

amplifier are located on the high voltage floating deck an optical fibre transmits the TTL signal via optical interface units. A second resistor of 2.5 k Ω in series with the tetrode and the beam load protects the system against the risk of short-circuits. Since the current capability of the tetrode is of the order of 10 A in the case of a short-circuit, the limit of the charging voltage is up to a maximum of 25 kV. The pulsed system has a maximum capability of operating at a repetition frequency of about 1 kHz with a duty cycle of the order of 5 %. This means a maximum pulse duration of about 50 μ s for the operation condition described above.

IV. CONCLUSION

The 25 kV/10A pulse generator described here has proven to be well suited for driving a high-power electron gun, which is a critical component in all microwave tubes. Concerning the beam optics, the tests have indicated that a substantial fraction of the injected current is intercepted by the cavity's input grid, made up of a slotted circular plate that acts as a short circuit at the RF operating frequency, thus totally reflecting back to the cavity the incident electromagnetic energy. This is an issue to be addressed in future experiments as full utilization of the beam current translates into higher RF power generated by the monotron. Reliability of the system has been demonstrated through well correlated and voltage and current pulses. We remark in addition that the pulses are regularly shaped by approximate rectangles such that this desired characteristic defines unambiguously the corresponding pulsed beam power.

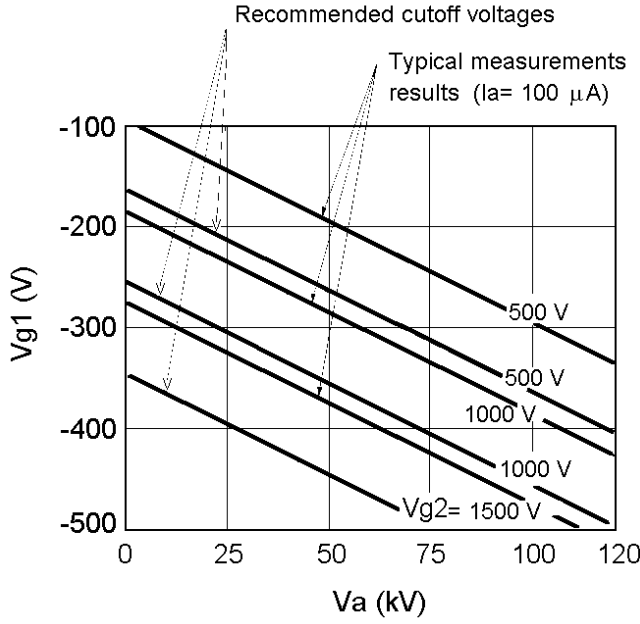


Fig. 2 Typical measurements and recommended values for the cutoff voltages of the TH5188 tetrode.

$R_2=1.1 \Omega$ and $R_3=10.0 \Omega$) to certify whether the beam is properly focused upon entering the cavity. A set of such measurements are given in Fig. 3. Indicative of proper functioning of the gun, the pulses are well time correlated; with no occurrence of either pulse shortening or delay effects, the current pulses follow the leading and trailing edges of the voltage pulses. In fact, we see the voltage difference V_1-V_2 (Fig. 1) gives the total current of 4.0 A, which is consistent with the sum of the current components, namely, the grid (~ 0.9 A) and collector (3.1~A) currents.

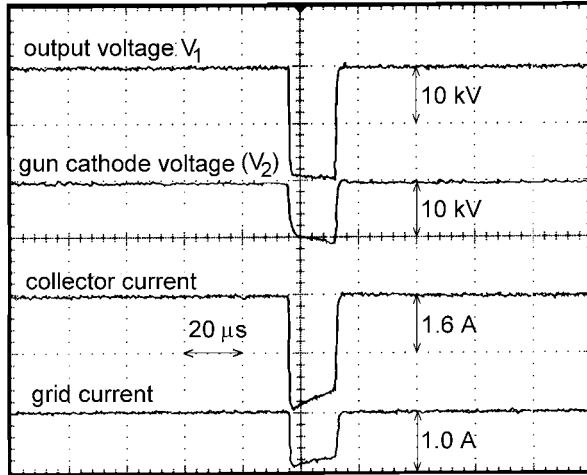


Fig. 3 Measured voltage and current waveforms

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