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* Some electronic parts/components would fail or malfunction at a certain rate. In spite of every effort to enhance reliability of products by NEC LCD Technologies, the possibility of failures and malfunction might not be avoided entirely. To prevent the risks of damage to death, human bodily injury or other property arising out thereof or in connection therewith, each customer is required to take sufficient measures in its safety designs and plans including, but not limited to, redundant system, fire-containment and anti-failure.

The products are classified into three quality grades: "Standard", "Special", and "Specific" of the highest grade of a quality assurance program at the choice of a customer. Each quality grade is designed for applications described below. Any customer who intends to use a product for application other than that of Standard quality grade is required to contact an NEC LCD Technologies sales representative in advance.

The Standard quality grade applies to the products developed, designed and manufactured in accordance with the NEC LCD Technologies standard quality assurance program, which are designed for such application as any failure or malfunction of the products (sets) or parts/components incorporated therein a customer uses are, directly or indirectly, free of any damage to death, human bodily injury or other property, like general electronic devices.
Examples: Computers, office automation equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment, industrial robots, etc.


The Special quality grade applies to the products developed, designed and manufactured in accordance with an NEC LCD Technologies quality assurance program stricter than the standard one, which are designed for such application as any failure or malfunction of the products (sets) or parts/components incorporated therein a customer uses might directly cause any damage to death, human bodily injury or other property, or such application under more severe condition than that defined in the Standard quality grade without such direct damage.
Examples: Control systems for transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, medical equipment not specifically designed for life support, safety equipment, etc.

The Specific quality grade applies to the products developed, designed and manufactured in accordance with the standards or quality assurance program designated by a customer who requires an extremely higher level of reliability and quality for such products.
Examples: Aircraft and air-control equipment, aerospace equipment, nuclear reactor control systems, medical equipment/devices/systems for life support, etc.


For purposes of NEC LCD Technologies catalogs, and data sheets and books, the Standard quality grade will apply to any product without indication of a quality grade.

(Note)
"NEC LCD Technologies" as used in this statement means NEC LCD Technologies, Ltd..


This pamphlet is produced using an environment-friendly printing method.

Recycled paper for forest preservation  Printed on 100% recycled paper

The use of recycled printing paper is crucial to the realization of an efficient recycling process. This pamphlet was printed on 100% recycled paper in order to protect forest resources.

Soy Ink That's Air- and Earth-Friendly  PRINTED WITH SOY INK

This pamphlet is printed with soy ink whose solvent is more than 20% soy oil. Soy ink is environment friendly because it uses less petroleum-based solvents, thus reducing the generation of VOC (Volatile Organic Compounds) that cause air pollution. It is also highly soluble, which means that it dissolves quickly in the soil after disposal.

Waterless printing that does not produce wastewater containing harmful substances 

This pamphlet has been produced using a waterless printing technique. Unlike conventional offset printing, this method uses plates that don't require water and does not produce wastewater containing harmful substances like IPA (isopropyl alcohol). Thanks to its faster start-up, waste paper also is eliminated.

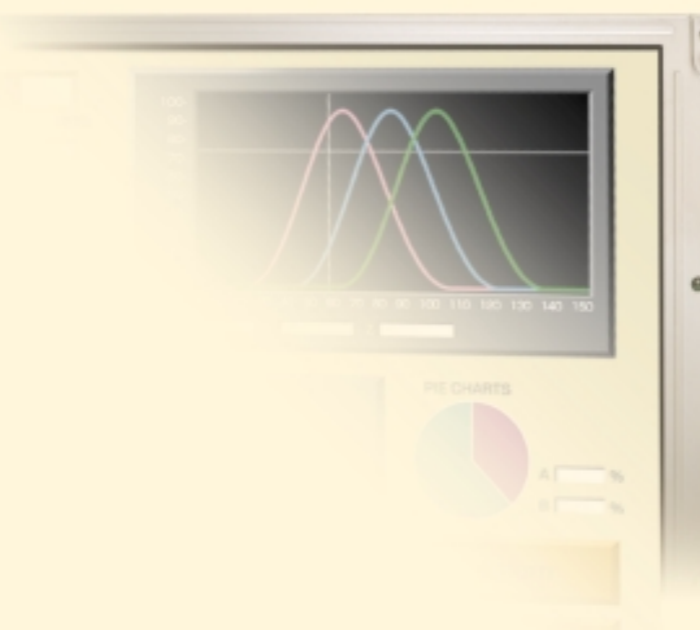
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TFT Color LCD Modules

LCD NEWS



- Four Core Technologies
- High-definition SFT screens
- Environment-friendly initiatives
- Product Lineup

The four core technologies of NEC LCD Technologies

NEC LCD Technologies' LCD modules are designed to target industrial and high-end monitor applications. We strive to quickly recognize and carefully address our customers' display needs and provide optimal display technology solutions. Our new monochrome high-definition technology, applied to professional display devices such as medical and printing equipment, has been used to develop an outstanding line of new products. Our focus on customer satisfaction enables us to create next-generation display solutions that provide "beautiful, brighter images anytime and anywhere."

