

Short Circuits

SCR TESTER

SCRs ARE INCREASINGLY being used for power control in mains circuitry (e.g. sound-to-light converters and drill speed controllers) and also in battery circuits (e.g. flash triggers). Testing any semiconductor can be a bit of a bind if you have to breadboard a test set-up to do the job, so that there are now many circuits available for transistor testers. Now, here's a simple SCR tester which will give an instant indication of a faulty device.

CONSTRUCTION

As can be seen from the circuit there are only a handful of components but we opted to mount most of these onto a small tag-board; there are almost as many components on the front panel, however.

SCRs come in a variety of encapsulations; the small ones are usually in TO5 cans and a socket is fitted to the front panel to accept these directly. Other types are not suitable for plugging in so the connections to the socket are taken to three sockets into which extension leads with croc clips can be plugged.

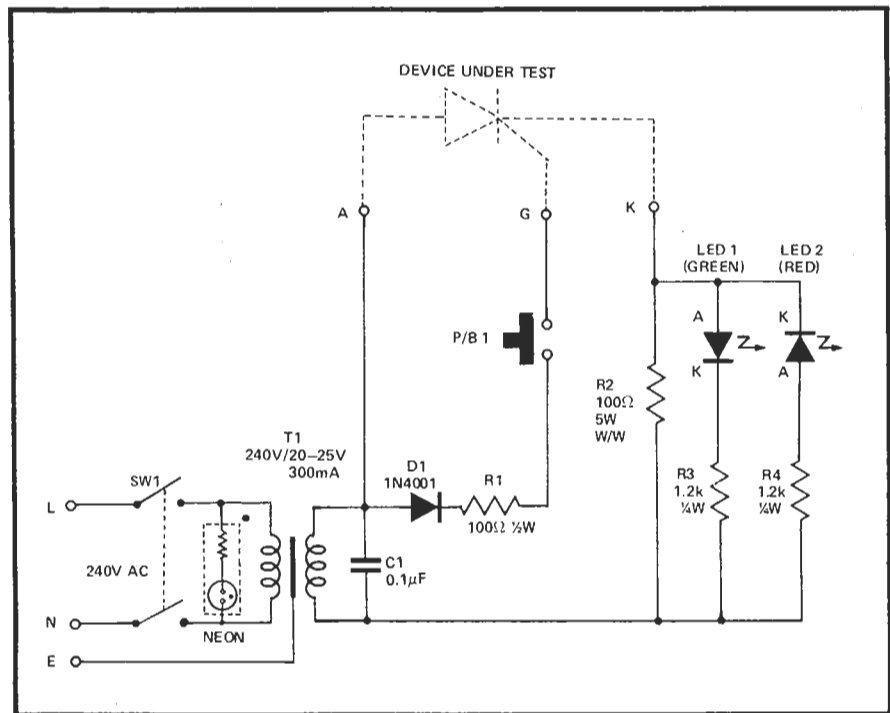


Fig. 1: Circuit of the SCR Tester.

How it works

On switch on, assuming a good SCR, there is approximately 20V AC across the SCR, but it does not conduct so that with no current flowing through R2, no volts are dropped across it, hence neither LED will light. When P/B1 is pressed, thyristor gate current will flow, and the thyristor will turn on when the anode is positive with respect to the cathode. Thus, for half of each cycle, current will flow through R2, so that LED1 will light up.

If both LEDs light up, this means that the SCR is conducting both ways, i.e. internally short circuiting. If neither LED lights up, when PB1 is pressed, the SCR has failed open circuit.

