

NARROW BAND FM IF AMPLIFIER

FEATURES

- Low Voltage Operation
- Two Stage IF Limiter
- Mixer
- Adjustable Internal Regulator

APPLICATIONS

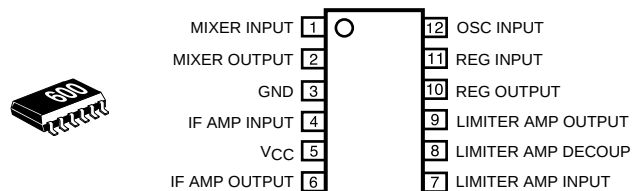
- GPS Systems
- Digital Communications

DESCRIPTION

The TK14600 is a low operating voltage FM IF system designed for use in GPS receivers and other digital communications systems. This IC contains a high gain 2-stage IF limiter with an internal voltage regulator.

The TK14600 is available in the SSOP-12 (MFP-12) surface mount package.

TK14600



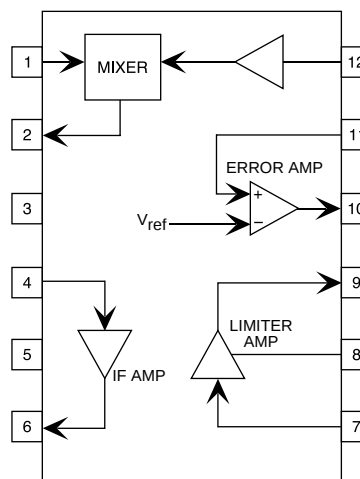
ORDERING INFORMATION

TK14600M □□

Tape/Reel Code

TAPE/REEL CODE
 BX: Bulk/Bag
 TL: Tape Left
 MG: Magazine

BLOCK DIAGRAM



TK14600

ABSOLUTE MAXIMUM RATINGS

Maximum Supply Voltage	6 V	Lead Soldering Temp. (10 sec.)	235 °C
Operating Voltage Range	2.3 to 5.5 V	Storage Temperature Range	-55 to +150 °C
Junction Temperature	150 °C	Operating Temperature Range	-30 to +80 °C
Power Dissipation (Note 1)	250 mW		

TK14600 ELECTRICAL CHARACTERISTICS

Test Conditions: $V_{CC} = 3\text{ V}$, $F_{RF} = 20\text{ MHz}$, $F_{OSC} = 18.9\text{ MHz}$, Injection Level = -5dBm, $F_{IF} = 1.1\text{ MHz}$

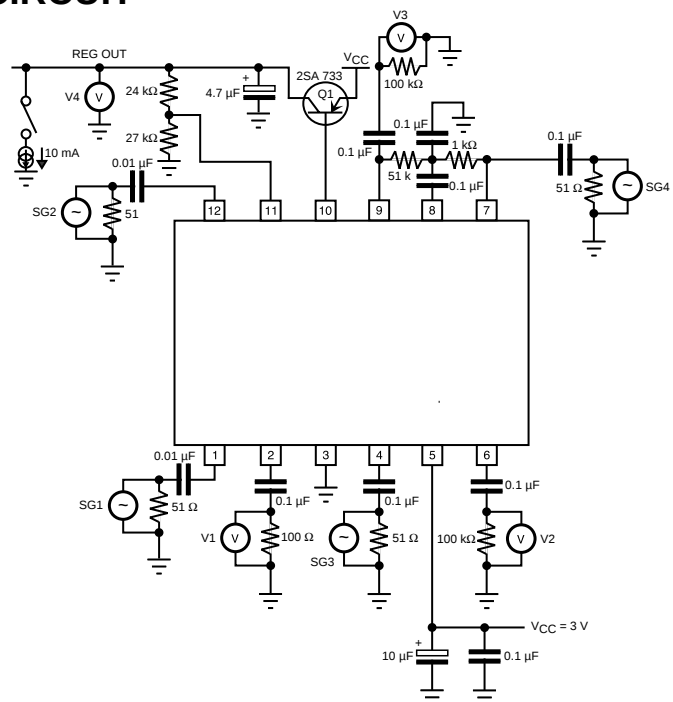
SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC}	Supply Current	No input	2.0	2.7	3.4	mA
GM	Mixer Transfer Gain	$f_{RF} = 20.0\text{ MHz}$, 50 dB μ input $f_{OSC} = 18.9\text{ MHz}$, -5 dBm input	24	30	36	dB
f_{IN}	Mixer Operating Frequency Range		0.1		40	MHz
GIF1	IF Amp Gain	40 dB μ input, $f_{IF} = 1.1\text{ MHz}$	24	30	36	dB
V_{OUT1}	IF Amp Output Voltage	80 dB μ input, $f_{IF} = 1.1\text{ MHz}$	0.22	0.33	0.44	V _{P-P}
GIF2	Limiter Amp Gain	20 dB μ input, $f_{IF} = 1.1\text{ MHz}$	65	75	85	dB
V_{OUT2}	Limiter Amp Output Voltage	80 dB μ input, $f_{IF} = 1.1\text{ MHz}$	0.6	1.0	1.4	V _{P-P}
f_{IF}	IF Amp, Limiter Amp Operating Frequency Range		0.1		5	MHz
V_R	Voltage Regulator Output	$I_{OUT} = 10\text{ mA}$	1.8	2.0	2.2	V

