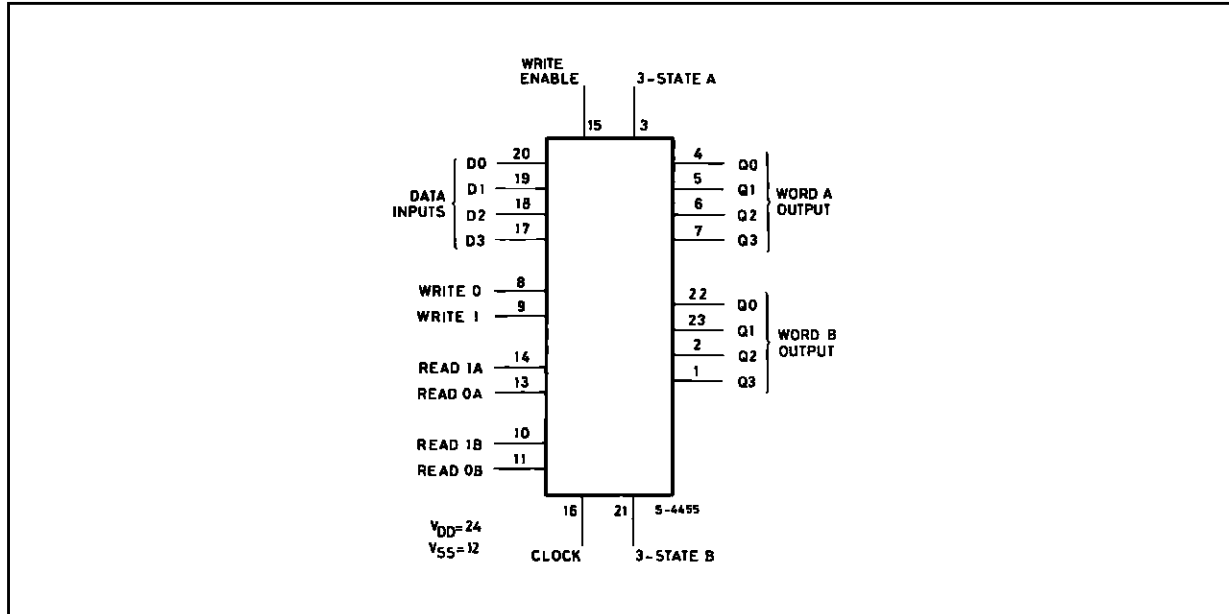
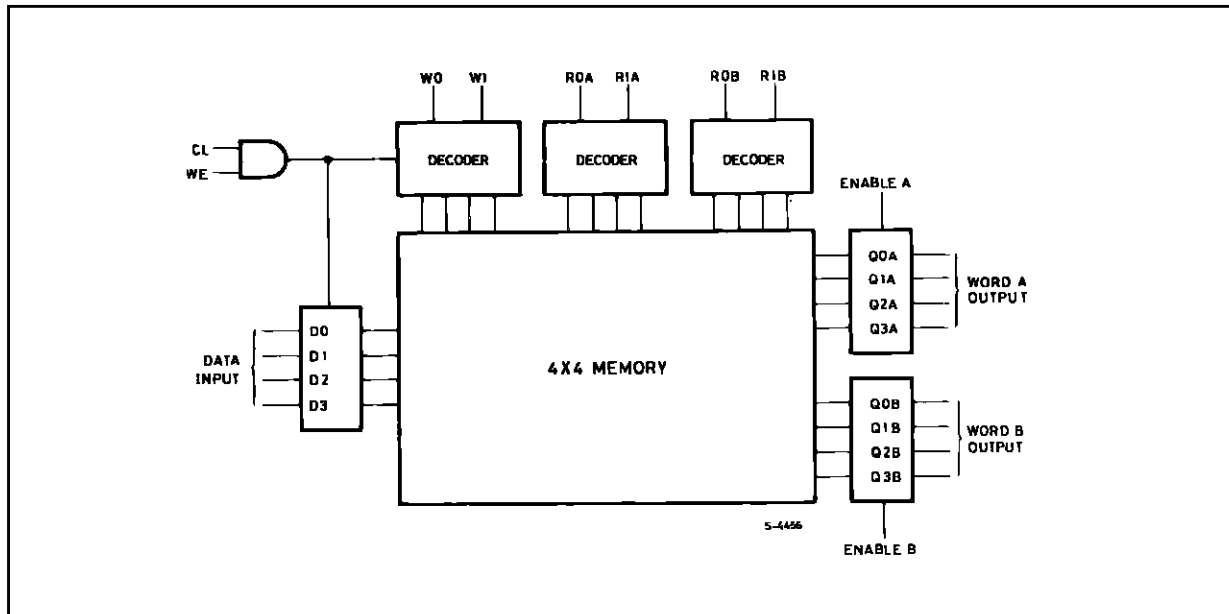


FUNCTIONAL DIAGRAM



LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Value	Unit
V _{DD} *	Supply Voltage: HCC Types HCF Types	-0.5 to +20	V
		-0.5 to +18	V
V _i	Input Voltage	-0.5 to V _{DD} + 0.5	V
I _I	DC Input Current (any one input)	± 10	mA
P _{tot}	Total Power Dissipation (per package) Dissipation per Output Transistor for Top = Full Package Temperature Range	200	mW
		100	mW
T _{op}	Operating Temperature: HCC Types HCF Types	-55 to +125	°C
		-40 to +85	°C
T _{stg}	Storage Temperature	-65 to +150	°C






Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for external periods may affect device reliability.

