NEW PRODUCTS

Contact No.160

OLED ROCKER IS

Multi-function Switch

Selection & Determination By One Device

Smooth Rocker Actuation & Tactile Pushbutton Feedback

Wide View Display

IP64 of IEC60529 Standard

GOOD DESIGN

Recipient of the ***Good Design Award***, Japan's only comprehensive design evaluation and commendation system

NKK nikkai®

OLED SMARTSWITCH™ Rocker

DISTINCTIVE CHARACTERISTICS

- OLED technology in display rocker IS (patent pending)
- A multifunctional device that offers greater options than current NKK programmable devices with selection/determination (such as tree search)
- Confirms indication status and operational at the same time - sequential and reverse capabilities
- Smooth rocker actuation and tactile pushbutton feedback in one solution
- Conforms to IP64 of IEC60529 Standards on panel surface
- Commands and data supplied via serial communications protocol (SPI)
- Short, 14.6mm behind-panel height for compact spaces
- Long life OLED with 52,000 hours at 30% illumination
- Dust tight construction of switch prevents entry of dust and improves contact reliability
- Sleek and stylish black housing design complements any application
- Components and packaging are RoHS compliant

Monochrome OLED featuring sharp contrast and high resolution

Wide view display accommodates text/symbols easily recognized from a distance

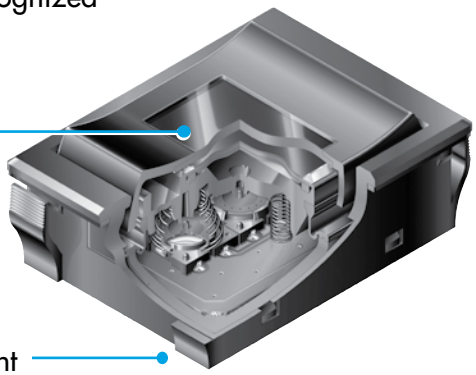
Loaded 0.92" OLED display with exceptional contrast and wide viewing angle

Sharp resolution with 96 x 64 pixels

High reliability and long life of one million actuations

Snap-in installation for easy, secure mounting and alignment

Connector socket for simple connection (AT715)



APPLICATIONS

The OLED SMARTSWITCH™ Series complements multiple applications, including:

- FA operation panels
- Hand control devices
- Home appliances
- Broadcast equipment
- Audio/video equipment
- Delivery tracking devices
- Transportation systems
- Education equipment
- Vending machines
- Ticket machines
- Industrial control devices
- POS

Actual Size

OLED SMARTSWITCH™ Rocker

SMARTSWITCH PART NUMBER & DESCRIPTION

Part Number	Switch Description	OLED	Pixel Format
IS18WWC1W	SP3T Rocker (ON) OFF (ON) Pushbutton Normally OFF	Single Color OLED Display Module White Indication Color	96 x 64 Pixels Horizontal x Vertical

SWITCH SPECIFICATIONS

Circuit	Single Pole Three Throw (Momentary)			
Contact Position	Rocker Down 	Pushbutton Pushbutton Normal 	Pushbutton Down 	Rocker Up 
	(ON) 9-12	OFF	(ON) 10-12	(ON) 11-12
Electrical Capacity (Resistive Load)	3VA maximum DC			
Contact Resistance	200 milliohms maximum			
Insulation Resistance	500 megohms minimum @ 250V DC			
Dielectric Strength	250V AC for 1 minute minimum			
Electrostatic Resisting Pressure	15kV minimum			
Mechanical Endurance	1,000,000 operations minimum			
Electrical Endurance	1,000,000 operations minimum			
Operating Force	6.0 Newtons at center of cap			
Total Travel	1.4mm (.055")			

