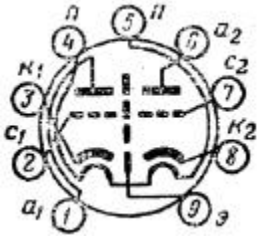
6N1P, 6N1PVI, 6N1PEV DATASHEET



The generic tube of **6N1P** is **ECC88**, which was originally designed as a medium voltage tube (90Volt) for measurement equipment, with very high linearity and low distortion, such as required for oscilloscopes. Today, ECC88 is very popular as an audio tube, since output impedance is relatively low and gain is relatively high. However there is a trend to use ECC88 at highest possible voltage, and highest possible filament-to-cathode voltage, and highest possible specifications in general, and expect no noise and excellent lifetime. Because of the limit breaking use, ECC88 is sometimes not good sounding, and/or develops a noise, or short circuits inside with sparks. It must be said, the gentlemen circuit designers are the real source of the trouble. It is accepted (by most) that the maximum limits should not be exceeded (also not a little bit) but it is at the same time expected by most, that if you stay a fraction below maximum limits, the tube should perform fully normal, and have no reliability issues, and all tubes out of a batch have “typical” specifications. This is in strong contradiction about what (real) specialists and historical literature tell you on the subject, but I have given up on the idea of learning somebody something about this issue.

Also with the issue if typical specifications, we see another classical error. “Typical” means many tubes from different batches will have this value as an average. When minimum and maximum values are not specified, it means you must expect +/- 40% for USA tubes and +/- 30% for West European tubes. A good circuit designer will select such a +40% and –40% tube and will make sure his circuits work good on both. Beginners take random tubes, and design the circuit around those.

Anyway, in a few words, here is what causes the disappointment with ECC88. If you have trouble with an ECC88, changing to 6N1P may be the solution, since you can not change the circuit.

6N1P is available in three versions.

1. Standard. Which al already much tighter specified as ECC88.
2. 6N1P-EV (or called EB, that is the same). Long Life.
3. 6N1P-IV. A very rare version with very tight gain specification

So if you look in the ECC88 datasheet you will find: Gain = 33 . This means t he minimum is ??, the maximum is ??, and average is 33

6N1P says: Gain is 35 +/-7. This means the minimum is 28x the maximum is 42x and the average is 35.

Similar results you find when comparing other parameters too. O for me 6N1P is the better tube. Take care, it is not fully identical, but will replace ECC88 in most circuits.

General characteristics (by UH=6.3V, UA=250V, RK=600 Ohm):

Type	6N1P	6N1PVI	6N1PEV
Filament (heater) current, mA	600± 50	600± 50	600± 50
Anode current, mA	5,6 - 10,5	7,5± 1,5	7,5± 1,5
Reverse grid current, mkA	≤1	≤0,5	≤0,2
Dissipate cathode-heater current, mkA	≤15	≤15	≤12
Mutual conductance, mA/V	4,5± 1,0	4,45± 0,65	4,5± 0,8
Gain coefficient	35± 7	35± 7	35± 7
Input resistance (by f=60 MHz), Kohm			
Equivalent noise resistance, Kohm			
Vibration noise (by R_A=2 KOhm), mV	≤100	≤80	≤50
Inter electrode capacitance, pF: input	3,1±1,1	3,3±0,9	3,05±0,55
output 1st triode	1.6±0.5	1.75±0.5	1.75±0.5
output 2nd triode	1.7±0.5	1.95±0.5	1.75±0.5
transfer	1.85±2.2	≤2.6	≤2.6
Operation period, hrs	≥3000	≥3000	≥5000

Limited operating values:

Type	6N1P	6N1PVI	6N1PEV
Filament voltage, V	5,7-7	5,7-7	6-6.6
Anode voltage, V	300	300	250

Grid voltage, V			
Cathode - heater voltage, V	100	120	120
Cathode current, mA	25	25	25
Anode dissipation (each triode), W	2,2	2,2	2,2
Grid dissipation, W			
Resistance in grid circuit, MOhm	1	2	0,5

Operating environmental conditions :

Type	6N1P	6N1PVI	6N1PEV
Acceleration of vibration loads, g	2,5	6	6
by frequencies, Hz	--	5-600	5-600
Acceleration of multiple impacts, g	12	150	150
Acceleration of single impact, g	-	500	500
Continuos acceleration, g	-	100	100
Ambient temperature, °?	-60 to +70	-60 to +90	-60 to +90
Relative humidity at up to 40°C, %	98	98	98