

SHARP

LCD Modules for Industrial Appliances

<http://sharp-world.com/products/device/>

September 2014

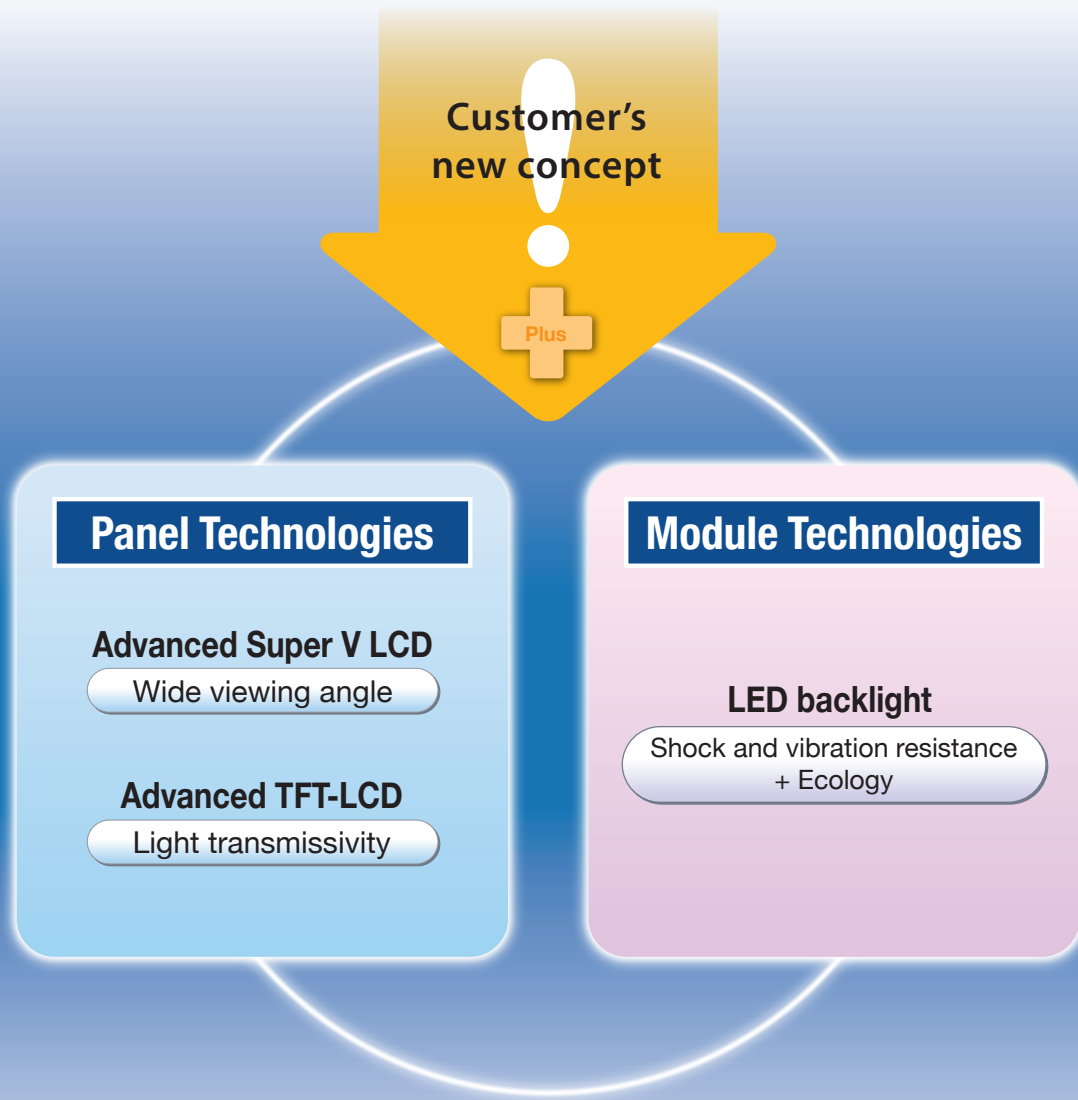
Sharp LCDs for Comprehensive Use



Creating one-of-a-kind technology as our customers' partner for innovation.

