



## Electronic Organ Circuits

### MM5823, MM5824 frequency dividers

#### general description

These frequency dividers provide 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 of the MM5823 are internally connected in cascades of two, one, one, and two flip-flops. Each flip-flop drives a push-pull output buffer which provides very low output impedance in both logic states.

The six stages of the MM5824 are internally connected in cascades of one, two and three flip-flops. Each flip-flop drives a push-pull output buffer which provides very 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 MM5823 and MM5824 complement the MM5832, MM5833 and MM5555, MM5556 chromatic frequency generators; output characteristics and power supply requirements are compatible. The MM5823 and MM5824 are packaged in a 14-lead dual-in-line package.

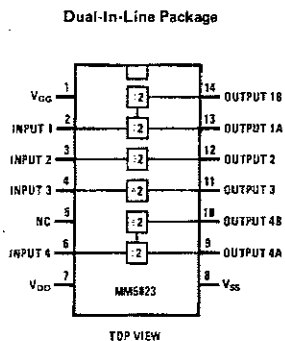
#### features

- 0 to 100 kHz toggle frequency
- 1, 2, 3 or 2, 1, 1, 2 stage partitioning

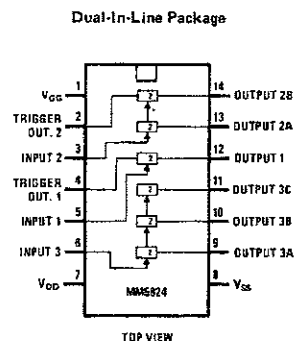
#### applications

- Electronic organs
- Electronic music synthesizers
- Musical instrument tuners

#### connection diagrams



Order Number MM5823N  
See Package 18



Order Number MM5824N  
See Package 18

**absolute maximum ratings**

Logic Supply Voltage ( $V_{GG}$ )	0.3V to -30V
Buffer Supply Voltage ( $V_{DD}$ )	0.3V to -18V
Trigger Input Voltage ( $V_{IT}$ )	0.3V to -25V
Power Dissipation ( $P_D$ )	250 mW
Storage Temperature ( $T_S$ )	-55°C to +150°C
Operating Temperature ( $T_A$ )	0°C to +70°C

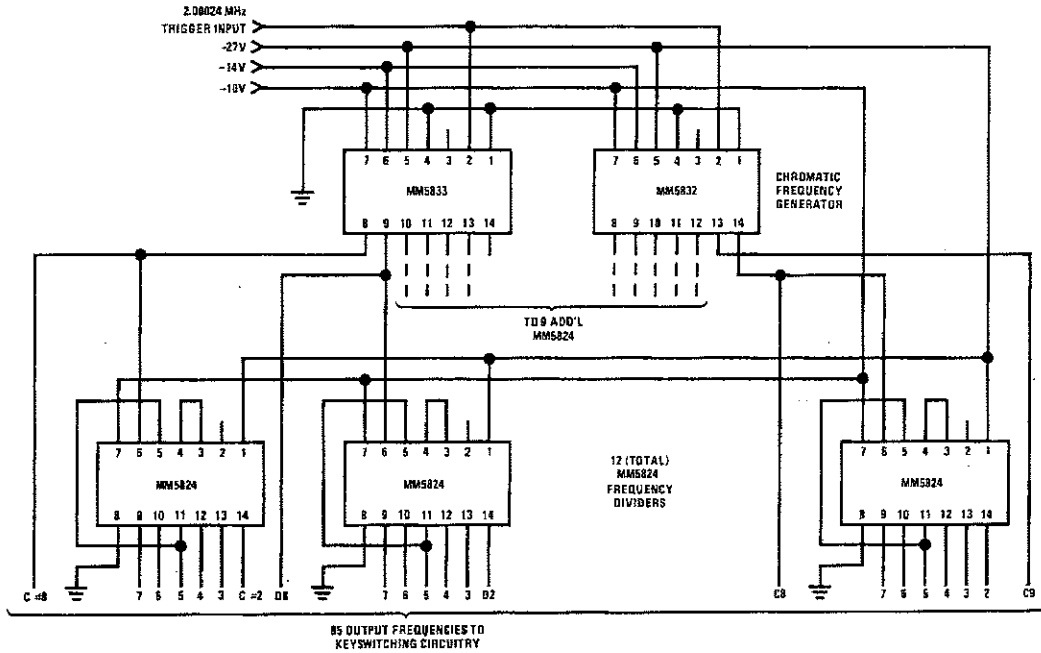
**electrical characteristics**

$T_A$  within operating range ( $V_{GG} = -27 \pm 1V$ ,  $V_{DD} = -11.5 \pm 0.5V$ ,  $V_{SS} = 0V$ ), unless otherwise noted.

PARAMETER	MIN	TYP	MAX	UNITS
<b>Inputs:</b>				
Frequency ( $f_{IT}$ )	DC		100	kHz
Rise and Fall Times (10% to 90%) ( $t_r$ , $t_f$ )			25	$\mu s$
Pulse Width (at 90%) ( $p_w$ )	2			$\mu s$
Logical High Level ( $V_{ITH}$ )	-2.0	$V_{SS}$	0.3	V
Logical Low Level ( $V_{ITL}$ )	-18	-10	-8.0	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 ( $V_{OTH}$ )	$V_{SS}-1.5$		$V_{SS}$	V
Logical Low Level ( $V_{OTL}$ )	-18		-10	V
<b>Outputs: (loaded 10k ohm to ground and 10k ohm to <math>V_{DD}</math>, <math>T_A = 25^\circ C</math>)</b>				
Logical High Level ( $V_{OH}$ )	-0.5		-0.3	V
Logical Low Level ( $V_{OL}$ )	$V_{DD}+0.3$		$V_{DD}+0.5$	V
<b>Supply Currents: (No output loads, <math>T_A = 25^\circ C</math>)</b>				
Logic Supply ( $I_{GG}$ )		2.0	8.0	mA
Buffer Supply ( $I_{DD}$ )			20	$\mu A$

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typical application



Typical Organ Tone Generator

timing diagram

