![VTC Inc. Value the Customer™ logo]

VM7750 Series
2, 4, 6 or 8-CHANNEL, 5-VOLT, THIN-FILM HEAD, READ/WRITE PREAMPLIFIER with MULTIPLE SERVO WRITE CAPABILITY

970801

FEATURES

- *General*
  - Single Power Supply (5 V ± 10%)
  - Power Up/Down Data Protect Circuitry
  - Very Low Power Dissipation
    (3 mW Typical in Sleep Mode)
  - Reduced Write-to-Read Recovery Time
  - Head Inductance Range = 0.2 – 1 µH (0.54 µH Typical)
  - Write Unsafe Detection
  - Available in 2, 4, 6 or 8-Channels

- *High Performance Reader*
  - Read Gain = 300 V/V Typical
  - Input Noise = 0.49nV/√Hz Typical
  - Low Input Capacitance = 11 pF Typical

- *High Speed Writer*
  - Write Current Range 5 - 20 mA
  - I_W Rise/Fall Times = 3.5 ns
    (L_H = 0.54 µH, I_W = 10 mA b-p)
  - PECL Write Data Inputs
  - Multi-Channel Servo Write
  - Write Data Flip-Flop Optional

DESCRIPTION

The VM7750 is a high-performance read/write preamplifier designed for use in high-end disk drives. It provides write current control, data protection circuitry, and a low-noise read preamplifier for up to eight channels.

Fault protection is provided so that during power supply sequencing the write current generator is disabled. System write-to-read recovery time is minimized by maintaining the read channel common-mode output voltage in write mode.

Very low-power dissipation from the +5V supply is achieved through use of high-speed bipolar processing and innovative circuit design techniques. When unselected, the device enters a sleep mode, with power dissipation reduced to less than 3mW.

In multi-channel servo write mode, all heads are written simultaneously. The VM7750 servo mode is activated via the WUS/SE line.

The VM7750 is available in several different packages. Please contact VTC for package availability.

BLOCK DIAGRAM
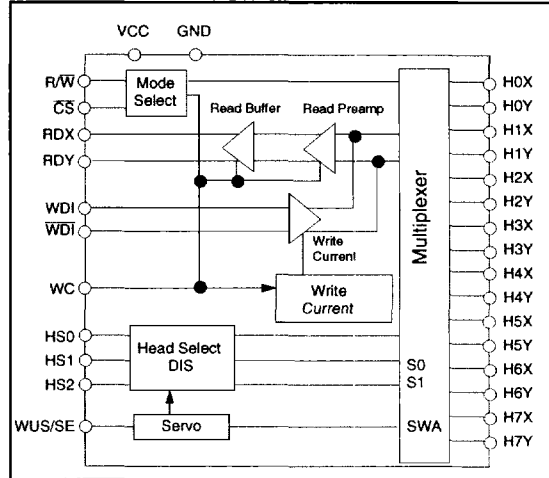
2 - TERMINAL 5V PREAMPS

ABSOLUTE MAXIMUM RATINGS

Power Supply:
  V_{CC} .... -0.3V to +7V
Write Current I_W 30mA
Input Voltages:
  Digital Input Voltage, V_{IN} .... -0.3V to (V_{CC} + 0.3)V
  Head Port Voltage, V_H .... -0.3V to (V_{CC} + 0.3)V
  WUS Pin Voltage Range, V_{WUS} .... -0.3V to +6V
Output Current:
  RDX, RDY: I_O ....-10mA
  WUS: I_{WUS} .... +12mA
Junction Temperature .... 150°C
Storage Temperature, Tstg .... -65° to 150°C
Thermal Characteristics, Θ_{JA}:
  20-lead SOIC .... 90°C/W
  20-lead SSOP .... 110°C/W
  20-lead VSOP .... 120°C/W
  24-lead SSOP .... 100°C/W
  28-lead SSOP .... 96°C/W
  32-lead VSOP .... 95°C/W
  36-lead SOIC .... 75°C/W

RECOMMENDED OPERATING CONDITIONS

Power Supply Voltage:
  V_{CC} ....+5V ± 10%
Write current, I_W ....5 to 20mA*
Head Inductance, L_H .... 0.2 to 1µH
Junction Temperature, T_J .... 25°C to 125°C

* Unless otherwise indicated.

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2 - TERMINAL 5V PREAMPS

CIRCUIT OPERATION

The VM7750 addresses up to eight two-terminal thin-film heads, providing write drive or read amplification. Mode control is accomplished with pins $\overline{CS}$ and R/$\overline{W}$, as shown in Table 1. Head selection is accomplished with pins HS0-HS2, as shown in Table 2.

Internal pull-up resistors provided on pins $\overline{CS}$ and R/$\overline{W}$ force the device into a non-writing condition if either control line is opened accidentally.

Write Mode

The write mode configures the VM7750 as a current switch and activates the write unsafe (WUS) detection circuitry.

VM7750: Write current is toggled with the rising edge of WDI-$\overline{WDI}$ (see Figure 1).

VM7750F: Without the write data flip-flop (WDFF), write current is toggled between the X and Y direction of a selected head on each transition on pins WDI (write data inputs). Current flows into H0Y on the high-to-low transition of WDI. Current flows into H0X on the high-to-low transition of $\overline{WDI}$.