Parts List

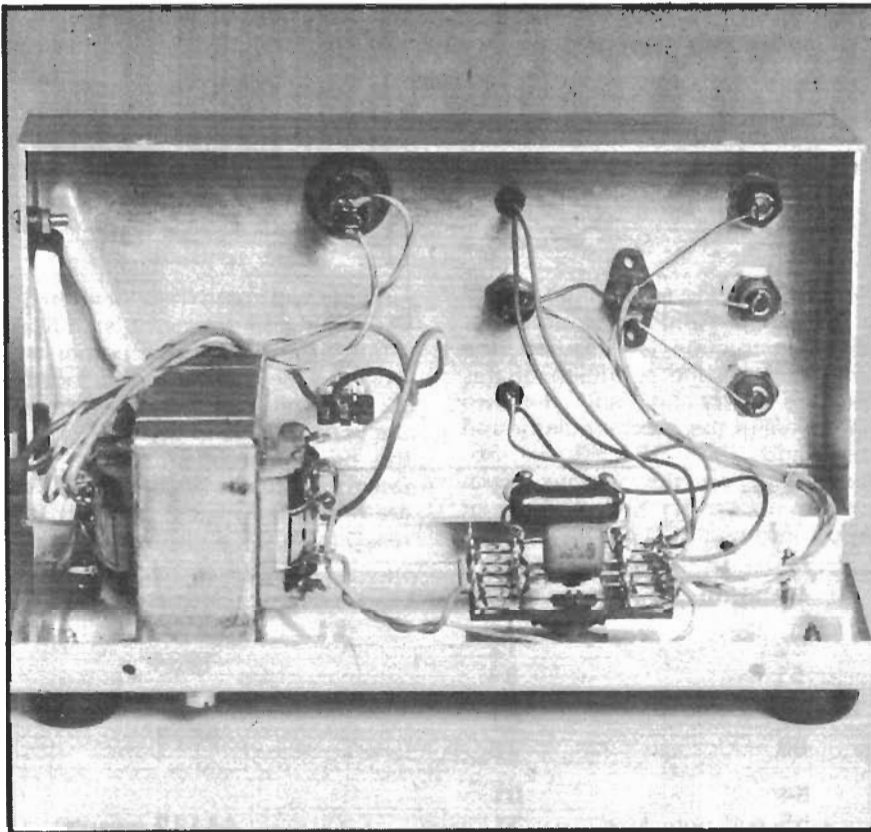
T1	240V--25V .3A MIN TRANS
NEON	240V TYPE
C1	0.1μF 160V
D1	1N4001
R1	100R 1/2W
R2	100R 5W W/W
R3, 4	1k2 1/4W
LED 1	GREEN TIL 209 TYPE
LED 2	RED TIL 209 TYPE
PB 1	Push to test type
SW1	OFF/ON mains toggle

TO5 Transistor test socket, wander sockets, mains cable, RS miniature tag board, feet, Aluminium case (6 3/8" x 2 7/8" x 1 7/8") (162 x 73 x 48mm) H. L. Smith, 2 Vero 1/2" stand off pillars, Nuts and bolts.

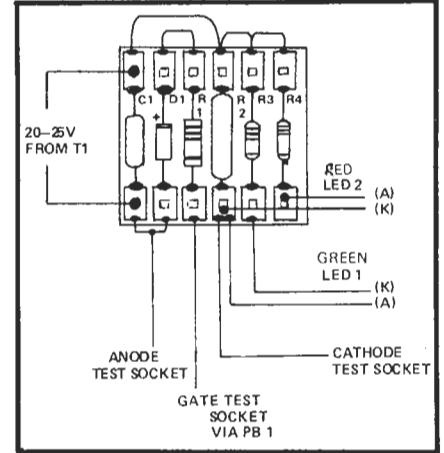
Approx. Price £5.00.



The completed unit is built into a strong aluminium box.



The majority of the components can be wired to a small tag board.



Test gear tends to be mishandled and a nice strong aluminium case is advisable in view of the propensity of small test gear to disappear under piles of components at the back of the workbench.

In a no-go condition, both LEDs will light under a short-circuit condition so don't be misled by the green light being on.

OPERATION

1. Insert SCR.
2. Switch on. If either or both LEDs come on, reject the SCR.
3. Press button 1. LED1 *only* should come on; if anything else happens, reject the SCR.

