Texas Instruments TMS0803

Features

With the TMS0803 Texas Instruments introduced in the year 1974 the successor of the TMS0102 single-chip calculator design. In opposite to the TMS0102 with the discrete segment- and digit-drivers the TMS0803 needs only external digit-drivers to drive the seven-segment LED display.

Due to a flexible design concept with a programmable ROM some design variations appeared.

A typical calculator built around the TMS0803 family performs the four basic functions +,-,*, : and adds the %-function.

Family Members and Usage

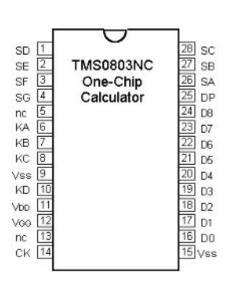| Type	Calculator	Digits	Functions
TMS0801	Sinclair Cambridge	sign + 8	Constant
TMS0803	TI-1500, TI-2500-II	sign + 8	%
TMS0805	Sinclair Scientific	sign + 8	UPN
TMS0806	Exactra 19	6	
TMS0807	Canon LE-85	sign + 8	sqr(x), %

Technical Specification

Item	Min	Typ	Max	Unit	Comments
V_{SS}		0		V	
V_{DD}	-10.5	-10.0	-9.5	V	
V_{GG}	-16.3	-15.8	-15.3	V	

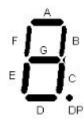## Housing

The TMS0803 uses a standard DIP-28 package.

Pin Description

Pin	IO	Function	Pin	IO	Function
1	O	Segment driver D	28	O	Segment driver C
2	O	Segment driver E	27	O	Segment driver B
3	O	Segment driver F	26	O	Segment driver A
4	O	Segment driver G	25	O	Segment driver DP
5		n.c.	24	O	Digit driver 8 (sign)
6	I	Keymatrix input A	23	O	Digit driver 7 (MSD)
7	I	Keymatrix input B	22	O	Digit driver 6


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SD  [1]              [28] SC
SE  [2]   TMS0803NC  [27] SB
SF  [3]   One-Chip   [26] SA
SG  [4]   Calculator [25] DP
nc  [5]              [24] D8
KA  [6]              [23] D7
KB  [7]              [22] D6
KC  [8]              [21] D5
Vss [9]              [20] D4
KD  [10]             [19] D3
VDD [11]             [18] D2
VGG [12]             [17] D1
nc  [13]             [16] D0
CK  [14]             [15] Vss
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8	I	Keymatrix input C	21	O	Digit driver 5
9	V	Common Voltage	20	O	Digit driver 4
10	I	Keymatrix input D	19	O	Digit driver 3
11	V	Negative Voltage V_{DD}	18	O	Digit driver 2
12	V	Negative Voltage V_{GG}	17	O	Digit driver 1
13		n.c.	16	O	Digit driver 0 (LSD)
14	O	Clock	15	V	Common Voltage

The Segment drivers A-G and the Decimal point are connected to a display in the pictured way.

Keyboard Scanmatrix

The keyboards of all calculators based on the TMS0803 family consist of a x/y-matrix connected to nine digit-driver outputs and the keymatrix inputs KA and KD.

	KA	KB	KC	KD=KC
D0		0	9	
D1		.	8	
D2		%	7	
D3		:	6	
D4		*	5	
D5		-	4	
D6		+	3	
D7	CE	=	2	
D8		C	1	

Display

Calculators based on the TMS0803 make use of a 9-digit LED-display with common cathode architecture.