EPSON

# SED1758 Series

## High Duty LCD Driver

- Suitable for Color STN-LCD
- 160 Output Segment Driver
- Super Slim TCP

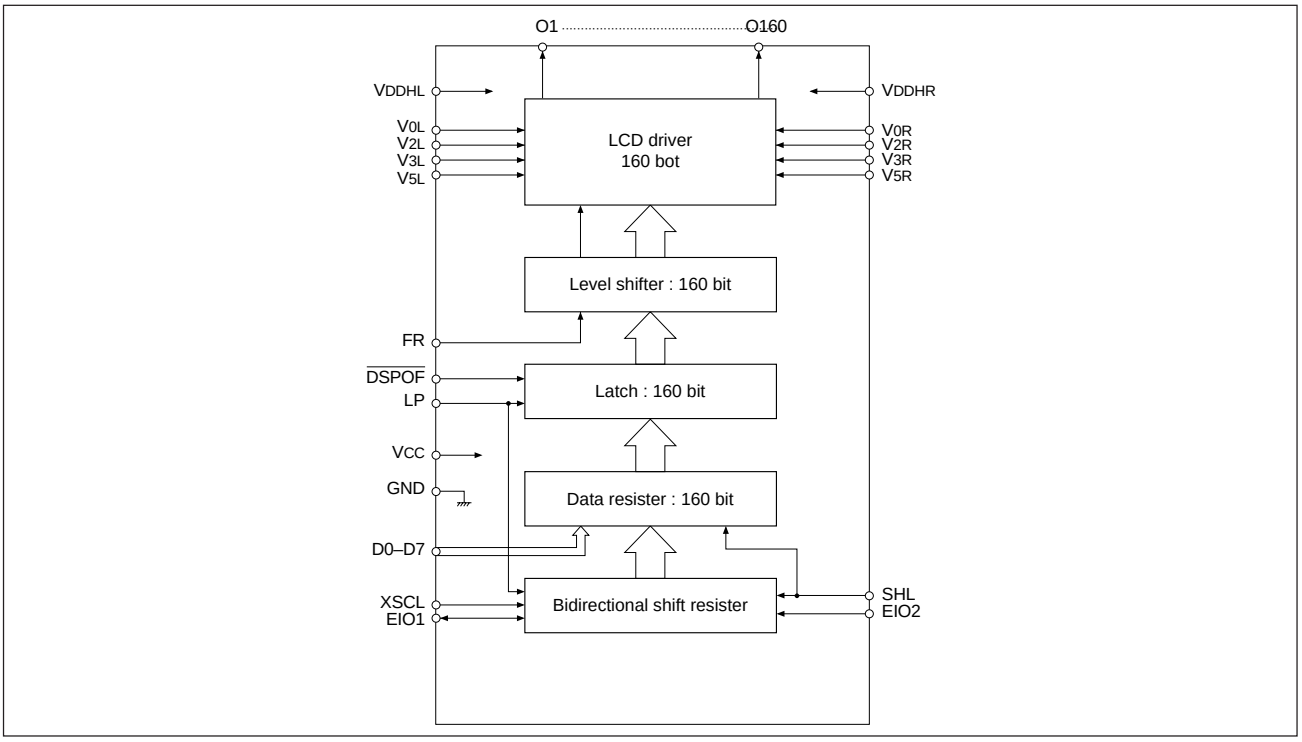
## ■ DESCRIPTION

SED1758 is a 160 output segment (column) LCD driver suitable for driving of colored STN dot-matrix LCD panels of a larger capacity, for use in combination with SED1743 or SED1753.
Contributing to making clearer LCD picture quality, this IC employs the high speed enable chain method and is slim-chip configuration which is more advantageous for miniaturization of the LCD panel. SED1758 is also capable of low-voltage and high-speed logic operations and fits to a wide range of applications.

