

# Square 0.134" 4-Character 5x5 Dot Matrix Serial Input Dot Addressable Intelligent Display® Devices

**Lead (Pb) Free Product - RoHS Compliant**



SCDQ554xQ



SCDQ554xP



SCDQ554xR

**Yellow SCDQ5541P/Q/R**

**Super-red SCDQ5542P/Q/R**

**Green SCDQ5543P/Q/R**

**High Efficiency Green SCDQ5544P/Q/R**

## DESCRIPTION

The SCDQ5541X (Yellow), SCDQ5542X (Super-red), SCDQ5543X (Green), and SCDQ5544X (High Efficiency Green) are four digit, dot addressable 5 x 5 dot matrix, serial input, alphanumeric Intelligent Display devices in a square format. The four digits are packaged in a rugged, high quality, optically transparent, plastic package several mounting options. The SIP Pin for standard display mounting and 90° Bend SIP for side mounting. Additionally, a connector/header configuration is also available for display side mounting.

The on-board CMOS has a 100 bit RAM, one bit associated with one LED, each to generate User Defined Characters. In Power Down Mode, quiescent current is <50  $\mu$ A.

The SCDQ554XX is designed to work with the serial port of most common microprocessors. Data is transferred into the display through the Serial Data Input (DATA), clocked by the Serial Data Clock (SDCLK), and enabled by the Load Input (LOAD).

## FEATURES

- Four 3.40 mm (0.134") 5 x 5 Dot Matrix Characters in Red, Yellow, Super-red, Green, or High Efficiency Green
- Optimum Display Surface Efficiency (display area to package ratio)
- Square Character Format to Display Data in a Vertical or Horizontal Format
- High Speed Data Input Rate: 5.0 MHz
- ROMless Serial Input, Dot Addressable Display— Ideal for User Defined Characters
- Built-in Decoders, Multiplexers and LED Drivers
- Readable from 1.8 meters (6 Feet)
- Wide Viewing Angle,  $\pm 55^\circ$  in X-Axis and Y-Axis
- Attributes:
  - 100 Bit RAM for User Defined Characters
  - Eight Dimming Levels
  - Power Down Model (<250  $\mu$ W)
  - Software Clear Function
  - Lamp Test
  - 3.3 V Capability

# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

## Ordering Information

Type	Color of Emission	Character Height mm (inch)	Ordering Code
SCDQ5541P	yellow	3.2 (0.134)	Q68100A1472P
SCDQ5542P	super-red		Q68100A1078P
SCDQ5543P	green		Q68100A1473P
SCDQ5544P	high efficiency green		Q68100A1474P
SCDQ5541Q	yellow	3.2 (0.134)	Q68100A1472Q
SCDQ5542Q	super-red		Q68100A1078Q
SCDQ5543Q	green		Q68100A1473Q
SCDQ5544Q	high efficiency green		Q68100A1474Q
SCDQ5541R	yellow	3.2 (0.134)	Q68100A1472R
SCDQ5542R	super-red		Q68100A1078R
SCDQ5543R	green		Q68100A1473R
SCDQ5544R	high efficiency green		Q68100A1474R

# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

## Maximum Ratings

Operation in excess of any of these conditions may result in permanent damage to this device ( $T_A = 25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Operating temperature range	$T_{op}$	- 40 ... + 85	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	- 40 ... + 100	$^\circ\text{C}$
Supply Voltage $V_{CC}$ to GND (non-operating)	$V_{CC}$	-0.5 to + 7.0	V
Input Voltage, any Pin to GND		-0.5 to $V_{CC}$ to 5.5	V
Solder Temperature, Connector only 1.59 mm (0.063") below seating plane, $t < 5.0$ s	$T_S$	260	$^\circ\text{C}$
Relative Humidity (non-condensing)		85	%
ESD (100 pF, 1.5 k $\Omega$ )	$V_Z$	2.0	kV
Input Current		$\pm 100$	mA
Power Dissipation at 85 $^\circ\text{C}$		0.65	W

## Optical Characteristics at 25 $^\circ\text{C}$

( $V_{CC}=5.0$  V at 100% brightness level, viewing angle: X axis  $\pm 55^\circ$ , Y axis  $\pm 65^\circ$ )

Description	Symbol	Values				Unit
		Yellow SCDQ5541	Super-red SCDQ5542	Green SCDQ5543	High Efficiency Green SCDQ5544	
Luminous Intensity (min.)	$I_{V_{peak}}$	1.8	1.8	1.8	2.1	mcd
Character Average (#displayed all digits) (typ.)		5.4	5.4	5.4	6.4	mcd
Peak Wavelength (typ.)	$\lambda_{peak}$	583	630	565	568	nm
Dominant Wavelength (typ.)	$\lambda_{dom}$	585	620	570	574	nm

Notes:

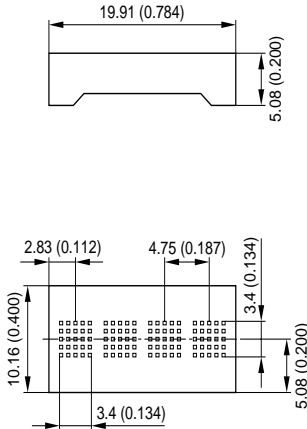
1. Dot to dot intensity matching at 100% brightness is 1.8:1.
2. Displays are binned for hue at 2.0 nm intervals.
3. Displays within a given intensity category have an intensity matching of 1.5:1 (max.).

# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

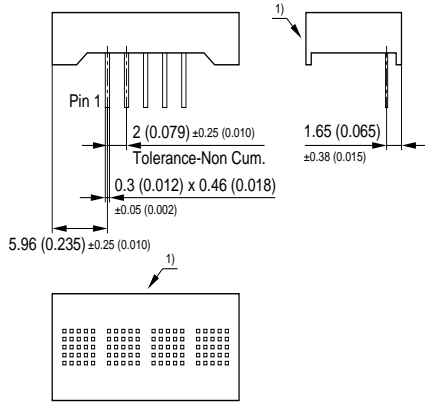
## Package Outlines

Dimensions in mm (inch)

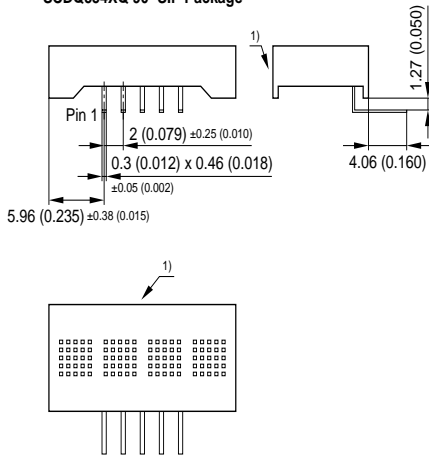
### Typical Package Outline & Matrix



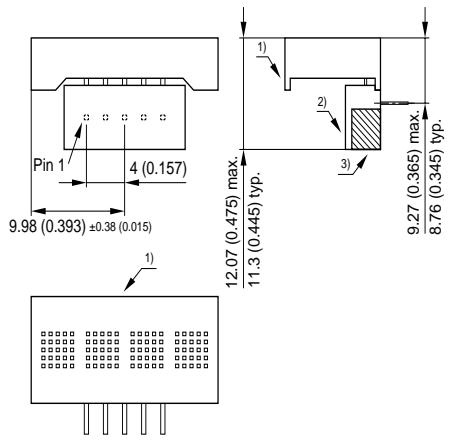
### SCDQ554XP SIP Package



### SCDQ554XQ 90° SIP Package



### SCDQ554XR 90° Connector/Header Package



- 1) Part marking is on this side of the display.  
RoHS Compliant (lead-free) have a "Z" marked to the right of the date code.
- 2) Molex header, 53290-0510 mounted on the display.
- 3) Molex receptacle, 52418-0510 mounted on the customer's PCB. Supplied by the customer.  
Use Pin 1 designation on this drawing, not the Molex connector specification.
- 4) Unless otherwise specified all tolerances are ±0.25 (0.010).