An internally-generated 2.5 V reference voltage is present at the WC pin. The write current magnitude is determined by an external resistor connected between the WC pin and ground and is defined by the equation:

$$I_W = K_W/R_{WC} + 0.3mA = (50/R_{WC}) + 0.3mA \quad \text{(eq. 1)}$$

(0-peak ± 10%)

Power supply fault protection improves data security by disabling the write current generator during a voltage fault or power-up. Additionally, the write unsafe circuitry will flag any of the conditions below as a high level on the open collector output pin WUS/SE.

- No write current
- WDI frequency too low
- Device in read or sleep mode

Two transitions on pin WDI, after the fault is corrected, may be required to clear the WUS flag.

Multi-Channel Servo Write Mode

In servo write mode, the operation is the same as described above except that all channels are written simultaneously. Servo mode is controlled using the WUS/SE pin.

To initiate servo mode:
1. Enter read mode (bring R/$\overline{W}$ high).
2. Select Head 1 (bring HS0 high).
3. Supply 10mA source current into the WUS/SE pin.
4. Enter servo mode (drop the R/$\overline{W}$ line low).

Note: If any other head is selected during servo, the part will temporarily exit servo and write only the selected head. Unless servo is "formally" exited by removing the current from the WUS/SE pin, servo mode will return whenever head 1 is selected.

To exit servo mode:
1. Enter read mode (bring R/$\overline{W}$ high).
2. Remove the applied current from the WUS/SE pin (to return to "normal" read mode).

Read Mode

The read mode configures the VM7750 as a low-noise differential amplifier and deactivates the write current generator and write unsafe detection circuitry. The RDX and RDY outputs are emitter followers and are in phase with the "X" and "Y" head ports. These outputs should be AC-coupled to the load.

The RDX, RDY common-mode voltage is maintained in the write mode, minimizing the transient between the write mode and the read mode, thereby substantially reducing the recovery time delay to the subsequent pulse detection circuitry.

Sleep Mode

In sleep mode ($\overline{CS}$ high), most of the circuit is idle and power dissipation is reduced to 3mW typical. The reader outputs are high impedance in this mode; this allows multiple chip connection by simply wiring the reader outputs together.

Table 1: Mode Select

R/$\overline{W}$	$\overline{CS}$	WUS/SE	MODE
0	0	0	Write
0	0	1	Servo *
1	0	0	Read
X	1	X	Sleep

* See the "Multi-Channel Servo Write Mode" section for additional detail.

Table 2: Head Selection

HS2	HS1	HS0	HEAD
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7

PIN DESCRIPTIONS

NAME	I/O	DESCRIPTION
HS0 - HS2	I	Head Select: Selects one of up to eight heads.
H0X - H7X H0Y - H7Y	I/O	X, Y Head Terminals
WDI, $\overline{WDI}$	I	Write Data Inputs: PECL input signal; a rising edge toggles direction of head current. (Each transition toggles the direction of head current on the "F" option without the write data flip-flop.)
$\overline{CS}$	I	Chip select: A high level signal puts chip in sleep mode; a low level awakens chip.
$R/\overline{W}$	I	Read/Write select: A high level selects read mode; a low-level selects write mode.
WUS/SE	O	Write Unsafe/Servo Enable: (open collector output) A high level indicates a write unsafe condition. **Note:** The WUS/SE pin is also used to enter servo mode. See the "Multi-Channel Servo Write Mode" section.
WC		Write Current Adjust: A resistor determines the level of write current.
RDX-RDY	O	Read Data Output: Differential output data.
VCC		+5 volt supply
GND		Ground

Damping Resistor

Unless otherwise indicated, the VM7750 has damping resistors isolated by Schottky diodes. The diodes effectively remove the resistor from the circuit during the read mode, however during the write mode with the higher level input signal, the resistor provides damping for the write current waveform.
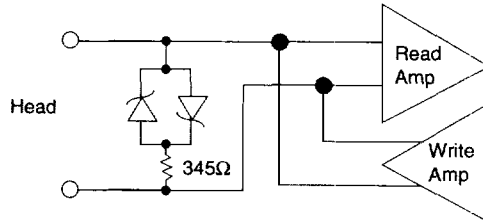
DC CHARACTERISTICS

Recommended operating conditions apply unless otherwise specified.

PARAMETER	SYM	CONDITIONS	MIN	TYP	MAX	UNITS
Power Supply Voltage	V_{CC}		4.5	5.0	5.5	mA
VCC Supply Current	I_{CC}	Read Mode		$31 + 0.05I_W$	44	mA
		Write Mode, Normal, $I_W = 10mA$		$26 + 1.05I_W$	43	
		Write Mode, Servo, $I_W = 10mA$ (2-Channel)		$38 + 2.0I_W$	80	
		Write Mode, Servo, $I_W = 10mA$ (4-Channel)		$55 + 4.3I_W$	115	
		Write Mode, Servo, $I_W = 10mA$ (6-Channel)		$70 + 6.5I_W$	155	
		Write Mode, Servo, $I_W = 10mA$ (8-Channel)		$90 + 8.5I_W$	195	
		Sleep Mode		0.5	3	
Power Supply Power Dissipation	PD	Read Mode		175	250	mW
		Write Mode, Normal, $I_W = 10mA$		200	240	
		Write Mode, Servo, $I_W = 10mA$ (2-Channel)		320	440	
		Write Mode, Servo, $I_W = 10mA$ (4-Channel)		540	633	
		Write Mode, Servo, $I_W = 10mA$ (6-Channel)		750	853	
		Write Mode, Servo, $I_W = 10mA$ (8-Channel)		960	1100	
		Sleep Mode		3	16.5	
Input High Voltage	V_{IH}		2		$V_{CC} +0.3$	V
Input Low Voltage	V_{IL}		-0.3		0.7	V
Input High Current	I_{IH}	$V_{IH} = 2.7V$			80	μA
Input Low Current	I_{IL}	$V_{IL} = 0.4V$	-160			μA
WDI, $\overline{WDI}$ Input High Voltage	V_{IH}	Pseudo ECL	$V_{CC} - 1.5$		$V_{CC} - 0.5$	V
WDI, $\overline{WDI}$ Input Low Voltage	V_{IL}	Pseudo ECL	$V_{IH} - 1.5$		$V_{IH} - 0.5$	V
WDI, $\overline{WDI}$ Input High Current	I_{IH}	$V_{IH} = V_{CC} - 0.7V$			100	μA
WDI, $\overline{WDI}$ Input Low Current	I_{IL}	$V_{IH} = V_{CC} - 1.6V$			80	μA
WUS Output Low Voltage	V_{OL}	$I_{OL} = 4.0mA$		0.35	0.5	V
WUS Output High Current	I_{OH}	$V_{OH} = 5.0V$		13	100	μA
VCC Value for Write Current Turn Off		$I_H < 0.2mA$	3.2	3.5	3.9	V