SFT*¹ Technology

High luminance, wide color gamut, quick response time, wide viewing angle all continually evolving toward perfection

High luminance/wide color gamut

With our SA-SFT and UA-SFT technologies we have achieved improved panel transmissivity, resulting in higher luminance and wider color gamut displays allowing customers to view clear and vivid color images in bright environments.

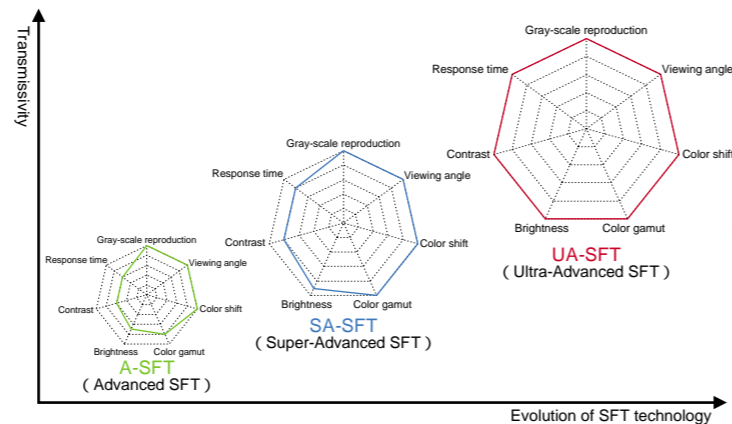
Quick response time

We are developing our SFT technology, which features low dependence on response time between gray-scale levels, to achieve uninterrupted full-motion video.

Ultra-wide viewing angle/reduced color shift

An ultra-wide viewing angle of 170° has substantially reduced the color shift problem that occurs as luminance changes with viewing angle, providing a high-quality picture with hardly any color deviation.

*1 SFT: Super Fine TFT



NEC LCD Technologies has upgraded its technical specifications around its IPS*² ultra-wide viewing technology and is continually making technology innovations with the aim of producing the perfect high-definition liquid crystal displays

*2 IPS: In Plane Switching

NEW!

Monochrome high-definition technology

High-definition technology that meets the demanding needs of the medical and printing professions

High-definition

A diverse lineup of ultra high-definition products (up to 5M pixels) with the most precise images possible is available allowing customers to choose the product that meets their needs.

Equipped with a 10-bit internal LUT (Look-Up Table)

The module is equipped with a switchable 10-bit internal LUT, which makes it possible to customize gray-scale settings and achieve smooth adjustment of gamma characteristics.



Two Phosphor Options

The ultra-high definition products for electronic imaging diagnosis come in two phosphor options (clear base and blue base) in line with traditional X-ray film types. Customers can choose the option suited to their equipment environment.

NLT*³ Technology

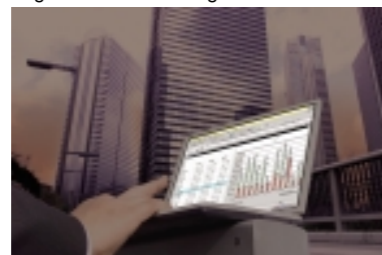
Clear and vivid display that adapts to all outdoor light environments

Transflective LCD with high transmissivity and high reflectivity

A transflective LCD that maximizes the high ambient light visibility features of a reflective-type LCD along with the low ambient light visibility features of a transmissive-type LCD to deliver high picture quality in all possible light environments.

*3 NLT: Natural Light TFT

Nighttime/Weak Light



High visibility in the transmissive mode

Daytime/Bright light



High visibility in the reflective mode

Adaptive Design Technology

Utilizing our substantial experience and expertise to meet a variety of needs

Extensive support

Development of backward-compatible designs enables us to provide the long-term support required by industrial applications.

Compact

Our broad experience in module design technology has culminated in the development of slim, lightweight LCDs with a narrow frame that are ideal for compact equipment.

Wide operating-temperature range

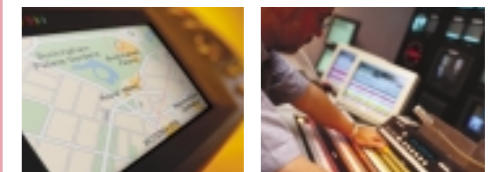
Our LCD displays are constructed of materials that can withstand extreme temperature variations and still deliver beautiful, high quality images.

