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CH1295/1296

# DTMF GROUP FILTERS

## GENERAL DESCRIPTION

The Cermetek Filters CH1295 and CH1296 are band splitter filters designed for use as the front end of a DTMF receiver. When used in conjunction with a limiter and digital filter/DTMF integrated circuit such as the Collins/ Rockwell CRC8030 or the Mostek MK5102, the combination produces the complete functions of a dual-tone multi-frequency receiver.

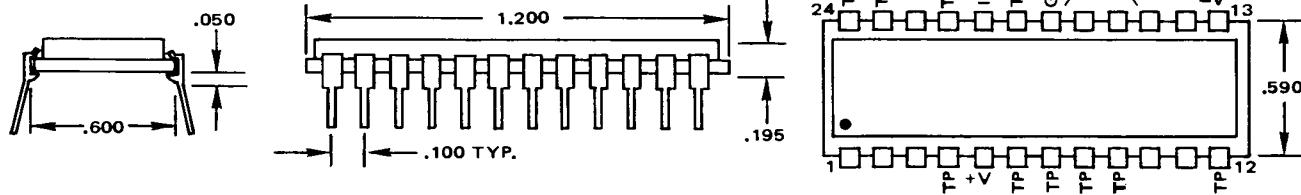
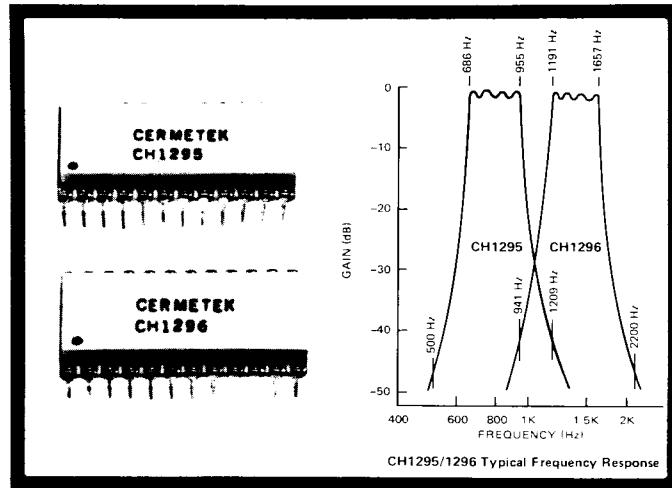
Inasmuch as the specifications for receivers vary with the application (i.e., central office, PABX, keyphone), the requirements for the receiver front end design also vary. Cermetek's CH1295 and CH1296 are designed to provide central office quality performance when implemented in accordance with the CRC8030 or Mostek MK5102 data sheet and application note. That is, the CH1295 and CH1296 provide  $\geq 40$  dB attenuation between the high and low groups and  $\geq 50$  dB of dial tone rejection.

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The following are for  $\pm 12$  VDC supplies,  $0 \leq T_A \leq 70^\circ C$

ELECTRICAL CHARACTERISTICS	Min.	Typ.	Max.	Units
Passband Ripple		1.0	3.0	dB Pk-Pk
Gain <sup>1,2</sup>	-1.0	0	+1.0	dB
Attenuation <sup>3,4</sup>	40			dB
Input Signal, W/O Clipping			+10	dBm
Input Impedance	100	150		K $\Omega$
Power Consumption $T_A = +70^\circ C$		250	360	mW
$T_A = 0^\circ C$		290	480	mW
Maximum Supply Voltage			$\pm 18$	VDC

### NOTES:

- (1) CH1295: Measured at 697, 770, 851, 941 Hz
- (2) CH1296: Measured at 1209, 1336, 1477, 1633 Hz
- (3) CH1295: Measured at 1209 Hz relative to 941 Hz and at 500 Hz relative to 697 Hz
- (4) CH1296: Measured at 941 Hz relative to 1209 Hz and at 2200 Hz relative to 1633 Hz