For example, if a customer's new product concept requires superior LCD technology, we focus our resources to meet that need. That is because we are driven by our long years of experience and success to develop unique LCD technologies and create LCD products required by the next generation.

We have a desire to advance with our customers as their innovation partner while looking at their needs from their viewpoint and sometimes beyond. We at Sharp continually strive to create together with our partners.



C o n t e n t s

Technical Overview		Product Specifications (23.1 to less than 5.0 inches)	05
Advanced Super V LCD	02		
Advanced TFT-LCD	03		
LED backlight	04		

Advanced Super V LCD

With a wide viewing angle of up to 176° vertically and horizontally, the superior image quality further expands the potential of LCD monitors.



The Advanced Super V LCD is a high-image quality LCD panel employing advanced technology developed exclusively by Sharp. For LCD TV screens, Advanced Super V LCD achieves a wide viewing angle of 176° from the top, bottom, left, and right by optimizing the alignment of the liquid crystal molecules.

Advanced Super V LCD

Wide viewing angle for bright, clear images from any direction

The Advanced Super V LCD delivers a wide viewing angle of 176° from the top, bottom, left, and right, which makes it ideal for all sorts of applications and usage configurations. There is very little color shift with viewing angle changes and no gray scale inversion, so the picture looks bright and sharp from any direction.

Conceptual illustration of viewing angle characteristics

TN



Advanced Super V



Applications

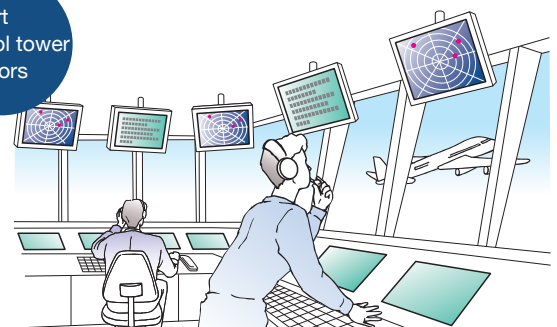
Video conferencing systems



Medical imaging



Airport control tower monitors



A third type of liquid crystal display that combines the advantages of transmissive and reflective LCDs.



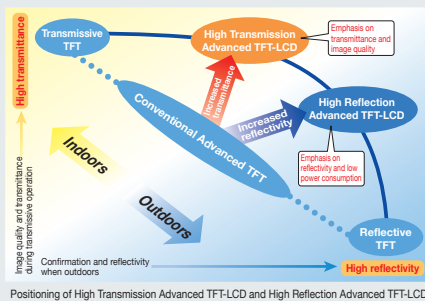
Super Mobile HR-TFT LCDs provide brilliant, vivid images outdoors where it is bright, but their visibility is poor indoors, where ambient light levels are lower.

Sharp has solved this problem by developing a multi-location display, the Advanced TFT-LCD. It combines the performance of an HR-TFT LCD in brightly lit locations with the functionality of a backlit transmissive LCD in dimmer environments. The Advanced TFT-LCD has been further refined to produce the High Transmission Advanced TFT-LCD and the High Reflection Advanced TFT-LCD. This enables users to choose the best possible panel for their particular application.

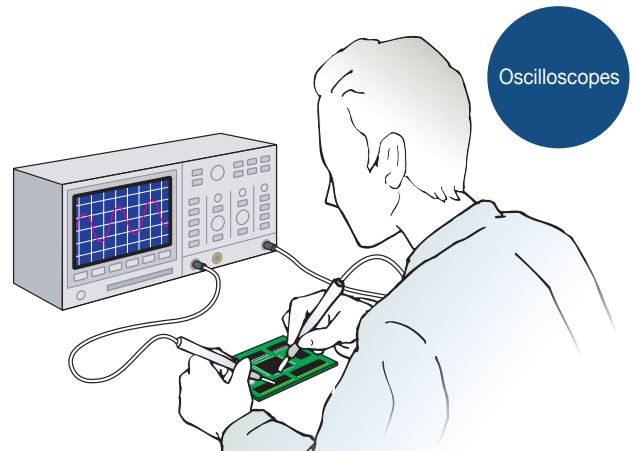
Advanced TFT-LCD

The High Transmission Advanced TFT-LCD and High Reflection Advanced TFT-LCD—two types of panels optimized for different applications

