54189/74189 64-Bit Ramdom-Access Memory with 3-State Output (64-Bit RAM)

	Schottky TTL					High-Speed TTL					Low-Power Schottky TTL					Standard TTL					Low-Power TTL				
	Device Type	Package				Device Type	Package				Devie Type	Package				Device Type	Package				Device Type	Package			
		C	P	M	CF		C	P	M	CF		C	P	M	CF		C	P	M	CF		C	P	M	CF
T. I.	SN54S189	J ①			W①																				
	SN74S189	J ①N①																							
FAIRCHILD																									
MOTOROLA																									
N. S. C.	DM54S189		①													DM54189		①							
	DM74S189		①													DM74189		①							
PHILIPS																									
SIGNETICS																									
SIEMENS																									
FUJITSU																									
HITACHI																									
MITSUBISHI																									
NEC																									
TOSHIBA																									

Electrica Characteristics SN54S189/SN74S189

absolute maximum ratings over operating free-air temperature ranse

Supply voltage, V_{CC}	7V	Operating free-air temperature range	SN54S	−55°C to 125°C
Input voltage	5.5V		SN74S	0°C to 70°C
Off-state output voltage	5.5V	Storage temperature range		−65°C to 150 °C

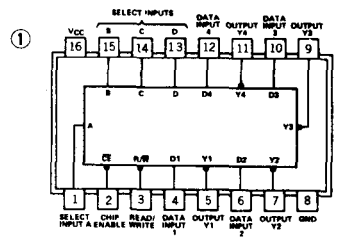
recommended operbrating conditions

		SN54S189			SN74S189			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}		4.5	5	5.5	4.75	5	5.25	V
High-level output voltage, I_{OH}				−2			−6.5	V
Low-level output current, I_{OL}				16			16	mA
Width of write-enable pulse (read/write low), t_w		25			25			n s
Setup time, t_{setup}	Address to read/write	0↓			0↓			n s
	Data to read/write	25↑			25↑			
	Chip enable to read/write	0↓			0↓			
Hold time, t_{hold}	Address fromread/write	0↑			0↑			n s
	Data fromromread/write	0↑			0↑			
	Chip enable fromread/write	0↑			0↑			
Operating free-air temperature, T_A		−55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range

PARAMETER *		TEST CONDITIONS†		MIN	TYP‡	MAX	UNIT
V_{IH} High-level input voltage				2			V
V_{IL} Low-level input voltage						0.8	V
V_I Input clamp voltage		V_{CC}=MIN, I_I=−18mA				−1.2	V
V_{OH} High-level output voltage	SN54S'	V_{CC}=MIN, V_{IH}=2V, V_{IL}=0.8V, I_{OH}=MAX		2.4	3.4		V
	SN74S'			2.4	3.2		
V_{OL} Low-level output voltage	SN54S'	V_{CC}=MIN, V_{IH}=2V, V_{IL}=0.8V, I_{OL}=16mA				0.5	V
	SN74S'					0.45	
I_{OZH} Off-state output current high-level voltage applied		V_{CC}=MAX, V_{IH}=2V, V_{IL}=0.8V, V_O=2.4V				50	μA
I_{OZL} Off-state output current low-level voltage applied		V_{CC}=MAX, V_{IH}=2V, V_{IL}=0.8V, V_O=0.5V				−50	μA
I_I Input current at maximum input voltage		V_{CC}=MAX, V_I=5.5V				1	mA
I_{IH} High-level input current		V_{CC}=MAX, V_I=2.7V				25	μA
I_{IL} Low-level input current		V_{CC}=MAX, V_I=0.5V				−250	μA
I_{OS} Short-circuit output current ◆		V_{CC}=MAX		−30		−100	mA
I_{CC} Supply current		V_{CC}=MAX, See Note			75	110	mA
t_{PLH} Access times from apddress		V_{CC}=5V, T_A=25°C, C_L=30pF, R_L=280Ω.	SN54S'		25	50	nn
			SN74S'		25	35	
t_{PLH}			SN54S'		25	50	
			SN74S'		25	35	
t_{ZH} Access times from chip enable			SN54S'		12	25	ns
			SN74'		12	17	
t_{ZL}			SN54S'		12	25	
			SN74S'		12	17	
t_{ZH} Sense recovery times from read/write		V_{CC}=5V, T_A=25°C, C_L=30pF, R_L=280Ω	SN54S'		22	40	ns
t_{ZL}			SN74S'		22	35	
			SN54S'		22	40	
			SN74S'		22	35	
t_{HZ} Disable times from chip enable		V_{CC}=5V, T_A=25°C, C_L=5pF, R_L=280Ω	SN54S'		12	25	ns
			SN74S'		12	17	
t_{LZ}			SN54S'		12	25	
			SN74S'		12	17	
t_{HZ} Disable times from read/write					12		ns
t_{LZ}					12		

Pin Assignment (Top View)



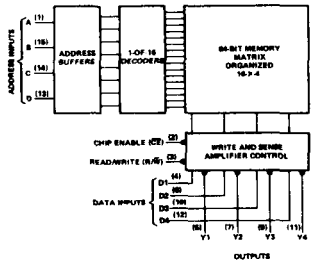
positive logic:

Function Table

FUNCTION	INPUTS		OUTPUT
	CHIP ENABLE	READ/WRITE	
Write (Store Complement of Data)	L	L	High Impedance
Read	L	H	Stored Data
Inhibit	H	X	High Impedance

H = high level, L = low level, X = irrelevant

Functional Block Diagram



I_{CC} is measured with the read/write and chip-enable inputs grounded, all other inputs at 4.5V, and the outputs open.

†↓The arrow indicates the transition of the read/write input used for rerence: ↑ for the low-to-high transition, ↓ for the high-to-low transition.

* t_{PLH} ≡ Propagation delay time, low-to-high-level output t_{ZH} ≡ Output enable time to high level
t_{HZ} ≡ Ouput disable time from high level t_{PHL} ≡ Propagation delay time, high-to-low-level output
t_{ZL} ≡ Output enable time to low level t_{LZ} ≡ Output disable time fromlow level

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended o operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C

◆ Duration of the short-circuit should not exceed one second.