

VERSATILE PROBE

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You can use this versatile probe for continuity testing and identification of transistor type and transformer windings. The n-side or p-side of a transistor can be identified quickly in one go. You can make two contacts with the probe in one hand

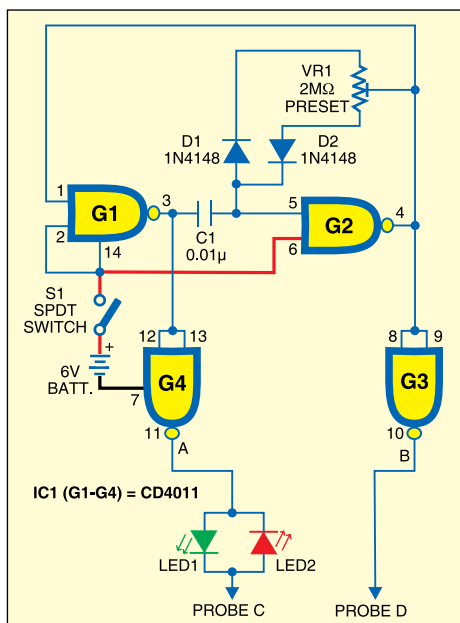


Fig. 1: Circuit of versatile probe



while the other hand is free.

Fig. 1 shows the circuit of the probe. The operation of the circuit is simple. It is driven by an alternating current flowing through two LEDs (LED1 and LED2). So one LED corresponds to forward direction of current flow, while the other shows reverse direction of current flow. This helps to detect orientation of the p-n junction with respect to the probes. The LEDs can be arranged near the probes to glow either for the p-side or the n-side as per your choice.

The frequency is determined by capacitor C1 and preset VR1 connected between gates G1

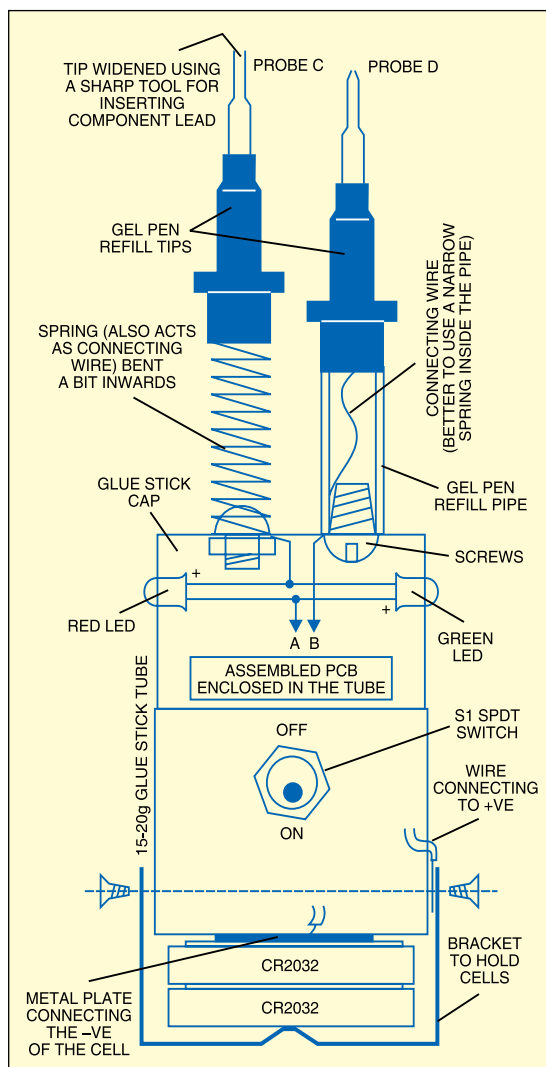


Fig. 2: Constructional detail of versatile probe

Testing Results for Different Components

Component	Probe D	Probe C	Red LED	Green LED	Result
Diode	1st terminal 1st terminal	2nd terminal 2nd terminal	Off On	On Off	Probe D side is anode (p) and probe C side is cathode (n) Probe D side is 'n' and probe C side is 'p'
Transistors	C	E	X	X	Unused pin is base
Any type pnp or npn	E	C	X	X	Unused pin is base
npn-type transistor	B B	E C	On On	Off Off	p-n junction p-n junction Result: 'p' is common, so npn transistor
pnp-type transistor	B B	E C	Off Off	On On	n-p junction n-p junction Result: 'n' is common, so pnp transistor
Step-down transformer	Primary terminal 1 Secondary terminal 1	Primary terminal 2 Secondary terminal 2	Glow with low intensity Glow with high intensity	Glow with low intensity Glow with high intensity	Both LEDs glowing with low intensity Result: Primary side Both LEDs glowing with high intensity Result: Secondary side
Continuity	Connect with LEDs probe	X	On	Off	Indicates shorting

and G2. The frequency can be varied using preset VR1. Higher frequency results in more sensitivity to inductive reactance. The preset is trimmed so that when the probes are shorted, both the LEDs glow equally.

Fig. 2 shows the probe arrangement for testing. Most of the battery power is consumed only when the LEDs glow. The probes have been constructed to provide a good grip on the components

under testing. One probe's tip has been widened. (Drop the empty refill of a ball-pen from some height to remove the ball, then insert a sharp needle or something similar into the tip. Slowly push the needle inside and widen the tip so that a component lead can be inserted into it during testing.) Slightly unequal probe lengths help to make easy contacts.

Assemble the circuit on a general-

purpose PCB which is as compact as possible and put it inside a glue stick tube (whose inner mechanism has been removed) at its centre. The metallic disk and metallic strips can be cut out from any tin container. For the probes, use the spring mechanism of gel ball pens. Probes C and D are the points representing the probe terminals. Two button cells (CR2032) are used to power the probe circuit. ●