* All voltage values are referred to V_{SS} pin voltage.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V _{DD}	Supply Voltage: HCC Types HCF Types	3 to 18	V
		3 to 15	V
V _i	Input Voltage	0 to V _{DD}	V
T _{op}	Operating Temperature: HCC Types HCF Types	-55 to +125	°C
		-40 to +85	°C

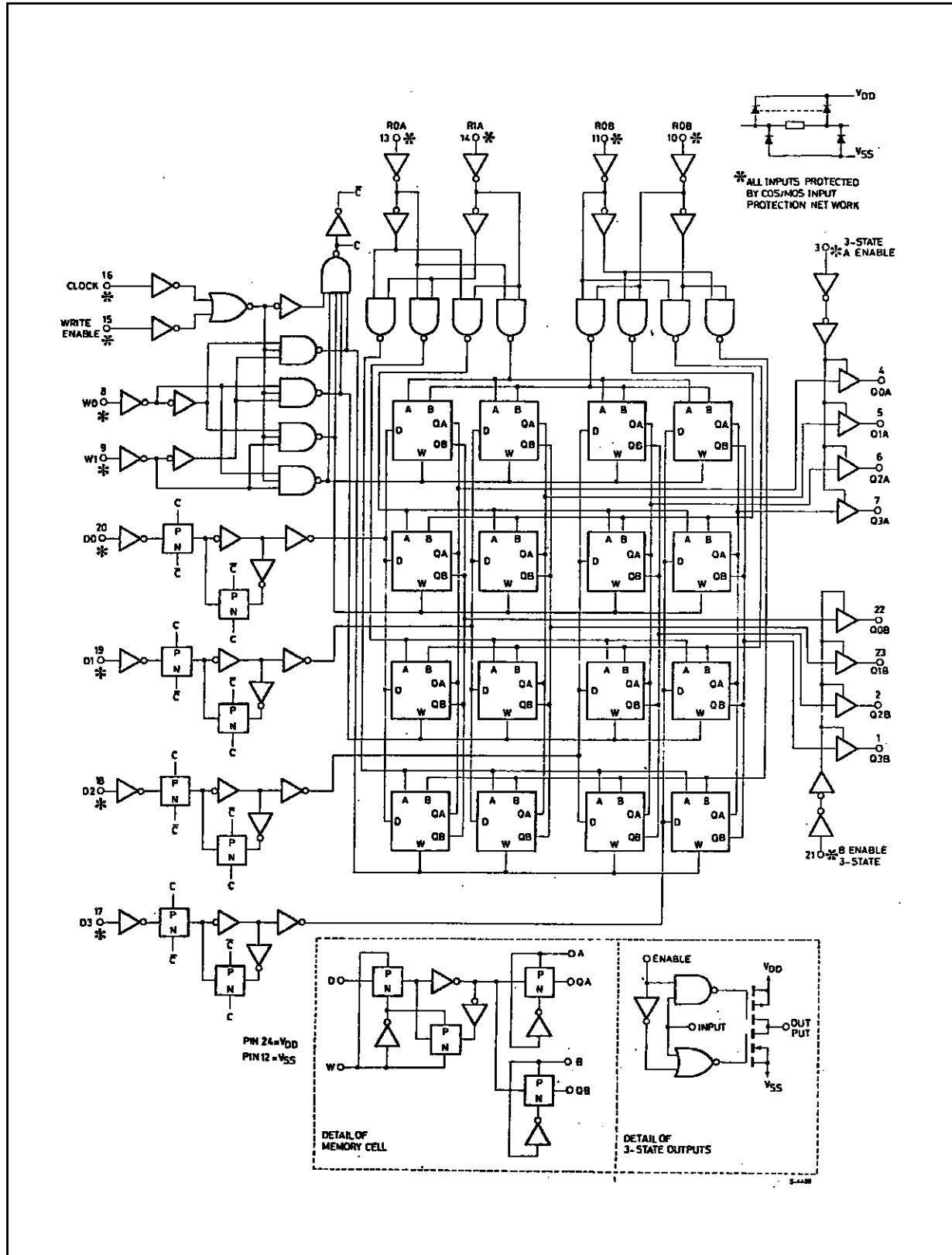
TRUTH TABLE

CLOCK	Write Enable	Write 1	Write 2	Read 1A	Read 0A	Read 1B	Read 0B	Enable A	Enable B	D _n	Q _{nA}	Q _{nB}
	1	S1	S2	S1	S2	S1	S2	1	1	1	1	1
	1	S1	S2	S1	S2	S1	S2	1	0	0	0	0
X	X	X	X	X	X	X	X	0	X	Z	Z	Z
	1	0	0	0	1	1	0	1	1	D _n to word 0	Word 1 Out	Word 2 Out
	0	0	0	0	1	1	0	1	1	Word 0 not altered	Word 1 Out	Word 2 Out
X	X	X	X	1	0	0	1	1	X	X	Word 2 Out	Word 1 Out
	X	X	X	X	X	X	X	1	1	X	NC	NC