OLED SPECIFICATIONS

Characteristics of Display

Display Device	Single color OLED display
Display Mode	Passive matrix
Viewing Area	15.5mm x 11.6mm (horizontal x vertical)
Pixel Format	96 x 64 pixels
Pixel Size	0.21mm x 0.20mm (horizontal x vertical)
Interface	Serial (SPI) interface
Indication Color	White/Black (normally White)
Water, Dust Proof	Conforms to IP64 of IEC60529 standards on panel surface
Operating Temperature Range	–20°C ~ +70°C (–4°F ~ +158°F)
Storage Temperature Range	–25°C ~ +80°C (–13°F ~ +176°F)
Operating Life Time (Display)	52,000 hours (30% brightness); 15,600 hours (100% brightness)

Absolute Maximum Ratings (Temperature at 25°C)

Items	Symbols	Ratings
Supply Voltage for Logic/Interface	VDDA	–0.3V to +3.6V
Supply Voltage for Drive	VAH	–0.3V to +18.0V
Input Voltage	Vin	–0.3V to VDDA +0.3V

Current Consumption

(Temperature at 25°C, VDDA = 2.8V, VAH = 15.0V)

Items	Symbols	Min	Typical	Max
All-Pixels-On Mode *Drive System Power Current	I_{H1}	—	11.0mA	13.2mA
All-Pixels-On Mode *Logic/IF System Power Current	I_{DD1}	—	0.58mA	0.72mA
Sleep Mode **Drive System Power Current	I_{H2}	—	—	10μA
Sleep Mode **Logic/IF System Power Current	I_{DD2}	—	—	10μA

* All pixels shall be turned on with the maximum level gray scale
** All pixels shall be turned off (while chip is operating)

Recommended Operating Conditions

Items	Symbols	Minimum	Typical	Maximum
Supply Voltage for Logic/Interface	VDDA	2.7V	2.8V	2.9V
Supply Voltage for Drive	VAH	14.5V	15.0V	15.5V
Input High Level Voltage	V_{IH}	0.75 x VDDA	—	VDDA
Input Low Level Voltage	V_{IL}	0.0	—	0.25V x VDDA

Optical Characteristics

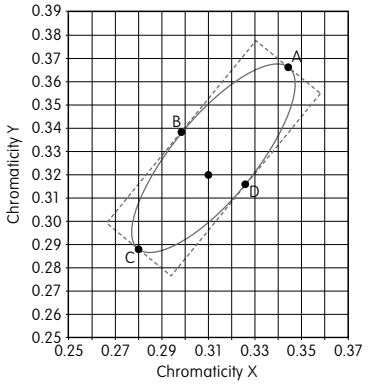
(Temperature at 25°C, Initial Value: depends on initial setting)

Items		Minimum	Typical	Maximum
Brightness		75 cd/m²	100 cd/m²	125 cd/m²
Chromaticity	(x)	*1	0.310	*1
	(y)	*1	0.320	*1
Contrast Ratio		100	—	—

* Chromaticity range is the area of the ellipse. (See Chromaticity Diagram next page.) The ellipse passes through points A, B, C and D and designates the center of each side of the quadrangle.

Chromaticity Diagram

Point	Chromaticity X	Chromaticity Y
A	0.3441	0.3663
B	0.2983	0.3384
C	0.2799	0.2881
D	0.3257	0.3160