Note 1: Power dissipation is 250 mW in free air. Derate at 2.0 mW/°C for operation above 25 °C.

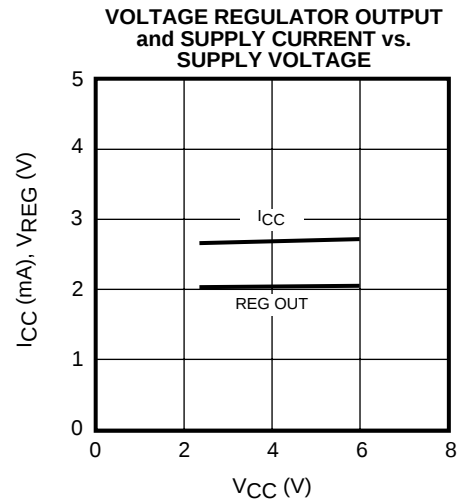
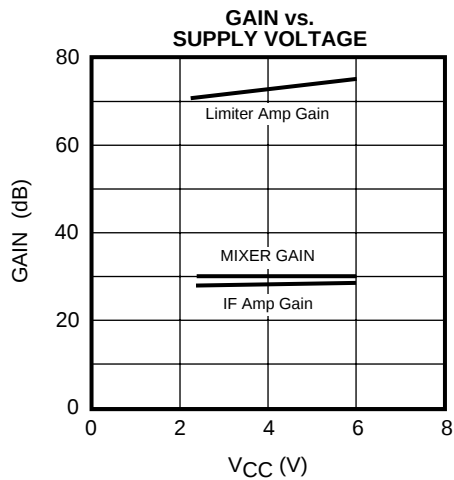
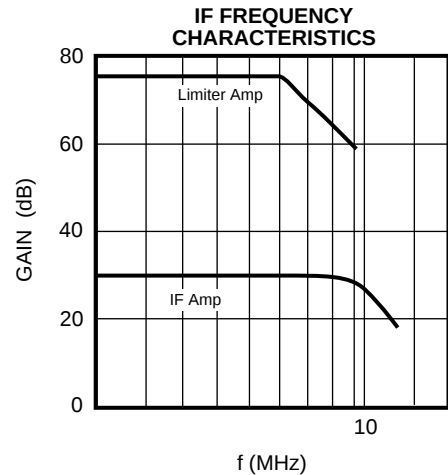
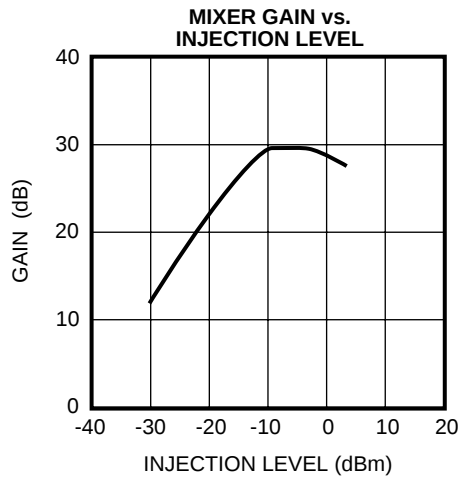
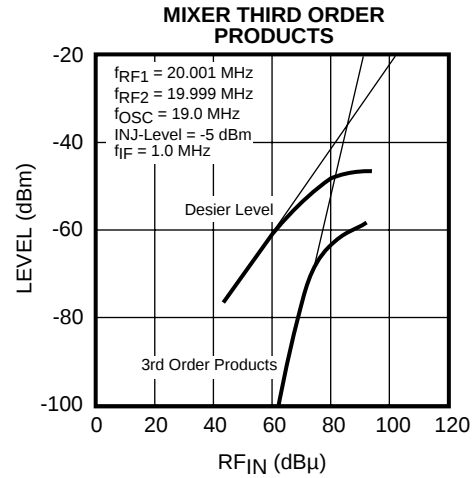
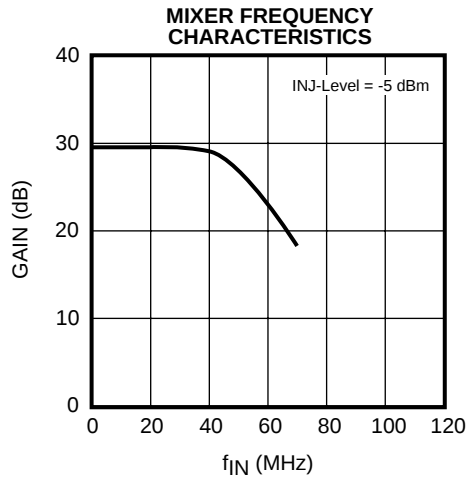
TEST CIRCUIT

