Capacitor voltage loss (Vloss)

Additionally a new parameter is output for capacitors with more than 5000 pF and low quality factor. This parameter is the voltage loss (Vloss) immediately after a load pulse. Some older paper capacitors make problems to get the right capacity. The error can be more than 100%. Also other instruments have problems to measure the right capacity for that capacitors. For type of capacitor a voltage loss of more than 10% is measured, so the Tester gives you a warning hint with the Vloss.

VLOSS = Initial capacitor voltage loss due to the energy required to complete the switchover operation (see Figure 4).

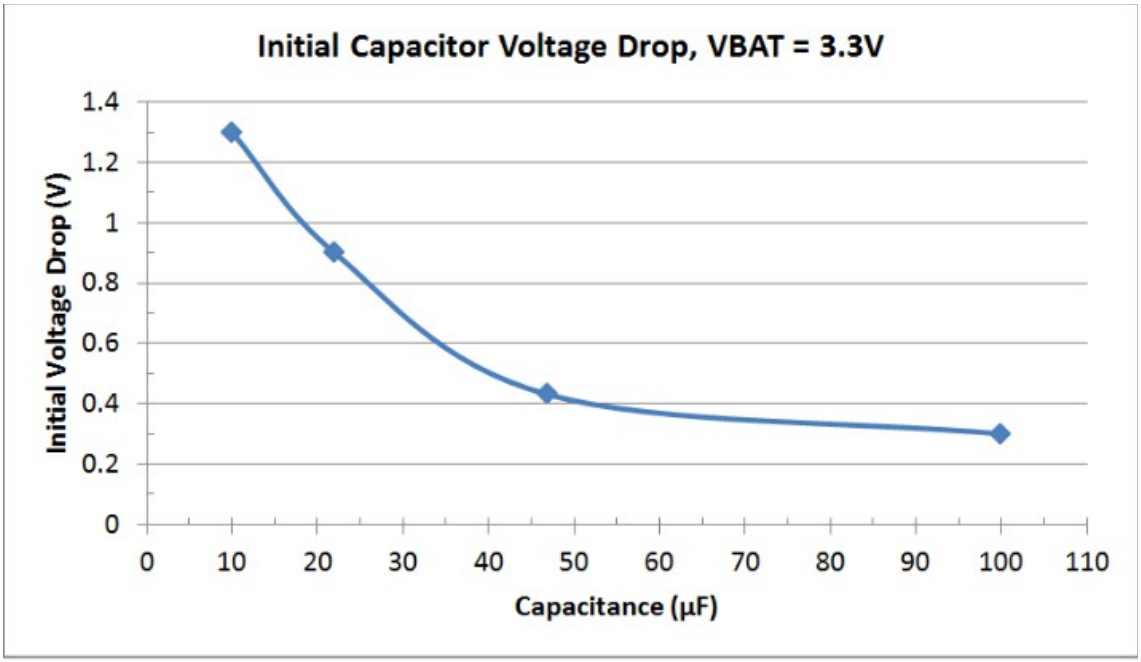

Figure 4 – Initial Capacitor Voltage Loss

Voltage loss after a load pulse, Vloss[1]
[With the measurement of capacitors with big capacity values the voltage loss after the loading is analysed. The reached load voltage is lost with electrolytic capacitors after a short periode. This voltage loss can be caused by a parallel connected resistor. But I assume, that this voltage loss of electrolytic capacitors is caused by a internal load dispersion directly after the load pulse. By loading the capacitors with the 470 kohm resistor, as it is done for little capacity values, this dispersion is already done after switching o the current. No voltage loss is detectable for this case. But if you load the same capacitor with a short current pulse, you can also detect the voltage loss for capacitors with lower capacity. The same e ect with lower loss can also be noticed for ceramic type capacitors.

I have noticed, that capacitors with more than some % voltage loss are suspect. Especially noticable with respect to the voltage loss are older paper type capacitors, which are for other measurement a problem too. Some measurement examples will be shown in the following table.

1 TransistorTester with AVR microcontroller and a little more Version 1.12k Karl-Heinz Kubbeleler

capacitor type	Nenn-capacity	PeakTech LCR 2170	Voltcraft M2650-B	PeakTech 3315	Transistor-Tester
paper	4700pF	6.75-10.36nF Q=2.5-32	8.00nF	25.40nF	10.71nF Vloss=11%
paper	6800pF	9.40-11.40nF Q=5-25	10.41nF	23.30nF	11.65nF Vloss=5.0%
unknown	4700pF	5.85-6.33nF Q=16-87	6.12nF	6.90nF	6225pF Vloss=1.7%
foil	7870pF	7.86-7.87nF Q= >1540	7.95nF	7.95nF	7872pF Vloss=0%
paper	22000pF	37.4-57.5nF Q=2.5-32	52.8nF	112nF	118.5nF Vloss=12%
foil	22600pF	22.4-22.5nF Q= >1540	22.57nF	22.69nF	22.54nF Vloss=0%
paper	100nF	144-256nF Q=2.6-28	177nF	318nF	529.7nF Vloss=12%
ceramic	100nF	97.7-102nF Q=90-134	103.7nF	103.3nF	103.1nF Vloss=0.1%
foil	100nF	98.0-101nF Q=58-700	101.4nF	102.2nF	101.6nF Vloss=0%

In this table you will find, that the capacity of all foil type capacitors can be measured by all intruments with good precision. The capacity values and the quality factor Q of the PeakTech LCR meter are minimum and maximum values of the measurements in the frequency range 100 Hz to 100 kHz . At all examples in the table the voltage loss Vloss of the TransistorTester is big, if the capacitors have a low quality factor. Only in this case the di erences of the capacity measurement results are also big. The TransistorTester can only determine the voltage loss, if the measured capacity is more than 5000 pF.]