Advanced TFT-LCDs feature a display panel that is divided into reflective and transmissive sections. Since the ratio of the two parts can be changed freely, it is possible to design display panels that are ideally suited to specific applications. The present selection of Advanced TFT-LCDs includes the High Transmission Advanced TFT-LCD, which is optimized for superior image quality, and the High Reflection Advanced TFT-LCD, which is designed for low power consumption.



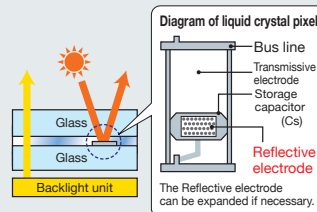
Applications



Excellent visibility and image quality under outdoor light

High Transmission Advanced TFT-LCD

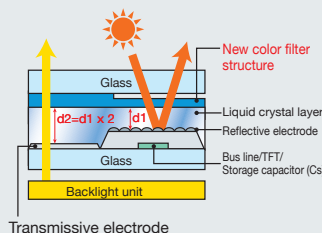
The transmissive part of the display panel is left as is and only the area that is not used for transmissive display is made reflective. Thus, though the display panel is transmissive, it provides high transmittance and excellent image quality on a par with conventional transmissive TFT-LCDs. At the same time, the panel provides good visibility under bright light, such as outdoors. The High Transmission Advanced TFT-LCD is suitable for applications where indoor use is of primary importance but outdoor use is occasionally necessary.



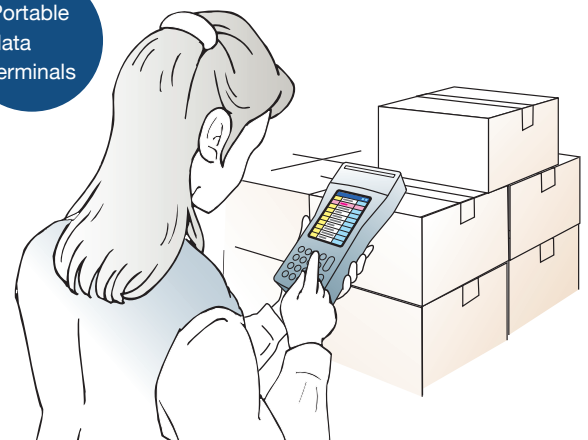
Reflectivity rivaling reflective TFT-LCDs for excellent visibility and low power consumption

High Reflection Advanced TFT-LCD

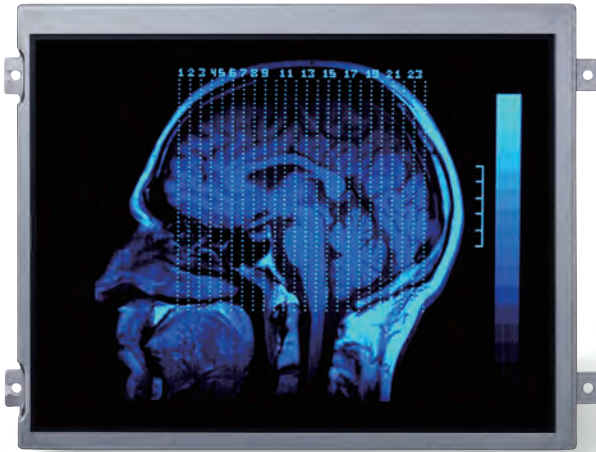
The rate of external light used to illuminate the display is increased by boosting the ratio of reflective display space and using reflective electrodes in parts other than the transmissive display area. This produces reflectivity nearly equal to that of a conventional reflective TFT-LCD. It is thus possible to reduce the amount of time the backlight needs to be used, and even retain excellent visibility with the backlight turned off. The High Reflection Advanced TFT-LCD is suitable for applications where outdoor use is emphasized and low power consumption is necessary.