1 = HIGH LEVEL, 0 = LOW LEVEL, X = DONT CARE, Z = HIGH IMPEDANCE

S1 and S2 refer to input states of either 1 or 0

SCHEMATIC DIAGRAM



STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

Symbol	Parameter		Test Conditions				Value						Unit	
			V _I (V)	V _O (V)	I _O (μ A)	V _{DD} (V)	T _{LOW} *		25 °C			T _{HIGH} *		
							Min.	Max.	Min.	Typ.	Max.	Min.		Max.
I _L	Quiescent Current	HCC Types	0/5			5		5		0.04	5		150	μ A
			0/10			10		10		0.04	10		300	
			0/15			15		20		0.04	20		600	
		0/20			20		100		0.08	100		3000		
		HCF Types	0/5			5		20		0.04	20		150	
			0/10			10		40		0.04	40		300	
0/15				15		80		0.04	80		600			
V _{OH}	Output High Voltage		0/5		< 1	5	4.95		4.95			4.95		V
			0/10		< 1	10	9.95		9.95			9.95		
			0/15		< 1	15	14.95		14.95			14.95		
V _{OL}	Output Low Voltage		5/0		< 1	5		0.05			0.05		0.05	V
			10/0		< 1	10		0.05			0.05		0.05	
			15/0		< 1	15		0.05			0.05		0.05	
V _{IH}	Input High Voltage			0.5/4.5	< 1	5	3.5		3.5			3.5		V
				1/9	< 1	10	7		7			7		
				1.5/13.5	< 1	15	11		11			11		
V _{IL}	Input Low Voltage			4.5/0.5	< 1	5		1.5			1.5		1.5	V
				9/1	< 1	10		3			3		3	
				13.5/1.5	< 1	15		4			4		4	
I _{OH}	Output Drive Current	HCC Types	0/5	2.5		5	-2		-1.6	-3.2		-1.15		mA
			0/5	4.6		5	-0.64		-0.51	-1		-0.36		
			0/10	9.5		10	-1.6		-1.3	-2.6		-0.9		
			0/15	13.5		15	-4.2		-3.4	-6.8		-2.4		
		HCF Types	0/5	2.5		5	-1.53		-1.36	-3.2		-1.1		
			0/5	4.6		5	-0.52		-0.44	-1		-0.36		
			0/10	9.5		10	-1.3		-1.1	-2.6		-0.9		
			0/15	13.5		15	-3.6		-3.0	-6.8		-2.4		
I _{OL}	Output Sink Current	HCC Types	0/5	0.4		5	0.64		0.51	1		0.36	mA	
			0/10	0.5		10	1.6		1.3	2.6		0.9		
			0/15	1.5		15	4.2		3.4	6.8		2.4		
		HCF Types	0/5	0.4		5	0.52		0.44	1		0.36		
			0/10	0.5		10	1.3		1.1	2.6		0.9		
			0/15	1.5		15	3.6		3.0	6.8		2.4		
I _{IH} , I _{IL}	Input Leakage Current	HCC Types	0/18	Any Input		18		± 0.1		$\pm 10^{-5}$	± 0.1		± 1	μ A
		HCF Types	0/15	Any Input		15		± 0.3		$\pm 10^{-5}$	± 0.3		± 1	
I _{OH} , I _{OL} **	3-State Output Leakage Current	HCC Types	0/18	0/18		18		± 0.4		$\pm 10^{-4}$	± 0.4		± 12	μ A
		HCF Types	0/15	0/15		15		± 1.0		$\pm 10^{-4}$	± 1.0		± 7.5	
C _I	Input Capacitance		Any Input						5	7.5			pF	

* T_{LOW} = -55 °C for HCC device; -40 °C for HCF device.* T_{HIGH} = +125 °C for HCC device; +85 °C for HCF device.The Noise Margin for both "1" and "0" level is: 1V min. with V_{DD} = 5V, 2V min. with V_{DD} = 10V, 2.5V min. with V_{DD} = 15V

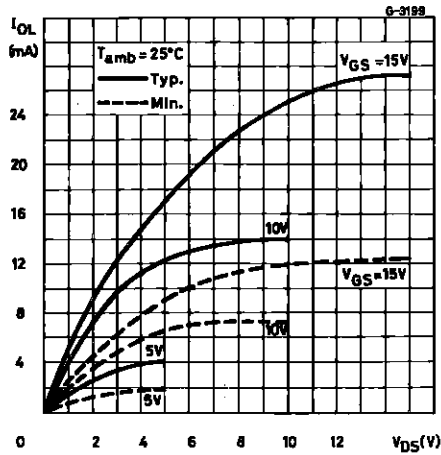
** Forced output disable

HCC/HCF40108

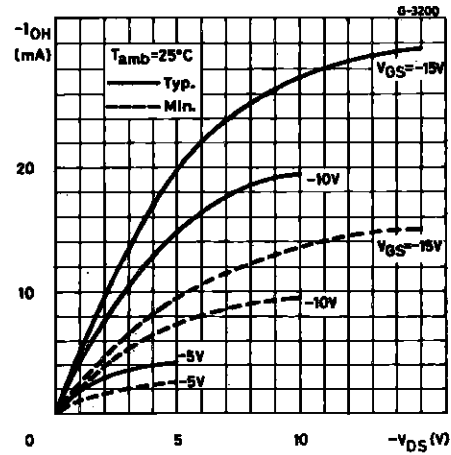
DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, $C_L = 50\text{ pF}$, $R_L = 200\text{ K}\Omega$, typical temperature coefficient for all V_{DD} values is $03\text{ } \%/^{\circ}\text{C}$, all input rise and fall times = 20 ns)

Symbol	Parameter	Test Conditions		Value			Unit
			V_{DD} (V)	Min.	Typ.	Max.	
t_{PLH} t_{PHL}	Propagation Delay Time Clock or Write Enable to Q		5		360	720	ns
			10		140	280	
			15		100	200	
	Propagation Delay Time Read or Write Address to Q		5		300	600	
			10		120	240	
			15		85	170	
t_{PZH} t_{PHZ}	3-State Disable Delay Time		5		100	200	ns
			10		50	100	
			15		40	80	
t_{PZL} t_{PLZ}	3-State Display Delay Time		5		130	260	ns
			10		60	120	
			15		50	100	
t_{TLH} t_{THL}	Output Transition Time		5		100	200	ns
			10		50	100	
			15		40	80	
t_{setup}	Setup Time Data to Clock $t_{s(D)}$		5	0	-95		ns
			10	0	-35		
			15	0	-20		
	Setup Time Write Enable to Clock $t_{s(WE)}$		5	250	125		
			10	100	50		
			15	70	35		
	Setup Time Write Address to Clock $t_{s(WA)}$		5	250	125		
			10	100	50		
			15	70	35		
t_r, t_s	Clock Rise and Fall Time		5			15	μs
			10			5	
			15			5	
t_{hold}	Hold Time Data to Clock $t_{s(D)}$		5	220	110		ns
			10	100	50		
			15	80	40		
	Hold Time Write Enable to Clock $t_{s(WE)}$		5	270	135		
			10	130	65		
			15	80	40		
	Hold Time Write Address to Clock $t_{s(WA)}$		5	330	165		
			10	140	70		
			15	90	45		
t_w	Clock Pulse Width Clock or Write Enable $t_{w(CL)}$		5	350	175		ns
			10	130	65		
			15	90	45		
	Clock Pulse Width Write Address $t_{w(WA)}$		5	300	150		
			10	150	75		
			15	90	45		
f_{CL}	Maximum Clock Input Frequency		5	1.5	3		MHz
			10	3.5	7		
			15	4.5	9		