TTLs by TEXAS 7400 17p 7486 36p 7489 291p 7402 18p 7403 18p 7404 25p 7405 25p 7406 45p 7407 39p 7408 22p 7409 22p 7410 18p 7411 25p 7412 27p 7413 38p 7414 80p 7416 34p 7417 34p 7420 18p 7421 43p 7422 24p 7423 40p 7425 33p 7427 40p 7428 35p 7430 18p 7432 30p 7437 32p 7438 32p 7440 18p 7441 75p 7442 75p 7443 116p 7444 116p 7445 90p 7446 90p 7447 81p 7448 85p 7451 20p 7453 20p 7454 20p 7460 20p 7470 32p 7472 30p 7473 34p 7474 36p 7475 48p 7476 34p 7480 54p 7481 103p 7482 75p 7483 97p 7484 103p	7485 130p 7486 36p 7489 291p 7490 43p 7491 81p 7492 55p 7493 43p 7494 81p 7495 70p 7496 84p 7497 291p 74100 116p 74104 60p 74105 60p 74107 32p 74109 96p 74110 55p 74116 215p 74118 90p 74120 130p 74121 32p 74122 52p 74123 75p 74126 75p 74132 75p 74136 81p 74141 80p 74142 30p 74145 75p 74148 175p 74150 155p 74151 77p 74153 92p 74154 164p 74155 96p 74156 96p 74157 97p 74158 97p 74176 131p 74177 120p 74180 120p 74181 322p 74182 89p 74185 146p 74190 155p	74191 156p 74192 130p 74193 130p 74194 130p 74195 96p 74196 120p 74197 120p 74198 214p 74199 220p C-MOS ICs 4000 19p 4001 19p 4002 19p 4006 120p 4007 19p 4009 67p 4012 19p 4013 55p 4015 90p 4016 54p 4017 110p 4018 247p 4020 140p 4022 180p 4023 19p 4024 100p 4025 19p 4026 200p 4027 81p 4028 152p 4029 130p 4030 59p 4031 59p 4032 218p 4045 150p 4047 110p 4049 68p 4050 50p 4054 130p 4055 140p 4056 145p 4058 130p 4069 30p 4071 29p 4072 29p 4081 19p 4082 29p 4510 142p 4511 200p 4514 140p 4518 120p 4528 130p	LINEAR ICs CA3028A Diff Cascade Amp TO99 112p CA3046 5 Transistor Array 14 pin DIL 75p CA3048 4 Low Noise Amp 16 pin DIL 250p CA3053 Diff Cascade Amp TO5/DIL 60p CA3080 Op Transcond Amp TO5/8 DIL 97p CA3089E FM IF System 16 pin DIL 250p CA3090AQ FM Stereo Decoder QIL 500p ICL8038CC VCO Fun Gen 16 pin DIL 375p LM3801 2W Audio Amp 14 pin DIL 110p LM3811N Stereo Pre Amp 14 pin DIL 175p M252 Rhythm Generator 16 pin DIL 1000p MC1310P FM Stereo Decoder 8 pin DIL 190p MC1351P Lim/Det Aud Pre amp 14 pin DIL 104p MC3340P Electronic Attenuator 8 pin DIL 160p MFC4008 1W Audio Amp PCB 75p NE540L Aud Pwr Driver TO5 140p NE550L Timer 8 pin DIL 40p NE555V Dual 555 14 pin DIL 96p NE561B PLL with AM Demod 14 pin DIL 425p NE562B PLL with VCO 16 pin DIL 425p NE565 PLL 14 pin DIL 200p NE566V PLL Fun Gen 8 pin DIL 200p NE567V PLL Tone Decoder 8 pin DIL 200p 2587 Dual 567 16 pin DIL 400p SN72710 DM Comparator 14 pin DIL 54p SN72733 Video Amp 14 pin DIL 150p SN76003N Aud Pwr Amp with int HS 16 pin DIL 275p SN76008 10W Amp in 8 chms 5 pin Plastic 280p SN76013N Aud Pwr Amp with int HS 16 pin DIL 175p SN76023N Aud Pwr Amp with int HS 16 pin DIL 175p SN76033N Aud Pwr Amp with int HS 16 pin DIL 275p TAA621A Aud Amp for TV QIL 270p TAA661B FM/IF Amp Lim/Det QIL 150p TBA641B Audio Amp QIL 300p TBA800 5W Audio Amp QIL 