ID05D001

# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

**Electrical characteristics** (over operating temperature, unless otherwise specified,  $T_A = 25^\circ\text{C}$ )

Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{CC}$	4.5	—	5.5	V	—
$I_{CC}$ (Power Down Mode)	—	—	5.0	$\mu\text{A}$	$V_{CC}=5.0\text{ V}$ , all inputs=0 V or $V_{CC}$
$I_{CC}$ (16 dots on per digit) <sup>1)</sup>	—	100	145	mA	$V_{CC}=5.0\text{ V}$ , “#” displayed in all 4 digits at 100% brightness at $25^\circ\text{C}$
$V_{IH}$	3.5	—	—	V	$V_{CC}=4.5\text{ V}$ to $5.5\text{ V}$
$V_{IL}$	—	—	1.5	V	$V_{CC}=4.5\text{ V}$ to $5.5\text{ V}$
$I_{IH}$	—	—	10	$\mu\text{A}$	$V_{CC}=V_{IN}=5.0\text{ V}$ (all inputs)
$I_{IL}$	—	—	-10	$\mu\text{A}$	$V_{CC}=5.0\text{ V}$ , $V_{IN}=0\text{ V}$ (all inputs)
Internal Mux Frequency	375	768	1086	Hz	—
$\theta_{ja}$	—	65	—	$^\circ\text{C/W}$	—

Notes:

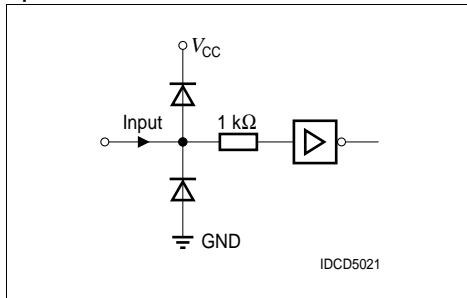
1)  $I_{CC}$  is an average value, the Peak current is  $\frac{5}{3} \times I_{CC}$ .

2) Contact manufacturer for 3.3 volt operation.

## Input Circuit

The input resistor/diode network shown below is used for ESD protection and to eliminate substrate latch-up caused by input voltage over/under shoot.

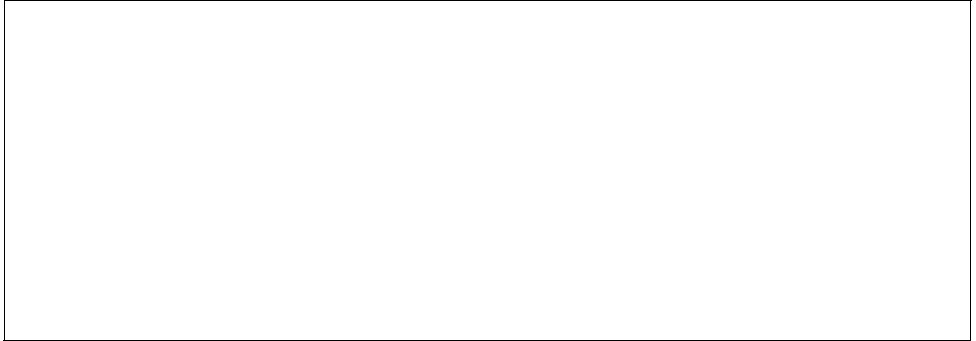
### Inputs



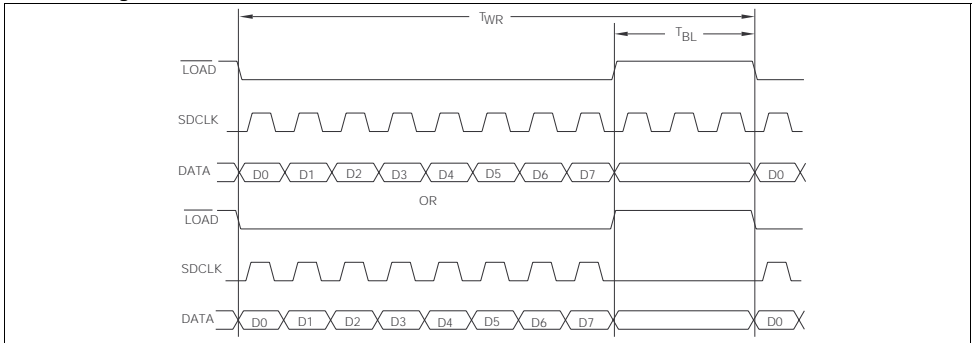
## Pinout and Pin Definitions

Pin	Function	Definitions
1	LOAD	Low input enables data clocking into 8-bit serial shift register. When LOAD goes high, the contents of 8-bit serial Shift Register will be decoded.
2	SDATA	Serial data input
3	SDCLK	Loads data into the 8-bit serial data register on a low to high transition
4	$V_{CC}$	Power supply
5	GND	Power supply ground

Close Up of Data “Write” Cycle



Device Timing



Write Cycle Timing

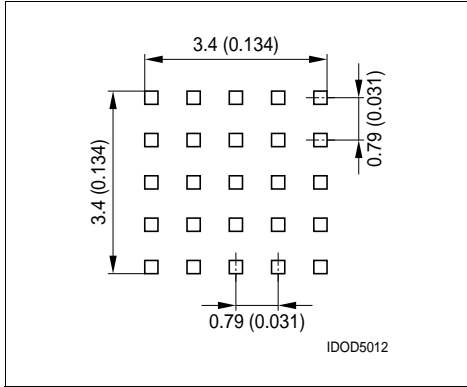
(over operating temperature range,  $V_{CC}=V_{LL}=4.5\text{ V to }5.5\text{ V}$ )

Symbol	Description	Min.	Max.	Units
$T_{LDS}$	Load Setup Time	50	—	ns
$T_{DS}$	Data Setup Time	50	—	ns
$T_{SDCLK}$	Clock Period	200	—	ns
$T_{SDCW}$ (HI or LOW)	Clock Width	70	—	ns
$T_{LDH}$	Load Hold Time	0	—	ns
$T_{DH}$	Data Hold Time	25	—	ns
$T_{WR}$	Total Write Time	2.25	—	$\mu\text{s}$
$T_{BL}$	Time Between Writes	600	—	ns
$T_{RST}$	Reset Active Time	600	—	ns

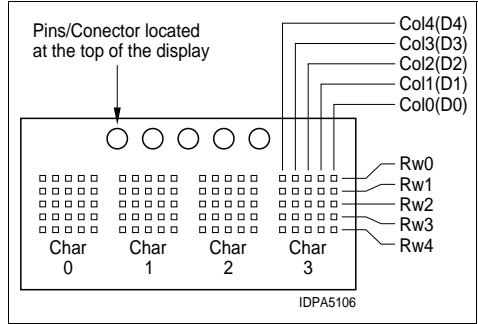
Notes:

- $T_{WR}$ =Setup Time + 8 Clock Times + Hold Times + Time Between Writes.
- Data is shifted into the display's 8 bit shift register on the positive going edge of the SDCLK.
- Shift register data is evaluated when Load goes high.

