

SIEMENS

S 041 P FM IF Amplifier with Demodulator

S 041 P is a symmetrical, six-stage amplifier with symmetrical coincidence demodulator for amplifying, limiting, and demodulating frequency-modulated signals. The IC is particularly suited for sets where low current consumption is of importance, or where major supply fluctuations occur.

The pin configuration corresponds to the well-known TBA 120. Pin 5 of S 041 P, however, is not connected internally. These types are especially suited for applications in narrow-band FM systems (455 kHz) and in conventional or standard FM IF systems (10.7 MHz).

Features

- Good limiting properties
- Wide voltage range
- Low current consumption
- Few external components

Maximum ratings

Supply voltage	V_S	15	V
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-40 to 125	°C
Thermal resistance (system-air)	$R_{th, SA}$	90	K/W

S 041 P

Operating range

Supply voltage range	V_S	4 to 15	V
Frequency range	f_i	0 to 35	MHz
Ambient temperature range	T_{amb}	-25 to 85	°C

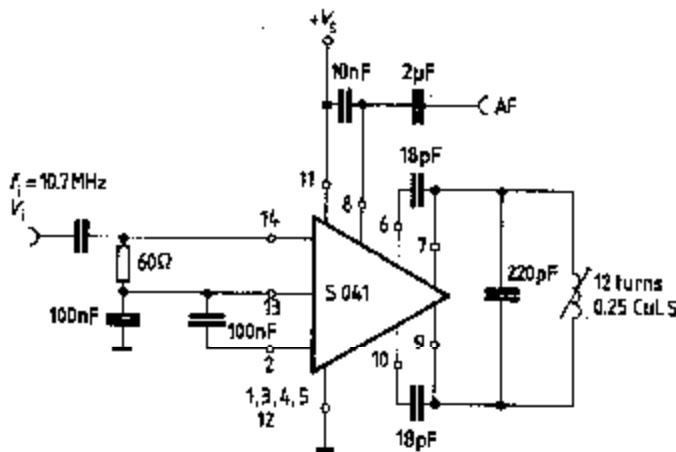
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Characteristics ($V_S = 12\text{ V}$, Q approx. 35, $f_{mod} = 1\text{ kHz}$, $T_{amb} = 25^\circ\text{C}$)

	min	typ	max		
Current consumption					
AF output voltage ($f_i = 10.7\text{ MHz}$, $\Delta f = \pm 50\text{ kHz}$, $V_i = 10\text{ mV}$)	I_B	4.0	5.4	6.8	mA
Total harmonic distortion ($f_i = 10.7\text{ MHz}$, $\Delta f = \pm 50\text{ kHz}$, $V_i = 10\text{ mV}$)	V_{dms}	100	170		mV
Deviation of AF output voltage ($V_S = 15\text{ V} \rightarrow 4\text{ V}$, $f_i = 10.7\text{ MHz}$, $\Delta f = \pm 50\text{ kHz}$)	THD		0.66	1.0	%
Input voltage for limiting ($f_i = 10.7\text{ MHz}$, $\Delta f = \pm 60\text{ kHz}$)	ΔV_{in}		1.6		dB
IF voltage gain ($f_i = 10.7\text{ MHz}$)	V_{lim}		30	60	μV
IF output voltage for limiting (each output)	G_v		68		dB
Input impedance $f_i = 10.7\text{ MHz}$	V_{dpp}		130		mV
$f_i = 455\text{ kHz}$	Z_i		20/2		k Ω /pF
Output resistance (pin 8)	Z_i		50/4		k Ω /pF
Voltage drop at AF ballast resistance	R_o	3.5	5	8.5	k Ω
AM suppression	V_{11-8}		1.5		V
($V_i = 10\text{ mV}$, $\Delta f = \pm 50\text{ kHz}$, $m = 30\%$)	B_{AM}		60		dB