Applications



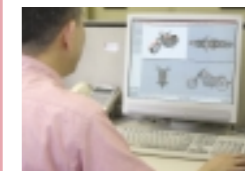
ATM

GOT/PDA



GPS terminal

Studio and broadcast monitor

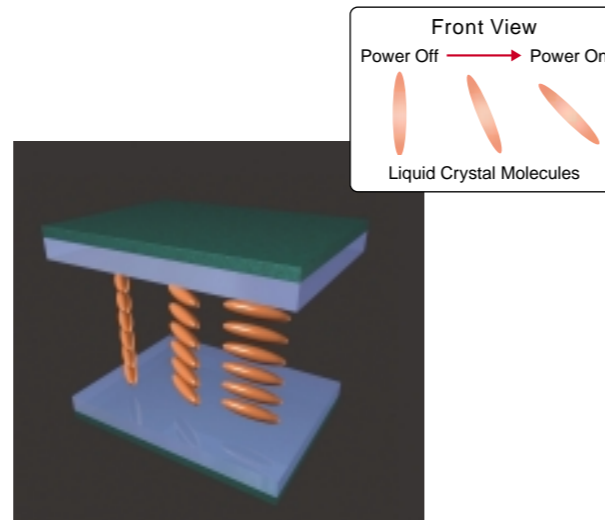


CAD and professional use

SFT technology delivers high quality images from all viewing angles

Image quality that specifications can't adequately describe

Although LCD technical specifications always include details of viewing angles, specifications cannot capture and detail the changes in image quality that can occur based upon actual technology used to achieve ultra-wide viewing angles. LCDs adjust brightness by changing the alignment/direction of liquid crystal molecules by passing an electric current through them. This in turn controls the amount of light that is transmitted. Unlike other technologies, with NEC LCD Technologies' SFT technology induces liquid crystal molecules to line up evenly and rotate horizontally when electrically charged. The rotation angle of the liquid crystal molecules changes according to the amount of electrical voltage applied, which then changes the amount of light that is transmitted. The liquid crystal molecules are always horizontal, so they appear the same size from the front. Therefore, even if the viewing angle changes, there is very little brightness or color deviation.



*SFT: Super Fine TFT

SFT Liquid Crystal Display



*The above images are samples.

TN Liquid Crystal Display



SFT Technology also provides high-quality moving images

Since liquid crystal molecules rotate horizontally for smooth movement in SFT LCDs, the difference in response time is relatively small, regardless of the magnitude of shift in gray scale. Moving images are also displayed very clearly because there is no sudden drop in response time between intermediate gray scales, as there is in other technologies where liquid crystal molecules rotate vertically.

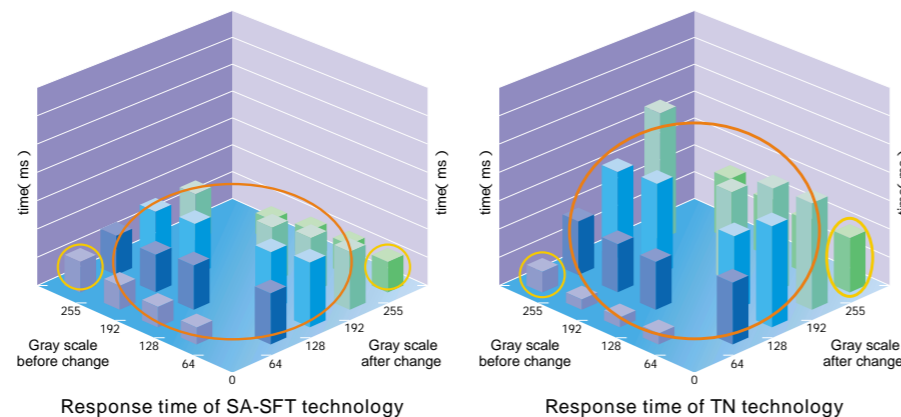
Spec Chart Response Time (sum of yellow-circled figures)

Although this is one indicator of LCD response time, it does not include the response time between intermediate gray scales.

Response Time Between Intermediate Gray Scales (shown by the orange circle)

Since most moving images consist primarily of changes between intermediate gray scales (even when the response time in the specifications is fast), if the response time between intermediate gray scales is slow, then the images may appear smeared.

*SA-SFT: Super-Advanced SFT



Environment-Friendly Initiatives

New steps taken toward implementation of the EU RoHS Directive

In February 2003, the European Union (EU) issued the RoHS Directive^{*1} aimed at restricting the use of certain hazardous substances. As a result, electrical and electronic equipment containing any of the six target substances (lead, mercury, cadmium, hexavalent chromium, PBB^{*2} and PBDE^{*3}) will be restricted from the EU market starting July 1, 2006.