**Dot Matrix Format**

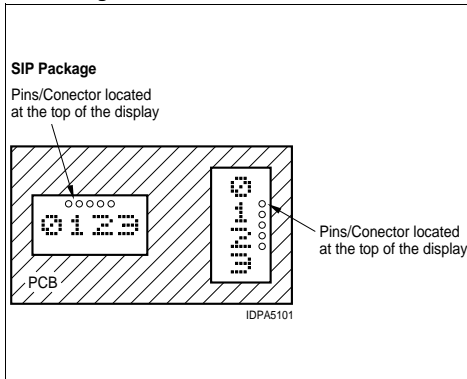


**Character Address, Row, & Column Data Map**

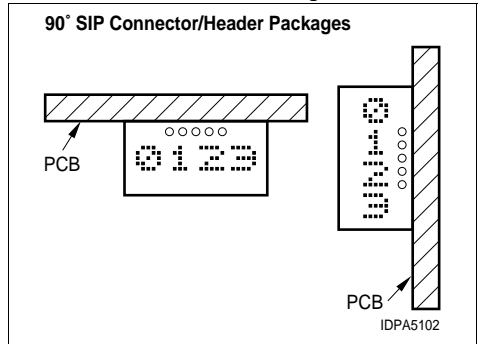


1. Viewed from the LED side of the display with the display in a horizontal position.
2. The row address and column data are typical for all character positions. The LED is on when the data bit = 1 and off when the data bit = 0.

**Suggested Display Mounting SIP Package**



**Suggested Display Mounting 90° SIP Connector / Header Packages**



**Operation of the SCDQ554XX**

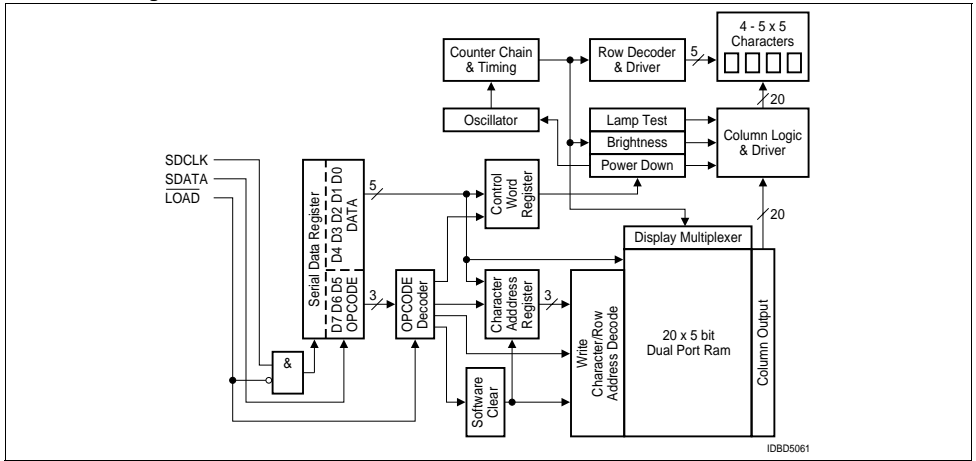
The SCDQ554XX display consists of a CMOS IC containing control logic and drivers for four 5 x 5 characters. These components are assembled in a compact plastic package.

Individual LED dot addressability allows the user great freedom in creating special characters or mini-icons. The User Definable Character Set examples illustrate 200 different character and symbol possibilities. Each example has the hexadecimal code required to display characters in a horizontal or vertical format. See Figures above, Suggested Display Mounting, for the display positioning. Generally, the contacts should be on the right side of the display for the vertical format and on the top of the display for the horizontal format.

The serial data interface provides a highly efficient interconnection between the display and the mother board. The SCDQ554XX requires only three input lines as compared to 15 for an equivalent four character parallel input part.

The on-board CMOS IC is the electronic heart of the display. The IC accepts decoded serial data, which is stored in the internal RAM. Asynchronously the RAM is read by the character multiplexer at a strobe rate that results in a flicker free display. shows the three functional areas of the IC. These include: the input serial data register and control logic, a 100 bits two port RAM, and an internal multiplexer/display driver.

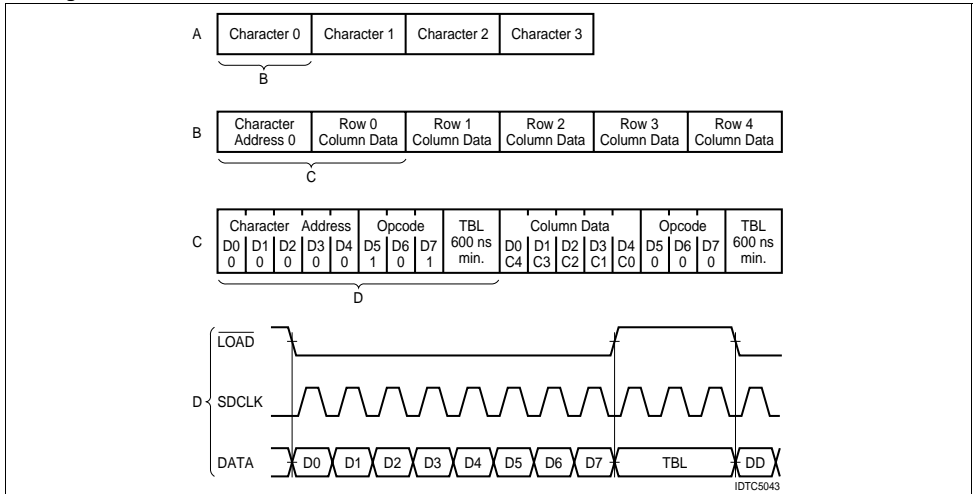
SCDQ Block Diagram



The following explains how to format the serial data to be loaded into the display. The user supplies a string of bit mapped decoded characters. The contents of this string is shown in Figure „Loading Serial Character Data A“ (page 8). Figure „Loading Serial Character Data B“ (page 8) shows that each character consists of six 8 bit words. The first word encodes the display character location and the succeeding five bytes are row data. The row data represents the status (On, Off) of individual column LEDs. Figure „Loading Serial Character Data C“ (page 8) shows that each 8 bit word is formatted to include a three bit Operational Code (OPCODE) defined by bits D7–D5 and five bits (D4–D0) representing Column Data, Character Address, or Control Word Data.

Figure „Loading Serial Character Data D“ (page 8) shows the sequence for loading the bytes of data. Bringing the LOAD line low enables the serial register to accept data. The shift action occurs on the low to high transition of the serial data clock (SDCLK). The least significant bit (D0) is loaded first. After eight clock pulses the LOAD line is brought high. With this transition the OPCODE is decoded. The decoded OPCODE directs D4–D0 to be latched in the Character Address register, stored in the RAM as Column data, or latched in the Control Word register. The control IC requires a minimum 600 ns delay between successive byte loads.