WRITE CHARACTERISTICS

Recommended operating conditions apply unless otherwise specified; $L_H = 0.54\mu H$, $R_H = 20\Omega$, $I_W = 10mA$, $f_{DATA} = 5MHz$.

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
WC Pin Voltage	V_{WC}		2.2	2.5	2.9	V
I_{WC} to Head Current Gain	A_I			20		mA/mA
Write Current Constant	K_W	$V_{CC} = 5V \pm 10\%$	46	50	54	V
Write Current Range	I_W	$10.64\Omega K > R_{WC} > 2.54K\Omega$	5		20	mA
Write Current Tolerance	ΔI_W	$V_{CC} \pm 10\%$	-10		+10	%
Differential Head Voltage Swing	V_{DH}	Open head, $V_{CC} = 4.5V$	4.5	5.6		Vp-p
WDI Transition Frequency for Safe Condition	f_{DATA}	WUS = low	1			MHz
Differential Output Capacitance	C_{OUT}				15	pF
Differential Output Resistance	R_{OUT}		3.2			$k\Omega$
Unselected Head Current	I_{UH}	$I_W = 20mA$		0.15	0.5	mA(pk)
RDX, RDY Common Mode Output Voltage	V_{CM}			$V_{CC} - 2.7$		V

Note 1: Typical values are given at $V_{CC} = 5V$ and $T_A = 25°C$.

Servo Write

PARAMETER	SYM	CONDITIONS	MIN	TYP	MAX	UNITS
Write Current Matching Between Channels	ΔI_W	$5mA < I_W < 20mA$			10	%
Duty Cycle (20mA/head)		$T_A \le 50°C$, $t_{s-on} < 5ms$ *			50	%
WUS Servo Enable	I_{WUS}		10	**	20	mA
Write Current Tolerance Servo	ΔI_W	$V_{CC} \pm 10\%$	-14		+14	%

* The ambient temperature (T_A) and servo-on time (t_{s-on}) limitation is used to keep the peak junction temperature under 125°C.

**The typical value for servo activation is 6 mA. The minimum value at which servo activation is guaranteed is 10 mA.

2 - TERMINAL
5V PREAMPS

READ CHARACTERISTICS

Recommended operating conditions apply unless otherwise specified; C_L (RDX, RDY) < 20pF, R_L (RDX, RDY) = 1kΩ.

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
Differential Voltage Gain	A_V	V_{IN} = 1mVrms, 1MHz	258	300	342	V/V
Bandwidth	BW	-1dB IZsI < 5Ω, V_{IN} = 1mVp-p	35			MHz
		-3dB IZsI < 5Ω, V_{IN} = 1mVp-p	65			
Input Noise Voltage	e_{in}	BW = 17MHz, L_H = 0, R_H = 0		0.49	0.65	nV/$\sqrt{Hz}$
Differential Input Capacitance	C_{IN}	V_{IN} = 1mVp-p, f = 5MHz		11	15	pF
Differential Input Resistance	R_{IN}	V_{IN} = 1mVp-p, f = 5MHz	380	580		Ω
Dynamic Range	DR	AC input where A_V is 90% of gain at 0.2mVrms input	2			mVrms
Common Mode Rejection Ratio	CMRR	V_{IN} = 100mVp-p @ 5MHz	50			dB
Power Supply Rejection Ratio	PSRR	100mVp-p @ 5MHz on V_{CC}	45			dB
Channel Separation	CS	Unselected channels: V_{IN} = 20mVp-p @ 5MHz V_{IN} = 0 on selected head	45			dB
Output Offset Voltage	V_{OS}	Steady state read	-250		250	mV
RDX, RDY Common Mode Output Voltage	V_{OCM}	Read/Write Mode		V_{CC} - 2.7		
RDX, RDY Common Mode Output Voltage Difference Between Modes	ΔV_{OCM}		-350		+350	mV
Single-Ended Output Resistance	R_{SEO}	f = 5 MHz		28	35	Ω
Output Current	I_O	AC-coupled load, RDX to RDY	±1.0			mA

Note 1: Typical values are given at V_{CC} = 5V and T_A = 25°C.