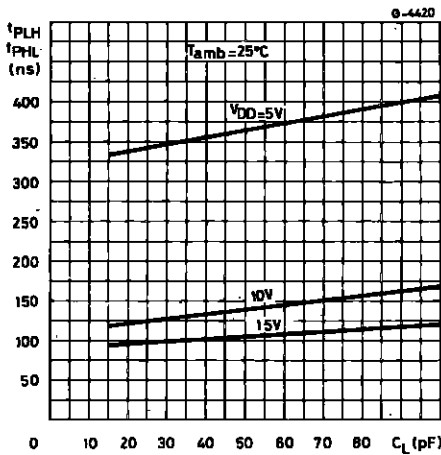
Output Low (sink) Current Characteristics



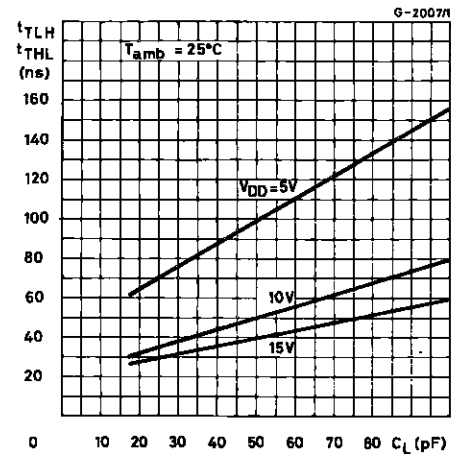
Output High (source) Current Characteristics



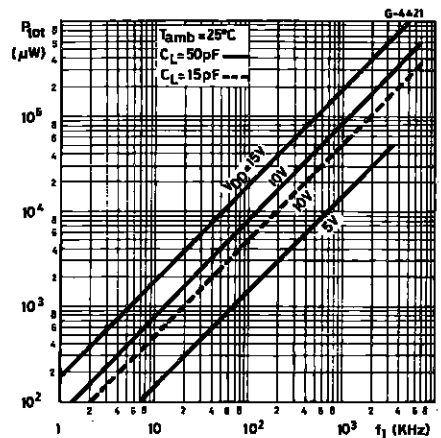
Typical Propagation Delay Time vs Load Capacitance (CL or WE to Q)



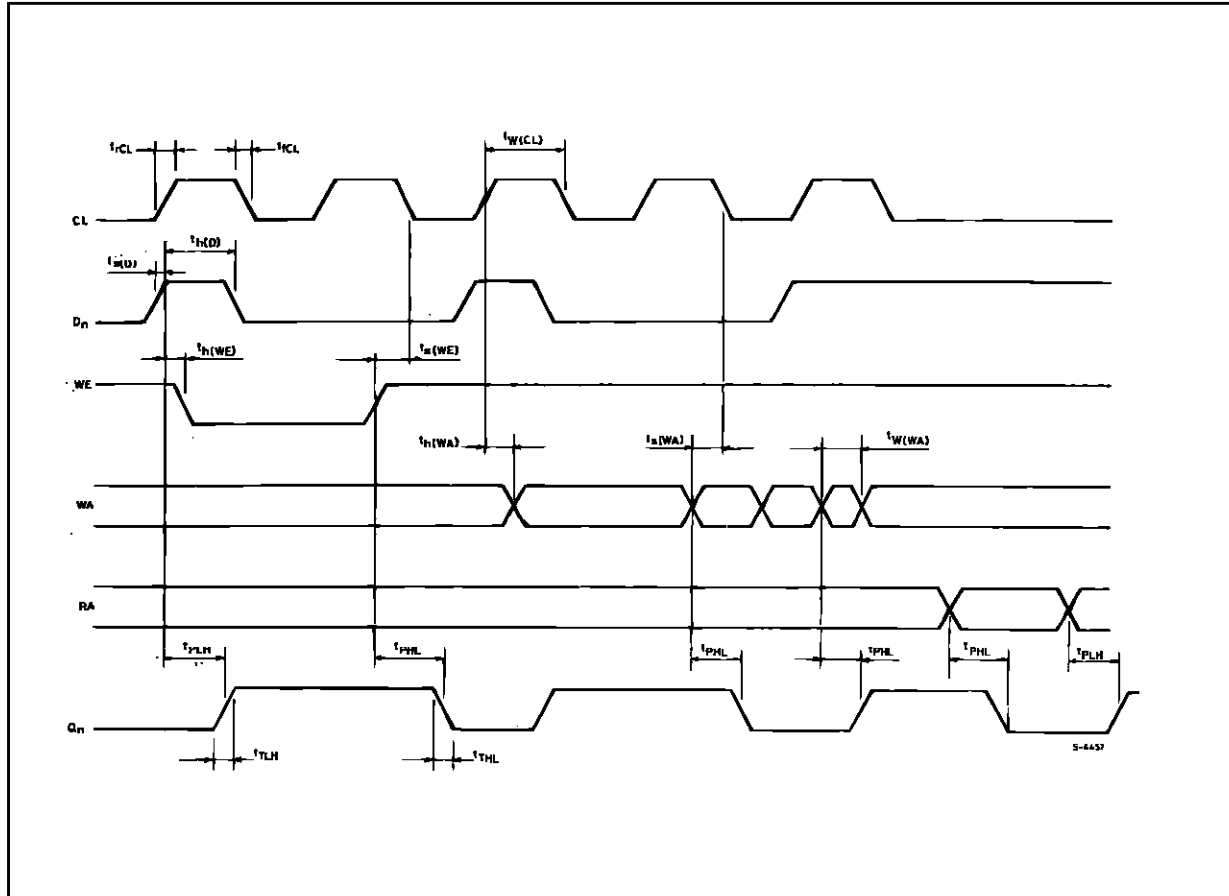
Typical Transition Time vs Load Capacitance