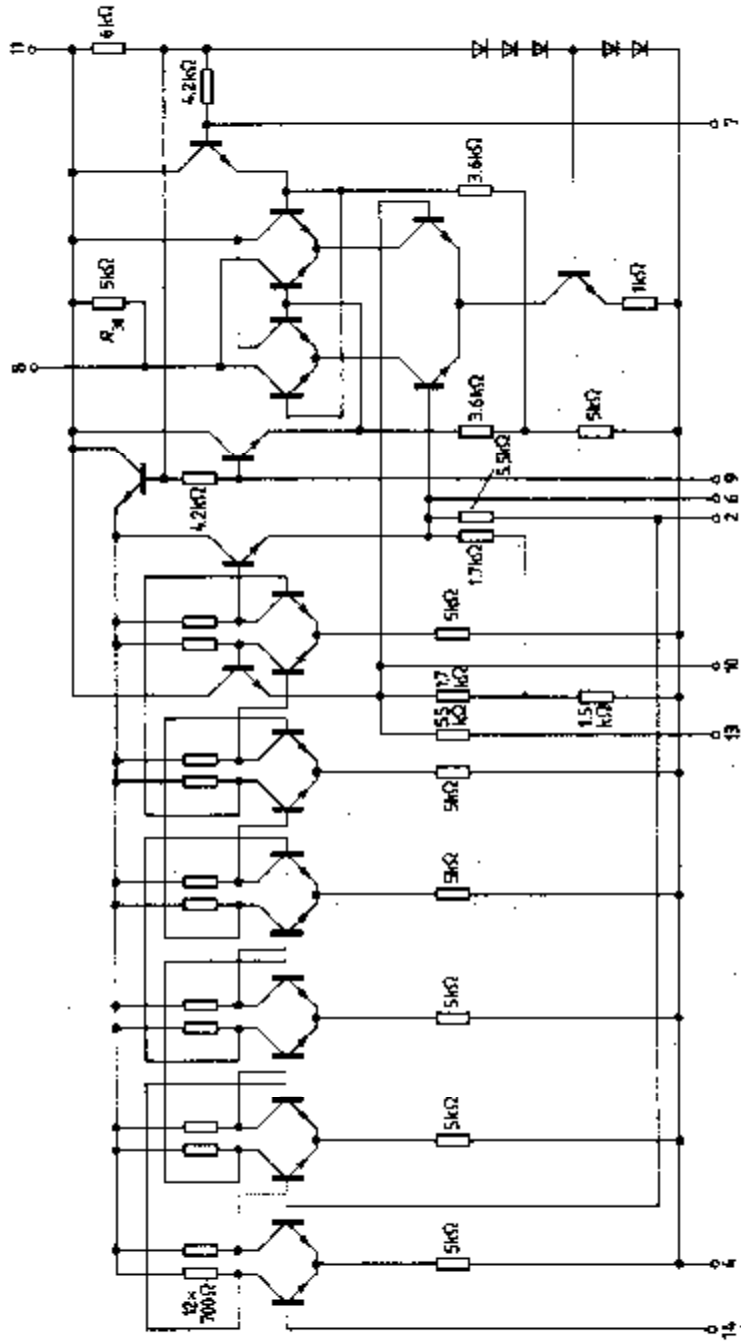
All connections mentioned in the Index refer to S 041 P (e.g. V_1)

Test circuit

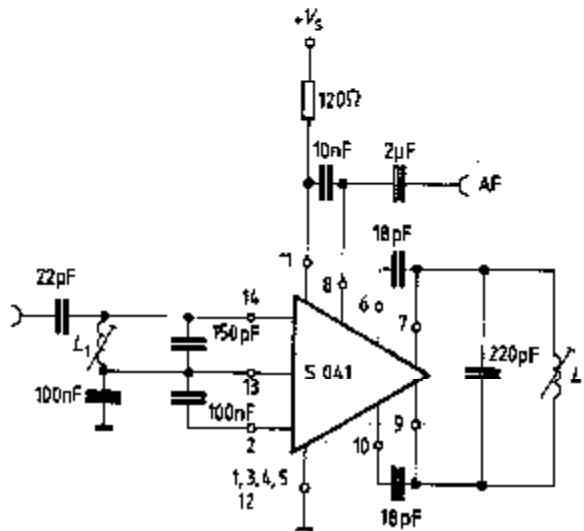




Circuit diagram



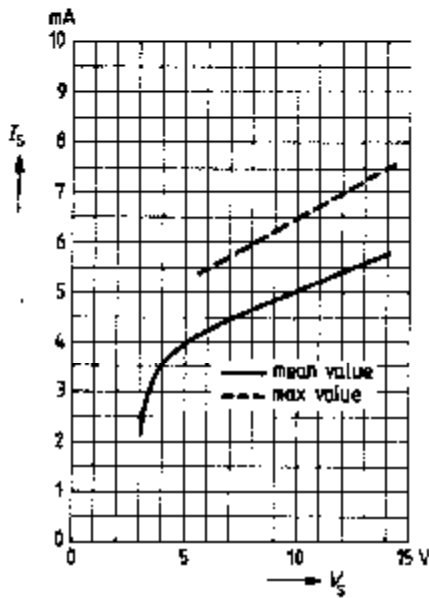
**Application circuit for 10.7 MHz (FM IF)
and 455 kHz (narrow-band FM)**



Data in parentheses for 455kHz (narrow-band FM)