Loading Serial Character Data





# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

The Character Address bits, D4–D0 stored in the Character Address Register and the Column Data Instruction's Row Address bits, D7–D5, direct the Column Data bits, D4–D0 to specific RAM location. See the Instruction Set Table for address and data format. Figure „Writing Character 'D' Example" (page 9) shows the Row Address for the example character "D". See Figure „Character Address, Row, & Column Data Map" (page 7) for the dot positioning (Display contacts are at the top of the display).

Column data is written and read asynchronously from the 200 bit RAM. Once loaded the internal oscillator and character multiplexer reads the data from the RAM. These characters are row strobed with column data as shown in Figure „Row Strobe Example" (page 10). The character strobe rate is determined by the internal IC's=320 counter.

## Instruction Set

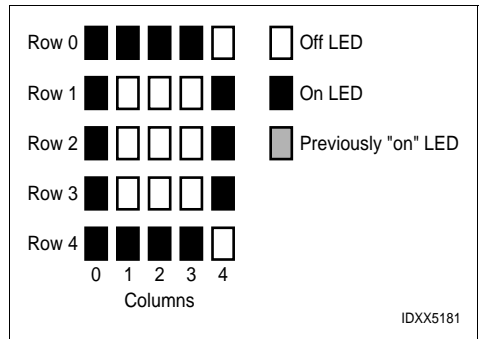
OPERATION	D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0	HEX	DESCRIPTION
CONTROL WORD	1	1	1	1	L T	B r	B r	B r	F0+X	Select Control Word plus operand See Control Word Format
Power Down Mode	1	1	1	1	1	1	1	1	FF	Power Down Mode=0% Brightness
SFT CLEAR	1	1	0	0	0	0	0	0	C0	Software Clear
ADDRESS REGISTER	1	0	1	0	0	0	0	0	A0	Select Digit Address 0
CHR ADRS 0–3	1	0	1	0	0	0	0	1	A1	Select Digit Address 1
	1	0	1	0	0	0	1	0	A2	Select Digit Address 2
	1	0	1	0	0	0	1	1	A3	Select Digit Address 3
COLUMN DATA	0	0	0	D 4	D 3	D 2	D 1	D 0	00+X	Row 0 D4–D0=Column Data
	0	0	1	D 4	D 3	D 2	D 1	D 0	20+X	Row 1 D4–D0=Column Data
	0	1	0	D 4	D 3	D 2	D 1	D 0	40+X	Row 2 D4–D0=Column Data
	0	1	1	D 4	D 3	D 2	D 1	D 0	60+X	Row 3 D4–D0=Column Data
	1	0	0	D 4	D 3	D 2	D 1	D 0	80+X	Row 4 D4–D0=Column Data

Row data is written to the character address contained in the Character Address Register.

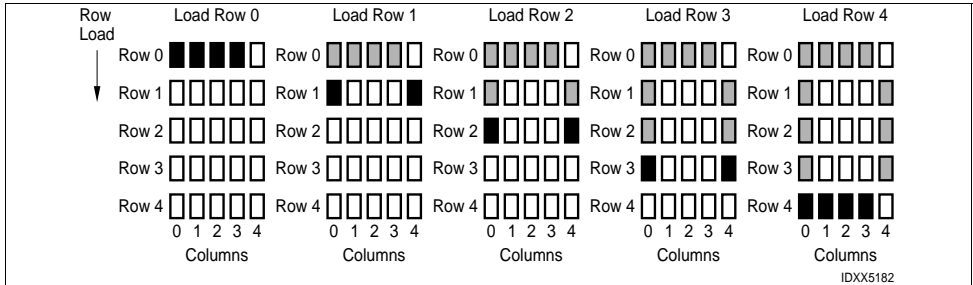
## Writing Character "D" Example

	Op code			Column Data				Hex	
	D7	D6	D5	D4 C0	D3 C1	D2 C2	D1 C3		D0 C4
Row 0	0	0	0	1	1	1	1	0	1E
Row 1	0	0	1	1	0	0	0	1	31
Row 2	0	1	0	1	0	0	0	1	51
Row 3	0	1	1	1	0	0	0	1	71
Row 4	1	0	0	1	1	1	1	0	9E

## Row and Column Locations for a Character "D"



**Row Strobe Example**



The user can activate four Control functions. These include: LED Brightness Level, Lamp Test, IC Power Down, or Display Clear. OPCODEs and five bit words are used to initiate these functions. The OPCODEs and Control Words for the Character Address and Loading Column Data are shown in Instruction Set Table.

The user can select seven specific LED brightness levels. These brightness levels (in percentages of full brightness of the display) include: 100% (F0HEX), 53% (F1HEX), 40% (F2HEX), 27% (F3HEX), 20% (F4HEX), 13% (F5HEX), and 6.6% (F6HEX). The brightness levels are controlled by changing the duty factor of the row strobe pulse.

**Display Brightness**

Op code D7 D6 D5	Control Word D4 D3 D2 D1 D0	Hex	Operation Level
1 1 1	1 0 0 0 0	F0	100%
1 1 1	1 0 0 0 1	F1	53%
1 1 1	1 0 0 1 0	F2	40%
1 1 1	1 0 0 1 1	F3	27%
1 1 1	1 0 1 0 0	F4	20%
1 1 1	1 0 1 0 1	F5	13%
1 1 1	1 0 1 1 0	F6	6.6%

The SCDQ554X offers a unique Display Power Down feature which reduces  $I_{CC}$  to less than 50  $\mu$ A. When FFHEX is loaded the display is set to 0% brightness and the internal multiplex clock is stopped. When in the Power Down mode data may still be written into the RAM. The display is reactivated by loading a new rightness Level Control Word into the display.

**Power Down**

Op code D7 D6 D5	Control Word D4 D3 D2 D1 D0	Hex	Operation Level
1 1 1	1 1 1 1 1	FF	0% brightness

The Lamp Test is enabled by loading F8HEX into the serial shift register. This Control Word sets all of the LEDs to a 53% brightness level. Operation of the Lamp Test has no effect on the RAM and is cleared by loading a Brightness Control Word.

**Lamp Test**

Op code D7 D6 D5	Control Word D4 D3 D2 D1 D0	Hex	Operation Level
1 1 1	1 0 B B B		Lamp Test (OFF)
1 1 1	1 1 0 0 0	F8	Lamp Test (ON)

The Software Clear (C0HEX) clears the Address Register and the RAM. The display is blanked and the Character Address Register will be set to Character 0. The internal counter and the Control Word Register are unaffected. The Software Clear will remain active until the next data input cycle is initiated.

**Software Clear**

Op code D7 D6 D5	Control Word D4 D3 D2 D1 D0	Hex	Operation Level
1 1 0	0 0 0 0 0	C0	CLEAR

**Electrical & Mechanical Considerations**

**Interconnect Considerations**

Optimum product performance can be had when the following electrical and mechanical recommendations are adopted. The SCDQ554XX's IC is constructed in a high speed CMOS process, consequently high speed noise on the SERIAL DATA, SERIAL DATA CLOCK, and LOAD lines may cause incorrect data to be written into the serial shift register. Adhere to transmission line termination procedures when using fast line drivers and long cables (>10 cm).

Good digital grounds (pin 1) and power supply decoupling (pin 2) will insure that  $I_{CC}$  (<350 mA peak) switching currents do not generate localized ground bounce. Therefore it is recommended that each display package use a 0.1  $\mu$ F and 20  $\mu$ F capacitor between  $V_{CC}$  and ground.

