

# TS6303 . TS63A03 . TS63B03

## PRODUCT PREVIEW

### 8-BIT MICROPROCESSING UNIT

The TS6303 is an 8-bit CMOS microprocessing unit which has the completely compatible instruction set with the TS6301. 128 bytes RAM, Serial Communication Interface (SCI), parallel I/O ports and multi function timer are incorporated in the TS6303. It is bus compatible with TS6800 and can be expanded up to 65 kwords. Like the TS6800 family, I/O levels is TTL compatible with +5.0 V single power supply. As the TS6303 is CMOS MPU, power dissipation is extremely low. And also TS6303 has Sleep Mode and Stand-by Mode as lower power dissipation mode. Therefore, flexible low power consumption application is possible.

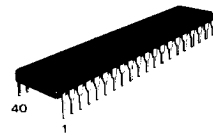
- Object Code Upward Compatible with the TS6800, TS6801, TS6802.
- Multiplexed Bus ( $D_0 \sim D_7/A_0 \sim A_7$ ), Non Multiplexed Bus.
- Abundant On-Chip Functions Compatible with the TS6301; 128 Bytes RAM, 13 Parallel I/O Lines, 16-bit Timer, Serial Communication Interface (SCI).
- Low Power Consumption Mode; Sleep Mode, Stand-by Mode.
- Minimum Instruction Execution Time  
 $1 \mu s$  ( $f = 1 \text{ MHz}$ ),  $0.67 \mu s$  ( $f = 1.5 \text{ MHz}$ ),  $0.5 \mu s$  ( $f = 2.0 \text{ MHz}$ ).
- Bit Manipulation, Bit Test Instruction.
- Error Detecting Function; Address Trap, Op Code Trap.
- Up to 65 kwords Address Space.

PART NUMBER	CLOCK FREQ
TS6303R	1 MHz
TS63A03R	1.5 MHz
TS63B03R	2 MHz

## CMOS

### 8-BIT MICROPROCESSING UNIT

#### CASE CB-182

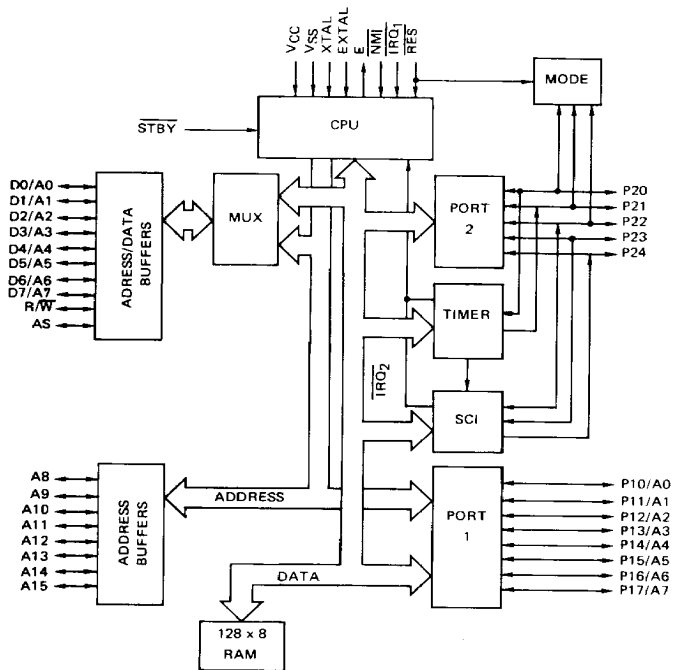


**P SUFFIX**  
PLASTIC PACKAGE

#### PIN ASSIGNMENT

VSS	1	40	E
XTAL	2	39	AS
EXIAL	3	38	R/W
NMI	4	37	D0/A0
TRQ	5	36	D1/A1
RES	6	35	D2/A2
STBY	7	34	D3/A3
P20	8	33	D4/A4
P21	9	32	D5/A5
P22	10	31	D6/A6
P23	11	30	D7/A7
P24	12	29	A8
A0/P10	13	28	A9
A1/P11	14	27	A10
A2/P12	15	26	A11
A3/P13	16	25	A12
A4/P14	17	24	A13
A5/P15	18	23	A14
A6/P16	19	22	A15
A7/P17	20	21	VCC

**BLOCK DIAGRAM**



These specifications are subject to change without notice.  
 Please inquire with our sales offices about the availability of the different packages