Typical Dynamic Power Dissipation vs Input Frequency

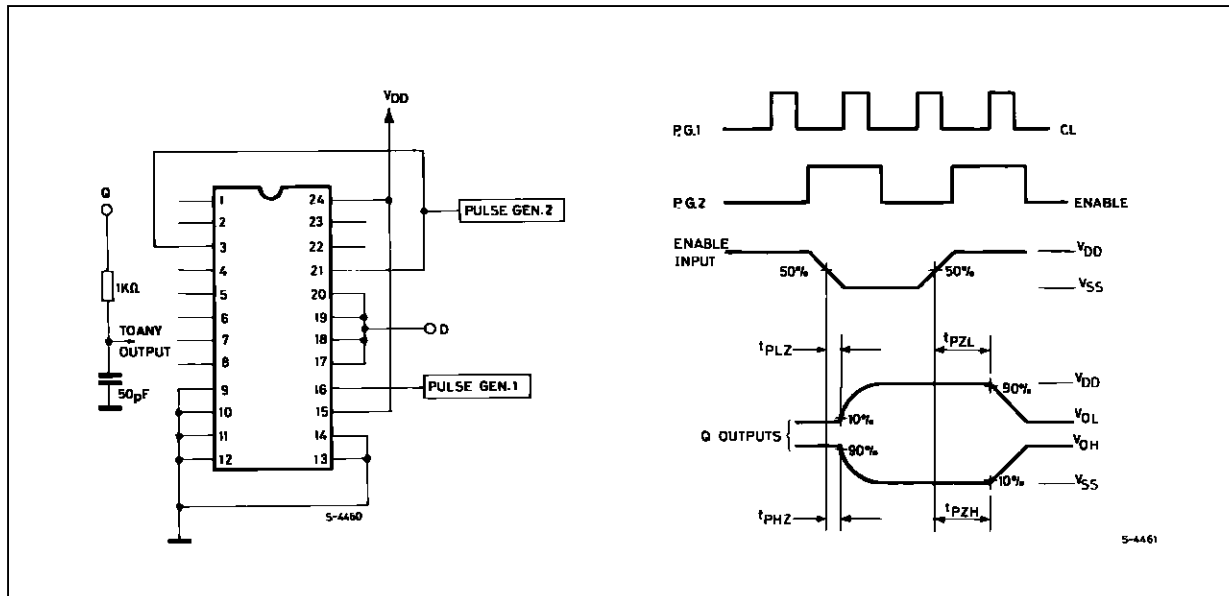


TIMING DIAGRAM

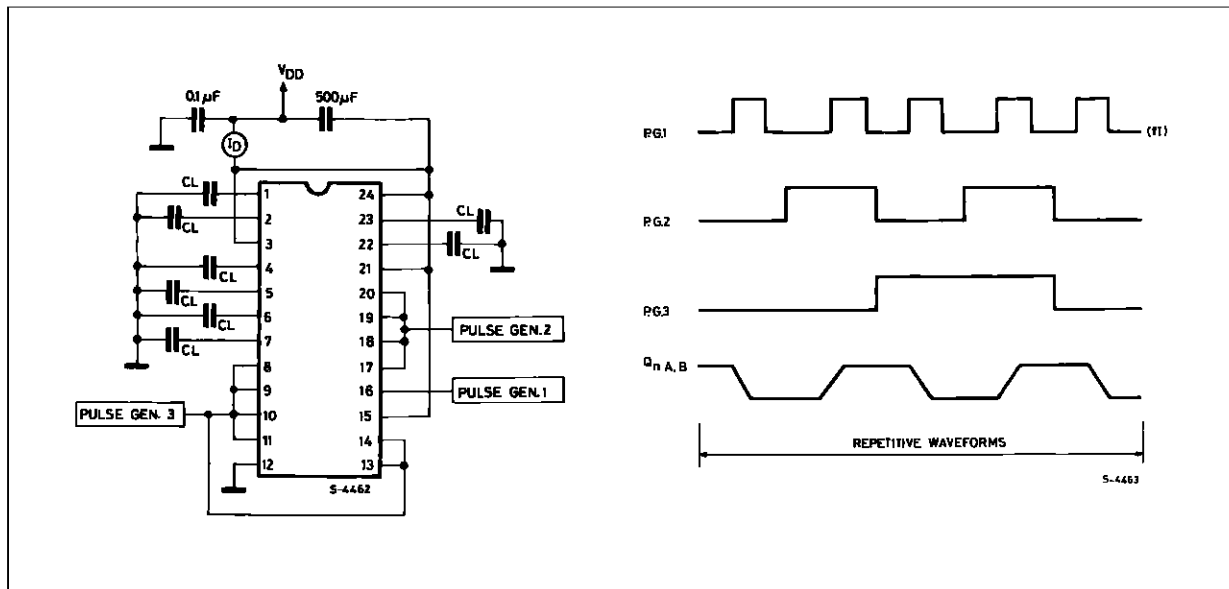


TEST CIRCUITS

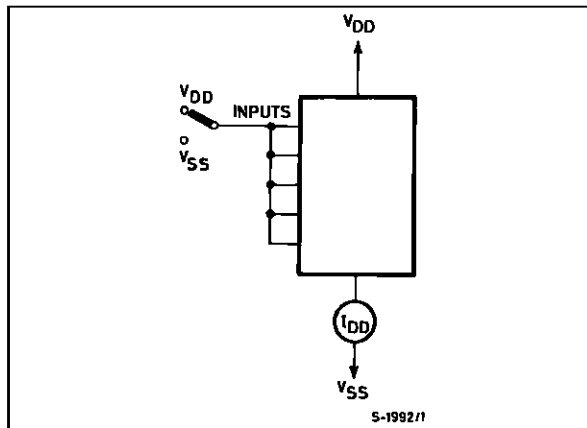
Output Enable Delay Times and Waveforms



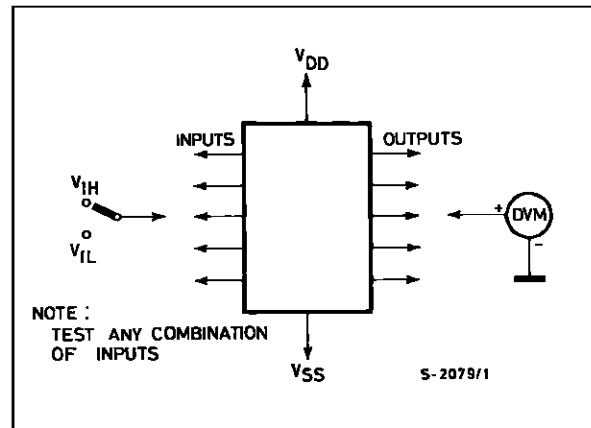
Power Dissipation and Waveforms



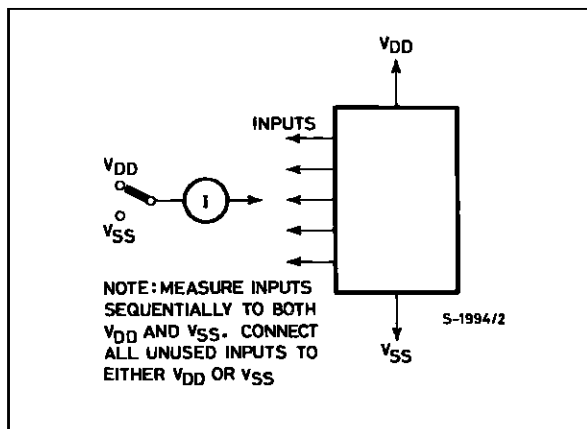
Quiescent Device Current



Noise Immunity