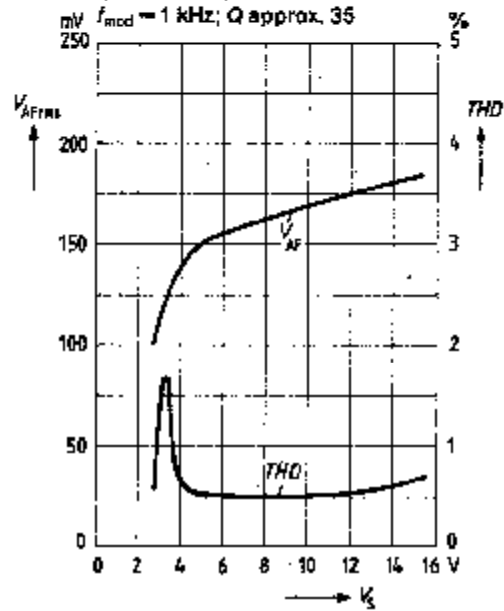
Coils	10.7 MHz	455 kHz
L_1	15 turns/0.15 CuLS	71.5 turns/12 x 0.04 CuLS
L_2	12 turns/0.25 CuLS	71.5 turns/12 x 0.04 CuLS
Coil set	D 41-2165	D 41-2393 of Messrs. Vagt

Current consumption versus supply voltage

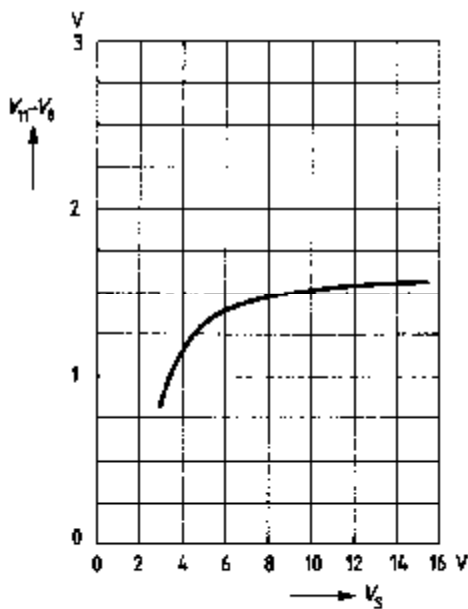


AF output voltage and total harmonic distortion versus supply voltage

$f_1 = 10.7 \text{ MHz}$; $\Delta f = \pm 50 \text{ kHz}$
 $f_{\text{mod}} = 1 \text{ kHz}$; Q approx. 35

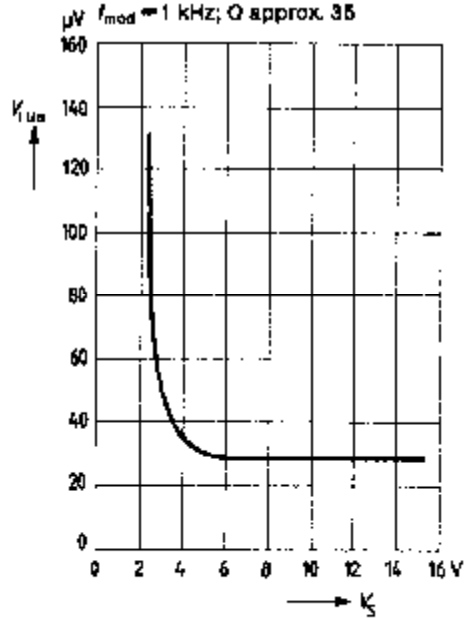


DC output voltage difference versus supply voltage (without signal)

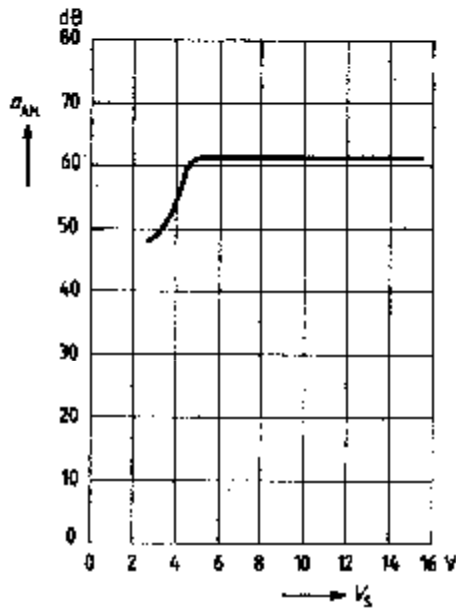


Input voltage for limiting versus supply voltage

$f_1 = 10.7 \text{ MHz}$; $\Delta f = \pm 50 \text{ kHz}$
 $f_{\text{mod}} = 1 \text{ kHz}$; Q approx. 35



AM suppression versus supply voltage
 $f_i = 10.7 \text{ MHz}$; $\Delta f = \pm 50 \text{ kHz}$;
 $V_i = 10 \text{ mV}$, $f_{mod} = 1 \text{ kHz}$, $m = 30\%$



AF output voltage and total harmonic distortion versus Q-factor
 $V_s = 12 \text{ V}$; $f_i = 10.7 \text{ MHz}$;
 $\Delta f = \pm 50 \text{ kHz}$, $f_{mod} = 1 \text{ kHz}$

