

Philips Components

Data sheet	
status	Product specification
date of issue	July 1990

LTA331

Liquid Crystal Display

T-41-38

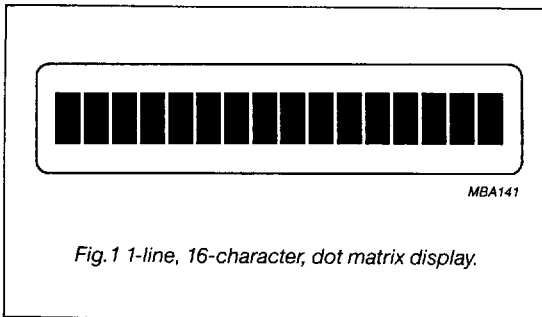
DEVICE DESCRIPTION

The LTA331 is a 16-character, 1-line dot matrix display. Typical applications include hand held equipment and industrial applications. The display can be inverted to adapt the optimal viewing direction to the application. The symmetrical pinout allows the use of only one PC-board.

QUICK REFERENCE DATA

Viewing area dimensions	65 x 14.4 mm
Overall glass dimensions	69 x 23 mm
Character format	5 x 7 dots and cursor
Character size	6.56 x 3.07 mm
Do* size (spacing 0.08 mm)	0.83 x 0.55 mm
Drive method	MUX 1:16
Operating voltage	5 V
Illumination mode	reflective/transflective
Preferred viewing direction	6 o'clock