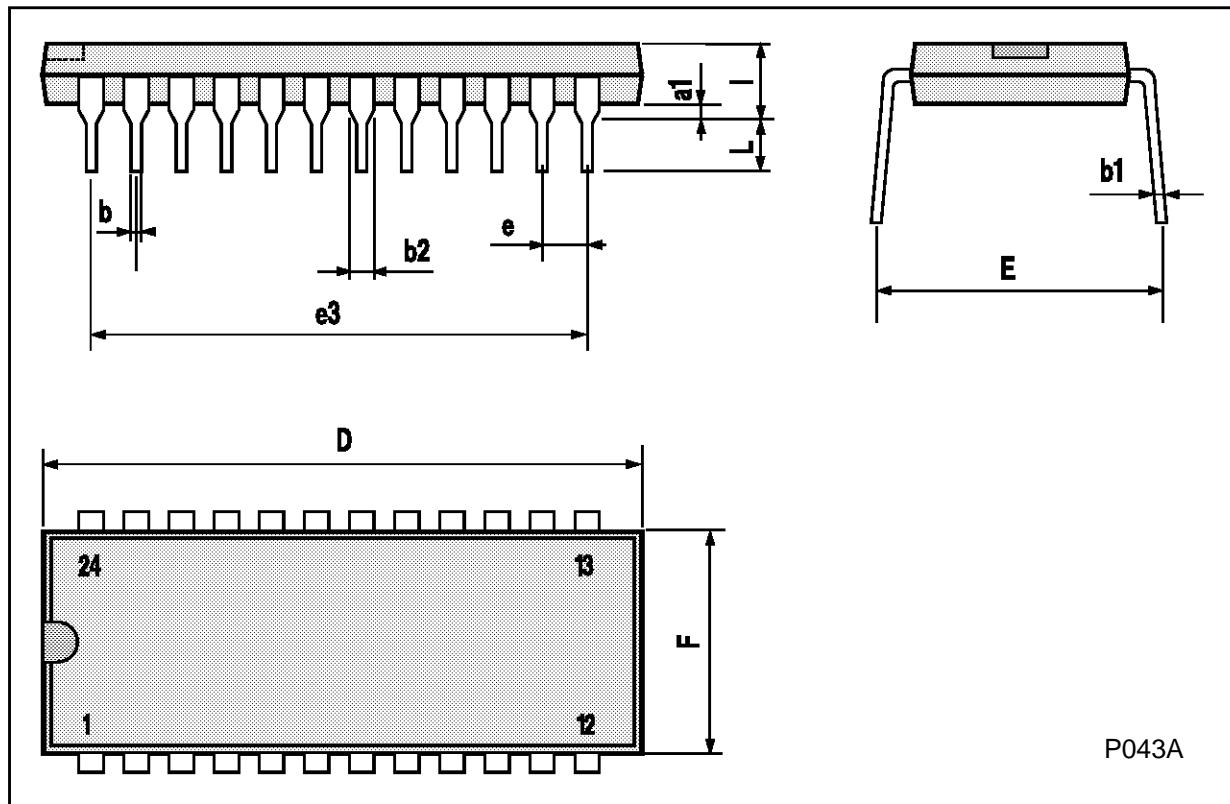


Input Leakage Current



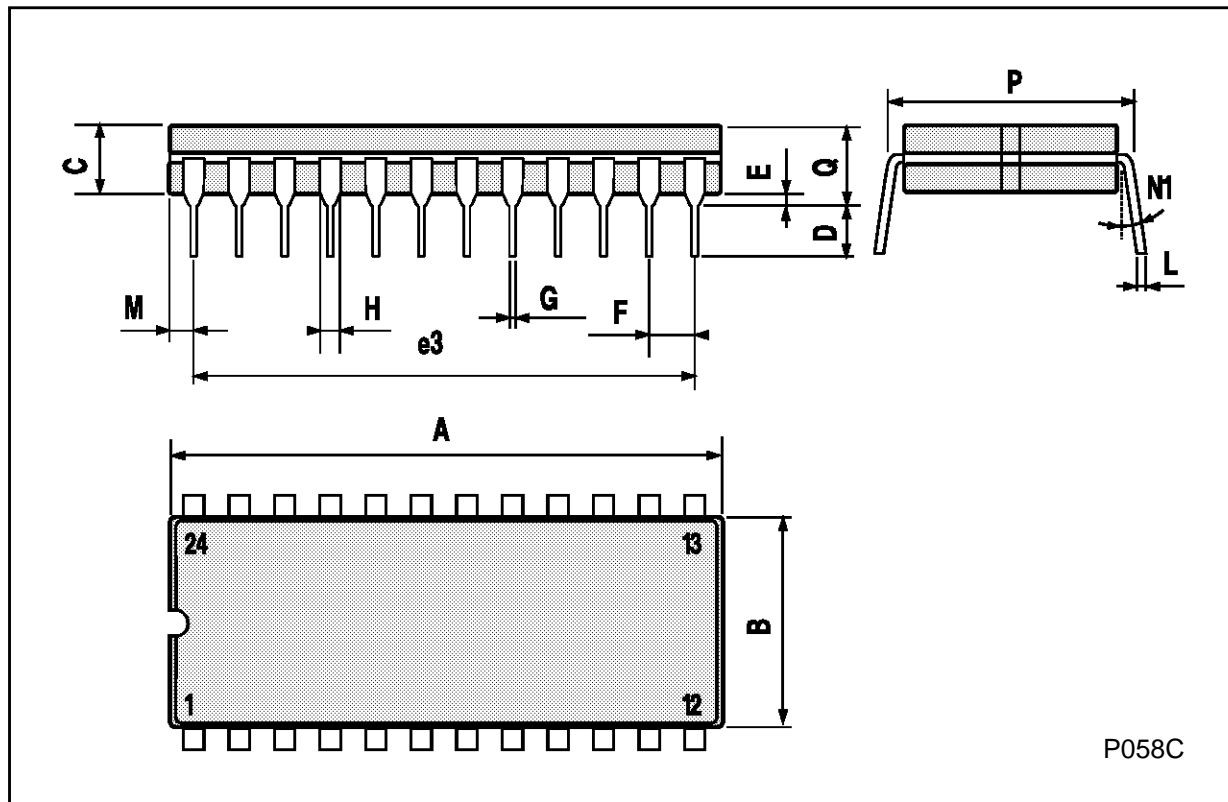
Plastic DIP24 (0.25) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1		0.63			0.025	
b		0.45			0.018	
b1	0.23		0.31	0.009		0.012
b2		1.27			0.050	
D			32.2			1.268
E	15.2		16.68	0.598		0.657
e		2.54			0.100	
e3		27.94			1.100	
F			14.1			0.555
l		4.445			0.175	
L		3.3			0.130	



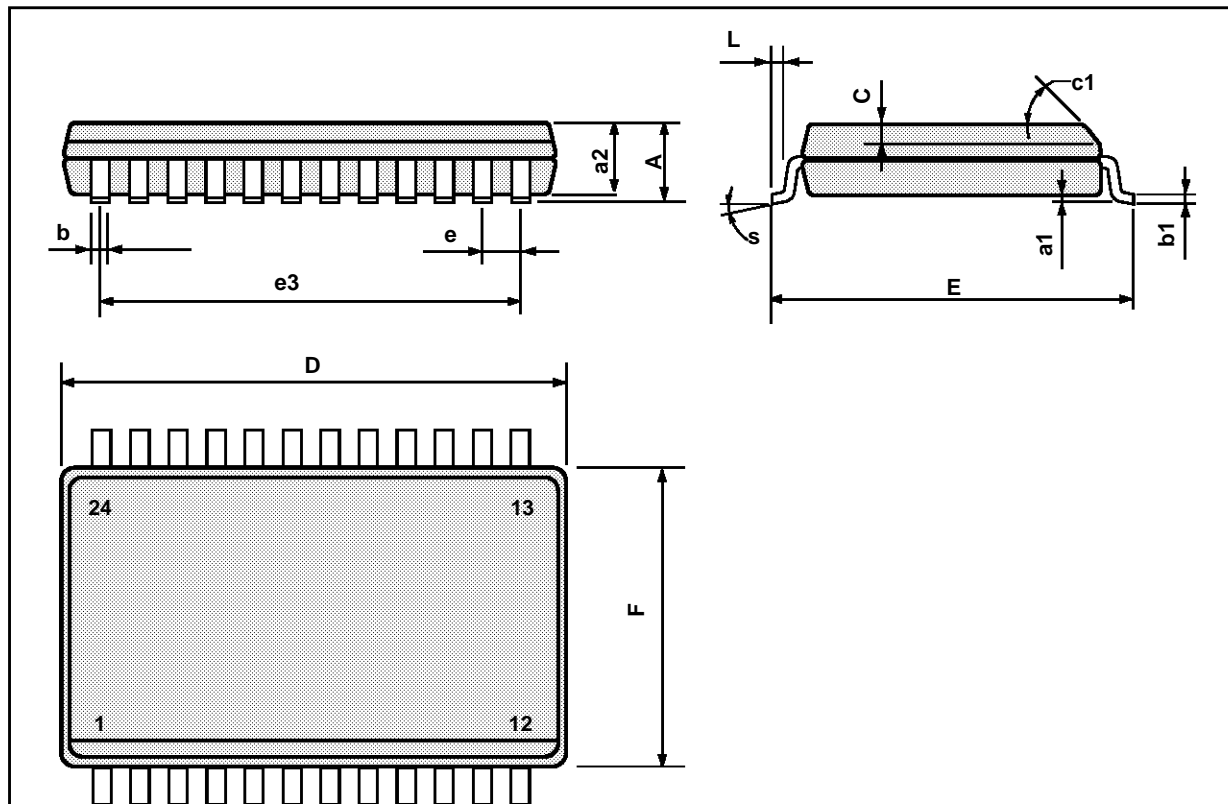
Ceramic DIP24 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			32.3			1.272
B	13.05		13.36	0.514		0.526
C	3.9		5.08	0.154		0.200
D	3			0.118		
E	0.5		1.78	0.020		0.070
e3		27.94			1.100	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
I	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
M	1.52		2.49	0.060		0.098
N1	4° (min.), 15° (max.)					
P	15.4		15.8	0.606		0.622
Q			5.71			0.225