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## MICROCOMPUTERS

### 4 BITS: ET9400 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 4	INSTRUCTION CYCLE (μs)	SUPPLY (V)	ALT. SOURCE	Nb PINS
ETL9410/11/13	NMOS Low Power	512	32	15-40	4.5-6.3	COP410L/11L/13L	24/20
ET9420/21/22	NMOS	1024	64	4-10	4.5-6.3	COP420/21/22	28/24/20
ETL9420/21/22	NMOS Low Power	1024	64	15-40	4.5-6.3	COP420L/21L/22L	28/24/20
ETL9444/45	NMOS Low Power	2048	128	15-40	4.5-6.3	COP444L/45L	28/24
ET94100/110/144	NMOS	512 to 2048	32 to 128	4-15	4.5-6.3	—	24/28/40

Common features: software compatible (same instruction set). Pin compatible. Three levels of stack. 8 bidirectional tristate I/O. Serial I/O and internal counter, interrupt programmable I/O. All devices are with plastic package (DIL) and also available with extended temperature range (-40°C to +85°C): ET93XX or ETC93XX.

## MICROCOMPUTERS

### 8 BITS: EF6804 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 8	I/O	ALT. SOURCE	Nb PINS
EF6804P2	HMOS	1024	32	20	MC6804P2	28
EF6804J2*	HMOS	1024	32	12	MC6804J2	20
EF68HC04J3*	HCMOS	2048	124	12	—	20

Available in plastic, ceramic, DIL packages or chip-carriers. All software compatible. Timer.

## MICROCOMPUTERS

### 8 BITS: EF6805 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 8	I/O	FEATURES	ALT. SOURCE	Nb PINS
EF6805P2	HMOS	1100	64	20	—	MC6805P2- HD6805S1	28
EF6805P4	HMOS	1100	112	20	Stand-by RAM	MC6805P4	28
EF6805P6	HMOS	1796	64	20	—	MC6805P6	28
EF6805R2	HMOS	2048	64	32	A/D Converter	MC6805R2	40
EF6805R3	HMOS	3776	112	32	A/D Converter	MC6805R3- HD6805W0	40
EF6805T2	HMOS	2508	64	19	On-chip PLL	MC6805T2	28
EF6805U2	HMOS	2048	64	32	—	MC6805U2	40
EF6805U3	HMOS	3776	112	32	—	MC6805U3	40
EF6805CT4	HMOS	4096	240	29	UACC, stand-by RAM	MC6805CT	40
EF6805TV*	HMOS	6144	96	32	Remote contrl. interf.	—	40

Available in plastic, ceramic, DIL packages or chip-carrier. Ext. temp range (-40°C, +85°C). All software compatible. Interrupt capabilities. Timer.

## MICROCOMPUTERS

### 8 BITS: EF6801 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 8	I/O	FEATURES	ALT. SOURCE	Nb PINS
EF6801	HMOS	2048	128	31	SCI, Timer, stand-by RAM	MC6801- HD6801-S0	40
EF6801-U4	HMOS	4096	192	31	Enhanced SCI and Timer Stand-by RAM	MC6801-U4 HD6801-U0	40
EF68HC11*	HCMOS	4096	256	—	SCI-SPI-EEPROM ADC-Enhanced Timer Real Time Inter. Watchdog	MC68HC11A4	48/52

Common features: 8 x 8 multiply instruction. Timer. 64 Kbyte addressing space. Serial communication interface. All devices available with DIL ceramic or plastic package and surface mount package (-40°C to +85°C).

\* To be introduced.

**THOMSON SEMICONDUCTEURS**

**MICROPROCESSORS****4-BIT SLICES:  
2900 FAMILY AND PERIPHERALS**

<b>PART Nber</b>	<b>DESCRIPTION</b>	<b>ALT. SOURCE</b>	<b>Nb PINS</b>
TS2901B	4 Bit bipolar microprocessor slice	AM2901B	40
TS2901C	Improved speed 4 Bit microprocessor slice	AM2901C	40
TS2902A	High speed look-ahead carry generator	AM2902A	16
TS2909A	Microprogram sequencer	AM2909	28
TS2910	Microprogram controller	AM2910	40
TS2911A	Microprogram sequencer	AM2911	20
TS2914	Vectored priority interrupt controller	AM2914	40
TS2915A	Quad 3 State Bus Transceiver with interface logic	AM2915	24
TS2917A	Quad 3 State Bus Transceiver with interface logic	AM2917A	20
TS2918	Quad D register with standard and 3 State Outputs	AM2918	16
TS2919	Quad D register with Dual 3 State Outputs	AM2919	20