Test Conditions: $V_{CC} = 3\text{ V}$, $T_A = 25\text{ °C}$

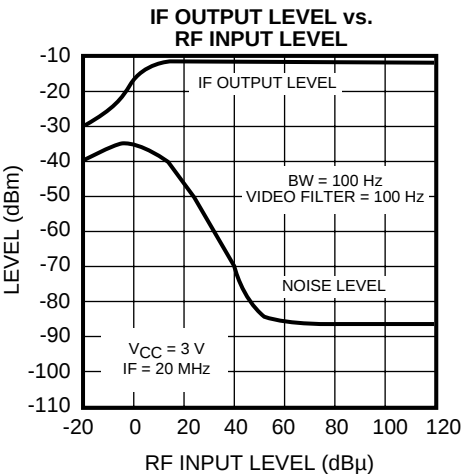
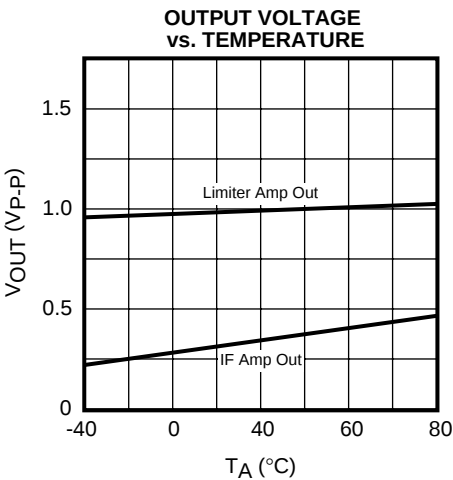
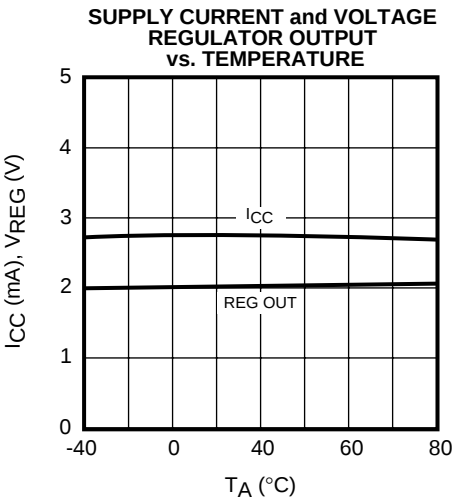
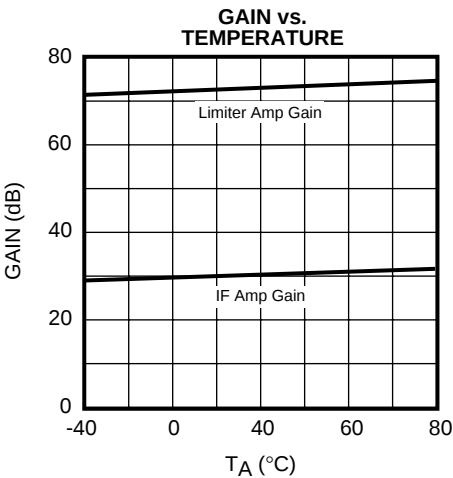
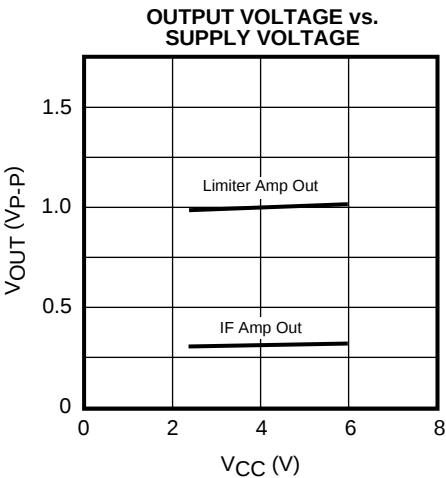
Mixer	SG1 (RF Input)	20 MHz Non-mod
	SG2 (Local Input)	18.9 MHz Non-mod
	V1 (IF Output)	1.1 MHz
IF Amp	SG3 (IF1 Input)	1.1 MHz Non-mod
	V2 (IF1 Output)	
Limiter Amp	SG4 (IF2 Input)	1.1 MHz Non-mod
	V3 (IF2 Output)	
Regulator	V4 (Regulator Output)	