CH1295/1296 DTMF GROUP FILTERS

## DTMF APPLICATIONS

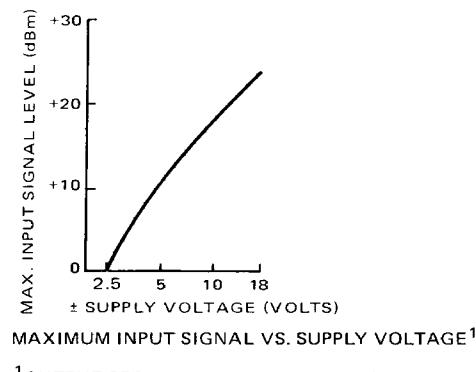
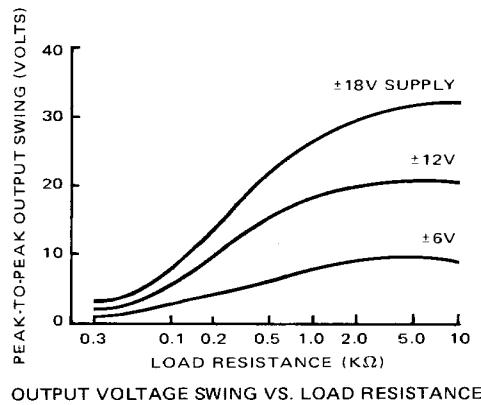
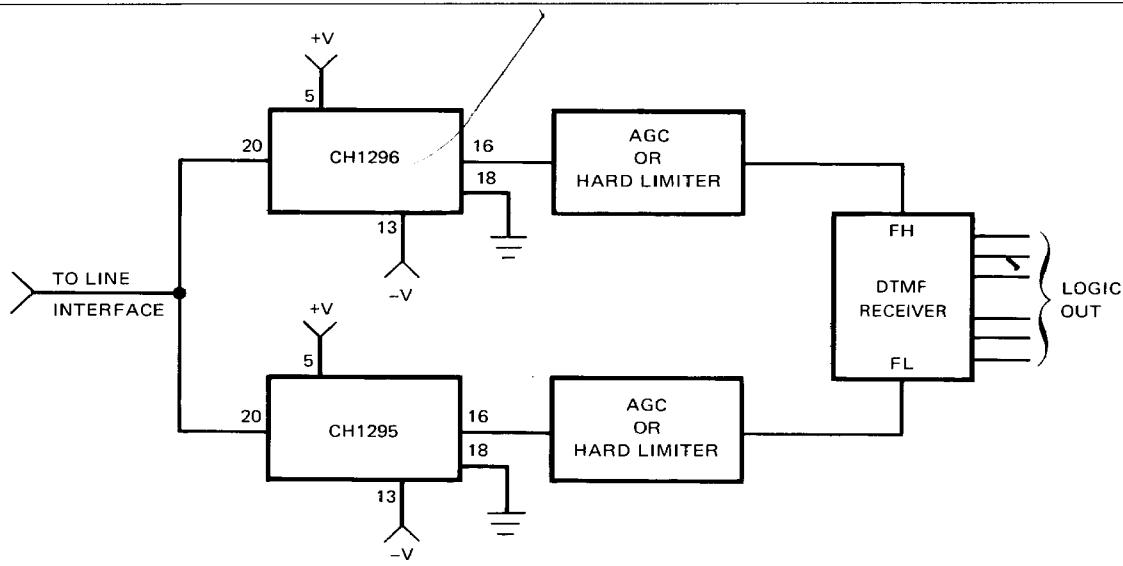
Dual-Tone Multi-Frequency (DTMF) or Touch-Tone® signaling has made telephone communication faster, more efficient and more convenient than dial pulse signaling. Touch-Tone® telephone instruments or automatic dialers generate a tone pair representing the "dialed" number and sends them over the lines to a receiver which detects the tones and reliably identifies the number. The tone pair is made up of one tone from each of a low frequency group (697 Hz, 770 Hz, 852 Hz, 941 Hz) and a high frequency group (1209 Hz, 1336 Hz, 1477 Hz, 1633 Hz). These non-harmonically related frequencies help protect the message against false-keying by stray signals and voice generated tones.

A DTMF receiver must recognize the dual tones within a certain bandwidth while tolerating dial-tone, noise, input amplitude variation and amplitude differential between the two tones ("twist"). In addition,

the receiver has to comply with timing restrictions imposed by the DTMF generation process and meet other specific requirements of the particular application.

Historically, DTMF receivers have been implemented with all-analog filtering techniques (i.e., phase-locked loops, LC filters and active filters). Recent advances in monolithic integrated circuit technology have made it possible to perform most of the DTMF receiver functions in a single MOS digital device. This type of integrated circuit is presently available from either the Collins Division of Rockwell International or Mostek Corporation.

The combination of Cermetek's CH1295 and CH1296 DTMF group filters and a dual limiter with the Collins CRC8030 or Mostek MK5102 implements a complete DTMF receiver of central office quality.



<sup>1</sup>OUTPUT SECOND HARMONIC DOWN  $\geq 40$  dB

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