

8 × 8 bit parallel multipliers

general information

The LMU557 and LMU558 are 8-bit parallel multipliers with high speed and low power operation. They are pin for pin equivalents with 54S557 and 54S558 type multipliers. Full military ambient temperature range operation is attained by the use of advanced CMOS technology.

Both the LMU557 and LMU558 produce the 16-bit product of two 8-bit signed or unsigned numbers in a single unclocked operation. Assertion of control inputs TCA and TCB indicate that the corresponding input value is in two's complement notation.

Provision is made for proper rounding for any combination of signed or unsigned inputs. The R_U input to the LMU558 causes the product to be rounded to 8 bits of precision for unsigned or mixed mode multiplication. For multiplication of two signed operands, the R_S input is used for rounding, and the most significant bit of the product is discarded. (It will be identical to the

sign bit for all except the $(-2^8) \cdot (-2^8)$ case, which will cause overflow if the result MSB is not considered.)

The LMU557 internally produces the R_U and R_S controls from a single round input, denoted R. With R asserted, R_S rounding occurs if either TCA or TCB is asserted, while R_U rounding is implemented for TCA and TCB not asserted. This implementation frees a pin for control of the transparent output register in the LMU557 via the G input.

Both the LMU557 and LMU558 offer three-state output buffers controlled by the OE input. The LMU557 has a 16-bit transparent latch between the multiplier array and the output drivers for flexibility in implementing pipelined systems. In addition both polarities of the result MSB (R_{15}) are available as separate output pins to allow simple expansion to longer word lengths in signed multiplication.

LMU557/LMU558

features

- 8 by 8 parallel multiplier
- Pin for pin replacement for AM25S557/8, SN54S557/8
- Double precision product
- High-speed, low-power CMOS technology
- Fully combinatorial, no clocks required
- Unsigned, two's complement, or mixed operands
- Transparent output latch on LMU557
- Signed or unsigned product rounding
- TTL compatible inputs and outputs
- 85mW typical power dissipation

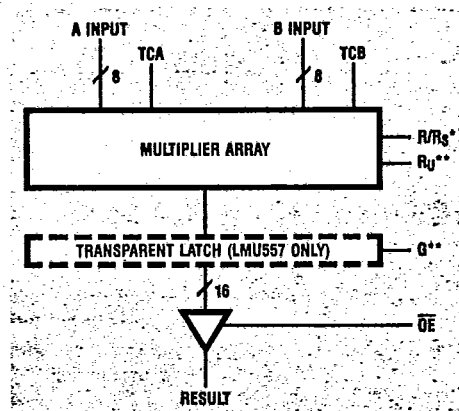
PIN CONFIGURATION

A INPUTS	OUTPUTS
A_7 - MSB A input	R_{15} - inverted result MSB
A_6	R_{14} - result MSB
A_5	R_{13}
A_4	R_{12}
A_3	R_{11}
A_2	R_{10}
A_1	R_9
A_0	R_8
B INPUTS	OUTPUTS
B_7 - MSB B input	R_7
B_6	R_6
B_5	R_5
B_4	R_4
B_3	R_3
B_2	R_2
B_1	R_1
B_0	R_0

PIN DESCRIPTION

PIN	FUNCTION	FUNCTION	PIN
1	A_0	TCA	40
2	A_1	R_0	39
3	A_2	R_1	38
4	A_3	R_2	37
5	A_4	R_3	36
6	A_5	R_4	35
7	A_6	R_5	34
8	A_7	R_6	33
9	RS/R	R_7	32
10	VCC	R_8	31
11	RU/G	GND	30
12	B_0	R_9	29
13	B_1	R_{10}	28
14	B_2	R_{11}	27
15	B_3	R_{12}	26
16	B_4	R_{13}	25
17	B_5	R_{14}	24
18	B_6	R_{15}	23
19	B_7	R_{16}	22
20	TCB	OE	21

functional diagram



*PIN 9 IS R FOR LMU557 AND R_S FOR LMU558
**PIN 11 IS G FOR LMU557 AND R_U FOR LMU558

absolute maximum ratings

Supply Voltage	- 0.5 to 7.0V
Input Voltage	0 to 5.5V
Output Voltage	0 to VCC
Operating Temperature (Ambient)	- 55°C to 125°C
Storage Temperature	- 65°C to 150°C

recommended operating conditions

PARAMETER	min	typ	max	unit
VCC Supply Voltage Commercial	4.75	5.0	5.25	V
VCC Supply Voltage Military	4.50	5.0	5.5	V
IOL Low Level Output Current			8.0	mA
IOH High Level Output Current			- 2.0	mA
TAMB Operating Temperature Commercial (Ambient)	0	25	70	°C
TAMB Operating Temperature Military (Ambient)	- 55	25	125	°C

LOGIC
DEVICES INCORPORATED