Portable data terminals



Liquid crystal displays that employ LED backlight technology in consideration of safety, cost, and the environment.

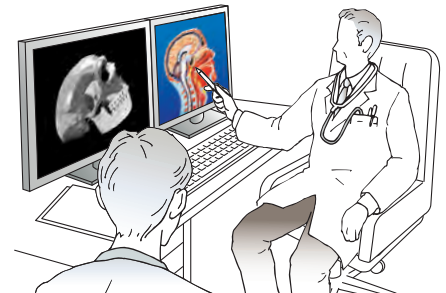


Developed from today's heightened ecological consciousness, these TFT liquid crystal displays adopt LED technology in their backlights. Offering significantly increased life expectancy over previous materials, it is now unnecessary to replace the display's backlight, thus preventing the unnecessary waste of our precious natural resources. While answering the call for mercury-free materials, tolerance for vibration, impact, and low temperature environments has been improved as well, enabling these displays to be applicable to a wider range of solutions. TFT liquid crystal displays that consider safety, costs and the environment in this way will be extremely useful in a wide variety of fields.

LED

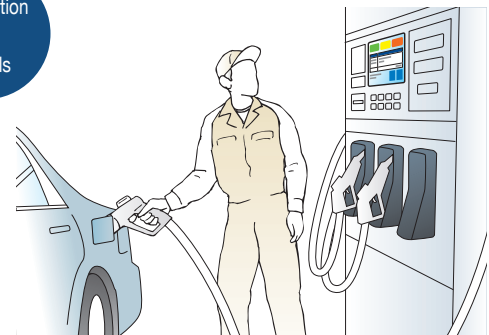
Applications

Medical imaging



Monitoring control systems

Gas station POS terminals



Low electrical noise

Electrical noise is suppressed through a direct current, low voltage drive, enabling installation in medical equipment, etc., that can't tolerate electromagnetic waves.

Greatly improved safety

Tolerance for mechanical shock has been greatly improved by eliminating the use of thin glass tubes. And, because no mercury is used, these products can be utilized without the usual apprehension for the environment. Moreover, by moving away from the use of an inverter motor drive, high voltage has become unnecessary, making these displays appropriate for use in applications with greater safety demands.

Wide dimmer range

A wide dimmer range has been achieved.

Quick attainment of stable light intensity

Stable light intensity can be reached instantaneously, even in a low temperature environment.

Longer backlight life

Vastly increased longevity is now available, for a richer variation of possible applications.

Comparison of longevity between CCFT and LED backlights

Note) The estimated time that the amount of relative luminescence will decrease by 50%

	CCFT*	LED
At normal temperature (+25°C)	up to 50,000 hrs	5,000 to 70,000 hrs
At low temperature (-20°C)	up to 3,000 hrs	

* Lifetime for lamp only

Product Specifications (23.1 to less than 5.0 inches)