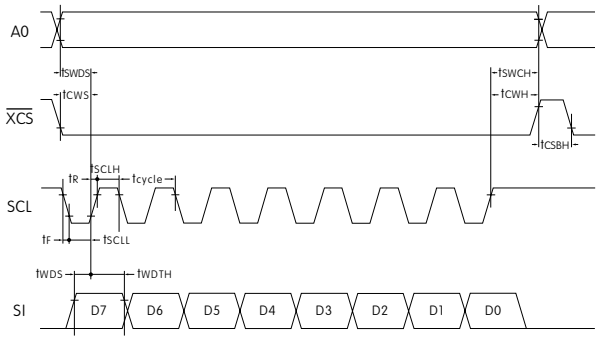
TIMING SPECIFICATIONS

AC Characteristics

(Temperature at 20°C ~ 70°C), VDDA = 2.8V, VAH = 16V

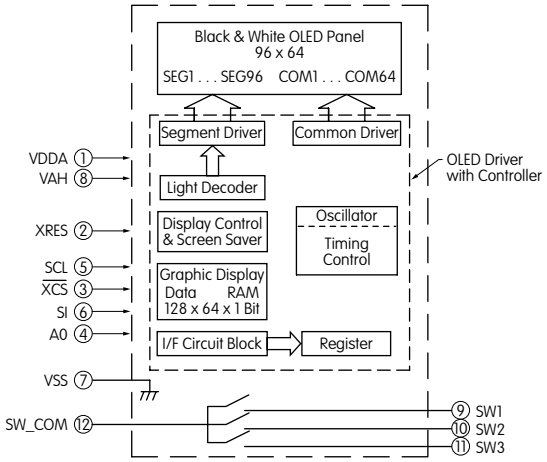
Items	Symbols	Minimum	Typical	Maximum
Clock Cycle Time	tcycle	100ns	—	—
A0 Setup Time	tSWDS	65ns	—	—
A0 Hold Time	tSWDN	35ns	—	—
$\overline{XCS}$ Setup Time	tCWS	65ns	—	—
$\overline{XCS}$ Hold Time	tCWH	95ns	—	—
High Level $\overline{XCS}$ Pulse Width	tCSBH	*10ns	—	—
Write Data Setup Time	tWDTS	10ns	—	—
Write Data Hold Time	tWDTH	20ns	—	—
SCL Low Time	tSCLL	45ns	—	—
SCL High Time	tSCLH	45ns	—	—
SCL Rise Time	tr	—	—	15ns
SCL Fall Time	tf	—	—	15ns

