GRAPHICS

Enhanced Video Display Processor

V9938C E-VDP

■ OUTLINE

V9938 (E-VDP) is a video display processor using an N-channel· silicon gate MOS and a 64-pin shrink DIL plastic package. TMS9918A is software compatible.

■ FEATURES

- 5V power supply
- Linear RGB and composite video output
- Built-in palette for displays in up to 512 colors.
- Maximum of 512 x 424 pixels and 16 colors.
- Bit mapped graphics
- A maximum of 256 colors can be displayed at the same time.
- 16 k-byte ~ 128 k-byte display memory
- 16K x 1b, 16K x 4b, 64K x 1b, 64K x 4b DRAMs can be used.
- 256 address, 4ms DRAM auto refresh.
- Expansion video memory can be connected.
- Built-in mouse and light pen interfaces.
- Eight sprites can be displayed for each horizontal line.
- Colors for sprites can be specified for each horizontal line.
- Area move, line, search and other commands.
- Logical operation function.
- Addresses can be specified by coordinates.
- External sync is possible.
- Superimpose is possible.
- Digitize is possible.
- Multi E-VDP configurations are possible.
- Additional external color palettes using the Color-Bus output.

■ ELECTRICAL CHARACTERISTICS

1. Maximum Ratings

Symbol	Item	Rating	Unit
Vcc	Power supply voltage	−0.5 ~ +7.0	V
Vin	Input voltage	−0.5 ~ +7.0	V
Ts	Storage temperature	−50 ~ +125	°C
To	Operating temperature	0 ~ +70	°C

2. Recommended Operating Conditions

Symbol	Item	Minimum	Typical	Maximum	Unit
Vcc	Power supply voltage	4.75	5.00	5.25	V
Vss	Power supply voltage		0		V
TA	Operating ambient temperature	0		70	°C
VIL 1	Low level input voltage (group 1)	−0.3		0.8	V
VIL 2	Low level input voltage (group 2)	−0.3		0.8	V
VIL 3	External clock low level input voltage (group 3)	−0.3		0.8	V
VIH 1	High level input voltage (group 1)	2.2		Vcc	V
VIH 2	High level input voltage (group 2)	2.2		Vcc	V
VIH 3	External clock high level input voltage (group 3)	3.5		Vcc	V

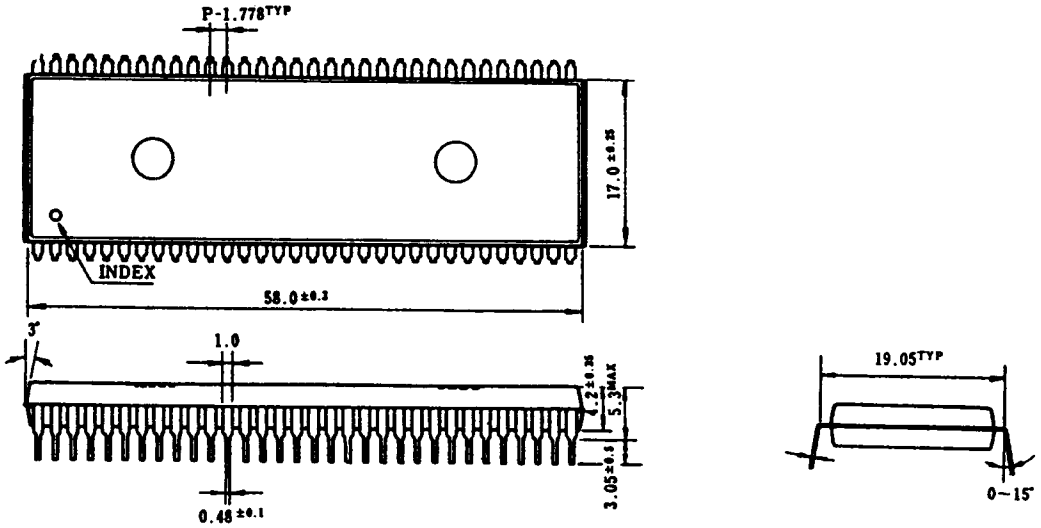
Note: Group 1 $\overline{CSR}$, RDO-7, CO-7, $\overline{LPS}$, $\overline{LPD}$, $\overline{RESET}$, DLCLK
Group 2 CDO-7, MODE 0, MODE 1, $\overline{CSW}$
Group 3 XTAL 1, XTAL 2

3. AC Characteristics

Symbol	Item	Condition	Minimum	Typical	Maximum	Unit
VOL 4	Low level output voltage (group 4)	IOL = 1.6mA			0.4	V
VOL 5	Low level output voltage (group 5)	IOL = 1.6mA			0.4	V
VOL 6	Low level output voltage (group 6)	IOL = 10mA			0.4	V
VOL 7	Low level output voltage (group 7)	IOL = 1.6mA			0.4	V
VOH 4	High level output voltage (group 4)	IOH = 100μA	2.4			V
VOH 5	High level output voltage (group 5)	IOH = 60μA	2.7			V
ILI	In-put leak current				10	μA
ILO	Output leak current (when floating)				25	μA
Icc	Current consumption				230	mA

Note: Group 4 CDO-7, RDO-7, ADO-7, $\overline{VDS}$, CBDR, CPUCLK, CO-7
Group 5 $\overline{RAS}$, $\overline{CAS\ 0}$, $\overline{CAS\ 1}$, $\overline{CASX}$, R/$\overline{W}$
Group 6 DLCLK, $\overline{DHCLK}$
Group 7 $\overline{INT}$

■ OUTLINE DIMENSIONS



■ BLOCK DIAGRAM