Out of concern for the environment, we at NEC LCD Technologies have been reducing the use of hazardous substances on our own initiative and by our standards. We have begun working toward eliminating many of them, along with the six target RoHS Directive substances, to meet Directive requirements by the end of March 2006.

*1 RoHS: Restriction of the use of certain hazardous substances in electrical and electronic equipment

*2 PBB: Polybrominated biphenyls

*3 PBDE: Polybrominated diphenyl ethers

The RoHS Directive goes into effect on July 1, 2006.

	April 2003	March 2004	April 2004	March 2005	April 2005	March 2006	April 2006	March 2007
Lead elimination			Use of lead-free solder in the assembling process of print bases		In compliance			
				Use of lead-free coating on terminals of embedded parts			In compliance	
Hexavalent chromium elimination			Termination of the use of chromate screws		In compliance			
Cadmium elimination			Cadmium-free confirmation		Confirmation completed			
PBB/PBDE elimination			PBB/PBDE-free confirmation		Confirmation completed			
Mercury elimination			Mercury in small fluorescent tubes is allowed if less than 5mg per tube. All our products have less than 5mg of mercury per fluorescent light.					

Introduction of environment-friendly products

Product in compliance with the RoHS Directive

From September 2004, the NL8060BC26-17 will be in compliance with the RoHS Directive. We also plan to adapt our other products to be Directive-compliant by the end of March 2006.



NL8060BC26-17

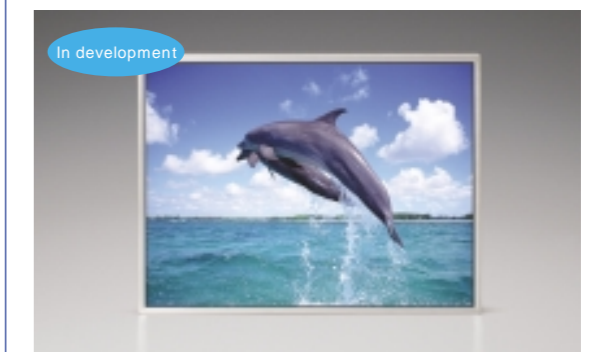
(Note)

The maximum concentration level allowed by the RoHS is 1000ppm for lead, mercury, hexavalent chromium, PBB, PBDE, and 100ppm for cadmium. Moreover, the Amendment to the RoHS Directive indicates applications that are exempt from Directive requirements, such as the lead inside high-melting point solder of electrical appliance parts and mercury amounting to less than 5mg in small fluorescent tubes. The maximum concentration level limit and its exemptions were not finalized as of August 2004. Since the RoHS Directive has not yet been finalized, we cannot guarantee that our products will be compliant. Moreover, it does not apply to spare parts for the repair of electrical and electronic equipment put on the market before July 1, 2006 or to the reuse of such equipment. Therefore, the following products and their handling will be exempt from the RoHS Directive.

Products for which maintenance notification has been given and are due for shipping by the end of March 2005; and Repair and maintenance of products produced before March 2003 that were not Directive-compliant.

Completely mercury-free product

We are currently developing a completely mercury-free product with a LED backlight instead of fluorescent tubes. Use of LED backlights, rather than fluorescent, would reduce the amount of mercury from the disposal of fluorescent lights.



2.13 inch UXGA equipped with LED backlight

1M, 2M, 3M, and 5M-pixel high-definition TFT modules
Compare pixels, compatibility, viewing angles, as well as other features, and then
choose the product that suits your needs.

Mounting compatibility: Outer dimensions (except thickness), position of mounting holes and relative to screen center.
Interface compatibility: Interface connector pin assignment.
Consult individual data sheets for details.



21.3 inch

20.1 inch

19.0 inch

18.1 inch

QSXGA Ultra-wide viewing angle type
2560×2048
(5M pixels)

NL256204AM15-01/01A
SA-SFT Monochrome
850cd/m², 600:1, 30ms

QXGA Ultra-wide viewing angle type
2048×1536
(3M pixels)

NL204153BC21-02
SA-SFT
235cd/m², 450:1, 23ms

NL204153BM21-01/01A
SA-SFT Monochrome
800cd/m², 700:1, 35ms

UXGA Ultra-wide viewing angle type
1600×1200
(2M pixels)

NL160120BC27-02
SA-SFT
250cd/m², 450:1, 20ms

NEW
NL160120BM27-03/03A
SA-SFT Monochrome
1000cd/m², 700:1, 35ms

SXGA Ultra-wide viewing angle type
1280×1024
(1M pixels)

