
Subject: 300B SE Project, Part 9 - E180F, E280F, D3a pentodes - triode connected
Posted by [Damir](#) on Thu, 09 Mar 2006 19:19:29 GMT

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These high-gm pentodes have the same base and similar specs. D3a and E280F are very similar looking – the same inside construction and height, «Siemens» produced, E180F is shorter. Those are SQ 10000h , gold pin tubes, and in this case it actually means something – OP is stable, they are close to the specs, the sound is beautiful. When we connect screen grid g2 to the anode ("through" g2-"stopper" resistor R9) we get high-quality triode – high μ , high gm, low r_p , very linear – Fig. 1 :The same active load as before, similar OP. I measured $A=\mu$ about 50,5 with E180F, with E280F – 58, and D3a – 74. E180F and D3a have about the same $U_a=200V$, E280F a little less, about 150V in this OP (11mA CCS, $R_k=226\text{ Ohms}$). All three tubes have r_p in this OP about 3kOhms or a little bit more. Input capacitance is the problem here – we have rel. large amplification, our $C_{ag} \sim 3pF$, and Miller capacitance is large, especially in D3a case – about 220pF. We must use a lower value input pot than "standard" 100k, about 10k, 25k max. is still adequate. Sound test: E180F has the softest and smoothest sound, E280F is drier, and D3a "in between", clean, a little dark top end, a little sharp, but not too much. But, all three have a good sound, IMO – in class "above" (say similar) 6C45Pi. E180F has great bass, detailed mids, punch, maybe highs aren't too enhanced, but it is clean, balanced, smooth, dynamic, direct and natural – my overall favorite. It has the "right" amplification ($A=50,5$ times) – input sensitivity is 1Vrms for max. power. I tried a few more dB "in the red" (a little bit of "class A2"), and low output impedance of the driver and grid choke helped that distortion and compression almost aren't noticeable. D3a is also good, has the larger amplification ($A=74$), it means input sensitivity of about $1V_p=0,7V_{rms}$ for full output power – large "reserve" is possible. E280F is also usable, but it's a little rarer. One of the main criterions for the driver tube choice is "common", not expensive tube. Little E180F NOS "Philips" is all of that, and I'll use it (with D3a as a backup, "plug in" compatibility) as a driver in my amp. I tried resistive load too, just swapped CCS with 27k/5W resistor – circuit "pulls" about 10mA, and I measured $A=66$ times with D3a and $A=45$ times with E180F. Sound is a little softer and rounder, but very good, too. Usual precautions about oscillations (stopper resistors close to the pins) are necessary. I used cathode bypass cap, it seems to me that the sound is somehow "fuller and smoother" with it. Use high-quality, high-temp. electrolytic, soldered on the one cathode pin and the driver ground, short wires. CONCLUSION: E180F triode connected driver "has it all" - from the "right" amplification (~ 50) to the "right" sound, it is quality NOS tube that isn't hard to find or expensive. D3a is very close, and with a higher amplification factor.