## ■ FEATURES

- Number of LCD drive output segments: 160
- Low voltage operation: 2.7V Min.
- High duty drive: 1/500 (an example)
- Wide LCD drive voltage range: + 8 to + 42V ($V_{DD}$ = 3 to 5.5V)
- High speed and low power consumption data transfer is possible by adoption of the 8-bit bus enable chain method:
  Shift clock frequencies: 18.0 MHz (5V ±10%)
  10.0 MHz (2.7V)
- Slim-chip configuration
- Non-bias display off function
- Pin-selection of the output shift direction is available
- Offset bias regulation of LCD power for respective $V_{DDH}$ and GND levels is possible
- Logic operation power supply: 2.7 to 5.5V
- Shipped status: TCP SED1758T**
- This IC is not radiation resistant

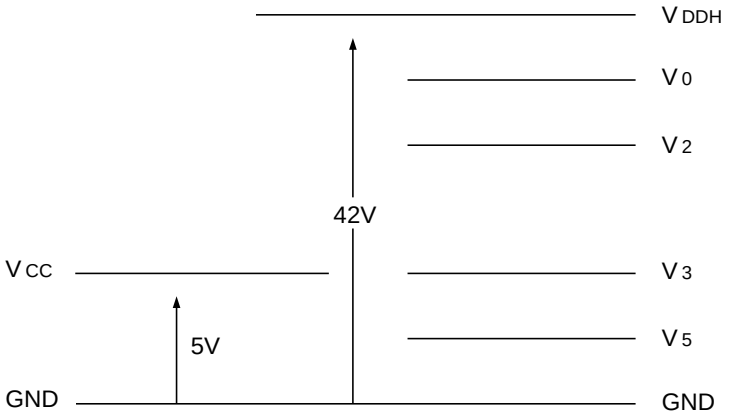
## ■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Supply voltage (1) | $V_{CC}$ | –0.3 to +7.0 | V |
| Supply voltage (2) | $V_{DDH}$ | –0.3 to +45.0 | V |
| Supply voltage (3) | $V_0$, $V_2$, $V_3$, $V_5$ | –0.3 to $V_{DDH}$ + 0.3 | V |
| Input voltage | $V_I$ | –0.3 to $V_{CC}$ + 0.3 | V |
| Output voltage | $V_O$ | –0.3 to $V_{CC}$ + 0.3 | V |
| EIO output current | $I_{O1}$ | 20 | mA |
| Working temperature | Topr | –30 to +85 | °C |
| Storage temperature 1 | Tstg1 | –65 to +150 | °C |
| Storage temperature 2 | Tstg2 | –55 to +100 | °C |

(Note 1) All the voltage ratings are based on GND = 0V.
(Note 2) The storage temperature 1 is applicable to independent chips and the storage temperature 2 is applicable to the TCP modular state.
(Note 3) $V_0$, $V_2$, $V_3$ and $V_5$ should always be in the order of $V_{DDH} \geq V_0 \geq V_2 \geq V_3 \geq V_5 \geq$ GND.




(Note 4) If the logic operation power goes into a floating state or if $V_{CC}$ drops to 2.6V or below while the LCD driving power is being applied, the LSI may be damaged. Therefore, keep from occurrence of the aforementioned status.
Specifically, pay close attention to the power supply sequence at times of turning the system power on and off.