NL128102AC31-02
A-SFT
250cd/m², 300:1, 53ms

NEW
NL128102BC29-01
SA-SFT
300cd/m², 450:1, 20ms

NL128102AC28-07
A-SFT
240cd/m², 300:1, 29ms

Mounting compatibility

Screen Size	21.3 inch(54cm diagonal)			
Part Number	NL204153BC21-02	NL204153BM21-01/01A	NL160120BC27-02	NL160120BM27-03/03A NEW
Resolution	2048 × 1536	2048 × 1536	1600 × 1200	1600 × 1200
Display Color	16,777,216 colors	Monochrome 256 gray scale	16,777,216 colors	Monochrome 256 gray scale
Pixel Pitch(mm)	0.211 × 0.211	0.211 × 0.211	0.27 × 0.27	0.27 × 0.27
Luminance(TYP.)	235cd/m ²	800cd/m ²	250cd/m ²	1000cd/m ²
Contrast Ratio(TYP.)	450 : 1	700 : 1	450 : 1	700 : 1
Viewing Angle(Up / Down ; Right / Left)	85 ° ; 85 ° ; 85 ° ; 85 °	85 ° ; 85 ° ; 85 ° ; 85 °	85 ° ; 85 ° ; 85 ° ; 85 °	85 ° ; 85 ° ; 85 ° ; 85 °
Response Time(TYP.) ^{*1}	23ms	35ms	20ms	35ms
Interface	4port LVDS RGB (8 bits each)	4port LVDS LCR (8 bits each)	2port LVDS RGB (8 bits each)	2port LVDS LCR (8 bits each)
Power Supply Voltage	12V	12V	12V	12V
Power Consumption(TYP.)	32.5W ^{*2}	34.2W ^{*2}	30.7W ^{*2}	30.7W ^{*2}
Operating Temperature	0 ~ +55	0 ~ +55	0 ~ +55	0 ~ +55
Storage Temperature	- 20 ~ +60	- 20 ~ +60	- 20 ~ +60	- 20 ~ +60
Polarizer Surface	Antiglare	Antiglare	Antiglare	Antiglare
Module Size(mm) : W×H×D (D: max)	457 × 350 × 25.5	457 × 350 × 25.5	457 × 350 × 25.5	457 × 350 × 25.5
Weight(TYP.)	3800g	3800g	3750g	3750g
Backlight	Top and bottom, 3 CCFL each	Top and bottom, 3 CCFL each	Top and bottom, 3 CCFL each	Top and bottom, 3 CCFL each
Inverter	None	None	None	None
Remarks	SA-SFT	SA-SFT Monochrome -01: Blue base -01A: Clear base	SA-SFT	SA-SFT Monochrome -03: Blue base -03A: Clear base

Screen Size	20.1 inch(51cm diagonal)	19.0 inch(48cm diagonal)	18.1 inch(46cm diagonal)	
Part Number	NL256204AM15-01/01A	NL128102AC31-02	NL128102BC29-01 NEW	NL128102AC28-07
Resolution	2560 × 2048	1280 × 1024	1280 × 1024	1280 × 1024
Display Color	Monochrome 256 gray scale	16,777,216 colors	16,777,216 colors	16,777,216 colors
Pixel Pitch(mm)	0.156 × 0.156	0.312 × 0.312	0.294 × 0.294	0.281 × 0.281
Luminance(TYP.)	850cd/m ²	250cd/m ²	300cd/m ²	240cd/m ²
Contrast Ratio(TYP.)	600 : 1	300 : 1	450 : 1	300 : 1
Viewing Angle(Up / Down ; Right / Left)	85 ° ; 85 ° ; 85 ° ; 85 °	85 ° ; 85 ° ; 85 ° ; 85 °	85 ° ; 85 ° ; 85 ° ; 85 °	85 ° ; 85 ° ; 85 ° ; 85 °
Response Time(TYP.) ^{*1}	30ms	53ms	20ms	29ms
Interface	4port LVDS LCR (8 bits each)	2port LVDS RGB (8 bits each)	2port LVDS RGB (8 bits each)	2port LVDS RGB (8 bits each)
Power Supply Voltage	12V × 2	12V × 2	5.0V	12V × 2
Power Consumption(TYP.)	49.2W	45.7W	26.8W ^{*2}	38.7W
Operating Temperature	0 ~ +55	0 ~ +55	0 ~ +55	0 ~ +55
Storage Temperature	- 20 ~ +60	- 20 ~ +60	- 20 ~ +60	- 20 ~ +60
Polarizer Surface	Antiglare	Antiglare	Antiglare	Antiglare
Module Size(mm) : W×H×D (D: max)	423.4 × 343.5 × 44.5	470 × 382 × 42.5	404.2 × 330 × 22.3	389 × 317.2 × 31.3
Weight(TYP.)	2440g	2320g	2900g	1650g
Backlight	12 CCFL	12 CCFL	Top and bottom, 3 CCFL each	12 CCFL
Inverter	Built in	Built in	None	Built in
Remarks	SA-SFT Monochrome -01: Blue base -01A: Clear base	A-SFT	SA-SFT	A-SFT