* Requires more than 100ns after resetting software



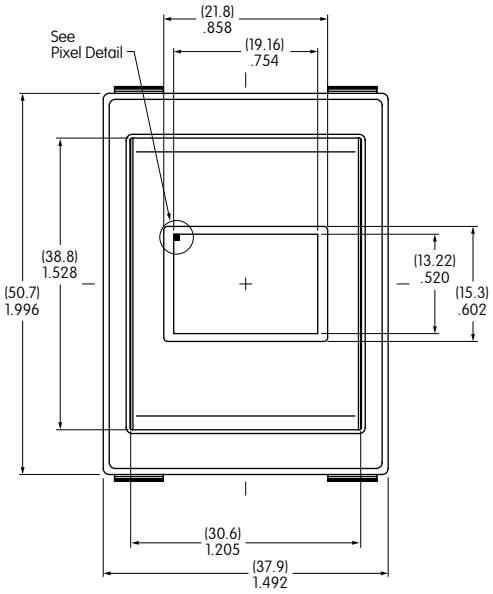
BLOCK DIAGRAM & PIN CONFIGURATIONS

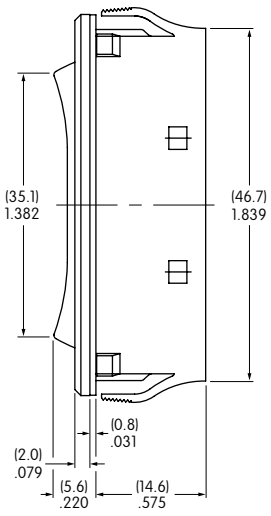
IS18WWC1W

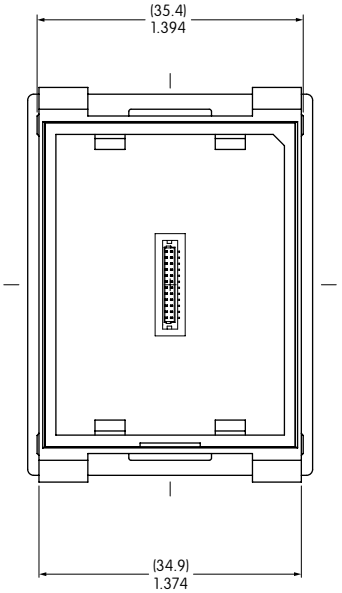


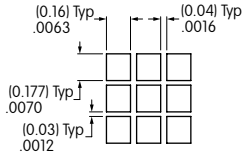
Pin No.	Symbol	Name	Function
1	**VDDA**	Logic Type Power Source	
2	**XRES**	Reset	Terminal to initialize IC built-in logic; initializes with low level
3	**$\overline{XCS}$**	Chip Select	Slave select for SPI. This line is active low
4	**A0**	Address	Terminal to input control signals of command/parameter Set low at time of command input and high level at the time of parameter input
5	**SCL**	Serial Clock	Read command/parameter at time of SCL signal standing up
6	**SI**	Serial Data Input	Terminal to input command/parameter by SPI
7	**VSS**	Ground	
8	**VAH**	Drive Type Power Source	
9	**SW1**	Switch Terminal 1	N/O
10	**SW2**	Switch Terminal 2	N/O
11	**SW3**	Switch Terminal 3	N/O
12	**SW_COM**	Switch Common Terminal	

SMARTSWITCH TYPICAL DIMENSIONS

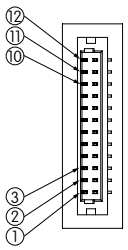








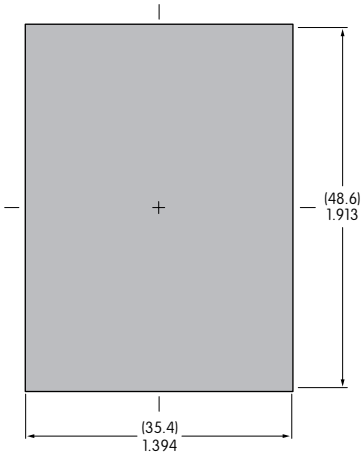
Pixel Detail



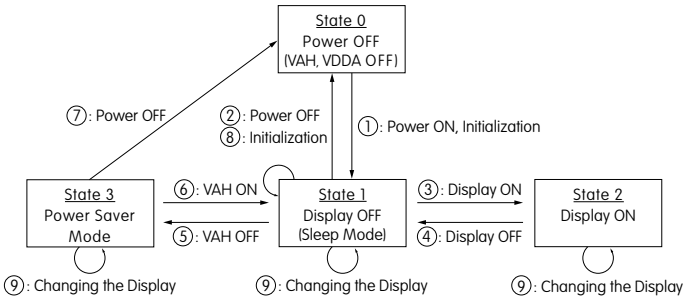
Terminal Connector Detail

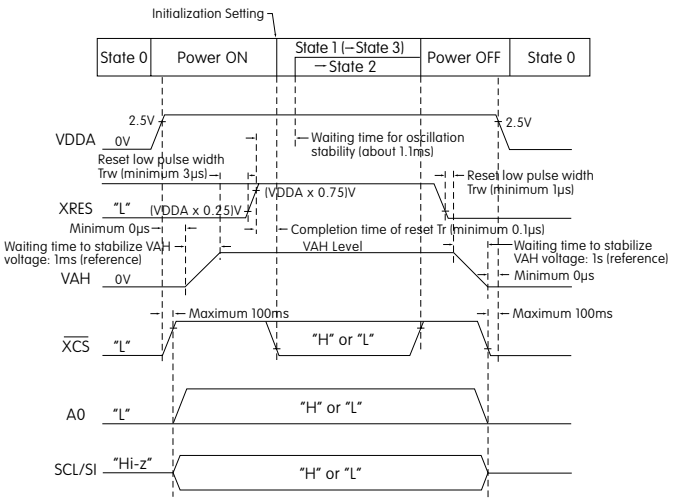
Panel Thickness Range

.039 ~ .157"
(1.0mm ~ 4.0mm)