## ESD Protection

The input protection structure of the SCDQ554XX provides significant protection against ESD damage. It is capable of withstanding discharges greater than 2.0 kV. Take all the standard precautions, normal for CMOS components. These include properly grounding personnel, tools, tables, and transport carriers that come in contact with unshielded parts. If these conditions are not, or cannot be met, keep the leads of the device shorted together or the parts in anti-static packaging.

## Soldering Considerations

The SCDQ554XX can be hand soldered with SN63 solder using a grounded iron set to 260°C.

Wave soldering is also possible following these conditions: Pre-heat that does not exceed 93°C on the solder side of the PC board or a package surface temperature of 85°C. Water soluble organic acid flux (except carboxylic acid) or resin-based RMA flux without alcohol can be used.

Wave temperature of 245°C ± 5°C with a dwell between 1.5 s to 3.0 s. Exposure to the wave should not exceed temperatures above 260°C for five seconds at 1.59 mm (0.063") below the seating plane. The packages should not be immersed in the wave.

The SCDQ554XR connects to an external connector receptacle which may be soldered before inserting the SCDQ554XR Display. In this way, only the connector is subject to the user's soldering process. The Molex 52418-0510 receptacle called out in the product drawing can be used in solder reflow processes. See Molex for specifications.

## Post Solder Cleaning Procedures

The least offensive cleaning solution is hot D.I. water (60°C) for less than 15 minutes. Addition of mild saponifiers is acceptable. Do not use commercial dishwasher detergents.

For faster cleaning, solvents may be used. Exercise care in choosing solvents as some may chemically attack the nylon package. For further information refer to Appnotes 18 and 19 at [www.osram-os.com](http://www.osram-os.com) or in the current Short Form Catalogue. See Appnote 19, Table 2, "Displays-Group 2".

## Optical Considerations

The 3.12 mm (0.123") high character of the SCDQ554XX gives readability up to five feet. Proper filter selection enhances readability over this distance.

Using filters emphasizes the contrast ratio between a lit LED and the character background. This will increase the discrimination of different characters. The only limitation is cost. Take into consideration the ambient lighting environment for the best cost/benefit ratio for filters.

Incandescent (with almost no green) or fluorescent (with almost no red) lights do not have the flat spectral response of sunlight. Plastic band-pass filters are an inexpensive and effective way to strengthen contrast ratios. The SCDQ5542X is a super-red display and should be matched with long wavelength pass filter in the 570 nm to 590 nm range. The SCDQ5541X/3X/4X should be matched with a yellow-green band-pass filter that peaks at 565 nm. For displays of multiple colors, neutral density grey filters offer the best compromise.

Additional contrast enhancement is gained by shading the displays. Plastic band-pass filters with built-in louvers offer the next step up in contrast improvement. Plastic filters can be improved further with anti-reflective coatings to reduce glare. The trade-off is fuzzy characters. Mounting the filters close to the display reduces

this effect. Take care not to overheat the plastic filter by allowing for proper air flow.

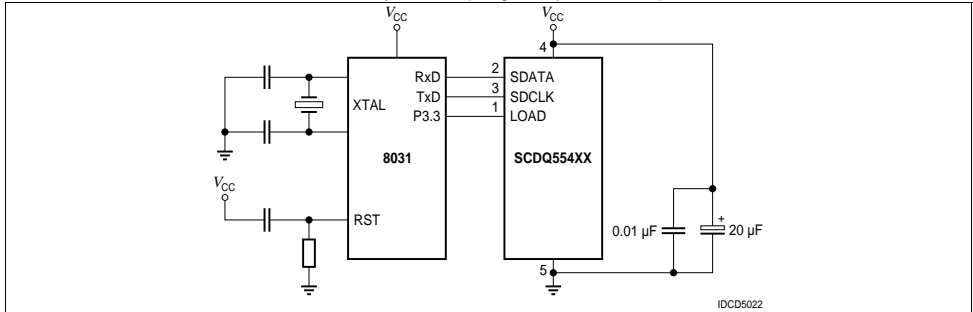
Optimal filter enhancements are gained by using circular polarized, anti-reflective, band-pass filters. The circular polarizing further enhances contrast by reducing the light that travels through the filter and reflects back off the display to less than 1%.

Several filter manufacturers supply quality filter materials. Some of them are: Panelgraphic Corporation, W. Caldwell, NJ; SGL Homalite, Wilmington, DE; 3M Company, Visual Products Division, St. Paul, MN; Polaroid Corporation, Polarizer Division, Cambridge, MA; Marks Polarized Corporation, Deer Park, NY; Hoya Optics, Inc., Fremont, CA.

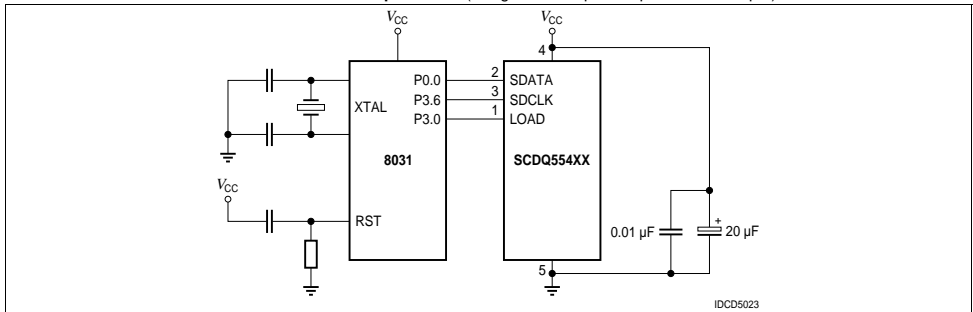
One last note on mounting filters: recessing displays and bezel assemblies is an inexpensive way to provide a shading effect in overhead lighting situations. Several Bezel manufacturers are: R.M.F. Products, Batavia, IL; Nobex Components, Griffith Plastic Corp., Burlingame, CA; Photo Chemical Products of California, Santa Monica, CA; I.E.E.-Atlas, Van Nuys, CA.

# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

**SCDQ554XX Interface to Siemens/Intel 8031 Microprocessor (using serial port in mode 0)**



**SCDQ554XX Interface to Siemens/Intel 8031 Microprocessor (using one bit of parallel port as serial input)**



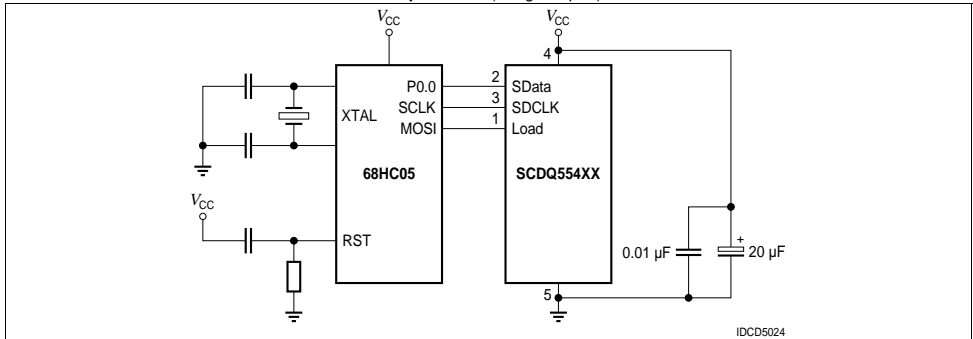
## Microprocessor Interface

The microprocessor interface is through the serial port, SPI port or one out of eight data bits on the eight bit parallel port and also control lines SDCLK and LOAD.