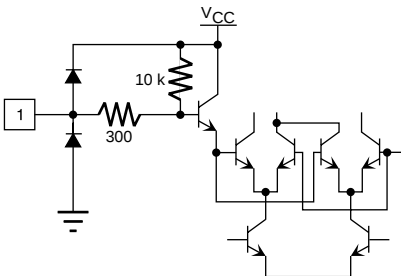
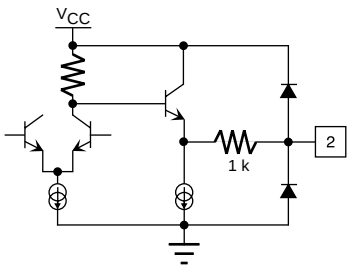
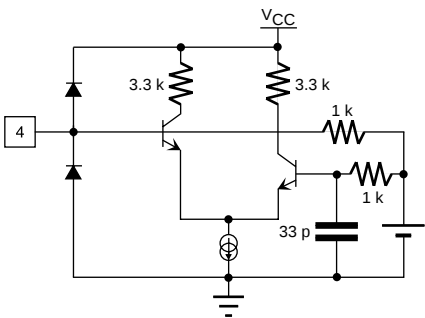
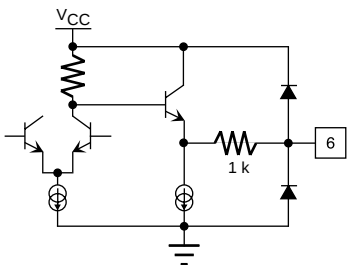
TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



PIN FUNCTION DESCRIPTION
 $V_{CC} = 3\text{ V}$, $f_{RF} = 20\text{ MHz}$, $f_{OSC} = 19\text{ MHz}$, Injection Level: -3 dBm , $f_{IF} = 1\text{ MHz}$

PIN NO.	SYMBOL	VOLTAGE	INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
1	MIXER INPUT	0.95 V		Mixer RF Input Pin The operating frequency range is up to 40 MHz. This pin is internally terminated with a 3 kΩ resistor.
2	MIXER OUTPUT	2.0 V		Mixer Output Pin The output impedance is 1 kΩ.
3	GND			GND Pin
4	IF AMP INPUT	2.3 V		IF Amplifier Input Pin. The input impedance is 1 kΩ. The voltage gain is approximately 28 dB. The IF amplifier frequency range is up to 3 MHz.
5	V_{CC}			Power Supply Pin. The supply voltage range is 2.3 to 5.5 V.
6	IF AMP OUTPUT	2.05 V		IF Amplifier Output The output impedance is 1 kΩ. The typical level is 300 mV_{P-P}.

