

Chart 4 — Component Test Quick Card

EXPECTED MULTIMETER READINGS • POWER OFF, CAPACITORS DISCHARGED

Component	Meter mode	Good reading	Failed reading
Resistor	Resistance	Marked value $\pm$ tolerance	OL = open • significantly high = drifted • low = check for parallel path first
Fuse	Continuity	Beeps, $\sim 0 \Omega$	OL = blown. Find out why before replacing
Fusible resistor	Resistance	Marked value (often 1–100 Ω)	OL = open. Replace only with a fusible type
Capacitor (large)	Resistance	Brief charging climb, then OL	$\sim 0 \Omega$ = shorted • stays at tens of k Ω = leaky
Capacitor (small ceramic)	Capacitance	Marked value $\pm$ tolerance	$\sim 0 \Omega$ in resistance mode = shorted. Reading OL immediately is normal
Electrolytic	ESR + capacitance	Low ESR (Chart 3), value within $\pm 20\%$	High ESR, low value, any bulging or leakage = replace
Inductor / coil	Resistance	Low ohms, often under 1 Ω	OL = open winding
Transformer	Resistance	Each winding low ohms; primary–secondary OL	Open winding, or any continuity across the isolation barrier = unsafe
Silicon diode	Diode	0.6–0.7 V forward, OL reverse	~ 0 V both ways = shorted • OL both ways = open
Schottky diode	Diode	0.2–0.4 V forward, OL reverse	As above
LED (red/green/yellow)	Diode	1.6–2.2 V forward, may glow faintly	OL both ways = open
LED (blue/white)	Diode	Often OL — most meters cannot drive it. Test with a current-limited supply instead	Do not condemn on an OL reading alone
Zener diode	Diode	0.7 V forward, OL reverse. Zener voltage needs a bench supply and series resistor	Shorted zener pulls its rail to ground
Bridge rectifier	Diode	Each of four junctions: ~ 0.6 V one way, OL the other	Any shorted junction blows the mains fuse instantly
NPN transistor	Diode (red on Base)	B $\rightarrow$ E and B $\rightarrow$ C: 0.6–0.7 V forward, OL reverse. C $\leftrightarrow$ E: OL both ways	Any short, or a missing junction = failed
PNP transistor	Diode (black on Base)	Identical, with every polarity reversed	As above
N-ch MOSFET	Diode	Discharge gate first. Body diode S $\rightarrow$ D: 0.4–0.7 V, OL reverse. G–S and G–D: OL both ways	D–S short = the classic failure • any G conduction = punctured gate oxide
Optocoupler	Diode	LED side ~ 1.0 – 1.2 V forward, OL reverse. Output side OL until the LED is driven	No switching when the LED is driven = failed
Relay	Resistance	Coil: tens to hundreds of ohms. NC contacts closed, NO contacts open	Open coil, or contacts that do not change state when energised
Crystal	—	Cannot be tested with a DMM. Use a scope ($\times 10$ probe) or substitute a known-good part	Flat line at the pins while powered = not oscillating
NTC thermistor	Resistance	Marked value when cold; falls as you warm it with a finger	OL = open. Common cause of a dead SMPS
MOV / varistor	Resistance	Essentially open	Low resistance or cracked = shorted, blows fuses
Switch	Continuity	$\sim 0 \Omega$ closed, OL open, clean transitions	Intermittent or high resistance when closed

Component	Meter mode	Good reading	Failed reading
IC (unpowered sweep)	Diode (black on GND)	Most pins read a similar 0.4–0.7 V	0.000 = pin shorted to ground · isolated OL among normal neighbors = suspect

BEFORE YOU CONDEMN ANYTHING In-circuit readings are affected by everything in parallel. If a component measures bad in circuit, lift one leg and measure again before replacing it.