## Power Up Sequence

Upon power up display will come on at random. Thus the display should be reset at power-up. The reset will set the Address Register to Digit 0, User RAM is set to 0 (display blank) the Control Word is set to 0 (100% brightness with Lamp Test off) and the internal counters are reset.

**SCDQ554XX Interface with Motorola 68HC05C4 Microprocessor (using SPI port)**



# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

## Loading Data into the Display

Use following procedure to load data into the display:

1. Power up the display.
2. Step A: software clear the display.
3. Step B: Load the Control Word with the desired brightness level.
4. Load the Digit Address into the display.
5. Load display row and column data for the selected digit.
6. Repeat steps 4 and 5 for all digits.

## Data Contents for the Display in a Horizontal Format “↑AB↓”

Step	D7	D6	D5	D4	D3	D2	D1	D0	Function
A	1	1	0	0	0	0	0	0	CLEAR
B (optional)	1	1	1	1	0	B	B	B	BRIGHTNESS SELECT
1	1	0	1	0	0	0	0	0	DIGIT D0 SELECT
2	0	0	0	0	0	1	0	0	ROW 0 D0 (↑)
3	0	0	1	0	1	1	1	0	ROW 1 D0 (↑)
4	0	1	0	1	0	1	0	1	ROW 2 D0 (↑)
5	0	1	1	0	0	1	0	0	ROW 3 D0 (↑)
6	1	0	0	0	0	1	0	0	ROW 4 D0 (↑)
7	1	0	1	0	0	0	0	1	DIGIT D1 SELECT
8	0	0	0	0	0	1	0	0	ROW 0 D1 (A)
9	0	0	1	0	1	0	1	0	ROW 1 D1 (A)
10	0	1	0	1	1	1	1	1	ROW 2 D1 (A)
11	0	1	1	1	0	0	0	1	ROW 3 D1 (A)
12	1	0	0	1	0	0	0	1	ROW 4 D1 (A)
13	1	0	1	0	0	0	1	0	DIGIT D2 SELECT
14	0	0	0	1	1	1	1	0	ROW 0 D2 (B)
15	0	0	1	0	1	0	0	1	ROW 1 D2 (B)
16	0	1	0	0	1	1	1	0	ROW 2 D2 (B)
17	0	1	1	0	1	0	0	1	ROW 3 D2 (B)
18	1	0	0	1	1	1	1	0	ROW 4 D2 (B)
19	1	0	1	0	0	0	1	1	DIGIT D3 SELECT
20	0	0	0	0	0	1	0	0	ROW 0 D3 (↓)
21	0	0	1	0	0	1	0	0	ROW 1 D3 (↓)
22	0	1	0	1	0	1	0	1	ROW 2 D3 (↓)
23	0	1	1	0	1	1	1	0	ROW 3 D3 (↓)
24	1	0	0	0	0	1	0	0	ROW 4 D3 (↓)

# SCDQ5541P/Q/R, SCDQ5542P/Q/R, SCDQ5543P/Q/R, SCDQ5544P/Q/R

## User Definable Character Set Examples\*

### Upper and lower case alphabets

HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE
04 2A 5F 71 91	1E 29 4E 69 8E	0F 30 57 70 9F	1E 39 5E 83 A0	1F 30 57 70 9F	1F 30 57 70 9F	1F 30 57 70 9F	1F 30 57 70 9F	1F 30 57 70 9F	1F 30 57 70 9F	0F 30 57 70 9F	11 31 5F 71 91	0E 24 44 64 8E	0E 24 44 64 8E	0E 24 44 64 8E	0E 24 44 64 8E
01 21 41 71 9E	13 34 54 74 93	10 30 50 70 9F	11 3B 5B 73 93	11 39 59 79 9F	11 39 59 79 9F	11 39 59 79 9F	11 39 59 79 9F	11 39 59 79 9F	11 39 59 79 9F	0E 31 51 70 90	1E 31 51 70 90	0C 2C 4C 6C 8C	1E 31 51 70 90	1E 31 51 70 90	1E 31 51 70 90
0F 30 51 61 9E	1F 24 64 84	11 31 51 71 9E	11 31 51 71 9E	11 31 51 71 9E	11 31 51 71 9E	11 31 51 71 9E	11 31 51 71 9E	11 31 51 71 9E	11 31 51 71 9E	11 2A 4A 6A 8A	11 2A 4A 6A 8A	1F 22 44 66 88	1F 22 44 66 88	1F 22 44 66 88	1F 22 44 66 88
0E 2E 4E 72 9D	10 30 50 71 9E	00 2F 5F 70 9F	01 21 41 61 81	00 2E 4E 70 9E	00 2E 4E 70 9E	00 2E 4E 70 9E	00 2E 4E 70 9E	00 2E 4E 70 9E	00 2E 4E 70 9E	0A 2A 4A 6A 8A	00 2F 5F 70 9F	10 30 50 70 9F	04 20 40 64 8E	04 20 40 64 8E	04 20 40 64 8E
00 28 48 72 9C	10 30 50 78 98	0C 24 44 64 84	00 2A 4A 71 91	00 2A 4A 71 91	00 2A 4A 71 91	00 2A 4A 71 91	00 2A 4A 71 91	00 2A 4A 71 91	00 2A 4A 71 91	00 2E 4E 7E 9E	00 3E 5E 8E	00 2F 5F 8F	00 33 53 7B 9B	00 33 53 7B 9B	00 33 53 7B 9B
00 23 44 64 8E	08 3C 5C 6A 84	00 32 52 72 9D	00 31 51 71 91	00 31 51 71 91	00 31 51 71 91	00 31 51 71 91	00 31 51 71 91	00 31 51 71 91	00 31 51 71 91	00 32 52 7C 9C	00 31 51 64 8E	00 3E 6E 9E	00 3E 6E 9E	00 3E 6E 9E	00 3E 6E 9E

IDCS5081

### Numerals and punctuation

HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE
8E 73 93 0E	04 2C 44 64 8E	1E 21 4E 68 9F	1E 21 4E 61 9E	06 2A 4E 62 82	1F 30 5E 61 9E	06 28 4E 71 9E	1F 22 44 68 88	1F 22 44 68 88	0E 31 51 71 9E	0E 31 51 71 9E	0E 31 51 71 9E	0E 31 51 71 9E	0E 31 51 71 9E	0E 31 51 71 9E	0E 31 51 71 9E
88 79 99 0C	0A 3F 5F 7F 9A	0F 34 4E 65 9E	06 29 4E 68 9F	19 3A 4A 6B 93	08 34 4D 72 8D	0C 2C 44 68 80	02 24 44 64 82	02 24 44 64 82	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88
80 7C 9C 00	04 24 44 64 84	00 2C 4C 64 88	00 2D 4D 60 80	00 2D 4D 60 80	01 22 4D 68 8C	04 24 44 60 84	0A 2A 4A 60 80	0A 2A 4A 60 80	08 28 48 68 88	08 28 48 68 88	08 28 48 68 88	08 28 48 68 88	08 28 48 68 88	08 28 48 68 88	08 28 48 68 88
90 68 74 01	01 24 44 64 8C	0E 35 4E 70 8E	00 20 40 60 80	0C 2C 4C 6C 8C	0C 2C 4C 64 88	02 24 44 64 82	00 3F 4F 7F 80	00 3F 4F 7F 80	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88	08 24 44 64 88
88 71 91 08	06 24 44 64 86	0C 24 4C 64 84	04 24 44 64 84	11 2A 4A 6E 84	15 2E 4E 6E 8E	04 2A 4A 60 80	08 35 45 60 80	08 35 45 60 80	08 35 45 60 80	08 35 45 60 80	08 35 45 60 80	08 35 45 60 80	08 35 45 60 80	08 35 45 60 80	08 35 45 60 80

IDCS5082

\*CAUTION: No more than 128 LEDs "on" at one time at 100% brightness.