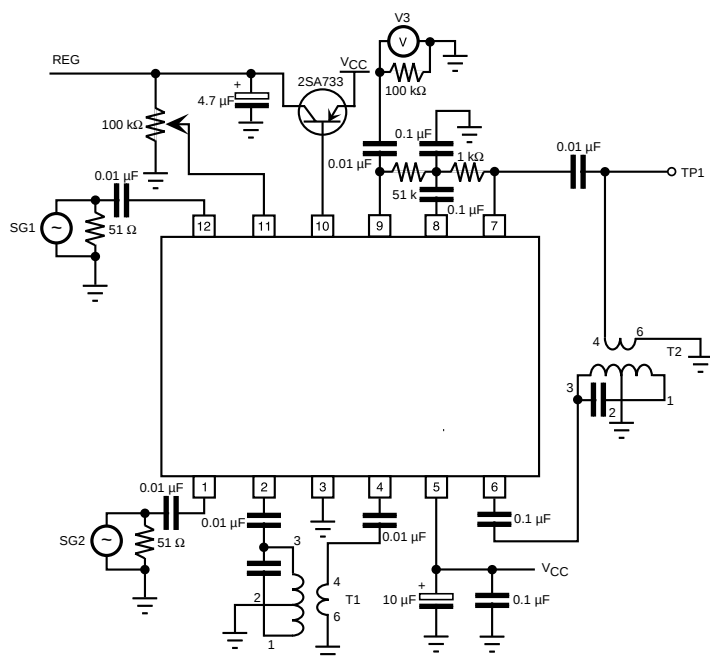
PIN FUNCTION DESCRIPTION

$V_{CC} = 3\text{ V}$, $f_{RF} = 20\text{ MHz}$, $f_{OSC} = 19\text{ MHz}$, Injection Level: -3 dBm , $f_{IF} = 1\text{ MHz}$

PIN NO.	SYMBOL	VOLTAGE	INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
7	LIMITER AMP INPUT	1.85 V		Limiter Amplifier Input Pin. The input impedance is $1\text{ k}\Omega$. The gain of this stage is approximately 70 dB. The limiter frequency range is up to 3 MHz.
8	LIMITER AMP DECOUPLING	1.78 V		Limiter Amplifier Decoupling Pin. A $0.1\text{ }\mu\text{F}$ decoupling capacitor is connected to this pin.
9	LIMITER AMP OUTPUT	1.89 V		Limiter Amplifier Output Pin. The output impedance is approximately $200\text{ }\Omega$. The typical output level is 1 V_{P-P}. This value is suitable for CMOS interface.
10	REGULATOR OUTPUT			Regulator Control Output Pin. This pin is the regulator's error amplifier output pin. This pin drives the external PNP transistor base.

PIN NO.	SYMBOL	VOLTAGE	INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
11	REGULATOR INPUT			Error Amplifier Input Pin. The reference voltage of the error amplifier is approximately 1 V. Therefore, the regulator's output voltage is determined as follows: $V_{OUT} = 1.0 \times (R1 + R2)/R2$
12	OSC INPUT	2.98 V		Local Oscillator Input Pin

APPLICATION CIRCUIT



RF Input Frequency 20.1 MHz

Local Input Frequency 19.0 MHz, Inj. Level -5 dBm

IF Frequency 1.1 MHz

 $V_{CC} = 3.0 \text{ V}$

IF Coil Application (T1, T2)

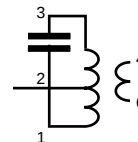
TOKO Part Number A7LCS-12434N

Center Frequency 1.1 MHz

Internal Capacitor	180 pF
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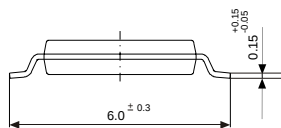
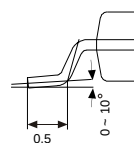
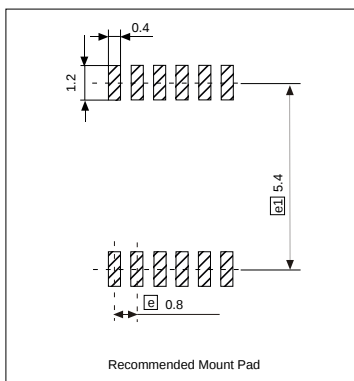
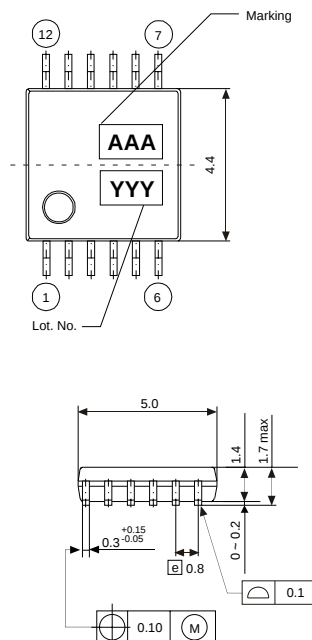
Unloaded Q.	Above 80
10	10
20	20
30	30
40	40
50	50
60	60
70	70
80	80
90	90
100	100

Winding	(1-3)	64T.
	(2-3)	11T.
	(4-6)	11T.



PACKAGE OUTLINE

SSOP-12 (MFP12)



Dimensions are shown in millimeters
Tolerance: x.x = ± 0.2 mm (unless otherwise specified)

Marking Information

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