★ Under development ☆ New model

Display size (inch)	Model No.	Resolution	Dot format H x V (dot)	Dot pitch H x V (mm)	Display colors	Brightness (cd/m ²)	Contrast	Viewing angle (°) L/R / U/D	Response time(ms)
23.1	LQ231U1LW31/32	UXGA	1 600 x 1 200	0.294 x 0.294	16.77 M	500	600 : 1	170/170 (CR > 10)	12
20.1	☆ LQ201U1LW32	UXGA	1 600 x 1 200	0.255 x 0.255	16.77 M	330	1400 : 1	170/170 (CR > 10)	30
	☆ LQ201U1LW31				256 Grayscale	1 000			
19.0	★ LQ190E1LW76	SXGA	1 280 x 1 024	0.294 x 0.294	16.77 M	470	1500 : 1	170/170 (CR > 10)	35
	★ LQ190E1LW72					350			
	☆ LQ190E1LX75					1 000	900 : 1		
	LQ190E1LX51					450	1 000 : 1		
	LQ190E1LW52					300	900 : 1		35
	LQ190N1LW01	WSXGA+	1 680 x 1 050	0.24325 x 0.24325					
15.0	☆ LQ150X1LW96	XGA	1 024 x 768	0.297 x 0.297	16.19 M	500	1 500 : 1	170/170 (CR > 10)	35
	★ LQ150X1LX96					400			
	☆ LQ150X1LW95								
	☆ LQ150X1LX95				270				
	★ LQ150X1LX92								
	LQ150X1LW94				12 M	330	1 000 : 1		30
	LQ150X1LW12				10 M	350			
	LQ150X1LG91				16.19 M	600		800 : 1	
	LQ150X1LG11						160/145 (CR > 10)		
12.1	LQ121X3LG02	XGA	1 028 x 764	0.240 x 0.240	260 K	1 200	1 000 : 1	140/110 (CR > 10)	30
	LQ121K1LG52	WXGA	1 280 x 800	0.204 x 0.204	16.19 M	430	800 : 1	160/145 (CR > 10)	
	LQ121S1DG81	SVGA	800 x 600	0.3075 x 0.3075	260 K	450		160/140 (CR > 10)	
	LQ121S1DC71					850			
	LQ121S1LG84					450			
	LQ121S1LG86					1 500			
LQ104S1LG81	SVGA					800 x 600			0.264 x 0.264
LQ104S1DG2C		350	500 : 1						
LQ104V1LG81	VGA	640 x 480	0.330 x 0.330	450	800 : 1	160/145 (CR > 10)			
LQ104V1DG81									
8.4" class	LQ085Y3DG18	WVGA	800 x 480	0.231 x 0.231	260 K	250	450 : 1	160/130 (CR > 10)	29
	LQ084S3LG03	SVGA	800 x 600	0.213 x 0.213	16.19 M	330		130/115 (CR > 10)	35
	LQ084V1DG43	VGA	640 x 480	0.267 x 0.267	260 K	370	600 : 1	140/110 (CR > 10)	
7.0	LQ070Y3LG01	WVGA	800 x 480	0.1905 x 0.1905	260 K	350	450 : 1	130/110 (CR > 10)	35
	LQ070Y3LW01				16.19 M	380	800 : 1	170/170 (CR > 10)	
6.4	LQ064V3DG06	VGA	640 x 480	0.204 x 0.204	260 K	350	350 : 1	140/110 (CR ≥ 5)	29
5.7	LQ057Q3DC03	QVGA	320 x 240	0.360 x 0.360	260 K	500	350 : 1	160/145 (CR ≥ 10)	30
Less than 5.0"	LQ043T1DG28	WQVGA	480 x 272	0.198 x 0.198	260 K	300	500 : 1	160/135 (CR ≥ 10)	30
	LQ043T1DG29					360		160/135 (CR > 10)	
	LS037V7DW06	VGA	480 x 640	0.117 x 0.117	16.77 M	300	900 : 1	160/160 (CR ≥ 5)	(35)
	LS037V7DW05					250			
	★ LQ035Q3DY01	QVGA	240 x 320	0.2235 x 0.2235	260 K	600	(800 : 1)	170/170 (CR > 10)	(25)
	LQ035Q3DG03		320 x 240	0.2205 x 0.2205	16.19 M	450	300 : 1	120/100 (CR > 10)	60