STATE TRANSITION

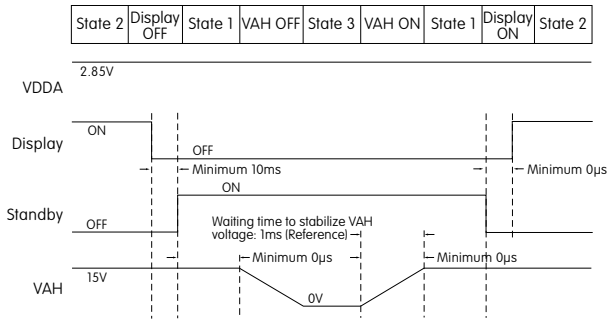




State Number	State	Display	Sleep	VAH	VDDA	Changing the Display
0	Power OFF	OFF	—	OFF	OFF	Disable
1	Display OFF	OFF	ON	ON	ON	Enable
2	Display ON	ON	OFF	ON	ON	Enable
3	Power Saver	OFF	ON	OFF	ON	Enable

STATE TRANSITION (CONTINUED)

State Transition	Transition		Reference or Setting Procedure
①	Power ON		Refer to "Power ON/OFF Sequence" → Refer to "Initialization Setting"
②	Power OFF		Refer to "Power ON/OFF Sequence"
③	Display ON		Refer to "Power ON/OFF Sequence"
④	Display OFF		
⑤	VAH OFF		Wait until VAH becomes stable
⑥	VAH ON		
⑦	Power OFF		Refer to "Power ON/OFF Sequence"
⑧	Initialization		Refer to "Initialization Setting"
⑨	Display Change	Image Rewriting	96 x 64 Image Data Sending
		Display Settings	Dimmer/Screen Saver/Indication 180° Reversal



INITIALIZITION SETTING

Command Name	Command Address	Parameter (1 or 2Byte)	Remarks
Software Reset	01		
Dot Matrix Display ON/OFF	02	00	Note 1
Read/Write Operation Wetting	07	00	Note 1
Display Direction Set Command	09	00	Note 1
Reserved 1	10	03	Note 2
Reserved 2	12	63	Note 2
Reserved 3	13	00	Note 2
Dot Matrix Display Standby ON/OFF	14	00	
Reserved 4	16	00	Note 2
Reserved 5	17	00	Notes 1 & 2
Reserved 6	18	09	Note 2
Reserved 7	1A	04	Notes 1 & 2
Reserved 8	1C	00	Notes 1 & 2
Graphic Memory Writing Direction	1D	00	Note 1
Setting Column Output Range	30	005F	Note 1
Setting Row Output Range	32	003F	
X Axis Reading/Writing Start Point	34	00	
X Axis Reading/Writing End Point	35	0B	
Y Axis Reading/WritingStart Point	36	00	Note 1
Y Axis Reading/Writing End Point	37	3F	Note 1

Notes: 1. Same as default value
2. Do not change setting value

Command Name	Command Address	Parameter (1 or 2Byte)	Remarks
X Axis Reading Start Address	38	00	Note 1
Y Axis Reading Start Address	39	00	Note 1
Reserved 9	48	03	
Screen Saver Event Timer Setting Command	C3	00	Note 1
Screen Saver Event Timer Setting Command	C4	00	Note 1
One Time, Repeat or Direction Setting for Screen Saver	CC	00	Note 1
Start/Stop Setting for Screen Saver	CD	00	Note 1
System Clock Division Ratio Setting	D0	80	Note 2
Setting the STBY Pin	D2	00	Notes 1 & 2
DACA Setting	D4	00	Notes 1 & 2
DACB Setting	D5	00	Notes 1 & 2
DACC Setting	D6	00	Notes 1 & 2
DACD Setting	D7	00	Notes 1 & 2
Reserved 10	D9	00	Notes 1 & 2
Dimmer Setting	DB	0F	Note 1
Reserved 11	DD	88	Note 2
Image Writing	08	Image data	

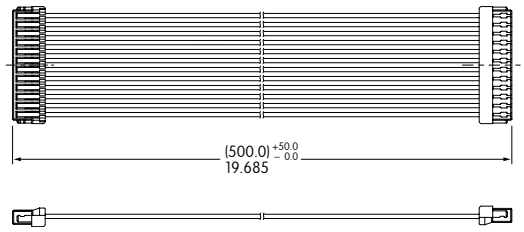
Notes: 1. Same as default value
2. Do not change setting value

ACCESSORIES

AT715 Cable for Connection

This accessory is available through Nihon Acchaku Tanshi Manufacturing.