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**6800 MICROPROCESSORS**

**8 BIT MPU**

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF6800	Bidirectional data and address bus 16 bit address bus		MC6800	1
EF68A00	DMA capabilities	NMOS	MC68A00	1.5
EF68B00	72 instructions - 7 addressing modes		MC68B00	2
EF6802	128 bytes of RAM On chip oscillator		MC6802	1
EF68A02	Expandable up to 64 kbytes	NMOS	MC68A02	1.5
EF68B02	72 instructions - 7 addressing modes 6800 compatible		MC68B02	2
EF6803	EF6801 without ROM - 128 bytes of RAM		MC6803	1
EF6803-1	Multiplexed address and data bus 16 bit address bus - 8 x 8 multiply	HMOS	MC6803-1	1.25
EF68A03	Serial communication interface		MC68A03	1.5
EF68B03	16 bit timer - 6800 compatible		MC68B03	2
EF6803U4	Same as above with 192 bytes of RAM	HMOS	MC6803U4	1
EF68A03U4	and enhanced timer		MC68A03U4	1.5
EF68B03U4			MC68B03U4	2
EF68HC05E2	Low power consumption - 6805 family Fully compatible with MC146805E2	HCMOS		1
EF6809	High performance 8-bit MPU with n-chip clock 64 kbytes addressing space		MC6809	1
EF68A09	Internal 16 bit structure	HMOS	MC68A09	1.5
EF68B09	59 instruction types - 10 addressing modes 6800 compatible		MC68B09	2
EF6809E			MC6809E	1
EF68A09E	External clock version of EF6809	HMOS	MC68A09E	1.5
EF68B09E			MC68B09E	2

**MICROPROCESSORS**

**16 BITS: EF68000 FAMILY**

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF68000-8	16 bit MPU 32 bit data and address registers		MC68000-8	8
EF68000-10	16 megabyte direct addressing range	HMOS	MC68000-10	10
EF68000-12	56 powerful instruction types		MC68000-12	12.5
EF68000-16	Memory mapped I/O 14 addressing modes			16
EF68008-8	8 bit data bus version of EF68000		MC68008-8	8
EF68008-10	1 megabyte direct addressing space	HMOS	MC68008-10	10
EF68008-12	Complete code compatibility with the EF68000		MC68008-12	12.5

**THOMSON SEMICONDUCTEURS**

**68000 MICROPROCESSORS****32 BITS: EF68000 FAMILY**

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
TS68020	32-bit MPU 4 Gigabyte direct, addressing range Virtual memory machine support Coprocessor interface Object code compatible with the EF68000 family	HCMOS	MC68020	

**6800 PERIPHERALS**

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF6821	Peripheral Interface Adapter (PIA) Two bidirectional 8-bit buses for interfaces to peripherals	NMOS	MC6821	1
EF68A21	Two programmable control registers		MC68A21	1.5
EF68B21	Two programmable data direction registers		MC68B21	2
EF6840	Programmable Timer Module (PTM) Three 16-bit binary counters	NMOS	MC6840	1
EF68A40	Selectable gating for frequency or pulse-width comparison		MC68A40	1.5
EF68B40			MC68B40	2
EF6850	Asynchronous Communication Interface Adapter (ACIA) 8 and 9 bit transmission	NMOS	MC6850	1
EF68A50	Peripheral/modem control functions		MC68A50	1.5
EF68B50			MC68B50	2
EF6852	Synchronous Serial Data Adapter (SSDA) 7, 8 or 9 bit transmission	NMOS	MC6852	1
EF68A52	Peripheral/modem control functions		MC68A52	1.5
EF6854	Advance Data-Link Controller (ADLC)		MC6854	1
EF68A54		MC68A54	1.5	
EF68B54		MC68B54	2	

**68000 PERIPHERALS**

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF68230-8	Parallel Interface/Timer (PI/T)	HMOS	MC68230-8	8
EF68230-10	EF68000 Bus Compatible		MC68230-10	10
EF68230-12	24 bit Programmable Timer Modes		MC68230-12	12.5
TS68564	Serial input/output	HMOS	MK68564	3-4-5
TS68901	Multi function peripheral	HMOS	MC68901	4
TS68HC901	CMOS Multi function peripheral	HCMOS	---	4

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## OTHER PERIPHERALS AND CRT CONTROLLERS

PART Nber	DESCRIPTION	TECHNOLOGY
EF9340	Alphanumeric, semigraphic display processor	NMOS
EF9341	25/21 rows of 40 Color and B/W	
EF9345	Single chip alphanumeric and semigraphic display processor 25/21 rows of 40 or 80 characters Multipage memory Color and B/W	HMOS
EF9365	Graphic display coprocessor Up to 512 x 512 interlaced Upto 256 x 256 non interlaced Color and B/W	NMOS
EF9366	Graphic display coprocessor Up to 256 x 512 non interlaced Color and B/W	NMOS
EF9367	Graphic display coprocessor Up to 512 x 1024 interlaced 50/60 Hz Color and B/W	HMOS
EF9369	"Palette" circuit for selection 16 colors among 9046 Compliatible with all display circuits	HMOS
EF68483	High performance display coprocessor	HMOS