Operating temperature (°C)	Storage temperature(°C)	Input signal	Input voltage LCD/LED (V)	Power consumption(W)	Screen treatment	Dimensions H x V x T (mm)	Weight (g)	Backlight	Remarks			
0 to +60 (panel surface)	-20 to +65	2ch LVDS 8-bit RGB	5.0/12.0	65.5	AG	530.0 x 431.5 x 23.9	Max. 4 500	LED	Advanced Super V Long life LED backlight Built-in LED driver circuit			
0 to +60 (panel surface)	-25 to +60	2ch LVDS 8-bit RGB	12.0/12.0	25.7	AG	436.0 x 335.0 x 20.4	Max. 2 400	LED	Advanced Super V Long life LED backlight Built-in LED driver circuit			
-20 to +70 (panel surface)	-25 to +70	2ch LVDS 8-bit RGB	5.0/12.0	26.8	AG	396.0 x 323.6 x 11.5	Max. 1 300	LED	Advanced Super V Long life LED backlight Built-in LED driver circuit			
	19.6			AG Haze 3%								
-15 to +60 (panel surface)	-20 to +60				75					Clear	404.2 x 330.0 x 34.0	Max. 2 600
0 to +65 (panel surface)	-25 to +65		5.0/21.0	21.7	AG	404.2 x 330.0 x 15.0	Max. 1 850			Advanced Super V Long life LED backlight		
0 to +60 (panel surface)	-20 to +60		12.0/12.0	20.2		444.0 x 283.3 x 15.5	Max. 1 600			Advanced Super V Long life LED backlight Built-in LED driver circuit		
-20 to +70 (panel surface)	-25 to +70	1ch LVDS 8-bit RGB	3.3/12.0	10.0	AG	326.5 x 253.5 x 9.6	Max. 950	LED	Advanced Super V Long life LED backlight Built-in LED driver circuit			
					AG Haze 3%							
					AG							
				AG Haze 3%								
	TBD			AG Haze 3% or less	Max. 950					LED	Advanced Super V Built-in LED driver circuit	
	9.7			AG								326.5 x 253.5 x 9.0
	10.2											331.6 x 254.7 x 9.0
	6.8											326.5 x 253.5 x 9.6
8.2	331.6 x 254.7 x 9.3											
-20 to +70 (panel surface)	-35 to +75	1ch LVDS 6-bit RGB	3.3/24.0	9.7	AG	259.0 x 205.0 x 7.5	Max. 550	LED	Long life LED backlight			
	-30 to +70	1ch LVDS 8-bit RGB	3.3/12.0	6.0		278.0 x 184.0 x 8.6	550		Long life LED backlight Built-in LED driver circuit			
-30 to +80 (panel surface)	-30 to +80	CMOS 6-bit RGB		6.2	276.0 x 209.0 x 11.0	Max. 650						
-15 to +75 (panel surface)	-30 to +75			7.4	Clear	265.0 x 205.0 x 9.5	550		Long life LED backlight			
-30 to +80 (panel surface)	-30 to +80	1ch LVDS 6-bit RGB	3.3/12.0	5.1	AG	276.0 x 209.0 x 9.1	600		Long life LED backlight Built-in LED driver circuit			
-30 to +70 (panel surface)	-30 to +70			12.9			Max. 600					
-30 to +80 (panel surface)	-30 to +80	1ch LVDS 6-bit RGB	3.3/12.0	6.1	AG	246.5 x 179.3 x 12.5	Max. 500	LED	Long life LED backlight Built-in LED driver circuit			
		CMOS 6-bit RGB		4.5		246.5 x 179.3 x 11.0						
		1ch LVDS 6-bit RGB		5.6		246.5 x 179.3 x 12.5	500					
		CMOS 6-bit RGB										
0 to +60 (panel surface)	-25 to +75	CMOS 6-bit RGB	3.3/24.0	4.1	AG	222.7 x 133.6 x 10.0	256	LED	Built-in LED driver circuit			
-30 to +75 (panel surface)	-30 to +75	1ch LVDS 8-bit RGB	3.3/12.0			199.5 x 154.0 x 11.6	Max. 320		Long life LED backlight Built-in LED driver circuit			
-10 to +70 (panel surface)	-25 to +70	CMOS 6-bit RGB	3.3 or 5.0/ 12.0			4.7	221.0 x 152.4 x 9.3		Max. 340			
-20 to +60 (panel surface)	-30 to +70	1ch LVDS 6-bit RGB	3.3/12.0	1.8	AG	164.9 x 104.0 x 3.9	125	LED	-			
-10 to +65 (panel surface)	-25 to +70	1ch LVDS 8-bit RGB	3.3/22.1	2.7		170.0 x 110.0 x 9.0	175		Advanced Super V Long life LED backlight			
-30 to +80 (panel surface)	-30 to +80	CMOS 6-bit RGB	3.3/12.0	3.0	AG	161.3 x 117.0 x 12.0	200	LED	Long life LED backlight Built-in LED driver circuit			
-30 to +80 (panel surface)	-30 to +80	CMOS 6-bit RGB	3.3/12.0	2.5	Clear	144.0 x 104.6 x 12.3	Max. 210	LED	Long life LED backlight Built-in LED driver circuit			
-10 to +70 (panel surface)	-30 to +85	CMOS 6-bit RGB SPI	3.3 + 3.3/ 28.8	0.7	AG	105.5 x 67.2 x 4.2	51	LED	With resistive touch panel			
						105.5 x 67.2 x 3.1	36		-			
-20 to +70 (panel surface)	-30 to +80	CMOS 8-bit RGB I ² C	5.5 + 1.8/ 18.0	0.4	Clear	65.0 x 89.2 x 3.6	38		Advanced TFT-LCD			
						65.0 x 89.2 x 4.4	48		Advanced TFT-LCD With resistive touch panel			
-10 to +60 (panel surface)	-25 to +70	CMOS 6-bit RGB SPI	3.3/14.2	(0.4)	Glare+LR	65.0 x 85.0 x 3.4	Max. 40		Advanced Super V Low-reflection technology			
-20 to +70 (panel surface)	-30 to +80	CMOS 8-bit RGB SPI	3.3 + 3.3/ 9.45 + 9.45	0.8	AG	76.9 x 63.9 x 4.7	42		Long life LED backlight			

