



COLD CATHODE HALF-WAVE RECTIFIER

DESCRIPTION

The CK1027 is an instant starting, cold cathode, gas-filled, half-wave rectifier of miniature construction. Several tubes can be operated in cascade to produce very high voltages. Typical applications include electronic photo-flash devices, fence controllers, and oscilloscopes. The type CK1027 should be used as a replacement in this type of equipment, originally designed to use the former type CK1013, and in new equipment having output currents up to 3 ma. The tube has a starter electrode which enables it to fire at the ignition voltages indicated in the ratings below.

MECHANICAL DATA

ENVELOPE: T-5 1/2 Glass

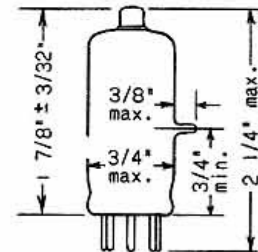
BASE: Miniature Button 7-Pin

TOP CAP: Skirted Miniature

TERMINAL CONNECTIONS:

Pin 1 Cathode	Pin 5 No Connection*
Pin 2 Cathode	Pin 6 Cathode
Pin 3 No Connection*	Pin 7 Cathode
Pin 4 Starter Electrode	TOP CAP Anode

MOUNTING POSITION: Any



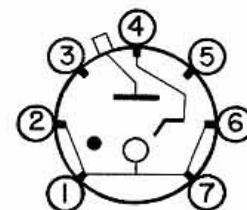
ELECTRICAL DATA

DESIGN CENTER MAXIMUM RATINGS:

Peak Inverse Voltage	2800 volts
Peak Cathode Current (steady state)**	30 ma.
Peak Cathode Current (surge)**	300 ma.
Average Cathode Current (dc)	3 ma.
Maximum Anode Supply Voltage (peak)	1700 volts
Minimum Anode and Starter Electrode Supply Voltage (peak)#	750 volts
Maximum Average Starter Electrode Current (Starter Electrode Operating as a Cathode)##	125 ua.
Maximum Peak Starter Electrode Current (Starter Electrode Operating as a Cathode)##	300 ua.

CHARACTERISTICS AND TYPICAL OPERATION - HALF-WAVE RECTIFIER:

Anode Supply Voltage (RMS)	1200 volts
Minimum Anode Supply Impedance	5000 ohms
Starter Electrode Limiting Resistance	10 meg.
Load Current (dc)	3 ma.
Approximate Anode to Cathode Drop	100 volts
Ambient Temperature Range	-50 to +60 °C



BOTTOM VIEW

* The socket terminals for pins 3 and 5 cannot be used as tie point terminal lugs and may not be connected to any other point in the circuit except to the cathode.

** To avoid damage to the equipment or tube, it is recommended that the anode supply impedance be adjusted to limit forward currents and intermittent reverse peak currents to stated values. Typical resistance is 5000 ohms minus the effective equivalent transformer loss, but never less than 2000 ohms dc resistance. For voltage multiplier circuits, a separate limiting resistor should be connected in series with the anode or the cathode of each tube. In the event of a reverse arc, the absence of a surge limiting resistor causes all of the energy of the filter condenser to be dissipated in the tube.

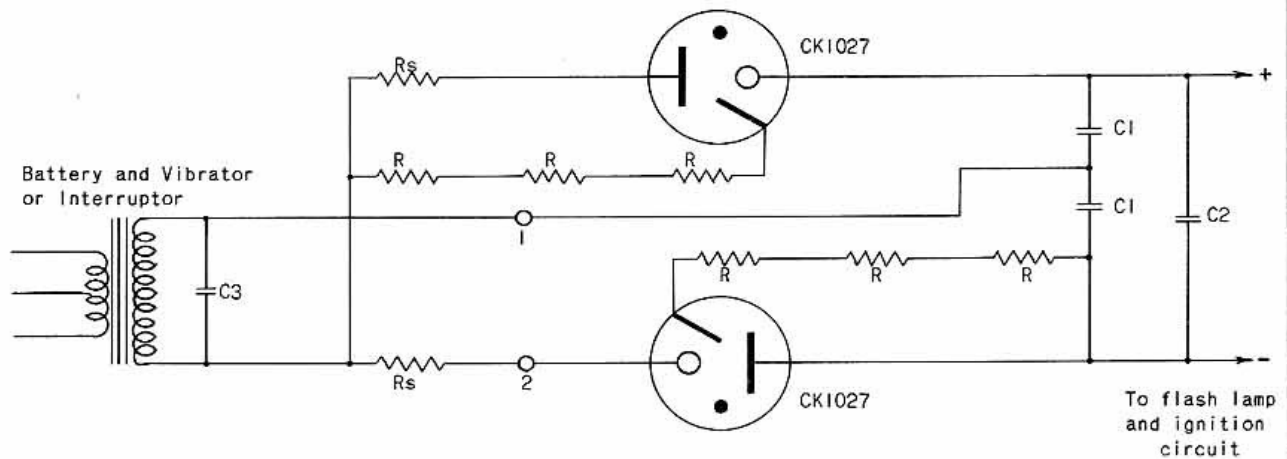
With starter electrode connected to anode through 10 megohms of resistance. The starter electrode connection may be omitted in extremely low current supplies (dc output currents up to 100 microamperes) to eliminate the reverse ionization current through the starter electrode circuit. It is recommended that this "floating" starter electrode connection be confined to high resistance transformer circuits, such as vibrator supplies, where a high peak open circuit voltage will insure the ignition of the anode circuit. Normally, the starter electrode must be used on sine wave voltage sources. The minimum anode and starter electrode supply voltage rating above does not apply to the "floating" starter electrode condition.

With the starter electrode connected to operate as an anode on the forward half of the cycle, the cathode current rating is the only limitation on the starter electrode current.



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CIRCUIT FOR BATTERY OPERATION OF ELECTRONIC PHOTO-FLASH



$R = 3.3 \text{ meg. } 1/2 \text{ watt } 350 \text{ Vdc}$

$R_s =$ Surge Resistor. Adjust to keep Peak Cathode Current (steady state) and Peak Cathode Current (surge) within ratings of 100 ma. and 300 ma., respectively. R_s should not be less than 2000 ohms in voltage doubler circuits regardless of transformer characteristics. By short-circuiting points 1 & 2 through a peak ammeter, the current thus measured must be approximately 40 ma. peak to attain a charging time of 10 sec. By increasing the available power, the condenser charging time can be decreased to approximately 2 sec. without exceeding the maximum tube current ratings. Since the wave form is only approximately square and will vary with transformer characteristics, vibrator frequency, etc., all measurements should be made with instruments of known wave form response although, in most cases, ratios of peak to RMS will be lower than the ratio for sine waves.

$C_1 = 0.1 \text{ uf } 1500 \text{ V}$

$C_2 = 28 \text{ uf } 2500 \text{ V}$

$C_3 =$ Buffer Condenser 0.002 to 0.01 uf. The exact value depends on vibrator or interrupter frequency and transformer characteristics and represents a compromise between excessive transformer loading and excessive inverse voltage.

The type CK1027 is manufactured under the following U.S. Patents: 1,731,899; 1,841,288; 1,841,289; 1,887,868; 2,077,961; 2,273,054. Other patents pending.