SmartSwitch™

DISTINCTIVE CHARACTERISTICS

- Same outer dimensions of switch and footprint, enabling ease of replacement with current switches
- Programmable display graphics for alphanumeric characters and animated sequences
- 64 colors of backlighting can be controlled dynamically
- Pushbutton switch with LCD, RGB LED backlighting
- General brightness of backlight is dynamically controlled in eight steps from dark to bright
- Operated by commands and data supplied via serial communications (SPI)
- Incorporates bitmap display function
- Dual image VRAM for quick change of displayed images
- Short travel of 1.8mm
- Low energy consumption
- Dust tight construction

Viewing area: 17.0mm x 13.0mm (horizontal x vertical)

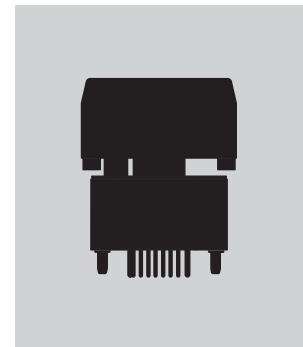High reliability and long life of one million actuations

High resolution of 64 x 32 pixels

Epoxy sealed straight PC terminals

Snap-in standoff legs ensure secure mounting and alignment, and prevents dislodging during wave soldering.

Actual Size

ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES
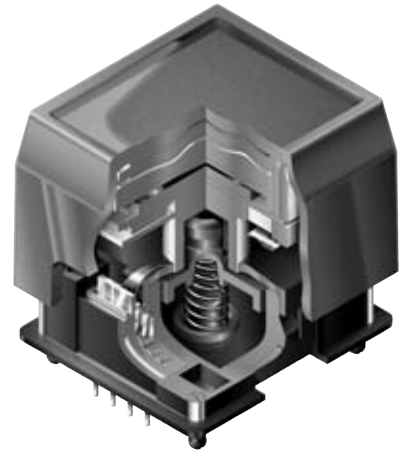
PART NUMBER & DESCRIPTION

Part Number	Switch Description	LCD Mode	LED Color
IS15EBFP4RGB-09YN	SPST Momentary ON Gold Contacts Straight PC Terminals	Black & White FSTN Positive	Red/Green/Blue

4.1.15

SmartSwitch™

**IS15EBFP4RGB-09YN**
RGB LED Backlight
Black and White LCD
Short Travel

SWITCH SPECIFICATIONS

|	
Circuit	SPST normally open
Electrical Capacity (Resistive Load)	100mA @ 12V DC
Contact Resistance	200 milliohms maximum @ 20mV 10mA
Insulation Resistance	100 megohms minimum @ 100V DC
Dielectric Strength	125V AC for 1 minute minimum
Mechanical Endurance	1,000,000 operations minimum
Electrical Endurance	1,000,000 operations minimum
Operating Force	1.7 ± 0.5 Newtons
Total Travel	1.8mm (.071")

TYPICAL SWITCH DIMENSIONS
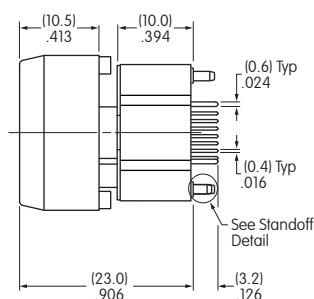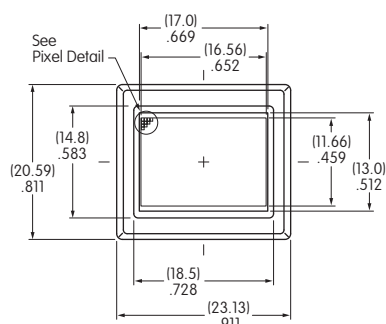
Terminal numbers are not on the switch.
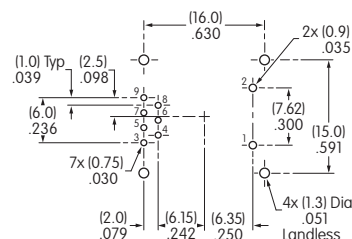

Pixel Detail
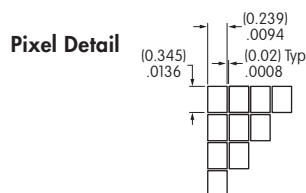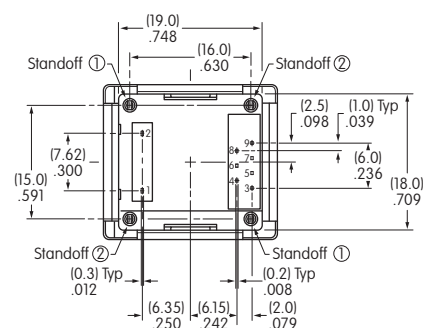
Standoff Detail
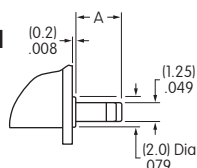
Dimension A
Standoff 1 = (2.7) Standoff 2 = (2.3)
.106   .091

Footprint

The Wide View Compact LCD 64 x 32 Pushbutton may utilize the same footprint as the Wide View/Short Travel LCD 64 x 32 Pushbutton.

