



## MM5554 frequency divider general description

The MM5554 frequency divider provides six stages of binary division to produce six octave-related outputs of an electronic musical instrument tone generator. Each divider stage consists of an asynchronous, DC-coupled flip-flop. The six stages are internally connected in cascades of one, two, and three flip-flops. Each flip-flop drives a push-pull output buffer, which provides low output impedance in both logic states. Two of the internal cascades also provide trigger outputs for use in cascading the divider stages. The timing diagram shown results from connecting the same input trigger to all three inputs.

The MM5554 complements the MM5555/MM5556

chromatic frequency generator; output characteristics and power supply requirements are compatible. The MM5554 is packaged in a 14-lead dual-in-line package.

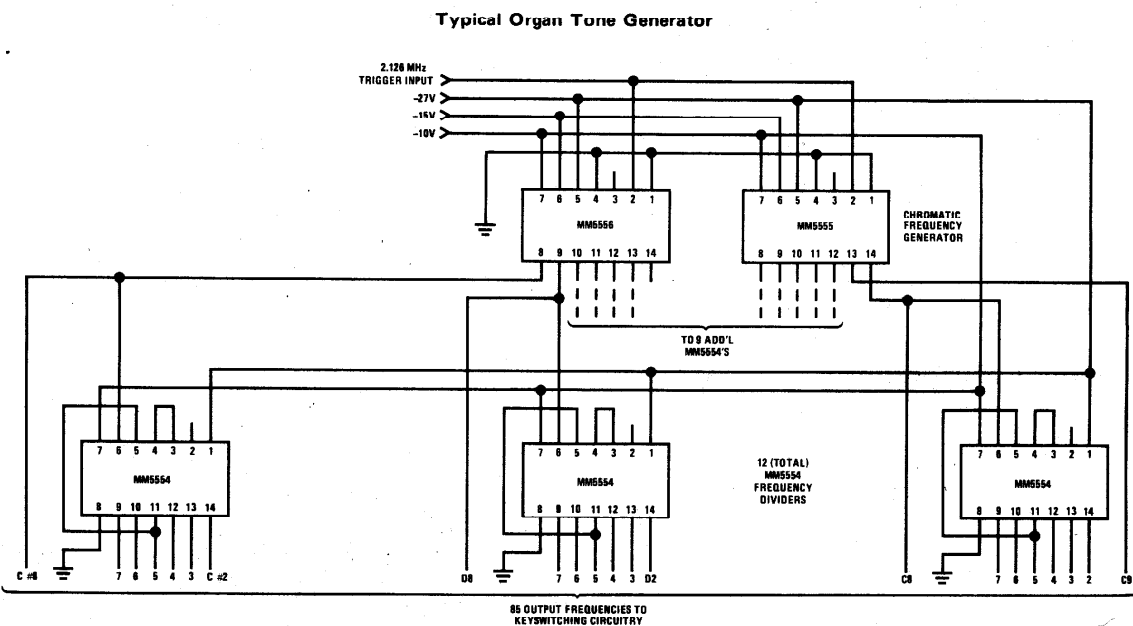
### features

- 0 to 500 kHz toggle frequency
- 1-, 2-, 3-stage partitioning

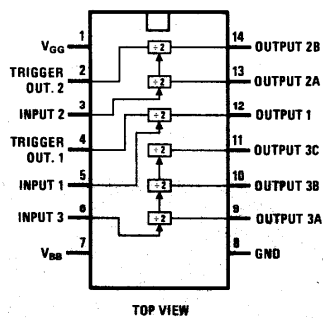
### applications

- Electronic organs
- Electronic music synthesizers
- Musical instrument tuners

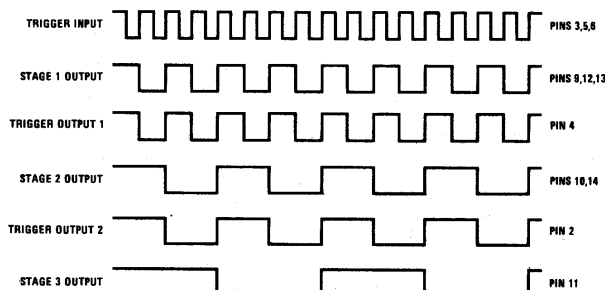
## logic and connection diagrams



**Dual-In-Line Package**



**Timing Diagram**



# MM5554 frequency divider

## absolute maximum ratings

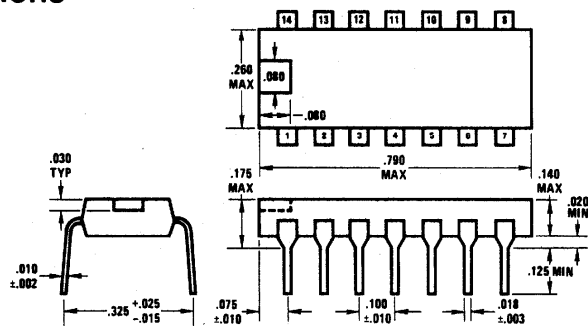
	SYMBOL	MIN	MAX	UNITS
Logic Supply Voltage	$V_{GG}$	+0.3	-33	V
Buffer Supply Voltage	$V_{BB}$	+0.3	-18	V
Trigger Input Voltage	$V_{IT}$	+0.3	-18	V
Power Dissipation	$P_D$		250	mW
Storage Temperature	$T_S$	-55	+100	°C
Operating Temperature	$T_A$	0	+70	°C

