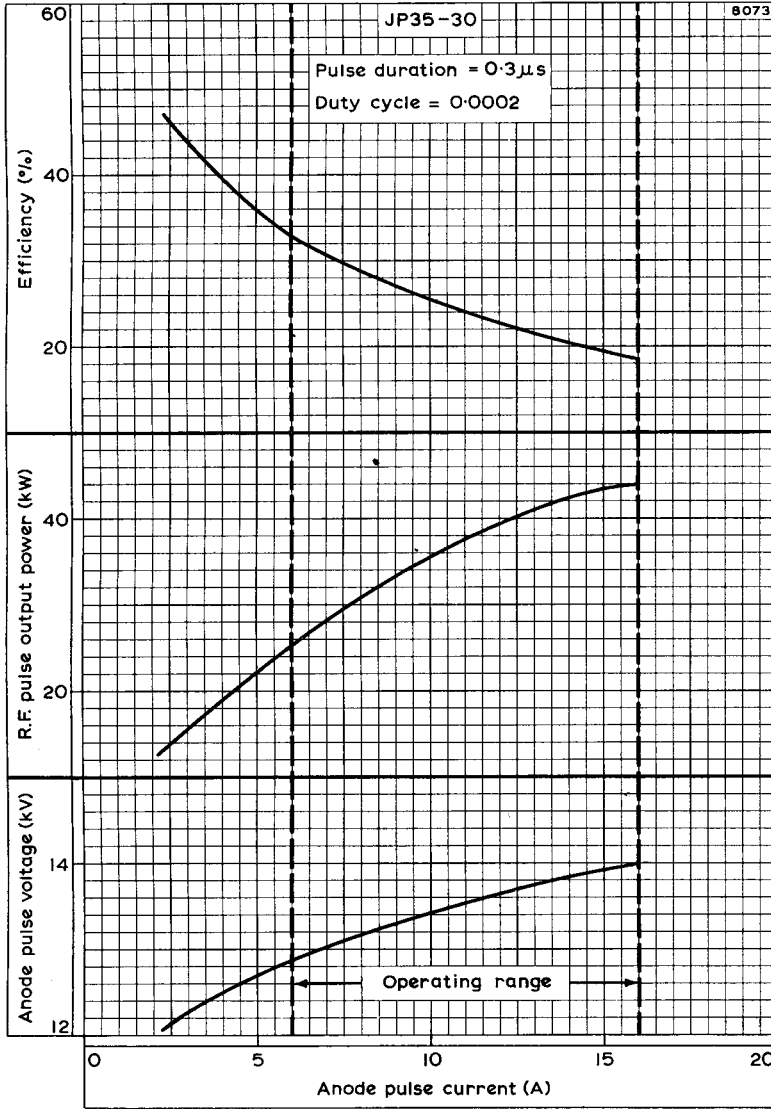
	<i>Inches</i>	<i>Millimetres</i>	
A	3.437	87.3	max.
B	2.531 ± 0.010	64.29 ± 0.25	
C	3.622	92	max.
D	1.937	49.2	max.
E	2.781 ± 0.010	70.64 ± 0.25	
F	0.217 ± 0.039	5.5 ± 1.0	
G	0.189	4.8	max.
H	1.874	47.6	min.
J	5.933	150.7	max.
K	3.819	97	min.
L	2.087	53	max.
M	0.906	23	max.
N	0.512	13	max.
P	3.189	81	max.
Q	2.842	72.2	max.
R	1.402 ± 0.039	35.6 ± 1.0	
S	1.968	50	max.
T	0.650 ± 0.059	16.5 ± 1.5	
U	0.433	11	max.
V	0.906	23	max.
AA	0.169 ± 0.006	4.30 ± 0.15	
BB	0.236 ± 0.004	6.0 ± 0.1	
CC	0.524 ± 0.008	13.3 ± 0.2	
DD	0.665 ± 0.008	16.9 ± 0.2	
EE	0.807	20.5	max.
FF	0.022 ± 0.018	0.55 ± 0.45	
GG	0.492	12.5	min.
HH	0.591	15	min.
JJ	0.079	2.0	min.
KK	0.591 ± 0.008	15.0 ± 0.2	

JP35-30

MAGNETRON



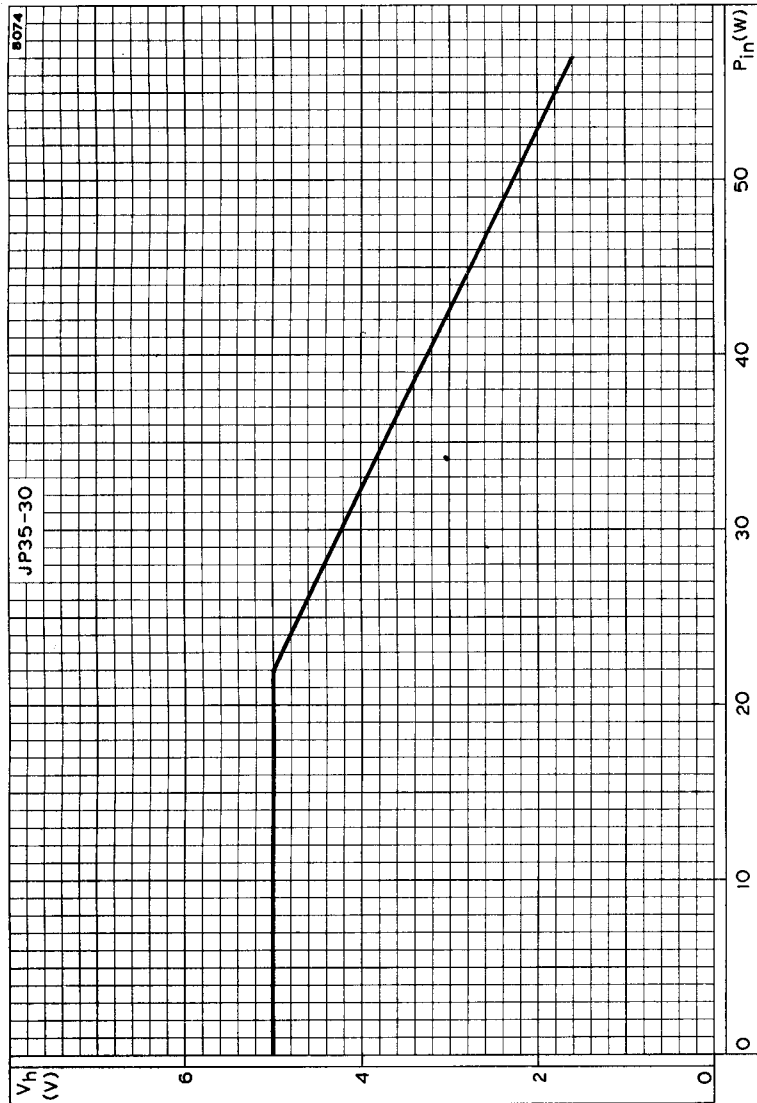
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ANODE PULSE VOLTAGE, R.F. PULSE OUTPUT POWER AND EFFICIENCY PLOTTED AGAINST ANODE PULSE CURRENT

JP35-30

MAGNETRON



HEATER VOLTAGE PLOTTED AGAINST MEAN INPUT POWER
MEAN INPUT POWER = MEAN INPUT CURRENT \times 13,500