Part Number: 12SUR-32S



IS Color Editor

The IS Color Editor is a software program for creating and editing bitmap image data, and may be used with OLED and High Resolution switches or displays. The software program is compatible with Windows XP or Vista.

OLED Rocker IS Evaluation Kit

The OLED Rocker IS Evaluation Kit allows users to input custom images or moving pictures and to display them. The images can be created or edited by the IS Color Editor.

These support tools and others that aid in development and design are now available. Contact the factory for more information.

Firmware for OLED Rocker IS Evaluation Kit

Firmware for the Evaluation Kit will be available on the web by April 1, 2009 and may be downloaded from the home page. Find other support products for the OLED Rocker IS by visiting:

http://www.nkksmartswitch.com/support/

PRECAUTIONS FOR HANDLING & STORAGE

Attention
Electrostatic
Sensitive Devices

Handling

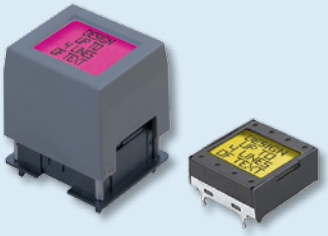
1. The IS Series OLED devices are electrostatic sensitive.
2. Signal input under conditions not recommended may cause damage to the OLED unit or deterioration of the display. Follow directions regarding supply sequences of power and signal voltages.
3. If the OLED panel is broken, avoid touching the contents. Wash off any contact to the skin or clothing.
4. Limit operating force to 100.0N maximum, as excessive pressure may damage the OLED.
5. Under certain actuation conditions, one side of the rocker and the center switch can both send actuation signals.
6. The IS series OLED devices are not process sealed.
7. Pixels acquire diminished brightness over time and use, and those most frequently habituated have greater reduction of brightness than those less used. To minimize this difference, operate OLED unit so that all pixels are used as consistently as possible.
8. Clean actuator surface with dry cloth. If further cleaning is needed, wipe with dampened cloth using neutral cleanser and dry with clean cloth. Do not use organic solvent.

Storage

1. Store in original container and away from direct sunlight.
2. Keep away from static electricity.
3. Avoid extreme temperatures, high humidity, gaseous substances, and all forms of chemical contamination.

The SmartSwitch™ Product Line

A Comprehensive Line of 21 Products to Complement Any Application

		Wide	Standard	Compact
Resolution 96 x 64	OLED		**OLED Rocker IS Multifunction Switch** Number of Pixels For Switch: 96 x 64	
Resolution 64 x 48	OLED		 **OLED IS Multifunction Switch & Display** Number of Pixels For Switch: 64 x 48 Number of Pixels For Display: 52 x 36 Number of Colors: 65,536	
Resolution 64 x 32	LCD		 **IS High Resolution LCD Multifunction Switch & Display** Number of Pixels For Switch or Display: 64 x 32 Backlight RGB: 64 Colors	 **IS Compact LCD Multifunction Switch with High Resolution** Number of Pixels For Switch: 64 x 32 Backlight RGB: 64 Colors
Resolution 36 x 24	LCD		 **IS Standard LCD Multifunction Switch & Display** Number of Pixels For Switches or Displays: 36 x 24 Backlight: Monochrome, 2 Colors, RGB	 **IS Compact LCD Multifunction Switch & Display (Custom)** Number of Pixels For Switches: 36 x 24 Backlight: Monochrome, 2 Colors, RGB

Nihon Kaiheiki Ind. Co., Ltd.
715-1 Unane, Takatsu-ku, Kawasaki-shi, 213-8553 Japan
www.nikkaiswitches.com E-mail: overseas@nikkai.co.jp

ISO 14001 ENVIRONMENT

Rev 0309