## ■ ELECTRICAL CHARACTERISTICS

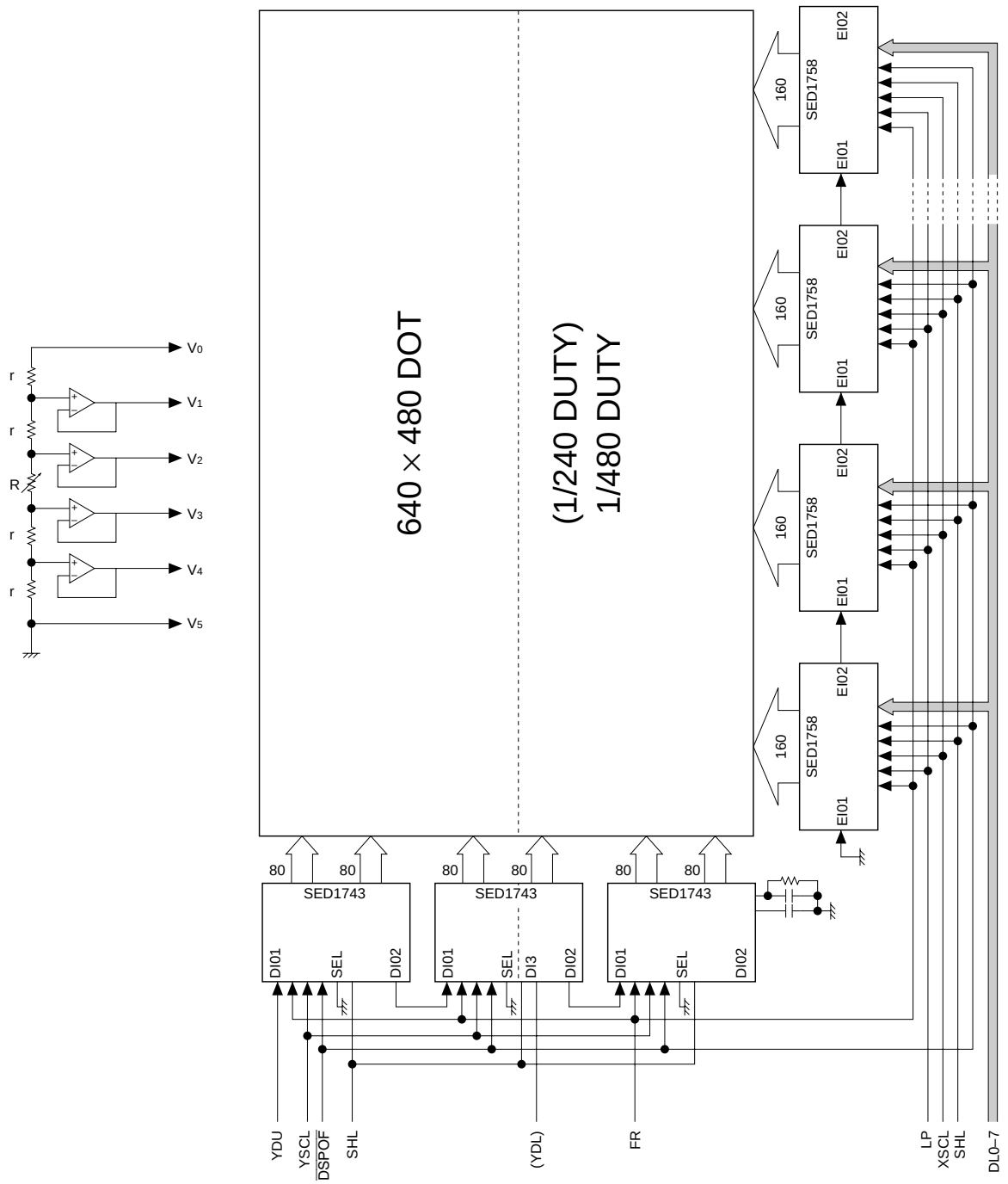
● DC characteristics

(Unless otherwise specified, GND = 5 V = 0V, $V_{CC}$ = +5.0 V ±10%, Ta = –30 to 85°C)