100p TBA810 7W Audio Amp QIL 125p TBA820 2W Audio Amp QIL 100p TDA2020 20W Audio Amp QIL 375p XR2240 Prog Timer/Counter 16 pin DIL 400p TRF241A TRF Radio Receiver TO18 140p	TRANSISTORS AC125 20p AC126 20p AC127 20p AC128 18p AC176 20p AC187 20p AC187K 25p AC188 20p AC188K 25p AD149 46p AD161 39p AD162 39p AF115 22p AF116 22p AF117 22p AF139 43p AF239 48p BC107/B 10p BC108/B 10p BC109/C 11p BC147 9p BC148 9p BC149 10p BC157 11p BC158 13p BC159 13p BC169C 15p BC171 12p BC172 12p BC173 13p BC177 20p BC178 17p BC179 20p BC182 12p BC183 12p BC184 14p BC187 32p BC212 14p BC213 12p BC214 17p BC218 32p BC247 12p BC257 12p BCY70 20p BCY71 24p BD124 120p BD131 39p BD132 43p BD135 54p BD136 55p BD139 54p BD140 60p BF115 24p BF167 25p BF173 27p	BF178 30p BF194 13p BF195 11p BF196 17p BF197 19p BF200 40p BF257 34p BF258 39p BFR39 34p BFR40 34p BFR79 34p BFR80 34p BFR88 37p BFX30 36p BFX84 30p BFX85 30p BFX86 30p BFX87 30p BFX88 30p BFY50 18p BFY51 16p BFY52 16p BFY53 45p BSX19 20p BSX20 20p BSX21 15p BU005 175p BU108 312p MJE340 49p MJE355 120p MJE355S 80p MPSA06 40p MPSA12 62p MPSU06 78p MPSU66 98p OC28 75p OC35 75p OC71 25p TIP29C 62p TIP30A 50p TIP30C 72p TIP31A 55p TIP31C 68p TIP32A 63p TIP32C 85p TIP33A 87p TIP33C 120p TIP34A 124p TIP34C 160p TIP35A 243p TIP35C 290p TIP36A 297p TIP36C 360p TIP41A 70p TIP41C 81p TIP42A 76p	TIP42C 88p TIP2955 85p TIP3055 70p TIS93 30p ZTX108 11p ZX300 16p ZTX500 19p ZTX504 60p ZN697 25p ZN698 32p ZN706 22p ZN708 22p ZN818 43p ZN830 19p ZN1132 20p ZN1132 20p ZN1304 40p ZN1305 40p ZN1306 43p ZN1613 27p ZN1711 27p ZN1893 32p ZN2219 25p ZN2222 25p ZN2369 15p ZN2484 32p ZN2904/A 25p ZN2905/A 25p ZN2906 25p ZN3026R8 9p ZN32560511p ZN3053 19p ZN3054 64p ZN3055 54p ZN3442 151p ZN3702 14p ZN3703 14p ZN3704 14p ZN3705 14p ZN3706 12p ZN3708 12p ZN3709 12p ZN3707 12p ZN3773 270p ZN3866 97p ZN3904 22p ZN3905 25p ZN3906 22p ZN4058 19p ZN4060 19p ZN4123 22p ZN4124 22p ZN4125 22p ZN4126 22p ZN4371 142p ZN4348 173p ZN4401 34p	2N4403 34p 2N5089 34p 2N5296 65p 2N5401 62p 2N6107 70p 2N6247 17p 2N3055 (Com to 2N3055) 2N6254 130p 2N6292 70p 2N6260 43p 40362 45p 40410 65p 40409 65p 40411 275p 40594 85p 40595 97p FETs BF244 36p MPF102 40p MPF104 40p MPF104 40p MPF105 40p 2N3819 27p 2N3820 50p 2N3823 54p 2N5657 40p 2N5458 40p 3N128 92p 3N141 90p 40603 63p 40673 63p	RECTIFIER BY100 31p BY126 12p BY127 12p 1N4001 6p 1N4002 9p 1N4004 7p 1N4005 7p 1N4007 8p BRIDGE RECTIFIERS 1A 50V 25p 1A 100V 27p 1A 400V 31p 2A 50V 37p 2A 100V 44p 2A 400V 56p 4A 100V 75p 6A 100V 78p 6A 200V 84p 6A 400V 90p ZENER 2.7 to 33V 400mW 11p 1W 22p NOISE Z5J 140p DIAC BR100 30p TRIACS Amp Volts 3 400 130p 6 400 162p 6 500 194p 10 400 200p 10 500 270p 15 400 310p 15 500 340p 40430 108p 40669 105p
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