Bipolar circuit

Type	Ordering code	Package outline
S 042 E	Q67000-A627	5 J 10 DIN 41873/sim. to TO 100
S 042 P	Q67000-A335	DIP 14

Symmetrical mixers for frequencies up to 200 MHz. They can be driven by an external source or by the built-in oscillator. The input signals are suppressed at the outputs. In addition to the usual mixer applications in receivers, converters, and demodulators for AM and FM, the S 042 E and S 042 P can also be used as electronic polarity switches, multipliers etc.

Features

- Versatile application
- Wide range of supply voltage
- Few external components
- High conversion transconductance
- Low noise figure

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) S 042 E:	$R_{th\ SA}$	190	K/W
S 042 P:	$R_{th\ SA}$	90	K/W

Operating range

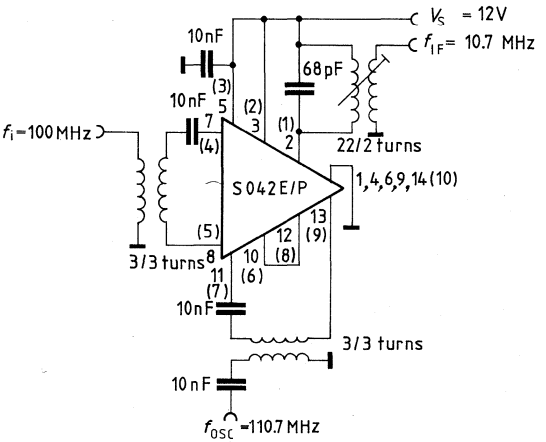
Supply voltage range	V_S	4 to 15	V
Ambient temperature range	T_{amb}	−15 to 70	°C

Characteristics ($V_S = 12$ V, $T_{amb} = 25$ °C)

		min	typ	max	
Current consumption	$I_S = I_2 + I_3 + I_5$	1.4	2.15	2.9	mA
Output current	$I_2 = I_3$	0.36	0.52	0.68	mA
Output current difference	$I_3 - I_2$	−60		60	mA
Supply current	I_5	0.7	1.1	1.6	mA
Power gain ($f_i = 100$ MHz, $f_{OSC} = 110.7$ MHz)	G_p	14	16.5		dB
Breakdown voltage ($I_{2,3} = 10$ mA; $V_{7,8} = 0$ V)	V_2, V_3	25			V
Output capacitance	$C_{2\text{-}M}$, $C_{3\text{-}M}$		6		pF
Conversion transconductance ($f = 455$ kHz)	$S = \frac{I_2}{V_7 - V_8} = \frac{I_3}{V_7 - V_8}$		5		mS
Noise figure	NF		7		dB

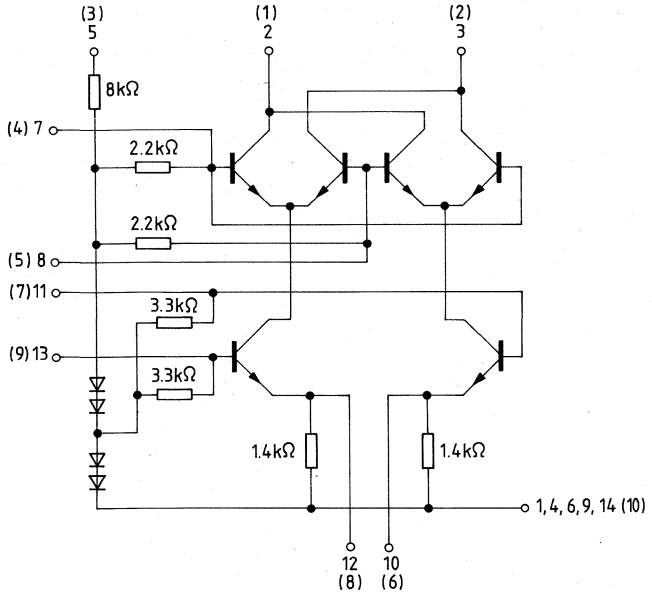
All connections mentioned in the index refer to S 042 P (e.g. I_2)

Test circuit



Connections in parentheses apply to S 042E

Circuit diagram

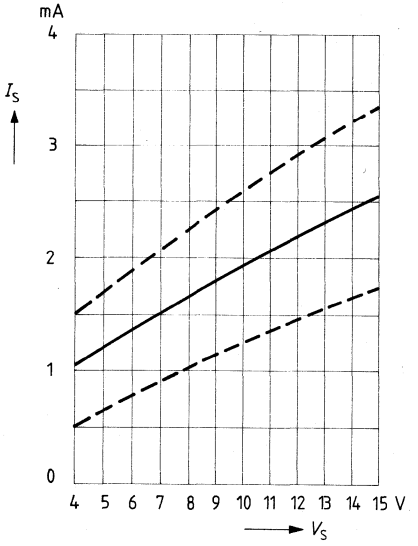


Connections in parentheses apply to S 042 E

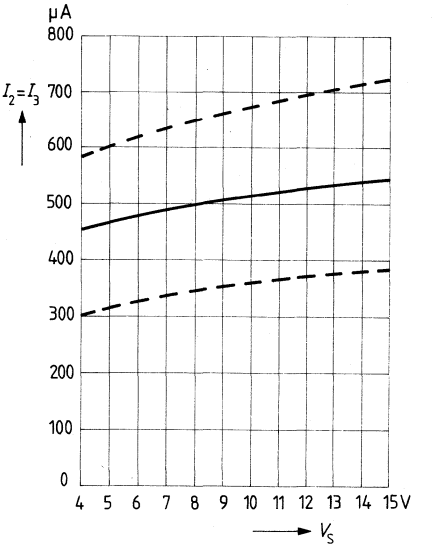
A galvanic connection between pins 7 and 8 and pins 11 and 13 through coupling windings is recommended.