U.S.A.

SHARP MICROELECTRONICS OF THE AMERICAS
■ North American Head Office
5700 NW Pacific Rim Boulevard
Camas, WA 98607 USA
PHONE: +1-360-834-8700 FAX: +1-360-834-8903
http://www.sharpsma.com
■ Western Region
1980 Zanker Road San Jose, CA 95112
PHONE: +1-408-436-4900 FAX: +1-408-436-0924
■ Eastern Region
200 Wheeler Rd., Burlington, MA 01803
PHONE: +1-781-270-7979 FAX: +1-781-229-9117
8000 Regency Parkway, Suite 280 Cary, NC 27518
PHONE: +1-919-460-0695 FAX: +1-919-460-0795
■ Southern Region
Braker Pointe, Bldg. #1, 10801 N. Mo-Pac Expy,
Ste 370, Austin, TX 78759
PHONE: +1-512-795-9395 FAX: +1-512-795-9685
■ Central Region
85 W. Algonquin Road, Suite 280
Arlington Heights, IL 60005
PHONE: +1-847-258-2750 FAX: +1-847-439-2479
One Towne Square, Suite 200
Southfield, MI 48076
PHONE: +1-248-663-5720 FAX: +1-248-663-5750

EUROPE

SHARP DEVICES EUROPE GmbH
■ Head Office
Landsberger Strasse 398, 81241 Munich, Germany
PHONE: +49-89-5468-420 FAX: +49-89-5468-4250
http://www.sharpsde.com
■ Germany:
Hamburg Office
Sonninstrasse 3, 20097 Hamburg, Germany
PHONE: +49-40-2376-0
■ Italy:
Milan Office
Ventro Direzionale Colleoni Palazzo Taurus Ingresso 2
20041 Agrate Brianza, Milano, Italy
PHONE: +39-039-689-9946
■ Sweden:
Nordic Office
Kanälvagen 1A, Upplands Vasby194 61, Sweden
PHONE: +46-8-751-1493

