



# M 087

## MOS INTEGRATED CIRCUITS

### TONE GENERATOR

- 12 TONE OUTPUTS TTL COMPATIBLE
- HIGH ACCURACY OF OUTPUT FREQUENCIES: ERROR LESS THAN  $\pm 0.069\%$
- LOW IMPEDANCE PUSH-PULL OUTPUTS
- LOW POWER DISSIPATION:  $< 400$  mW
- INPUT PROTECTED AGAINST STATIC CHARGES
- LOW INTERMODULATION

The M 087 is a monolithic tone generator specifically designed for electronic organs. Constructed on a single chip using low threshold P-channel silicon gate technology it is supplied in a 16-lead dual in-line plastic package.

### ABSOLUTE MAXIMUM RATINGS

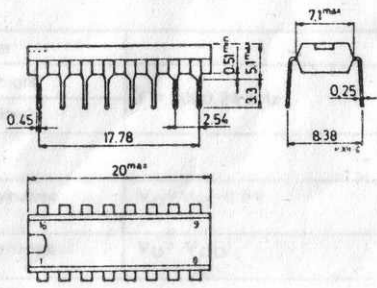
$V_{GG}^*$	Source supply voltage	-20 to 0.3	V
$V_i^*$	Input voltage	-20 to 0.3	V
$I_o$	Output current (at any pin)	3	mA
$T_{stg}$	Storage temperature	-65 to 150	$^{\circ}$ C
$T_{op}$	Operating temperature	0 to 70	$^{\circ}$ C

\* This voltage is referred to  $V_{SS}$  pin voltage

ORDERING NUMBER: M 087 B1 for dual in-line plastic package

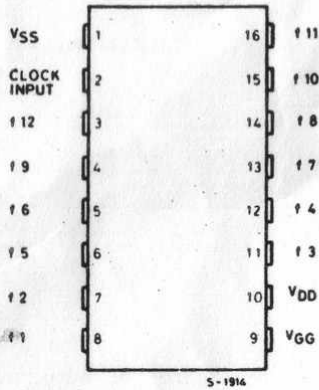
### MECHANICAL DATA

Dimensions in mm

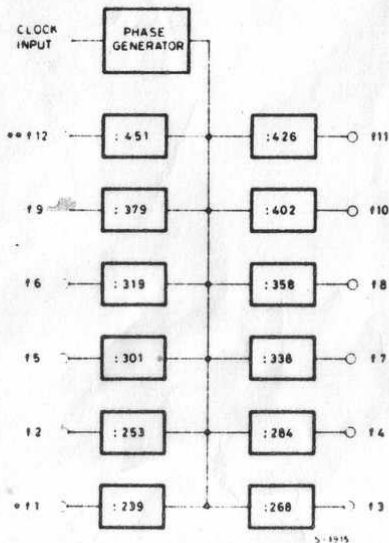


# M 087

## CONNECTION DIAGRAM



## BLOCK DIAGRAM



- \* f1 is the highest output frequency and its musical equivalent is : C
- \*\* f12 is the lowest output frequency and its musical equivalent is : C #

## STATIC ELECTRICAL CHARACTERISTICS

(positive logic,  $V_{GG} = V_{SS} - 16.15$  to  $-18.75V$ ,  $V_{DD} = V_{SS} - 9$  to  $-10V$ ,  $V_{SS} = 4.75$  to  $5.25V$ ,  $T_{amb} = 0$  to  $70^{\circ}C$  unless otherwise specified)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
<b>CLOCK INPUT</b>					
$V_{IH}$ Clock high voltage		$V_{SS} - 0.5$		$V_{SS}$	V
$V_{IL}$ Clock low voltage		$V_{SS} - 6$		$V_{SS} - 4.5$	V
<b>DATA OUTPUTS</b>					
$V_{OL}$ Output low voltage	$I_L = 0$ mA	$V_{DD}$			V
$V_{OH}$ Output high voltage	$I_L = 1$ mA	$V_{SS} - 0.5$		$V_{SS}$	V
$I_{LO}$ Output leakage current	$V_O = V_{SS} - 10V$ $T_{amb} = 25^{\circ}C$			10	$\mu A$
<b>POWER DISSIPATION</b>					
$I_{GG}$ Supply current	$T_{amb} = 25^{\circ}C$		11	13	mA
$I_{DD}$ Supply current	$T_{amb} = 25^{\circ}C$		13	16	mA

2+1

**DYNAMIC ELECTRICAL CHARACTERISTICS** (positive logic,  $V_{GG} = V_{SS} - 16.15$  to  $-18.75V$ ,  $V_{DD} = V_{SS} - 9$  to  $-10V$ ,  $V_{SS} = 4.75$  to  $5.25V$ ,  $T_{amb} = 0$  to  $70^{\circ}C$  unless otherwise specified)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
<b>CLOCK INPUT</b>					
f Clock repetition rate		15	2000.24		kHz
$t_{pw}^*$ Pulse width (clock high)	f = 2000.24 kHz	170			ns
$t_{pw}^{**}$ Pulse width (clock low)		150			ns
<b>DATA OUTPUTS</b>					
$R_{DH}$ High level output dynamic impedance	$V_O = V_{SS} - 0.5V$		1		k $\Omega$
$R_{DL}$ Low level output dynamic impedance	$V_O = V_{DD}$		1		k $\Omega$

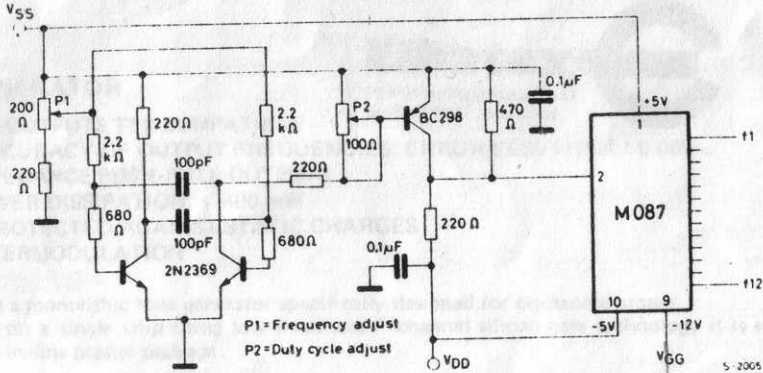
\* Measured at 90% of the swing.

\*\* Measured at 10% of the swing.

# M087



## TYPICAL APPLICATION



Handwritten notes:  
 $I_{mA} \approx 0,01A$   
 $-15V$   
 $(1,36k\Omega)$

### ABSOLUTE MAXIMUM RATINGS

- $V_{DD}$ : Source supply voltage
- $V_I$ : Input voltage
- $I_O$ : Output current (at any pin)
- $T_{stg}$ : Storage temperature
- $T_{op}$ : Operating temperature

\* This voltage is referred to  $V_{DD}$  pin voltage.

ORDERING NUMBER: M087 01 for dual in-line plastic package

### MECHANICAL DATA

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