

SymAsym5_3 - Project page

(schematics to be updated)

Description:

Symasym5, is a "cute" power amplifier, designed with quality but still low price in mind. This resulted in a ClassAB BJT amplifier, using only TO92 transistors for input and VAS, with a reasonable part count. The topology used is well known and consist of a single diffamp for input, plus a 2nd diffamp with current mirror for VAS. This is followed by normal darlington EF outputstage using modern high beta devices. The circuit uses large amounts of feedback over the whole audioband and an unconventional feedback compensation scheme.

Right now symasym is designed to be driven directly from a CD/DVD-player, simply place a 22k poslog stereo pot between player and symasym. (as voltage divider)

Important updates:

There is an issue with substituting the MJLs by the Toshiba sc5200/sa1943. Without further modification symasym starts to oscillate when using these devices, resulting in a dull and flat sound !

Please check Pavels site for more details and what to change with these devices.

The at least change is to reduce C14 from 22pF to 10pF, but i recommend to follow Pavel's advice.

I recommend C14 with 10pF also for MJLs, this increases safety margin.

Do not forget to read Pavel's Review! A very promising evaluation of the qualities to be expected from symasym. Thanks Pavel !

Another update are the resistors R31/32 to be increased from 22ohm to 47ohm.

Symasym5_3 is an update of v5.2, with an improved board layout concerning power gnd, resulting in lower thd for high frequencies, giving more clarity in sound. The Page for symasym5_2 still exists.

If the gain is too high because symasym is driven from preamp, R30 can be increased from 499ohms to 1k, but in this case R16/19 (22 or 33 ohms, not on schematic, REs to Q1/2) are required to keep feedback at same level and symasym stable.

Some specs:

- THD: ~0.005% (measured) sim'd: 0.002%
- Power into 8ohm: 60 watts
- Power into 4ohm: 100 watts
- Gain: 32dB (~1:40) full output at 0.7v input (0.5v rms)
- Feedback: 57dB
- GainBandWidth: ~400Mhz
- Slewrate: ~20v/us (symetrical)
- Supply voltage: +/- 36v
- Biasing: 55ma, ~12mv across a single 0.22 ohm
- Measurings: [RMAA Symasym5](#) The measuring setup itself is far from perfect, but gives a good idea !
- Frequency response: 3.2hz to 145khz (-1db) using 4.7uf input cap
- Phaseshift at 10khz: <3°
- More will follow !

The sound:

Incredible of course ! (Your neighbors will hate you...)

The most outrageous characteristics are great dynamics, very tight and controlled bass, surprisingly detailed sound, uncolorized and an incredible soundstage !

Also, no turn on/off thump is recognizable and this amp is dead silent, no noise or hum is audible. Voice-imaging is stunning, like touchable, perfectly understandable. Sounding is pleasant, not bright/false trebles, nearly soft but very transparent.

Symasym does not prefer special kind of music, it plays well with all kind of signals music or dvd...

"Diana Krall" is a must have heard on symasym ! (Best from SACD)

Recommended parts:

All resistors are standard metal film 250mW except: R1/3/4/7, these are 2W metal film, and the 0.22ohm beeing 5W.

Around R7 is wounded a 0.6mm isolated (enamelled) copper wire forming the output coil. (~12 windings)

For c19 i used 470uf/16v, all other electrolytics 63v. The 10/100/330pF should be mica-caps. The 100nf and 47nf is recommended to be Wima MKS2 (or better), also for C1 i suggest Wima MKS2, 4.7uf is enough.

For Trimpot i use a Piher. The MPSA18 can be substituted by BC550C, for all other parts i do not recommend changes, especially the feedback network (r29/30) should be kept unchanged, feedback compensation is very delicate for this circuit !

Be careful when substituting the MPSA18 with BC550C, the pinout is reversed between these 2 transistors !!!

Matching devices:

Matching is simple, no complementary matching is required. Following pairs need matching: Q1<->Q2, Q3<->Q9, Q4<->Q12

With good matching DC-offset is easily below 3mv. Matching outputdevices is optional, i didn't.

Adjusting:

The bias is adjusted via the trimpot (R22). Recommended bias is 55ma, resulting in 12mv across a single 0.22ohms or 24mv across both 0.22ohms. Connect a DMM to the upper wires of these resistors and adjust trimpot until DMM reads wanted voltage.

Parts list:

Transistors:			
Device	Qty	Value	Notes
Q1,Q2	2	MPSA18	can be substituted by BC550C (pins reversed !)
Q7,Q8	2	BC546B	or maybe 2n5551 (pins reversed !)
Q3,Q9	2	2N5551	OnSemi/Fairchild/Philips
Q4,Q5,Q12	3	2N5401	OnSemi/Fairchild/Philips
T1	1	BD139	or bd135, bd135-16
U\$5	1	MJE15030	OnSemi
U\$6	1	MJE15031	OnSemi
U\$3	1	MJL3281A	OnSemi
U\$4	1	MJL1302A	OnSemi

Capacitors:			
Device	Qty	Value	Notes
C14	1	10pF (has been 22pF)	Mica
C2,C7	2	100pF	Mica
C3,C4	2	330pF	Mica
C18	1	47nF	Wima MKS2
C5, C6, C10, C11, C16, C17, C20	7	100nF	Wima MKS2
C1	1	10uF (4.7uF also fits)	Wima MKS2
C8,C9	2	100uF	Electrolytic 63v (at least 40v)
C19	1	470uF	Electrolytic 16v
C12,C13	2	1000uF	Electrolytic 63v (at least 40v)

Resistors:			
Device	Qty	Value	Notes
R27,R28	2	0R22	5Watts
R1, R3	2	1R2	2Watts metal film
R4	1	4R7	2Watts metal film
R7	1	10	2Watts metal film
R2	1	10	250mW metal film
R8, R9	2	22	250mW metal film
R31, R32	2	47 (have been 22)	250mW metal film
R26	1	33	250mW metal film

R10	1	68	250mW metal film
R15,R17	2	150	250mW metal film
R11	1	220	250mW metal film
R24,R30	2	499 (or 500)	250mW metal film
R5,R6	2	680	250mW metal film
R13,R23	2	2k	250mW metal film
R12,R14,R29	3	22k	250mW metal film
R18,R20	2	47k	250mW metal film
R22	1	1k pot	Piher, small (470ohm might be better)

Miscellaneous:			
Device	Qty	Value	Notes
F1,F2	2	2.5T Fuse	Slow blow
F1,F2	2	---	Fuse holder
L1	1	---	0.6mm isolated (enamelled) copper wire wounded around R7 forming the output coil.

Authorized for use by any private hobbyist, commercial use / profit unauthorized !
Have fun !
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