2 - TERMINAL
5V PREAMPS

SWITCHING CHARACTERISTICS

Recommended operating conditions apply unless otherwise specified; I_W = 10mA, f_{DATA} = 5MHz, L_H = 0.54µH, R_H = 20Ω, C_L (RDX, RDY) ≤ 20pF (see Figures 1 and 2).

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
R/$\overline{W}$ Read to Write Delay	t_{RW}	R/$\overline{W}$ to 90% I_W		100	300	ns
R/$\overline{W}$ Write to Read Delay	t_{WR}	R/$\overline{W}$ to 90% of 100mV, 10 MHz read signal envelope		250	500	ns
$\overline{CS}$ Unselect to Select Delay	t_{IR}	$\overline{CS}$ to 90% I_W or 90% of 100mV, 10MHz read signal envelope			0.6	µs
$\overline{CS}$ Select to Unselect Delay	t_{RI}	$\overline{CS}$ to 10% of I_W			0.6	µs
HS0 - HS2 any Head Delay	t_{HS}	HS0 - HS2 to 90% of 100mV, 10MHz read signal envelope			0.6	µs
WUS Safe to Unsafe Delay	t_{D1}		0.6		3.6	µs
WUS Unsafe to Safe Delay	t_{D2}	I_W = 10mA			1.0	µs
Head Current Propagation	t_{D3}	L_H = 0, R_H = 0, from 50% points			30	ns
Head Current Asymmetry	A_{SYM}	50% duty cycle on WDI, 1ns rise/fall time; L_H = 0, R_H = 0			0.5	ns
Head Current Rise/Fall Time	t_r/t_f	10% to 90% points, L_H = 0, R_H = 0		1.5	4	ns
		10% to 90% points, L_H = 540nH, R_H = 20Ω, I_W = 10mA		3.5	7	

Note 1: Typical values are given at V_{CC} = 5V and T_A = 25°C.
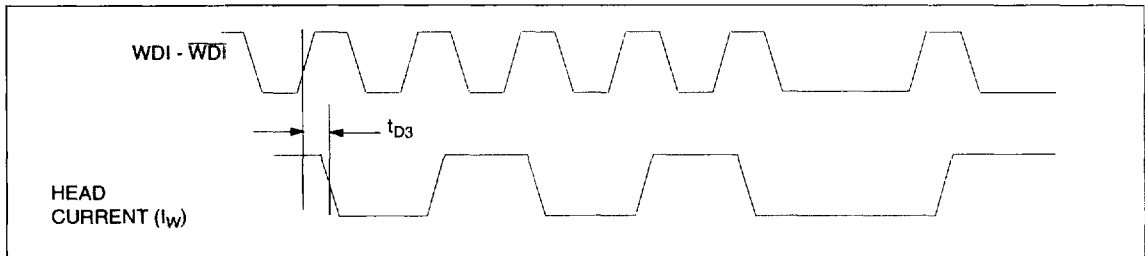
Figure 1: Write Mode Timing Diagram for VM7750 (Head Current Switches with the Rising Edge of WDI-$\overline{WDI}$)
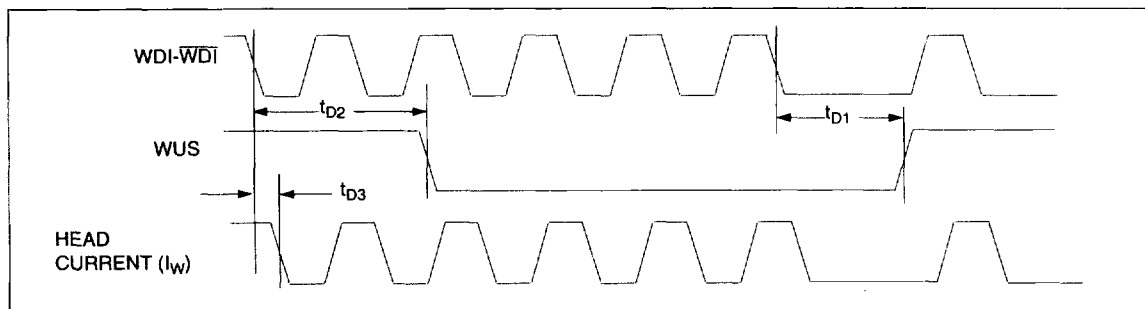
Figure 2: Write Mode Timing Diagram for VM7750F (without flip-flop)

TYPICAL APPLICATION CONNECTIONS
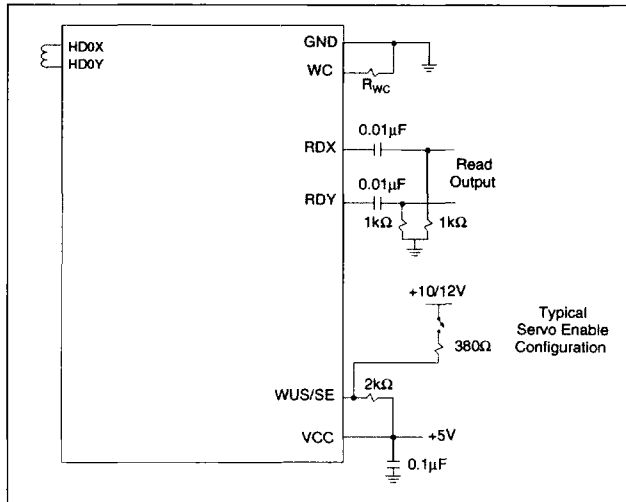
Note: The pin placements in the diagram are not meant to be exact and will vary between packages. The connections shown will apply regardless of package variation.