*1 Response Time(TYP.)value is Ton + Toff(10% ~ 90%). *2 Value does not include inverter power consumption.
Consult data sheet for technical specification details.
A-SFT : Advanced SFT 、 SA-SFT : Super-Advanced SFT

A versatile lineup of TFT modules from 5.5 to 15 inches. Compare the resolution, compatibility, and viewing angles, as well as other features, and then choose the product that suits your needs.

Mounting compatibility: Outer dimensions (except thickness), position of mounting holes and relative to screen center.
Interface compatibility: Interface connector pin assignment.
Consult individual data sheets for details.

...Wide operating-temperature range

		15.0 inch	12.1 inch	10.4 inch	8.4 inch	6.3/6.5 inch	5.5 inch
XGA 1024×768	Ultra-wide viewing angle type	XGA (LVDS) NEW NL10276BC30-15 250cd/m ²	XGA Interface Compatibility (LVDS) NL10276BC24-13 400cd/m ²		NL10276BC16-01 UA-SFT 400cd/m ²		
	Wide viewing angle type			NL10276BC20-04 300cd/m ²		[6.3 inch] NL10276BC12-02 250cd/m ²	
SVGA 800×600	Ultra-wide viewing angle type		SVGA Interface Compatibility (CMOS) NL8060BC31-20 A-SFT 250cd/m ²				
	Wide viewing angle type		NL8060BC31-27 400cd/m ²	NL8060BC26-17 280cd/m ²			
			SVGA (LVDS) NL8060BC31-28D 350cd/m ²				
VGA 640×480	Ultra-wide viewing angle type			NL6448BC33-53 SA-SFT 380cd/m ²			
	Wide viewing angle type			NL6448BC33-59/59D 450cd/m ²	NL6448BC26-01 450cd/m ²	[6.5 inch] NL6448BC20-08E 300cd/m ²	
				NL6448BC33-50 Transflective 250cd/m ² (transmissive mode)	NL6448BC26-03 450cd/m ²		
					NL6448CC33-30W without backlight		
	Standard type			NL6448BC33-54 220cd/m ²			
QVGA 320×240	Digital type						NL3224BC35-20 400cd/m ²
							NL3224BC35-21 400cd/m ²
	Analog type						NL3224AC35-01/13 NTSC/PAL Input 250cd/m ²
							NL3224AC35-06 NTSC Input 250cd/m ²

Mounting compatibility

Mounting compatibility

Mounting compatibility

Mounting compatibility

Mounting compatibility

Screen Size	15 inch(38cm diagonal)	12.1 inch(31cm diagonal)			
Part Number	NL10276BC30-15 NEW	NL10276BC24-13	NL8060BC31-20	NL8060BC31-27	NL8060BC31-28D
Resolution	1024 × 768	1024 × 768	800 × 600	800 × 600	800 × 600
Display Color	16,777,216 colors	16,777,216 colors / 262,144 colors	262,144 colors	262,144 colors	262,144 colors
Pixel Pitch(mm)	0.297 × 0.297	0.24 × 0.24	0.308 × 0.308	0.308 × 0.308	0.308 × 0.308
Luminance(TYP.)	250cd/m ²	400cd/m ²	250cd/m ²	400cd/m ²	350cd/m ²
Contrast Ratio(TYP.)	400 : 1	600 : 1	400 : 1	600 : 1	600 : 1
Viewing Angle(Up / Down ; Right / Left)	40 ; 60 ; 60 ; 60 °	45 ; 55 ; 70 ; 70 °	80 ; 80 ; 80 ; 80 °	45 ; 55 ; 70 ; 70 °	45 ; 55 ; 70 ; 70 °
Response Time(TYP.)*	25ms	33ms	80ms	33ms	33ms
Interface	LVDS RGB(8 bits each)	LVDS RGB (8 bits each / 6 bits each)	CMOS RGB(6 bits each)	CMOS RGB(6 bits each)	LVDS RGB(6 bits each)
Power Supply Voltage	3.3V	3.3V	3.3V / 5V	3.3V / 5V	3.3V
Power Consumption(TYP.)	9.4W*2	7.0W*2	7.0W*2	6.4W*2	6.4W*2
Operating Temperature	0 ~ +50	- 10 ~ +70	0 ~ +55	- 10 ~ +70	- 10 ~ +70
Storage Temperature	- 20 ~ +60	- 20 ~ +80	- 20 ~ +60	- 20 ~ +80	- 20 ~ +80
Polarizer Surface	Antiglare	Clear	Clear	Clear	Antiglare
Module Size(mm) : W×H×D (D: max)	328 × 252 × 11.5	280 × 210 × 13.7	280 × 210 × 13.7	280 × 210 × 13.7	280 × 210 × 13.7
Weight(TYP.)	970g	750g	760g	740g	730g
Backlight	Top and bottom, 1 CCFL each	One side, 2 CCFL	One side, 2 CCFL	One side, 2 CCFL	One side, 2 CCFL
Inverter	None	Sold Separately	Sold Separately	Sold Separately	Sold Separately
Recommended Inverter		121PW181	121PW111	121PW181	121PW181
Remarks			A-SFT		