NKK SWITCHES

LCD SPECIFICATIONS

Characteristics of Display

Display Operation Mode	FSTN positive; background colors, black & white
Display Condition	Transflective with built-in LED backlight
Viewing Angle Direction	6 o'clock
Viewing Area	17.0mm x 13.0mm (horizontal x vertical)
Pixel Format	64 x 32 pixels (horizontal x vertical)
Pixel Size	0.239mm x 0.345mm (horizontal x vertical)
*Operating Temperature Range	−15°C ~ +50°C (+5°F ~ +122°F)
Storage Temperature Range	−20°C ~ +60°C (−4°F ~ +140°F)
Backlight LED	**RGB:** red/green/blue

* In a low temperature environment (below 0°C), speed and contrast decrease when image changes. The non-indicator dot may become dense in a high temperature environment (about +50°C). Highest backlight brightness level should not be used for temperatures above +35°C.

Absolute Maximum Ratings (Temperature at 25°C)

Items	Symbols	Ratings
Supply Voltage	V_{DD}	−0.3V to +7.0V
Input Voltage	V_I	−0.3V to V_{DD} +0.3V
Output Voltage	V_O	−0.3V to V_{DD} +0.3V

Optical Characteristics (Temperature at 25°C)

Items		Symbols	Min	Typical	Max
Contrast Ratio		Cr	—	3.0	—
Viewing Angle (Cr ≥ 1.1)	Up & Down	θ	—	90°	—
	Right & Left	ϕ	—	90°	—

Recommended Operating Conditions (Temperature at 25°C)

Items	Symbols	Minimum	Typical	Maximum
Supply Voltage	V_{DD}	4.9V	5.0V	5.1V
High Level Input Voltage	V_{IH}	0.8 V_{DD}	—	—
Low Level Input Voltage	V_{IL}	—	—	0.2V_{DD}
SPI Clock Frequency	f_{SCK}	—	—	8MHz
Current Consumption	I_{DD}	** 10mA	—	*** 60mA

 ** 10mA: Backlighting LED is off
*** 60mA: Backlighting LEDs (Red, Green, Blue) are maximum brightness

SWITCH BLOCK DIAGRAM & PIN CONFIGURATIONS
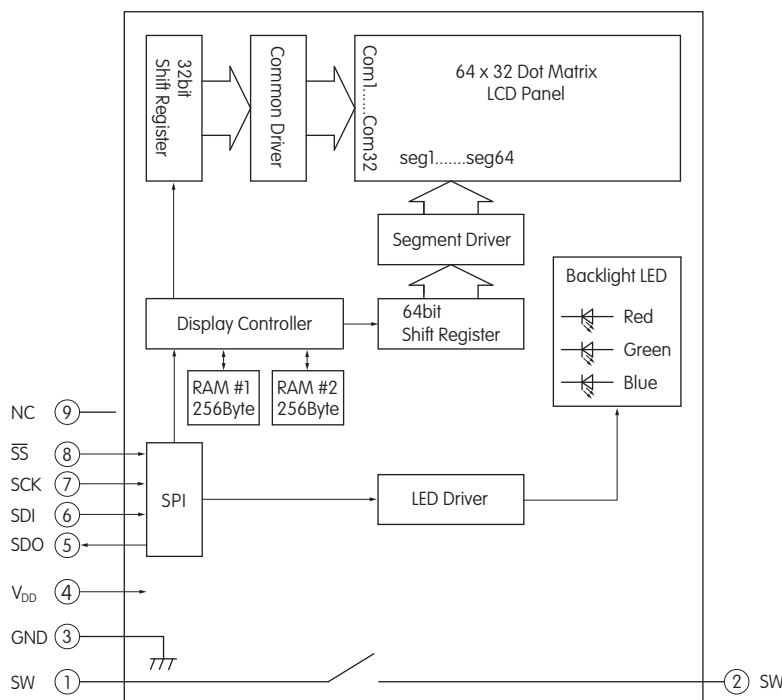
Pin No.	Symbol	Name	Function
1	**SW**	Terminal of Switch	Normally open
2	**SW**	Terminal of Switch	Normally open
3	**GND**	Ground	
4	**V$_{DD}$**	Power	Power source for logic circuit and LCD
5	**SDO**	Data Out	Data output line for SPI
6	**SDI**	Data In	Data input line for SPI
7	**SCK**	Serial Clock	Clock line for SPI that synchronizes commands and data
8	**$\overline{SS}$**	Slave Select	Chip select for SPI; line is active low
9	**NC**	None	No connection

NKK SWITCHES

SmartSwitch™

PRECAUTIONS FOR HANDLING & STORAGE OF LCD 64 x 32 DEVICES

Handling

ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES

1. The IS Series devices are electrostatic sensitive.

2. Limit operating force to keytop to 100.0N maximum, as excessive pressure may damage the LCD device.

3. The IS series devices are not process sealed.

4. If the LCD is accidentally broken, avoid contact with the liquid and wash off any liquid spills to the skin or clothing.

5. Clean cap 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.

6. Recommended soldering time and temperature limits:

    Do not exceed 60°C at the LCD level.
    Wave Soldering: see Profile B in Supplement section.
    Manual Soldering: see Profile A in Supplement section.

7. Excessive images may result after the same image is emitted continuously for an extended period of time.

8. The highest backlight brightness level should not be used for temperatures above +35°C.

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.

Mouser Electronics

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[NKK Switches](#):
  [IS15EBFP4RGB](#) [IS15EBFP4RGB-09YN](#)