Application Notes:

- For maximum stability, place the decoupling capacitors and the R_{WC} resistor as close to the package pins as possible.
- The voltage at the WUS/SE pin will clamp at two diode drops above VCC.
- The typical servo-enable configuration shown above is presented as an example. Other supply and resistor values are possible, and the supply/resistor symbols shown could be displayed as a 10 mA current source.

List of Specific Part Variations

(described on the following pages)

PART VARIATION	Page Location
VM775830 rev J	66
VM775830 rev L	67
VM775N820	68
VM775N620	69
VM775630	70
VM775430 rev J	71
VM775430 rev L	72
VM775N425 rev K	73
VM775N425 rev L	74
VM775N225	75

VM775830 rev J

8-CHANNEL CONNECTION DIAGRAM
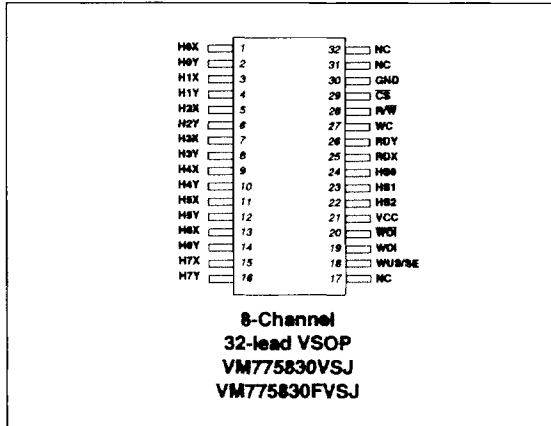
H0X	1	32	NC
H0Y	2	31	NC
H1X	3	30	GND
H1Y	4	29	CS
H2X	5	28	R/W
H2Y	6	27	WC
H3X	7	26	RDY
H3Y	8	25	RDX
H4X	9	24	HS0
H4Y	10	23	HS1
H5X	11	22	HS2
H5Y	12	21	VCC
H6X	13	20	WOI
H6Y	14	19	WOI
H7X	15	18	WUS/SE
H7Y	16	17	NC

**8-Channel
32-lead VSOP
VM775830VSJ
VM775830FVSJ**

Specific CHARACTERISTICS
See the general data sheet for common specification information.

VM775830 rev L

8-CHANNEL CONNECTION DIAGRAM

Pin	Signal	Pin	Signal
H0X	1	32	NC
H0Y	2	31	NC
H1X	3	30	GND
H1Y	4	29	CS
H2X	5	28	R/W
H2Y	6	27	WC
H3X	7	26	RDY
H3Y	8	25	RDX
H4X	9	24	HS0
H4Y	10	23	HS1
H5X	11	22	HS2
H5Y	12	21	VCC
H6X	13	20	WDI
H6Y	14	19	WDI
H7X	15	18	WUS/SE
H7Y	16	17	NC

**8-Channel
32-lead VSOP
VM775830VSL**

Specific CHARACTERISTICS
See the general data sheet for common specification information.
- Low input capacitance.

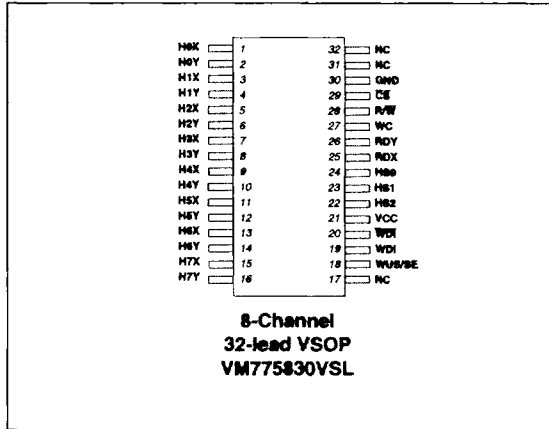| PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
VCC Supply Current	I_{CC}	Read Mode		$36 + 0.05I_W$	51	mA
VCC Supply Current	I_{CC}	Write Mode		$29 + 1.05I_W$	47	mA
Power Supply Power Dissipation	PD	Read Mode		215	275	mW
Input Low Voltage	V_{IL}		-0.3		0.8	V
Bandwidth	BW	-1dB $|Zs| < 5\Omega$, $V_{IN} = 1mVp\text{-}p$	55			MHz
		-3dB $|Zs| < 5\Omega$, $V_{IN} = 1mVp\text{-}p$	85			
Differential Input Capacitance	C_{IN}	$V_{IN} = 1mVp\text{-}p$, f = 5MHz		9	13	pF
Write Current Range	I_W	$10.64\Omega K > R_{WC} > 2.54K\Omega$	5		15	mA
R/W Read to Write Delay	t_{RW}	R/W to 90% I_W		65	100	ns
R/W Write to Read Delay	t_{WR}	R/W to 90% of 100mV, 10 MHz read signal envelope		200	250	ns
Differential Input Resistance	R_{IN}	$V_{IN} = 1mVp\text{-}p$, f = 5MHz	300	580		Ω