| Characteristic | Symbol | Condition | Applicable pin | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Supply voltage (1) | $V_{CC}$ | | $V_{CC}$ | 2.7 | | 5.5 | V |
| Recommended working voltage | $V_0$ | | $V_{0L}$,$V_{DDHL}$ | 14.0 | | 40.0 | V |
| Workable voltage | $V_0$ | Function only | $V_{0R}$,$V_{DDHL}$ | 8.0 | | 42.0 | V |
| Supply voltage (2) | $V_2$ | Recommended value | $V_{2L}$, $V_{2R}$ | 7/9 $V_0$ | | $V_0$ | V |
| Supply voltage (3) | $V_3$ | Recommended value | $V_{3L}$, $V_{3R}$ | GND | | 2/9 $V_0$ | V |
| High level input voltage | $V_{IH}$ | $V_{DD}$ = 2.7 to 5.5V | EIO1,EIO2,FR D0–D7,XSCL SHL,LP,$\overline{DSPOF}$ | 0.8$V_{CC}$ | | | V |
| Low level input voltage | $V_{IL}$ | | | | | 0.2$V_{CC}$ | V |
| High level output voltage | $V_{OH}$ | $V_{CC}$= 2.7 to 5.5V, $I_{OH}$ = –0.6mA | EIO1, EIO2 | $V_{CC}$–0.4 | | | V |
| Low level output voltage | $V_{OL}$ | $V_{CC}$= 2.7 to 5.5V, $I_{OL}$ = 0.6mA | | | | 0.4 | V |
| Input leak current | $I_{LI}$ | GND ≤ $V_{IN}$ ≤ $V_{CC}$ | D0–D7,LP,FR XSCL, SHL $\overline{DSPOF}$ | | | 2.0 | µA |
| I/O leak current | $I_{LI/O}$ | GND ≤ $V_{IN}$ ≤ GND | EIO1, EIO2 | | | 5.0 | µA |
| Rest current | GND | $V_0$ = 14.0 to 42.0V, $V_{IH}$ = GND, $V_{IL}$=GND | GND | | | 25 | µA |
| Output resistance | $R_{SEG}$ | △$V_{ON}$ =0.5V Recommended condition, $V_0$ =+36.0V, 1/24, 01–0160 | | | 0.85 | 2.6 | KΩ |
| | | $V_0$ =+26.0V, 1/20, 01–0160 | | | 0.90 | 2.6 | |
| In-chip deviation of output resistance | △$R_{SEG}$ | △$V_{ON}$=0.5V, $V_0$ = +36.0V, 1/24, 01–0160 | | | | 90 | Ω |
| Mean working current consumption (1) | $I_{CC}$ | $V_{CC}$ = +5.0V, $V_{IH}$ = $V_{CC}$, $V_{IL}$ = GND, $f_{XSCL}$ = 5.38MHz, $f_{LP}$ = 33.6kHz, $f_{FR}$ = 70Hz, Input data: Checkered indication, no-load | $V_{CC}$ | | 0.5 | 1.1 | mA |
| | | $V_{CC}$ = +3.0V, Other conditions are the same as those when $V_{CC}$ = 5V. | | | 0.2 | 0.6 | |
| Mean working current consumption (2) | $I_O$ | $V_0$ = +30.0V, $V_{CC}$ = +5.0V, $V_3$ = +4.0V, $V_2$ = +26.0V, $V_5$ = +0.0V, Other conditions are the same as those in the $I_{DD}$ column. | $V_{OL}$, $V_{OR}$ | | 0.15 | 0.9 | mA |
| Input terminal capacity | CI | Freq. = 1 Mhz, Ta = 25°C, Independent chips | D0–D7, LP, FR XSCL, SHL, $\overline{DSPOF}$ | | | 8 | pF |
| I/O terminal capacity | $C_{I/O}$ | | EIO1, EIO2 | | | 15 | pF |