Screen Size	10.4 inch(26cm diagonal)	8.4 inch(21cm diagonal)			
Part Number	NL10276BC20-04	NL8060BC26-17	NL10276BC16-01	NL6448BC26-01	NL6448BC26-03
Resolution	1024 × 768	800 × 600	1024 × 768	640 × 480	640 × 480
Display Color	262,144 colors	262,144 colors	16,777,216 colors / 262,144 colors	262,144 colors	262,144 colors
Pixel Pitch(mm)	0.206 × 0.206	0.264 × 0.264	0.167 × 0.167	0.267 × 0.267	0.267 × 0.267
Luminance(TYP.)	300cd/m ²	280cd/m ²	400cd/m ²	450cd/m ²	450cd/m ²
Contrast Ratio(TYP.)	300 : 1	300 : 1	400 : 1	500 : 1	500 : 1
Viewing Angle(Up / Down ; Right / Left)	45 ; 60 ; 60 ; 60 °	35 ; 45 ; 50 ; 50 °	85 ; 85 ; 85 ; 85 °	40 ; 70 ; 55 ; 55 °	55 ; 55 ; 40 ; 70 °
Response Time(TYP.)*	55ms	80ms*1	25ms	35ms	35ms
Interface	LVDS RGB(6 bits each)	CMOS RGB(6 bits each)	LVDS RGB (8 bits each / 6 bits each)	CMOS RGB(6 bits each)	CMOS RGB(6 bits each)
Power Supply Voltage	3.3V	3.3V / 5V	3.3V	3.3V / 5V	3.3V / 5V
Power Consumption(TYP.)	6.2W*2	6.3W*2	9.8W*2	4.6W*2	4.6W*2
Operating Temperature	0 ~ +60	0 ~ +50	0 ~ +55	0 ~ +60	0 ~ +60
Storage Temperature	- 20 ~ +70	- 20 ~ +60	- 20 ~ +60	- 20 ~ +70	- 20 ~ +70
Polarizer Surface	Clear	Antiglare	Antiglare	Antiglare	Antiglare
Module Size(mm) : W×H×D (D: max)	243 × 185.1 × 11.5	243 × 185.1 × 11.5	200 × 152 × 17	200 × 152 × 12.7	200 × 152 × 12.7
Weight(TYP.)	530g	520g	465g	375g	375g
Backlight	One side, 2 CCFL	One side, 2 CCFL	Top and bottom, 2 CCFL each	Top and bottom, 1 CCFL each	Top and bottom, 1 CCFL each
Inverter	Sold Separately	Sold Separately	Sold Separately	Sold Separately	Sold Separately
Recommended Inverter	104PW191	104PWBR1	84PW021	65PWB31	65PWB31
Remarks		In Compliance with ROHS Directive	UA-SFT		