VM775N820

8-CHANNEL CONNECTION DIAGRAMS
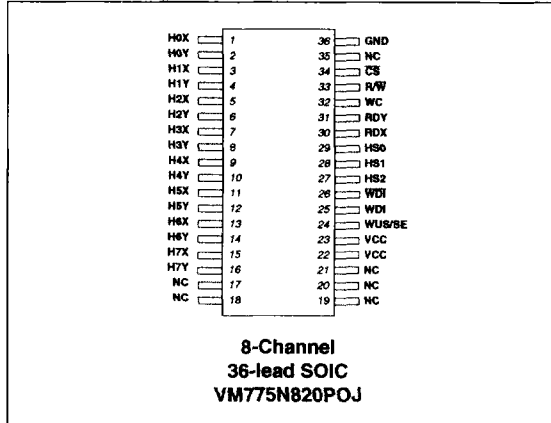
Pin	Signal		Pin	Signal
1	H0X		36	GND
2	H0Y		35	NC
3	H1X		34	CS
4	H1Y		33	R/W
5	H2X		32	WC
6	H2Y		31	RDY
7	H3X		30	RDX
8	H3Y		29	HS0
9	H4X		28	HS1
10	H4Y		27	HS2
11	H5X		26	WDI
12	H5Y		25	WDI
13	H6X		24	WUS/SE
14	H6Y		23	VCC
15	H7X		22	VCC
16	H7Y		21	NC
17	NC		20	NC
18	NC		19	NC

**8-Channel
36-lead SOIC
VM775N820POJ**

Specific CHARACTERISTICS

See the general data sheet for common specification information.

- 200 V/V read gain.
- No damping resistor.

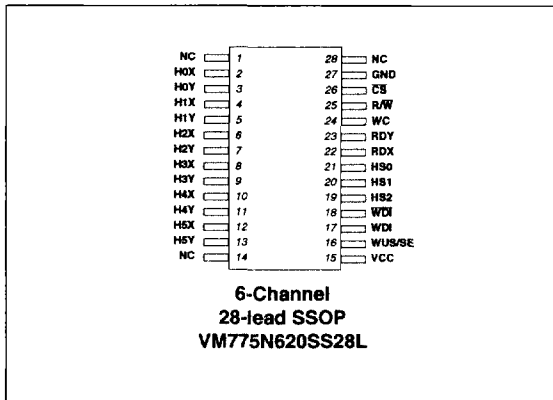| PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
Differential Voltage Gain	A_V	V_{IN} = 1mVrms, 1MHz	172	200	228	V/V
Differential Input Resistance	R_{IN}	V_{IN} = 1mVp-p, f = 5MHz	300	580		Ω

Important Note: The VM775N820POJ has the opposite WDI polarity from other VM7750 products; write current is toggled with the falling edge of WDI - $\overline{WDI}$.