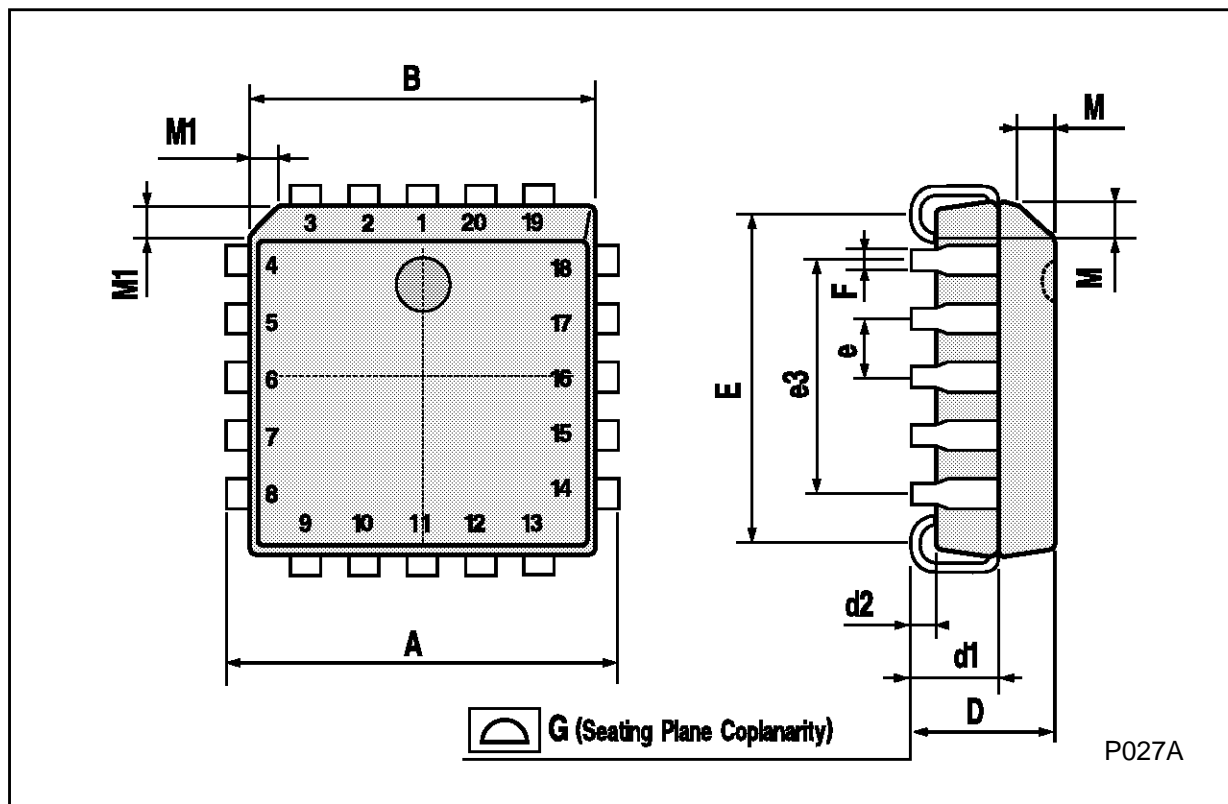
SO24 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.10		0.20	0.004		0.007
a2			2.45			0.096
b	0.35		0.49	0.013		0.019
b1	0.23		0.32	0.009		0.012
C		0.50			0.020	
c1	45° (typ.)					
D	15.20		15.60	0.598		0.614
E	10.00		10.65	0.393		0.420
e		1.27			0.05	
e3		13.97			0.55	
F	7.40		7.60	0.291		0.299
L	0.50		1.27	0.19		0.050
S	8° (max.)					



PLCC20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	9.78		10.03	0.385		0.395
B	8.89		9.04	0.350		0.356
D	4.2		4.57	0.165		0.180
d1		2.54			0.100	
d2		0.56			0.022	
E	7.37		8.38	0.290		0.330
e		1.27			0.050	
e3		5.08			0.200	
F		0.38			0.015	
G			0.101			0.004
M		1.27			0.050	
M1		1.14			0.045	



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