ASIA

SHARP ELECTRONICS (SHANGHAI) CO., LTD. Microelectronics Sales & Marketing Division
15F, King Tower, 28 Xin Jin Qiao Road,
Pudong DIST, Shanghai 201206 P.R. China
PHONE: +86-21-58547710
FAX: +86-21-50304510-8400
http://ses.sharpmicro.com
■ Beijing Office
5F, Tower F, Phoenix Place, 5A, Shuguang xili,
Chaoyang District, Beijing 100028, P.R. China
PHONE: +86-10-8521-5688 FAX: +86-10-6588-0773
■ Shenzhen Office
Room AB, 21F, China Economic Trade Building, No.18
Zizhu 7th Road, Zhuzilin, Shenzhen 518131, P.R. China
PHONE: +86-755-8826-5236 FAX: +86-21-50304510-8600
SHARP-ROXY (HONG KONG) LTD.
Device Business Division, Level 26, Tower 1, Kowloon
Commerce Centre, NO.51 Kwai Cheong Road, Kwai
Chung, N.T., Hong Kong
PHONE: +852-28229311 FAX: +852-28660779
http://www.sharp.com.hk
■ Shenzhen Representative Office
Room 602-603, 6/F, International Chamber of
Commerce Tower, 168 Fuhua Rd. 3, CBD, Futian
District, Shenzhen 518048, Guangdong, P.R. China
PHONE: +86-755-88313505 FAX: +86-755-88313515
SHARP ELECTRONIC COMPONENTS (TAIWAN) CORPORATION
8F-A, No. 16, Sec. 4, Nanking E. Rd., Taipei, Taiwan
PHONE: +886-2-2577-7341
FAX: +886-2-2577-7326/2-2577-7328
SHARP ELECTRONICS (SINGAPORE) PTE., LTD.
491B River Valley Road, #09-02/03/04
Valley Point, Singapore 248373
PHONE: +65-63042500 FAX: +65-63042598
http://www.sesl-sharp.com
SHARP ELECTRONIC COMPONENTS (KOREA) CORPORATION
33, Gangnam-Daero 101an-gil, Seocho-Gu,
Seoul 137-902, Korea
PHONE: +82-2-711-5813 FAX: +82-2-711-5819



The following facilities of Sharp Corporation have been certified under the ISO 14001:2004 international standard for environmental management systems. In our products and manufacturing processes, we are actively engaged in environmental preservation efforts.

Facility	Certificate No.	Date of Registration	Scope of Registered Activities
Electronic Components and Devices Group (Fukuyama)	EC99J2016	September 24, 1996	Design, development and manufacture of electronic devices
Advanced Development and Planning Center	EC99J2038	December 3, 1996	Research and development, production technology development, and manufacture of LCD panels
Mie Plant	EC99J2051	January 28, 1997	Development, design and manufacture of LCDs
Kameyama Plant	EC04J0284	October 12, 2004	Development and production of LCD
Electronic Components and Devices Group (Mihara)	20002660 UM	November 17, 2003	Design, development and manufacture of laser diodes, hologram laser and LED devices Design and development of printed wiring boards



The following groups of Sharp Corporation have been certified under the ISO 9001:2008 international standard for quality management systems.

Certifying organization: Japan Quality Assurance Organization (JQA) [JAB certified]

Group	Certificate No.	Scope of Registered Activities
Electronic Components and Devices Division	JQA-QM8688	The Sales, design / development and manufacture of integrated circuits The Sales, design / development and manufacture of RF devices The Sales, design / development and manufacture of Opto-electronic devices The Sales, design / development and manufacture of module The Sales, design / development and manufacture (outsourcing) of power control equipment The Sales, design / development and manufacture of LEDs The Sales, design / development and manufacture of LED units
Display Device Business Division	JQA-QM3776	The Sales, design / development and manufacture of laser diodes, hologram laser The design / development and manufacture of Liquid crystal display panel and module

Distributed by



This brochure uses vegetable oil ink.

Ref. No. HT156E

SHARP CORP. H2.0 Printed in Japan

The contents of this catalog are current as of August 2014.