Between pins 10 and 14 (ground) and between pins 12 and 14, one resistance each of at least 220 Ω may be connected to increase the currents and thus the conversion transconductance. Pins 10 and 12 may be connected through any impedance. In case of a direct connection between pins 10 and 12, the resistance from this pin to 14 may be at least 100 Ω. Depending on the layout, a capacitor (10 to 50 pF) may be required between pins 7 and 8 to prevent oscillations in the VHF band.

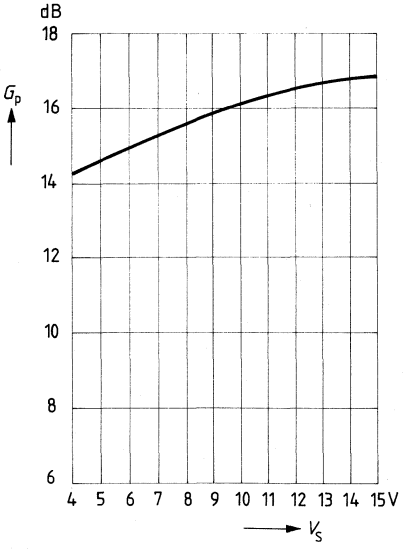
Total current consumption versus supply voltage



Output current versus supply voltage

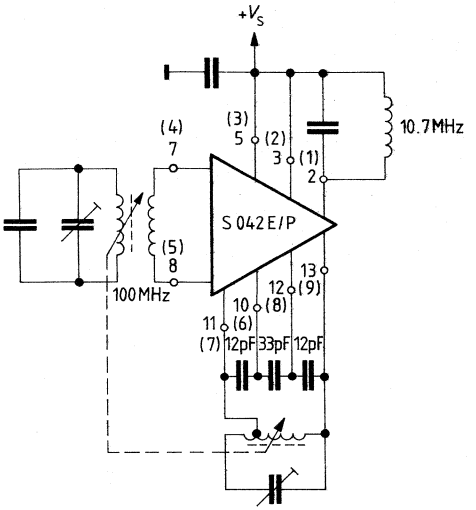


Power gain versus supply voltage



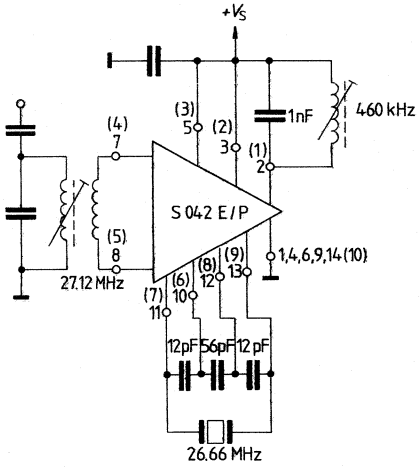
Application circuits

VHF mixer with inductive tuning



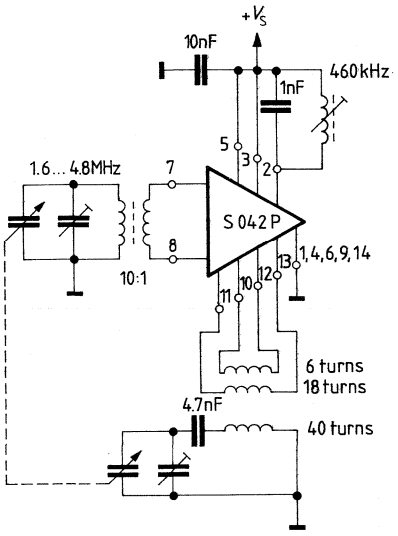
Connections in parentheses apply to S 042 E

Mixer for remote control receivers
without oscillator



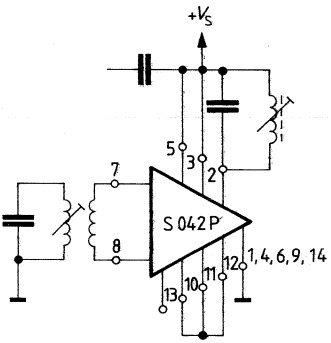
Connections in parentheses apply to S 042 E

Mixer for short-wave application
in self-oscillating operation



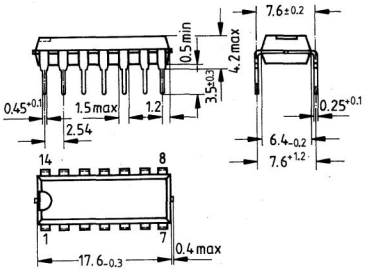
For overtone crystals an adequate inductance is recommended between pins 10 and 12 to avoid oscillations to the fundamental tone.

Differential amplifier with internal neutralization, also suited for use as limiter for frequencies up to 50 MHz or at higher currents up to 100 MHz



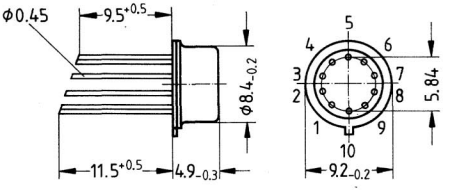
Package Outlines

Plastic plug-in package 20 A 14 DIN 41866, 14 pins, DIP



Approx. weight 1.1 g

Metal case 5 J 10 DIN 41873 (similar to TO-100)



Approx. weight 1.1 g

Dimensions in mm