## ■ LCD PANEL CONNECTION EXAMPLE

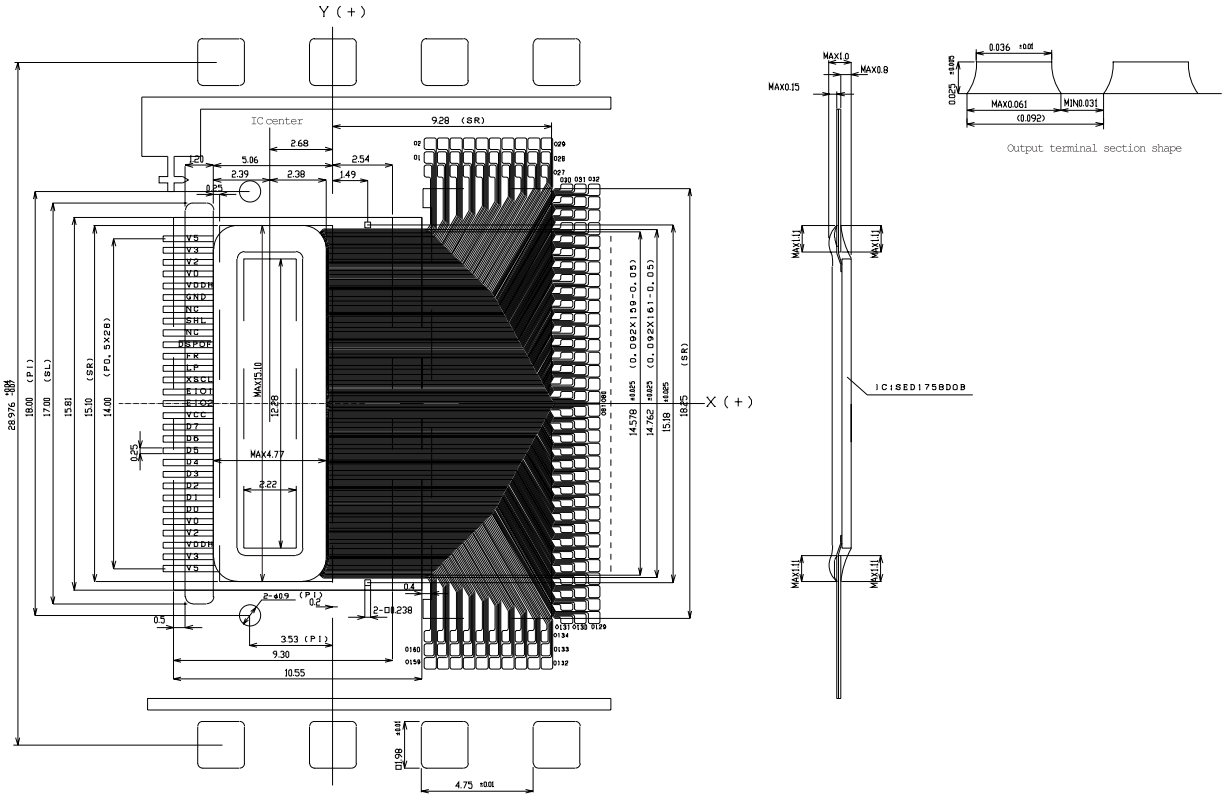
**Block diagram of a large-plane LCD**



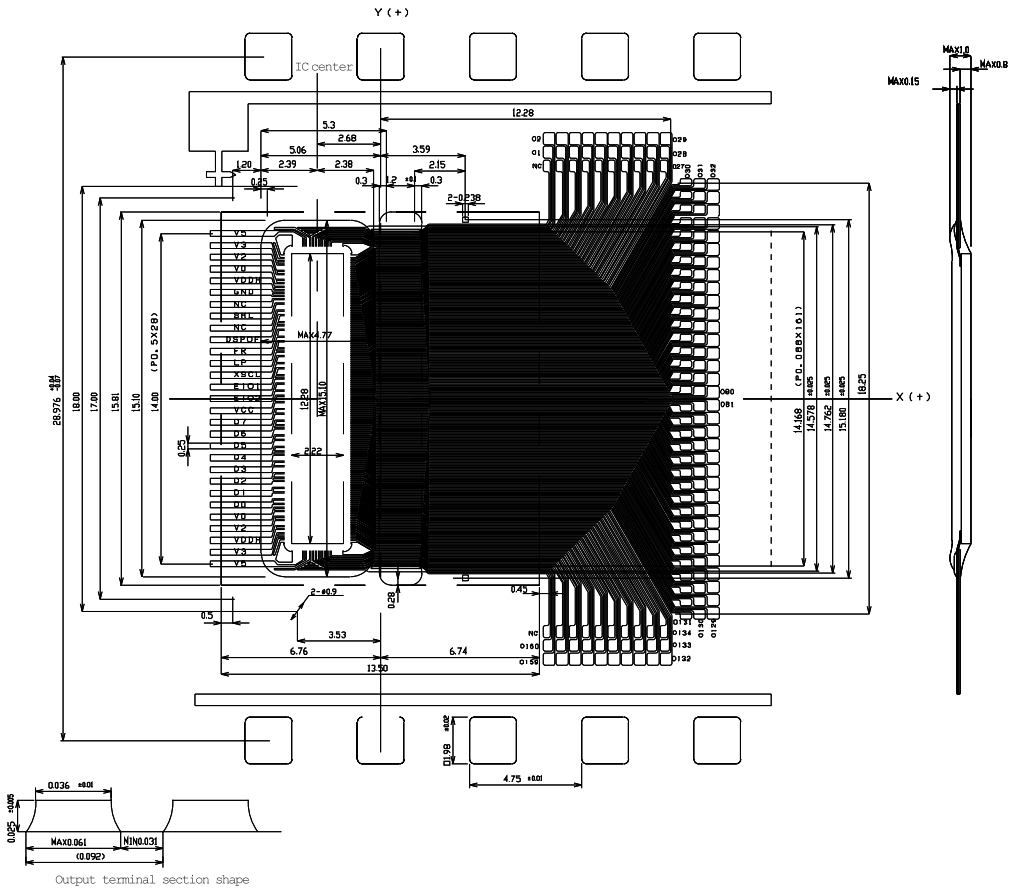
## ■ TCP EXTERNAL DIMENSIONS

For reference

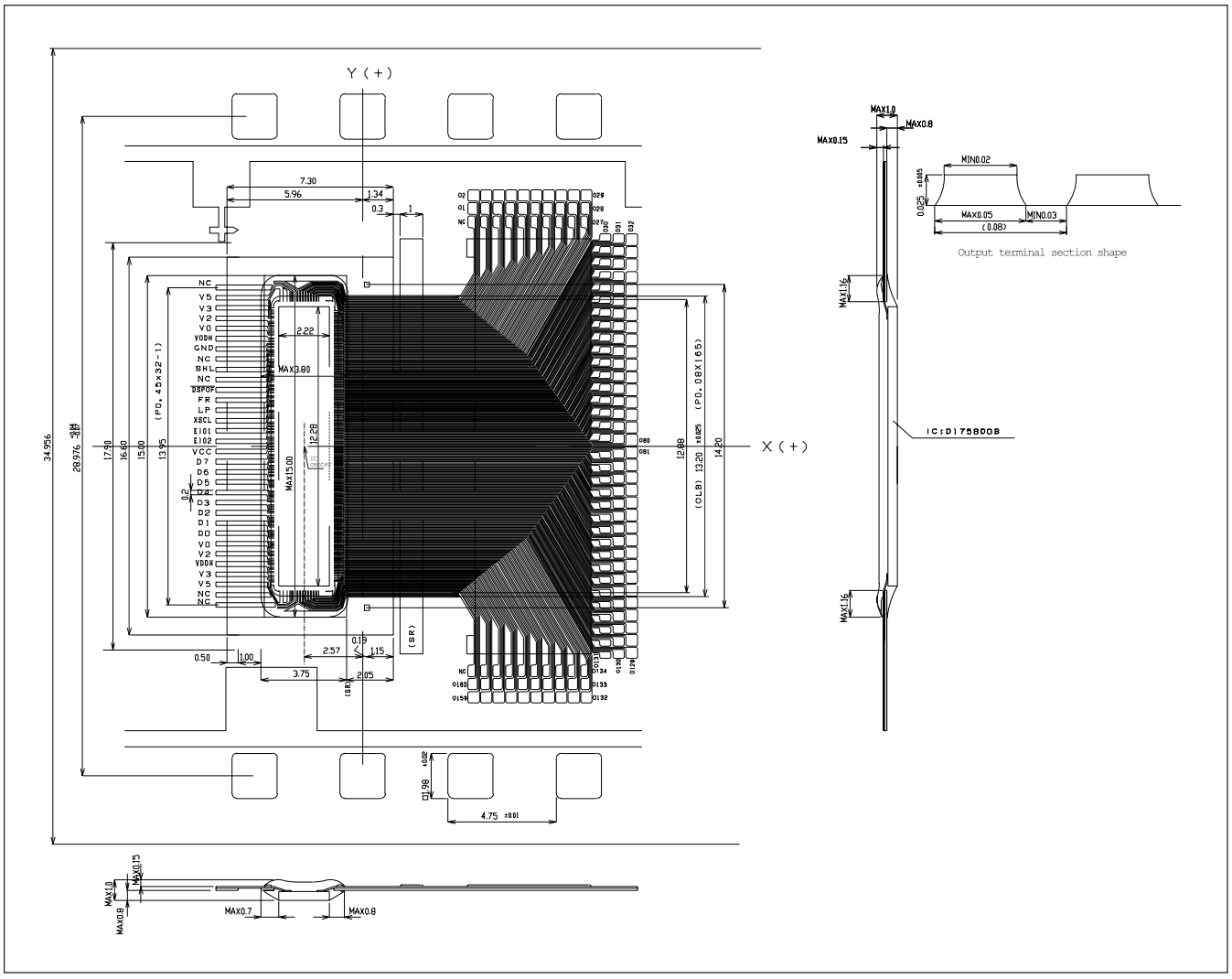
● **SED1758T0A**



● **SED1758T0B**


Y (+)
IC center
X (+)
MAX1.8
MAX0.8
MAX0.15
12.28
5.3
2.68
5.06
3.59
2.39
2.38
2.15
1.20
0.25
0.3
1.2
0.3
2-0.938
MAX4.77
MAX13.0
12.28
2.22
0.25
(P0.5X28)
(P0.088X101)
28.976 +0.4 -0.1
18.00
17.00
15.81
15.10
14.00
14.168 ±0.025
14.578 ±0.025
14.762 ±0.025
15.180 ±0.025
18.25
2-ø0.9
0.28
0.45
0.5
3.53
6.76
6.74
13.50
0.99 ±0.02
4.75 ±0.01
0.036 ±0.01
0.025 +0.005 -0.015
MAX0.061
(0.092)
MIN0.031
Output terminal section shape

● **SED1758T0G**



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