User Definable Character Set Examples\* (continued)

Scientific notations, ect.

HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	
80	RE	08	04 24 45 75 8E	0E	04 24 45 75 8E	1F	20 29 59 75 93	3E	1F 20 56 75 91	4E	20 4A 84 8A	DD	32 72 7D
81	RE	09	04 24 45 75 8E	0F	04 24 45 75 8E	20	29 59 75 93	3F	1F 20 56 75 91	4F	20 4A 84 8A	DE	32 72 7D
82	RE	0A	04 24 45 75 8E	10	0E 04 24 45 75 8E	21	20 29 59 75 93	40	3E 1F 20 56 75 91	50	4E 20 4A 84 8A	DF	32 72 7D
83	RE	0B	04 24 45 75 8E	11	0E 04 24 45 75 8E	22	20 29 59 75 93	41	3E 1F 20 56 75 91	51	4E 20 4A 84 8A	02	32 72 7D
84	RE	0C	04 24 45 75 8E	12	0E 04 24 45 75 8E	23	20 29 59 75 93	42	3E 1F 20 56 75 91	52	4E 20 4A 84 8A	03	32 72 7D
85	RE	0D	04 24 45 75 8E	13	0E 04 24 45 75 8E	24	20 29 59 75 93	43	3E 1F 20 56 75 91	53	4E 20 4A 84 8A	04	32 72 7D
86	RE	0E	04 24 45 75 8E	14	0E 04 24 45 75 8E	25	20 29 59 75 93	44	3E 1F 20 56 75 91	54	4E 20 4A 84 8A	05	32 72 7D
87	RE	0F	04 24 45 75 8E	15	0E 04 24 45 75 8E	26	20 29 59 75 93	45	3E 1F 20 56 75 91	55	4E 20 4A 84 8A	06	32 72 7D
88	RE	10	04 24 45 75 8E	16	0E 04 24 45 75 8E	27	20 29 59 75 93	46	3E 1F 20 56 75 91	56	4E 20 4A 84 8A	07	32 72 7D
89	RE	11	04 24 45 75 8E	17	0E 04 24 45 75 8E	28	20 29 59 75 93	47	3E 1F 20 56 75 91	57	4E 20 4A 84 8A	08	32 72 7D
8A	RE	12	04 24 45 75 8E	18	0E 04 24 45 75 8E	29	20 29 59 75 93	48	3E 1F 20 56 75 91	58	4E 20 4A 84 8A	09	32 72 7D
8B	RE	13	04 24 45 75 8E	19	0E 04 24 45 75 8E	2A	20 29 59 75 93	49	3E 1F 20 56 75 91	59	4E 20 4A 84 8A	0A	32 72 7D
8C	RE	14	04 24 45 75 8E	1A	0E 04 24 45 75 8E	2B	20 29 59 75 93	4A	3E 1F 20 56 75 91	5A	4E 20 4A 84 8A	0B	32 72 7D
8D	RE	15	04 24 45 75 8E	1B	0E 04 24 45 75 8E	2C	20 29 59 75 93	4B	3E 1F 20 56 75 91	5B	4E 20 4A 84 8A	0C	32 72 7D
8E	RE	16	04 24 45 75 8E	1C	0E 04 24 45 75 8E	2D	20 29 59 75 93	4C	3E 1F 20 56 75 91	5C	4E 20 4A 84 8A	0D	32 72 7D
8F	RE	17	04 24 45 75 8E	1D	0E 04 24 45 75 8E	2E	20 29 59 75 93	4D	3E 1F 20 56 75 91	5D	4E 20 4A 84 8A	0E	32 72 7D
90	RE	18	04 24 45 75 8E	1E	0E 04 24 45 75 8E	2F	20 29 59 75 93	4E	3E 1F 20 56 75 91	5E	4E 20 4A 84 8A	0F	32 72 7D
91	RE	19	04 24 45 75 8E	1F	0E 04 24 45 75 8E	30	20 29 59 75 93	4F	3E 1F 20 56 75 91	5F	4E 20 4A 84 8A	10	32 72 7D
92	RE	1A	04 24 45 75 8E	20	0E 04 24 45 75 8E	31	20 29 59 75 93	50	4E 20 4A 84 8A	60	5A 84 8A 84	11	32 72 7D
93	RE	1B	04 24 45 75 8E	21	0E 04 24 45 75 8E	32	20 29 59 75 93	51	4E 20 4A 84 8A	61	5A 84 8A 84	12	32 72 7D
94	RE	1C	04 24 45 75 8E	22	0E 04 24 45 75 8E	33	20 29 59 75 93	52	4E 20 4A 84 8A	62	5A 84 8A 84	13	32 72 7D
95	RE	1D	04 24 45 75 8E	23	0E 04 24 45 75 8E	34	20 29 59 75 93	53	4E 20 4A 84 8A	63	5A 84 8A 84	14	32 72 7D
96	RE	1E	04 24 45 75 8E	24	0E 04 24 45 75 8E	35	20 29 59 75 93	54	4E 20 4A 84 8A	64	5A 84 8A 84	15	32 72 7D
97	RE	1F	04 24 45 75 8E	25	0E 04 24 45 75 8E	36	20 29 59 75 93	55	4E 20 4A 84 8A	65	5A 84 8A 84	16	32 72 7D
98	RE	20	04 24 45 75 8E	26	0E 04 24 45 75 8E	37	20 29 59 75 93	56	4E 20 4A 84 8A	66	5A 84 8A 84	17	32 72 7D
99	RE	21	04 24 45 75 8E	27	0E 04 24 45 75 8E	38	20 29 59 75 93	57	4E 20 4A 84 8A	67	5A 84 8A 84	18	32 72 7D
9A	RE	22	04 24 45 75 8E	28	0E 04 24 45 75 8E	39	20 29 59 75 93	58	4E 20 4A 84 8A	68	5A 84 8A 84	19	32 72 7D
9B	RE	23	04 24 45 75 8E	29	0E 04 24 45 75 8E	3A	20 29 59 75 93	59	4E 20 4A 84 8A	69	5A 84 8A 84	1A	32 72 7D
9C	RE	24	04 24 45 75 8E	2A	0E 04 24 45 75 8E	3B	20 29 59 75 93	5A	4E 20 4A 84 8A	6A	5A 84 8A 84	1B	32 72 7D
9D	RE	25	04 24 45 75 8E	2B	0E 04 24 45 75 8E	3C	20 29 59 75 93	5B	4E 20 4A 84 8A	6B	5A 84 8A 84	1C	32 72 7D
9E	RE	26	04 24 45 75 8E	2C	0E 04 24 45 75 8E	3D	20 29 59 75 93	5C	4E 20 4A 84 8A	6C	5A 84 8A 84	1D	32 72 7D
9F	RE	27	04 24 45 75 8E	2D	0E 04 24 45 75 8E	3E	20 29 59 75 93	5D	4E 20 4A 84 8A	6D	5A 84 8A 84	1E	32 72 7D
00		00		00		00		00		00		00	
27		27		27		27		27		27		27	
4E		4E		4E		4E		4E		4E		4E	
83		83		83		83		83		83		83	
8C		8C		8C		8C		8C		8C		8C	
8F		8F		8F		8F		8F		8F		8F	
9F		9F		9F		9F		9F		9F		9F	