## electrical characteristics

$T_A$  within operating range ( $V_{GG} = -27 \pm 2V$ ,  $V_{BB} = -10 \pm .5V$ ), unless otherwise noted.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
<b>Inputs:</b>					
Frequency	$f_{IT}$	DC		500	kHz
Rise and Fall Times (10% to 90%)	$t_r, t_f$			25	$\mu s$
Pulse Width (at 90%)	$p_w$	1			$\mu s$
Logical High Level	$V_{ITH}$	+0.3	0	-2.5	V
Logical Low Level	$V_{ITL}$	-7.0	-10	-18	V
Leakage Current @ $V_{ITL} = -18V$	$I_{ITL}$			1.0	$\mu A$
<b>Trigger Outputs: (loaded 10M ohm to ground, <math>T_A = 25^\circ C</math>)</b>					
Logical High Level	$V_{OTH}$	0		-1.5	V
Logical Low Level	$V_{OTL}$	-10			V
<b>Outputs: (loaded 20K ohm to ground and 20K ohm to <math>V_{BB}</math>, <math>T_A = 25^\circ C</math>)</b>					
Logical High Level	$V_{OH}$	0		-1.0	V
Logical Low Level	$V_{OL}$	-8.0		$V_{BB}$	V
<b>Supply Currents: (no output loads, <math>T_A = 25^\circ C</math>)</b>					
Logic Supply	$I_{GG}$		2	4	mA
Buffer Supply	$I_{BB}$			20	$\mu A$

## physical dimensions



**Molded Dual-In-Line Package (N)**  
Order Number MM5554N

Manufactured under one or more of the following U.S. patents: 3083262, 3189758, 3231797, 3303356, 3317671, 3323071, 3381071, 3408542, 3421025, 3426423, 3440498, 3518750, 3519897, 3557431, 3560765, 3566218, 3571630, 3575609, 3579059, 3593069, 3597640, 3607469, 3617859, 3631312, 3633052, 3638131, 3648071, 3651565.

### National Semiconductor Corporation

2900 Semiconductor Drive, Santa Clara, California 95051, (408) 732-5000/TWX (910) 339-9240

### National Semiconductor GmbH

8080 Fuerstenfeldbruck, Industriestrasse 10, West Germany, Telephone (01841) 1484/Telex 527-649

### National Semiconductor (UK) Ltd.

Larkfield Industrial Estate, Greenock, Scotland, Telephone 33251/Telex 778-632