DISPLAY MODE



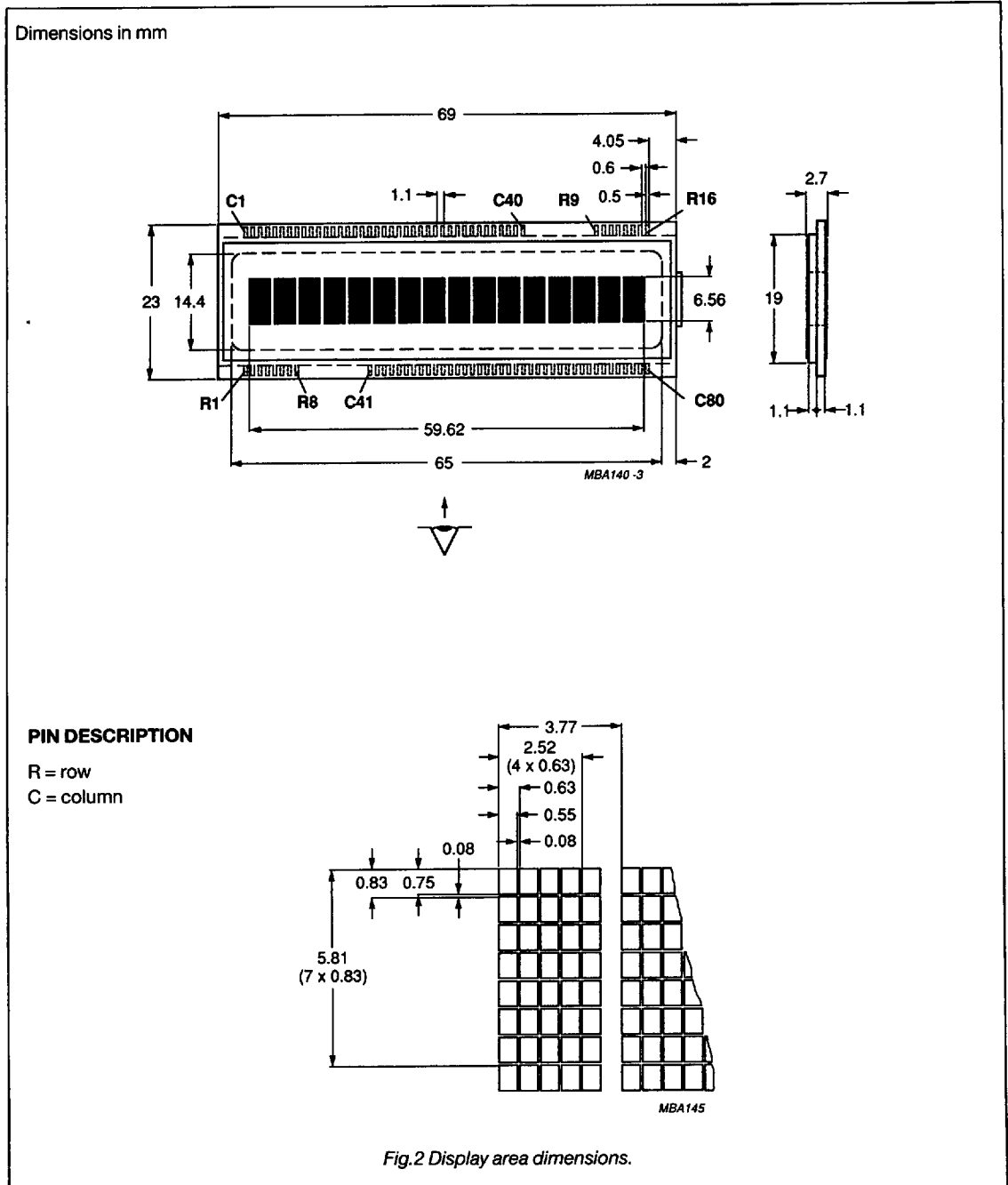
TYPE DEPENDENT DATA

TYPE	ILLUMINATION MODE	CONNECTION METHOD	OPERATING AMBIENT TEMPERATURE RANGE	RELIABILITY GRADE
LTA331R-11	reflective	for conductive rubber	-10 to +60 °C	commercial
LTA331F-11	transflective	for conductive rubber	-10 to +60 °C	commercial

Liquid Crystal Display

LTA331

MÉCHANICAL DATA



Liquid Crystal Display**LTA331****RATINGS**

Limiting values in accordance with Absolute Maximum System (IEC 134)

Maximum voltage between any two connections (see note)

 V_{\max} 10 V RMS

Storage temperature range

 T_{stg} -25 to +70 °C

Note: maximum DC component = 0.1 V

OPERATING CONDITIONSAll values at, $T_{\text{amb}} = 25\text{ °C}$; $V_{\text{op}} = V_{\text{op typ}}$; $f_{\text{dr}} = 100\text{ Hz}$, unless otherwise specified

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
operating voltage	V_{op}	-	5	-	V
temperature compensation of V_{op}	TC	-	-20	-	mV/°C
operating ambient temperature	T_{amb}	-10	-	+60	°C
current consumption (see note)	I	-	52	110	µA
frame frequency	f_{dr}	30	-	100	Hz

Note: with all dots "ON".

ELECTRO-OPTICAL CHARACTERISTICS $T_{\text{amb}} = 25\text{ °C}$, $V_{\text{op}} = V_{\text{op typ}}$, $\alpha = 10^\circ$, $\phi = \phi_{\text{opt}}$, unless otherwise specified

PARAMETER	SYMBOL	CONDITIONS	TYP.	MAX.	UNIT
Response times	t_{on}	$T_{\text{amb}} = 0\text{ °C}$	380	760	ms
		$T_{\text{amb}} = 25\text{ °C}$	110	220	ms
		$T_{\text{amb}} = 50\text{ °C}$	45	90	ms
	t_{off}	$T_{\text{amb}} = 0\text{ °C}$	470	940	ms
		$T_{\text{amb}} = 25\text{ °C}$	110	220	ms
		$T_{\text{amb}} = 50\text{ °C}$	45	90	ms
Viewing Angles (contrast ratio CR > 3)	α_{opt} $\alpha_2 - \alpha_1$	reflective types	30	-	°
			30	-	°
	α_{opt} $\alpha_2 - \alpha_1$	transflective types reflective operation	30	-	°
			25	-	°
	α_{opt} $\alpha_2 - \alpha_1$	transflective types transmissive operation	30	-	°
			20	-	°

For definitions of contrast ratio, viewing angles and response times see notes 1 to 3.