VM775N620

6-CHANNEL CONNECTION DIAGRAM

```
        NC ▭  1        28  ▭ NC
       H0X ▭  2        27  ▭ GND
       H0Y ▭  3        26  ▭ CS
       H1X ▭  4        25  ▭ R/W
       H1Y ▭  5        24  ▭ WC
       H2X ▭  6        23  ▭ RDY
       H2Y ▭  7        22  ▭ RDX
       H3X ▭  8        21  ▭ HS0
       H3Y ▭  9        20  ▭ HS1
       H4X ▭ 10        19  ▭ HS2
       H4Y ▭ 11        18  ▭ WDI
       H5X ▭ 12        17  ▭ WDI
       H5Y ▭ 13        16  ▭ WUS/SE
        NC ▭ 14        15  ▭ VCC
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**6-Channel
28-lead SSOP
VM775N620SS28L**

Specific CHARACTERISTICS

See the general data sheet for common specification information.
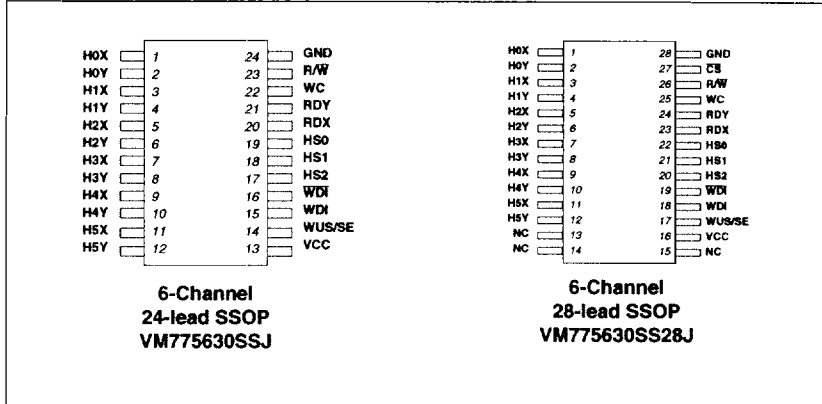
- 200 V/V read gain.
- No damping resistor.
- Low input capacitance.

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
VCC Supply Current	I_{CC}	Read Mode		$38 + 0.05I_W$	50	mA
VCC Supply Current	I_{CC}	Write Mode		$28 + 1.05I_W$	46	mA
Power Supply Power Dissipation	PD	Read Mode		215	275	mW
Input Low Voltage	V_{IL}		-0.3		0.8	V
Differential Voltage Gain	A_V	$V_{IN} = 1mVrms, 1MHz$	172	200	228	V/V
Bandwidth	BW	-1dB |Zs| < 5Ω, $V_{IN} = 1mVp$-p	55			MHz
		-3dB |Zs| < 5Ω, $V_{IN} = 1mVp$-p	85			
Differential Input Capacitance	C_{IN}	$V_{IN} = 1mVp$-p, f = 5MHz		9	13	pF
Write Current Range	I_W	10.64ΩK > R_{WC} > 2.54KΩ	5		12	mA
R/W Read to Write Delay	t_{RW}	R/W to 90% I_W		65	100	ns
R/W Write to Read Delay	t_{WR}	R/W to 90% of 100mV, t0 MHz read signal envelope		200	250	ns
Differential Input Resistance	R_{IN}	$V_{IN} = 1mVp$-p, f = 5MHz	300	580		Ω

VM775630

6-CHANNEL CONNECTION DIAGRAM

		6-Channel 24-lead SSOP			
HOX	1		24	GND	
HOY	2		23	R/W	
H1X	3		22	WC	
H1Y	4		21	RDX	
H2X	5		20	RDX	
H2Y	6		19	HS0	
H3X	7		18	HS1	
H3Y	8		17	HS2	
H4X	9		16	WDI	
H4Y	10		15	WDI	
H5X	11		14	WUS/SE	
H5Y	12		13	VCC	

6-Channel
24-lead SSOP
VM775630SSJ

		6-Channel 28-lead SSOP			
HOX	1		28	GND	
HOY	2		27	CS	
H1X	3		26	R/W	
H1Y	4		25	WC	
H2X	5		24	RDY	
H2Y	6		23	RDX	
H3X	7		22	HS0	
H3Y	8		21	HS1	
H4X	9		20	HS2	
H4Y	10		19	WDI	
H5X	11		18	WDI	
H5Y	12		17	WUS/SE	
NC	13		16	VCC	
NC	14		15	NC	

6-Channel
28-lead SSOP
VM775630SS28J

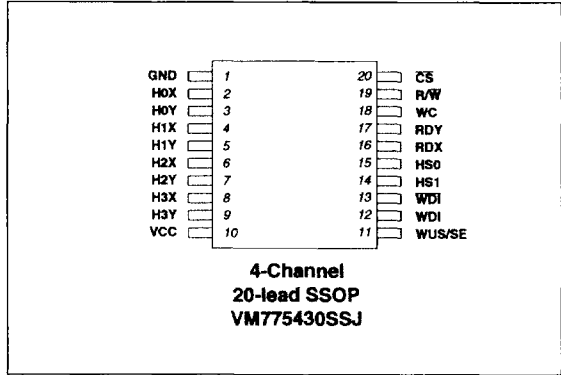## Specific CHARACTERISTICS

See the general data sheet for common specification information.

VM775430 rev J

4-CHANNEL CONNECTION DIAGRAM

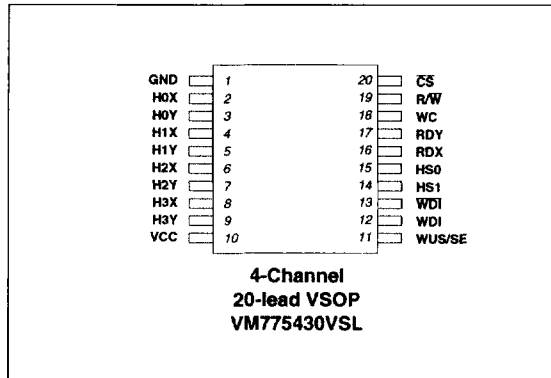|		
GND	1	20 CS
H0X	2	19 R/W
H0Y	3	18 WC
H1X	4	17 RDY
H1Y	5	16 RDX
H2X	6	15 HS0
H2Y	7	14 HS1
H3X	8	13 WDI
H3Y	9	12 WDI
VCC	10	11 WUS/SE

**4-Channel
20-lead SSOP
VM775430SSJ**

Specific CHARACTERISTICS
See the general data sheet for common specification information.

VM775430 rev L

4-CHANNEL CONNECTION DIAGRAM