Screen Size	10.4 inch(26cm diagonal)				
Part Number	NL6448BC33-53	NL6448BC33-59/59D	NL6448BC33-54	NL6448CC33-30W	NL6448BC33-50
Resolution	640 × 480	640 × 480	640 × 480	640 × 480	640 × 480
Display Color	262,144 colors	262,144 colors	262,144 colors	262,144 colors	262,144 colors
Pixel Pitch(mm)	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33
Luminance(TYP.)	380cd/m ²	450cd/m ²	220cd/m ²		250cd/m ² (transmissive mode)
Contrast Ratio(TYP.)	500 : 1	600 : 1	350 : 1	150 : 1	100:1(transmissive mode) 8:1(reflective mode)
Viewing Angle(Up / Down ; Right / Left)	85 ; 85 ; 85 ; 85 °	45 ; 55 ; 70 ; 70 °	30 ; 20 ; 45 ; 45 °	30 ; 50 ; 55 ; 55 °	40 55 55 75 (transmissive mode)
Response Time(TYP.)*	34ms	33ms	38ms	70ms	25ms(transmissive mode)
Interface	CMOS RGB(6 bits each)	CMOS RGB(6 bits each)	CMOS RGB(6 bits each)	CMOS RGB(6 bits each)	CMOS RGB(6 bits each)
Power Supply Voltage	3.3V / 5V	3.3V / 5V	3.3V / 5V	3.3V / 5V	3.3V / 5V
Power Consumption(TYP.)	5.9W*2	5.8W*2	5.8W*2	1.0W	6.2W*2
Operating Temperature	- 10 ~ +70	- 10 ~ +70	- 10 ~ +70	- 10 ~ +70	0 ~ +65
Storage Temperature	- 20 ~ +80	- 20 ~ +80	- 20 ~ +80	- 30 ~ +85	- 20 ~ +80
Polarizer Surface	Clear	Clear / Antiglare	Clear	Clear	Clear + Antireflection
Module Size(mm) : W×H×D (D: max)	243 × 185.1 × 11	243 × 185.1 × 11	243 × 185.1 × 11	264 × 187.8 × 9.3	243 × 185.1 × 11.5
Weight(TYP.)	475g	475g	465g	300g	560g
Backlight	One side, 2 CCFL	One side, 2 CCFL	One side, 2 CCFL	None	One side, 2 CCFL
Inverter	Sold Separately	Sold Separately	Sold Separately	None	Sold Separately
Recommended Inverter	104PW191, 104PW161	104PW191, 104PW161	104PW191, 104PW161		104PW191, 104PW161
Remarks	SA-SFT			Without backlight	Transflective

Screen Size	6.5 inch(17cm diagonal)	6.3 inch(16cm diagonal)	5.5 inch(14cm diagonal)		
Part Number	NL6448BC20-08E	NL10276BC12-02	NL3224BC35-20/21	NL3224AC35-01/13	NL3224AC35-06
Resolution	640 × 480	1024 × 768	320 × 240	320 × 240	320 × 240
Display Color	262,144 colors	16,194,277 colors/262,144 colors	262,144 colors	Full Color	Full Color
Pixel Pitch(mm)	0.207 × 0.207	0.126 × 0.126	0.348 × 0.348	0.348 × 0.348	0.348 × 0.348
Luminance(TYP.)	300cd/m ²	250cd/m ²	400cd/m ²	250cd/m ²	250cd/m ²
Contrast Ratio(TYP.)	250 : 1	500 : 1	400 : 1	85 : 1	85 : 1
Viewing Angle(Up / Down ; Right / Left)	35 ; 45 ; 50 ; 50 °	45 ; 60 ; 60 ; 60 °	50 ; 40 ; 55 ; 55 °	30 ; 15 ; 45 ; 45 °	25 ; 25 ; 50 ; 50 °
Response Time(TYP.)*	49ms	21ms	30ms	60ms*1	160ms MAX
Interface	CMOS RGB(6 bits each)	LVDS RGB (8 bits each / 6 bits each)	CMOS RGB(6 bits each)	Analog RGB	Analog RGB / Composite Video
Power Supply Voltage	3.3V / 5V	3.3V	3.3V / 5V	9.5V × 2	9.5V × 2
Power Consumption(TYP.)	5.0W*2	4.9W*2	4.1W*2	6.6W	8.0W
Operating Temperature	0 ~ +60	0 ~ +65	- 10 ~ +70	- 30 ~ +85	- 30 ~ +85
Storage Temperature	- 25 ~ +70	- 20 ~ +80	- 30 ~ +80	- 40 ~ +95	- 40 ~ +95
Polarizer Surface	Antiglare	Antiglare	Antiglare	Antiglare / Clear	Antiglare
Module Size(mm) : W×H×D (D: max)	178.8 × 126.8 × 11.5	178.8 × 126.8 × 12.5	134 × 104.5 × 13	134 × 110 × 23	134 × 110 × 16.5
Weight(TYP.)	240g	265g	210g	315g	285g
Backlight	Top and bottom, 1 CCFL each	Top and bottom, 1 CCFL each	Top and bottom, 1 CCFL each	1 CCFL	1 CCFL
Inverter	Sold Separately	Sold Separately	Sold Separately	Built in	Built in
Recommended Inverter	65PWB31	65PWB31	55PW131		
Remarks			Variation: Position of Lamp Cable Compartment Side compartment: NL3224BC35-20 Back compartment: NL3224BC35-21	NTSC / PAL Input	NTSC Input

* Response Time(TYP.)value is Ton + Toff(10% 90%). *1 Response Time(TYP.)value is Ton(100% 10%)+ Toff(0% 90%).
*2 Value does not include inverter power consumption. Consult data sheet for technical specification details.
A-SFT : Advanced SFT、SA-SFT : Super-Advanced SFT