Liquid Crystal Display

LTA331

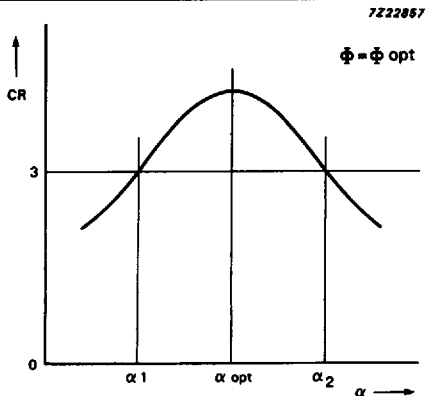
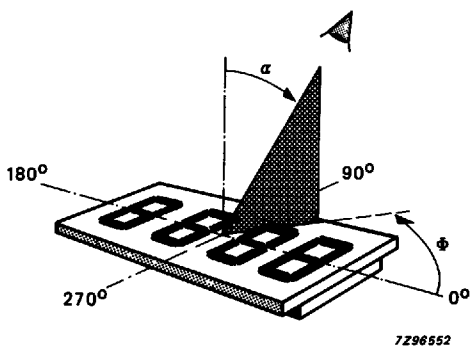
Note 1 Definition of contrast ratio (C_R).

in positive image mode: $C_R = \frac{B_{off}}{B_{on}}$

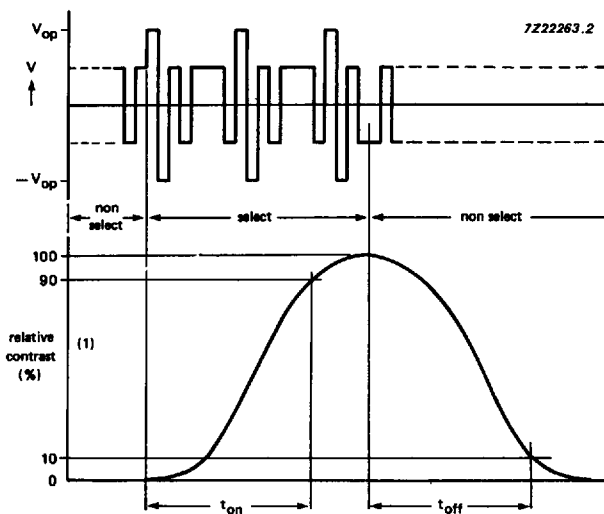
in negative image mode: $C_R = \frac{B_{on}}{B_{off}}$

B_{on} is the brightness of selected segments
 B_{off} is the brightness of non-selected segments

Note 2 Definition of viewing angles α and ϕ .



Note 3 Definition of response times.

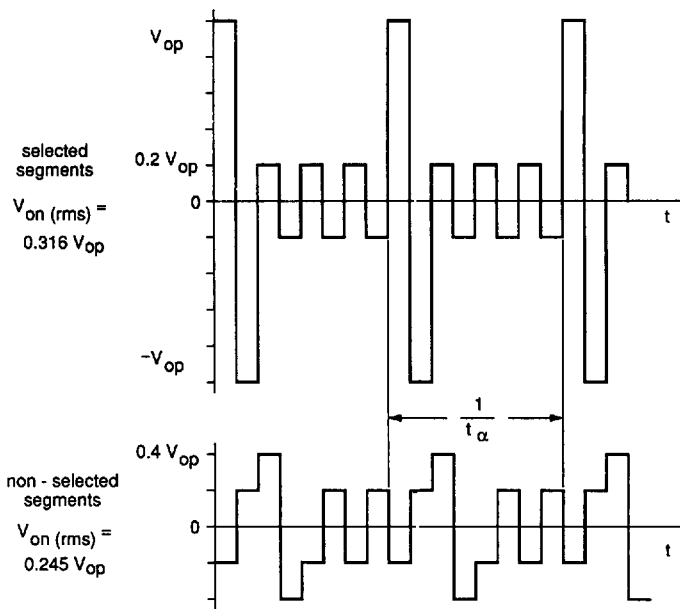


1) measured at $\alpha = 10^\circ$

Liquid Crystal Display

LTA331

Note 4 Definition of waveforms.



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