```
GND   1       20   CS
H0X   2       19   R/W
H0Y   3       18   WC
H1X   4       17   RDY
H1Y   5       16   RDX
H2X   6       15   HS0
H2Y   7       14   HS1
H3X   8       13   WDI
H3Y   9       12   WDI
VCC   10      11   WUS/SE
```

**4-Channel
20-lead VSOP
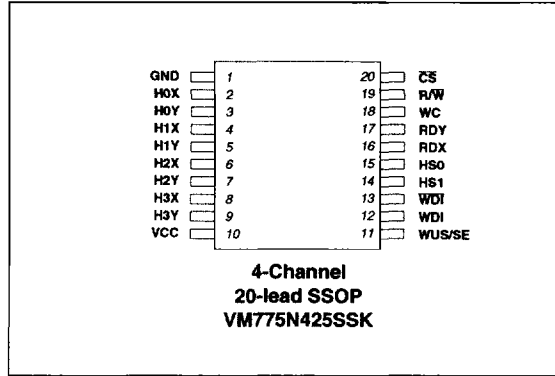VM775430VSL**

Specific CHARACTERISTICS

See the general data sheet for common specification information.
- Low input capacitance.

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
VCC Supply Current	I_{CC}	Read Mode		$38 + 0.05I_W$	50	mA
Power Supply Power Dissipation	PD	Read Mode		215	275	mW
Input Low Voltage	V_{IL}		-0.3		0.8	V
Bandwidth	BW	-1dB $|Zs| < 5\Omega$, $V_{IN} = 1mVp\text{-}p$	55			MHz
		-3dB $|Zs| < 5\Omega$, $V_{IN} = 1mVp\text{-}p$	85			
Differential Input Capacitance	C_{IN}	$V_{IN} = 1mVp\text{-}p$, f = 5MHz		9	13	pF
Write Current Range	I_W	$10.64\Omega K > R_{WC} > 2.54K\Omega$	5		15	mA
R/W Read to Write Delay	t_{RW}	R/W to 90% I_W		65	100	ns
R/W Write to Read Delay	t_{WR}	R/W to 90% of 100mV, 10 MHz read signal envelope		200	250	ns
Differential Input Resistance	R_{IN}	$V_{IN} = 1mVp\text{-}p$, f = 5MHz	300	580		Ω

VM775N425 rev K

4-CHANNEL CONNECTION DIAGRAM

GND	1	20	CS
H0X	2	19	R/W
H0Y	3	18	WC
H1X	4	17	RDY
H1Y	5	16	RDX
H2X	6	15	HS0
H2Y	7	14	HS1
H3X	8	13	WDI
H3Y	9	12	WDI
VCC	10	11	WUS/SE

**4-Channel
20-lead SSOP
VM775N425SSK**

Specific CHARACTERISTICS

See the general data sheet for common specification information.

- 250 V/V read gain.
- No damping resistor.

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
Differential Voltage Gain	A_V	V_{IN} = 1mVrms, 1MHz	215	250	285	V/V
Differential Input Resistance	R_{IN}	V_{IN} = 1mVp-p, f = 5MHz	300	580		Ω

VM775N425 rev L

4-CHANNEL CONNECTION DIAGRAM

GND	1	20	CS
H0X	2	19	R/W
H0Y	3	18	WC
H1X	4	17	RDY
H1Y	5	16	RDX
H2X	6	15	HS0
H2Y	7	14	HS1
H3X	8	13	WDX
H3Y	9	12	WDI
VCC	10	11	WUS/SE

4-Channel
20-lead SSOP
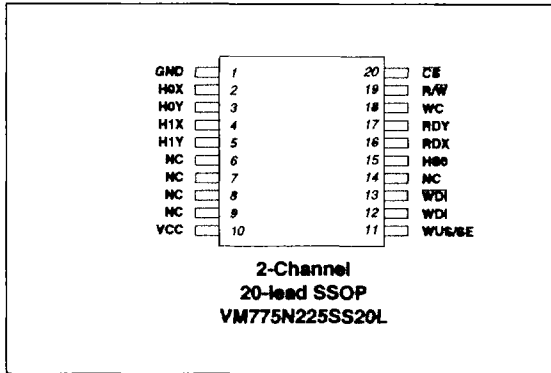### VM775N425SSL

Specific CHARACTERISTICS
See the general data sheet for common specification information.

- 250 V/V read gain.
- No damping resistor.
- Low input capacitance.

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
VCC Supply Current	I_{CC}	Read Mode		$38 + 0.05I_W$	50	mA
Power Supply Power Dissipation	PD	Read Mode		215	275	mW
Input Low Voltage	V_{IL}		-0.3		0.8	V
Differential Voltage Gain	A_V	$V_{IN} = 1mVrms, 1MHz$	215	250	285	V/V
Bandwidth	BW	-1dB |Zs| < 5Ω, $V_{IN} = 1mVp-p$	55			MHz
		-3dB |Zs| < 5Ω, $V_{IN} = 1mVp-p$	85			
Differential Input Capacitance	C_{IN}	$V_{IN} = 1mVp-p, f = 5MHz$		9	13	pF
Write Current Range	I_W	$10.64ΩK > R_{WC} > 2.54KΩ$	5		12	mA
R/W Read to Write Delay	t_{RW}	R/W to 90% I_W		65	100	ns
R/W Write to Read Delay	t_{WR}	R/W to 90% of 100mV, 10 MHz read signal envelope		200	250	ns
Differential Input Resistance	R_{IN}	$V_{IN} = 1mVp-p, f = 5MHz$	300	580		Ω

VM775N225

2-CHANNEL CONNECTION DIAGRAM

```
GND   1       20   CE
H0X   2       19   R/W
H0Y   3       18   WC
H1X   4       17   RDY
H1Y   5       16   RDX
NC    6       15   H00
NC    7       14   NC
NC    8       13   WD0
NC    9       12   WD1
VCC   10      11   WUS/SE
```

2-Channel
20-lead SSOP
VM775N225SS20L

Specific CHARACTERISTICS
See the general data sheet for common specification information.

- 250 V/V read gain.
- No damping resistor.
- Low input capacitance.

PARAMETER	SYM	CONDITIONS	MIN	TYP (Note 1)	MAX	UNITS
VCC Supply Current	I_{CC}	Read Mode		$38 + 0.05I_W$	50	mA
Power Supply Power Dissipation	PD	Read Mode		215	275	mW
Input Low Voltage	V_{IL}		-0.3		0.8	V
Differential Voltage Gain	A_V	$V_{IN} = 1mVrms, 1MHz$	215	250	285	V/V
Bandwidth	BW	-1dB IZsl < 5Ω, $V_{IN} = 1mVp-p$	55			MHz
		-3dB IZsl < 5Ω, $V_{IN} = 1mVp-p$	85			
Differential Input Capacitance	C_{IN}	$V_{IN} = 1mVp-p, f = 5MHz$		9	13	pF
Write Current Range	I_W	10.64ΩK > R_{WC} > 2.54KΩ	5		12	mA
R/W Read to Write Delay	t_{RW}	R/W to 90% I_W		65	100	ns
R/W Write to Read Delay	t_{WR}	R/W to 90% of 100mV, 10 MHz read signal envelope		200	250	ns
Differential Input Resistance	R_{IN}	$V_{IN} = 1mVp-p, f = 5MHz$	300	580		Ω