IDCS5083

Foreign characters

HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE	HEX CODE
1F	3F	4F	5F	6F	7F	8F	9F	0F	1F	2F	3F	4F
3E	4E	5E	6E	7E	8E	9E	0E	1E	2E	3E	4E	5E
5D	6D	7D	8D	9D	0D	1D	2D	3D	4D	5D	6D	7D
8B	9B	0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	0B
10	20	30	40	50	60	70	80	90	0A	1A	2A	3A
31	41	51	61	71	81	91	01	11	21	31	41	51
62	72	82	92	02	12	22	32	42	52	62	72	82
93	03	13	23	33	43	53	63	73	83	93	04	14
25	35	45	55	65	75	85	95	05	15	25	35	45
66	76	86	96	06	16	26	36	46	56	66	76	86
97	07	17	27	37	47	57	67	77	87	97	08	18
29	39	49	59	69	79	89	99	09	19	29	39	49
70	80	90	0A	1A	2A	3A	4A	5A	6A	7A	8A	9A
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	0C	1C	2C
3C	4C	5C	6C	7C	8C	9C	04	14	24	34	44	54
64	74	84	94	05	15	25	35	45	55	65	75	85
95	06	16	26	36	46	56	66	76	86	96	07	17
28	38	48	58	68	78	88	98	08	18	28	38	48
59	69	79	89	09	19	29	39	49	59	69	79	89
90	0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	0B	1B
2B	3B	4B	5B	6B	7B	8B	9B	0C	1C	2C	3C	4C
5D	6D	7D	8D	9D	0D	1D	2D	3D	4D	5D	6D	7D
8E	9E	0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	0F
1F	2F	3F	4F	5F	6F	7F	8F	9F	10	20	30	40
51	61	71	81	91	01	11	21	31	41	51	61	71
82	92	02	12	22	32	42	52	62	72	82	92	03
13	23	33	43	53	63	73	83	93	04	14	24	34
35	45	55	65	75	85	95	06	16	26	36	46	56
67	77	87	97	07	17	27	37	47	57	67	77	87
98	08	18	28	38	48	58	68	78	88	98	09	19
2A	3A	4A	5A	6A	7A	8A	9A	0A	1A	2A	3A	4A
5B	6B	7B	8B	9B	0B	1B	2B	3B	4B	5B	6B	7B
8C	9C	0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	0D
1D	2D	3D	4D	5D	6D	7D	8D	9D	0E	1E	2E	3E
3F	4F	5F	6F	7F	8F	9F	0F	1F	2F	3F	4F	5F
60	70	80	90	01	11	21	31	41	51	61	71	81
92	02	12	22	32	42	52	62	72	82	92	03	13
24	34	44	54	64	74	84	94	04	14	24	34	44
36	46	56	66	76	86	96	05	15	25	35	45	55
68	78	88	98	06	16	26	36	46	56	66	76	86
99	07	17	27	37	47	57	67	77	87	99	08	18
21	31	41	51	61	71	81	91	08	18	28	38	48
52	62	72	82	92	09	19	29	39	49	52	62	72
83	93	0A	1A	2A	3A	4A	5A	6A	7A	83	93	0B
14	24	34	44	54	64	74	84	94	0C	1C	2C	3C
35	45	55	65	75	85	95	0D	1D	2D	3D	4D	5D
66	76	86	96	0E	1E	2E	3E	4E	5E	66	76	86
97	0F	1F	2F	3F	4F	5F	6F	7F	8F	97	10	20
31	41	51	61	71	81	91	01	11	21	31	41	51
62	72	82	92	02	12	22	32	42	52	62	72	82
93	03	13	23	33	43	53	63	73	83	93	04	14
25	35	45	55	65	75	85	95	04	14	24	34	44
37	47	57	67	77	87	97	05	15	25	35	45	55
68	78	88	98	06	16	26	36	46	56	68	78	88
99	07	17	27	37	47	57	67	77	87	99	08	18
2A	3A	4A	5A	6A	7A	8A	9A	08	18	28	38	48
5B	6B	7B	8B	9B	09	19	29	39	49	5B	6B	

Revision History: 2006-05-12

Previous Version: 2006-01-23

Page	Subjects (major changes since last revision)	Date of change
all	Lead free device	2006-01-23

Published by  
OSRAM Opto Semiconductors GmbH  
Wernerwerkstrasse 2, D-93049 Regensburg  
[www.osram-os.com](http://www.osram-os.com)  
© All Rights Reserved.

**Attention please!**

The information describes the type of component and shall not be considered as assured characteristics. Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances. For information on the types in question please contact our Sales Organization. If printed or downloaded, please find the latest version in the Internet.

**Packing**

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

**Components used in life-support devices or systems must be expressly authorized for such purpose!** Critical components<sup>1)</sup> may only be used in life-support devices or systems<sup>2)</sup> with the express written approval of OSRAM OS.

<sup>1)</sup> A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.  
<sup>2)</sup> Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health and the life of the user may be endangered.



## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [LED Displays & Accessories](#) category:*

*Click to view products by [Osram](#) manufacturer:*

Other Similar products are found below :

[LTC-2721WC](#) [LTC-4624JD](#) [LTC-4627WC](#) [LTC-571P](#) [LTD-5021AWC](#) [LTM-8522G](#) [LTP-4323P](#) [LTP-747G](#) [LTS-3361JG-06](#) [ELS-316SYGWA/S530-E2](#) [1668](#) [HT-F196NB-5323](#) [IPD2131-27](#) [SA03-12EWA](#) [LDQ-N514RI](#) [LDS-A3506RD](#) [LDS-A3926RI](#) [SC03-12HDB](#) [SI-B9T151550WW](#) [SI-B9V171550WW](#) [SLC-3PF-WL](#) [SLDN-32M-G](#) [1624](#) [LTC-2623WC](#) [LTC-4627JD](#) [LTD-322G](#) [LTD-482PC](#) [LTP-1057AHR](#) [LTP-1457AKR](#) [LTP-3784G-01](#) [LTS-313AP](#) [LTS-4812SKR-P](#) [LTS-547AE](#) [LTS-6780P](#) [446010401-3](#) [DA43-11GWA](#) [LDD-A516RI-17](#) [LDD-E305RI](#) [LDQ-N3402RI](#) [LDQ-N3606RI](#) [LDT-M2804RI](#) [86004CB830](#) [LTP-3862JD](#) [LTD-6740P](#) [LTS-6880Y](#) [LDS-SMC3002RISUGTR](#) [LTC-2623E](#) [CC25-12YWA](#) [LDM-6432-P3-UR-1](#) [SR420312N/32](#)