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THOMSON SEMICONDUCTEURS

## STATIC RAMS

PART Nber	ORGANIZATION (word x bit)	ACCESS TIME (ns)	TECHNOLOGY	I <sub>CC</sub> (mA)	I <sub>SB</sub> (mA)
ET2128-3	2k x 8	150	NMOS	70	10
ET2128-4	2k x 8	200		70	10
ET2147-1	4k x 1	35	NMOS	180	30
ET2147-2	4k x 1	45		180	30
ET2147-3	4k x 1	55		180	30
ETL2147-3	4k x 1	55		125	20
EF6810	128 x 8 static RAM		MC6810		1
EF68A10			NMOS MC68A10		1.5
EF68B10			MC68B10		2

## DYNAMIC RAMS

PART Nber	ORGANIZATION (word x bit)	ACCESS TIME (ns)	TECHNOLOGY	POWER SUPPLY
TS4164-2	16k x 1	150	NMOS	+5 V (±10%)
TS4164-3	16k x 1	200		+5 V (±10%)
TS41256-12	256k x 1	120	NMOS	+5 V (±10%)
TS41256-15		150		
TS41257-12	256k x 1	120	NMOS	
TS41257-15		150		

## EPROMS

PART Nber	ORGANIZATION (word x bit)	ACCESS TIME (ns)	TECHNOLOGY	CONSUMPTION (mW)
ET2716Q	2k x 8	450	NMOS	525/132
ET2716Q1	2k x 8	350		525/132
ETC2716Q	2k x 8	450	CMOS	25/0.5
ETC2716Q1	2k x 8	350		25/0.5
ETC2732Q35	4k x 8	350	CMOS	25/0.5
ETC2732Q45	4k x 8	450		25/0.5
ET2764Q	8k x 8	250	NMOS	525/132
ET2764Q3	8k x 8	300		525/132
ET2764Q4	8k x 8	450		525/132
TS27C64-20	8k x 8	200	CMOS	75/0.5
TS27C64-25	8k x 8	250		75/0.5
TS27C64-30	8k x 8	300		75/0.5
ET27128Q	16k x 8	250	NMOS	525/158
ET27128Q3	16k x 8	300		525/158
ET27128Q4	16k x 8	450		525/158
TS27C256-20	32k x 8	200	CMOS	200/0.5
TS27C256-25	32k x 8	250		200/0.5
TS27C256-30	32k x 8	300		200/0.5

## OTP (One Time Programmable EPROMS)

TS2764P	8k x 8		NMOS	
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**BIPOLAR PROMS (supply = +5 V)**

<b>PART Nber</b>	<b>DESCRIPTION</b>	<b>OUTPUT</b>	<b>ACCESS TIME (ns)</b>	<b>PACKAGE</b>
TS71180A	1k x 8	Op. Col.	45 ns	DIL
TS71180B	1k x 8	Op. Col.	35 ns	DIL
TS71180C	1k x 8	Op. Col.	25 ns	DIL
TS71181A	1k x 8	3 State	45 ns	DIL
TS71181B	1k x 8	3 State	35 ns	DIL
TS71181C	1k x 8	3 State	25 ns	DIL
TS71280A	1k x 8	Op. Col.	45 ns	Slim Line
TS71280B	1k x 8	Op. Col.	35 ns	Slim Line
TS71280C	1k x 8	Op. Col.	25 ns	Slim Line
TS71281A	1k x 8	3 State	45 ns	Slim Line
TS71281B	1k x 8	3 State	35 ns	Slim Line
TS71281C	1k x 8	3 State	25 ns	Slim Line
TS71190A	2k x 8	Op. Col.	60 ns	DIL
TS71190B	2k x 8	Op. Col.	45 ns	DIL
TS71190C	2k x 8	Op. Col.	35 ns	DIL
TS71191A	2k x 8	3 State	60 ns	DIL
TS71191B	2k x 8	3 State	45 ns	DIL
TS71191C	2k x 8	3 State	35 ns	DIL
TS71290C	2k x 8	Op. Col.	35 ns	Slim Line
TS71291C	2k x 8	3 State	35 ns	DIL
TS71321B	4k x 8	3 State	55 ns	DIL
TS71321C	4k x 8	3 State	45 ns	DIL
TS71641	8k x 8	3 State	55 ns	DIL