



# SSL6203TW

120 V mains dimmable, 12 W linear LED driver

Rev. 1 — 3 November 2014

Objective data sheet

## 1. General description

The SSL6203TW is a monolithic high-voltage Integrated Circuit (IC) that can drive and dim three high-voltage LED strings directly from the rectified mains. The high level of integration gives a low-cost and low component count application, which is especially suitable for retrofit Solid-State Lighting (SSL).

The IC operates as a linear high-voltage current source. The string current in the LEDs can easily be adjusted. A patented LED drive scheme ensures optimal LED utilization.

The application can be dimmed. It also runs on a leading-edge phase cut dimmer with the integrated smart bleeder current.

To guarantee correct and proper operation, the SSL6203TW incorporates many protection features.

A thermally enhanced small outline package gets rid of the heat and makes integration of the whole application on the LED plate possible.

## 2. Features and benefits

### 2.1 High-voltage integration

- Integrated 120 mA (120 V (AC) mains compatible) high-voltage current sources
- Integrated bleeder high-voltage current source
- Integrated low voltage supply regulator
- Two high-voltage current sources per output for optimal heat balancing
- Start up Junction Field Effect Transistor (JFET)
- Integrated floating switches for improving LED utilization
- Robust high-voltage IC with 330 V rating, compatible with 120 V (AC) mains voltage

### 2.2 Mains dimmable

- Leading-edge dimmer compatible (phase-cut)
- Adjustable bleeder current by a single resistor
- Adjustable LED current by a single resistor or controlled by a current source
- Low dimmer inrush current stress due to the absence of an electrolytic capacitor on the rectified mains



## 2.3 LED current

- For high-voltage LEDs
- Adjustable LED current using a single resistor or controlled by a current source
- Adjustable LED current ripple using external capacitors
- Drives three LED strings (typical string voltage ranges from approximately 43 V to 50 V (120 V (AC) mains))
- Overvoltage feedback for < 10 % line and load regulation
- Two high-voltage current sources per output for optimal heat balancing
- Patented LED drive scheme for optimal LED utilization (US 20130257282 A1)

## 2.4 Protections

- UnderVoltage LockOut (UVLO)
- Open LED protection on every LED string
- Protected against shorted LEDs
- OverTemperature Protection (OTP) on the high-voltage current sources

## 2.5 Thermal features

- Reduced IC dissipation because of the presence of dual LED current outputs per string, enabling the application of external heat dissipation resistors
- Thermally enhanced thin shrink small outline package ensuring the heat can be transported to the PCB easily
- Optimized start-up current for instantaneous on-light output

## 2.6 Mains current

- High power factor (> 0.9)
- Total Harmonic Distortion (THD) according to the IEC61000-3-2 standard
- No inrush current
- No EMI filter

## 2.7 Cost

- Low component count
- No inductors
- No mains electrolytic capacitor
- No EMI filter

## 2.8 Form factor

- Small form factor
- No inductors
- No EMI filter required as the SSL6203TW is a non-High-Frequency switching converter
- High integration level

## 2.9 Smart lighting

- Setting the LED and BLEED pins to 0 V externally using a smart lighting system can switch off the IC.
- Externally controlling the LED pin with a current source using a smart lighting system can dim the LEDs.

## 3. Applications

- 120 V (AC) mains dimmable retrofit SSL lamps

## 4. Ordering information

Table 1. Ordering information

| Type number | Package  |                                                                                                         |          |
|-------------|----------|---------------------------------------------------------------------------------------------------------|----------|
|             | Name     | Description                                                                                             | Version  |
| SSL6203TW   | HTSSOP20 | Plastic thermal enhanced thin shrink small outline package, 20 leads, body width 4.4mm, exposed die pad | SOT527-1 |

5. Block diagram

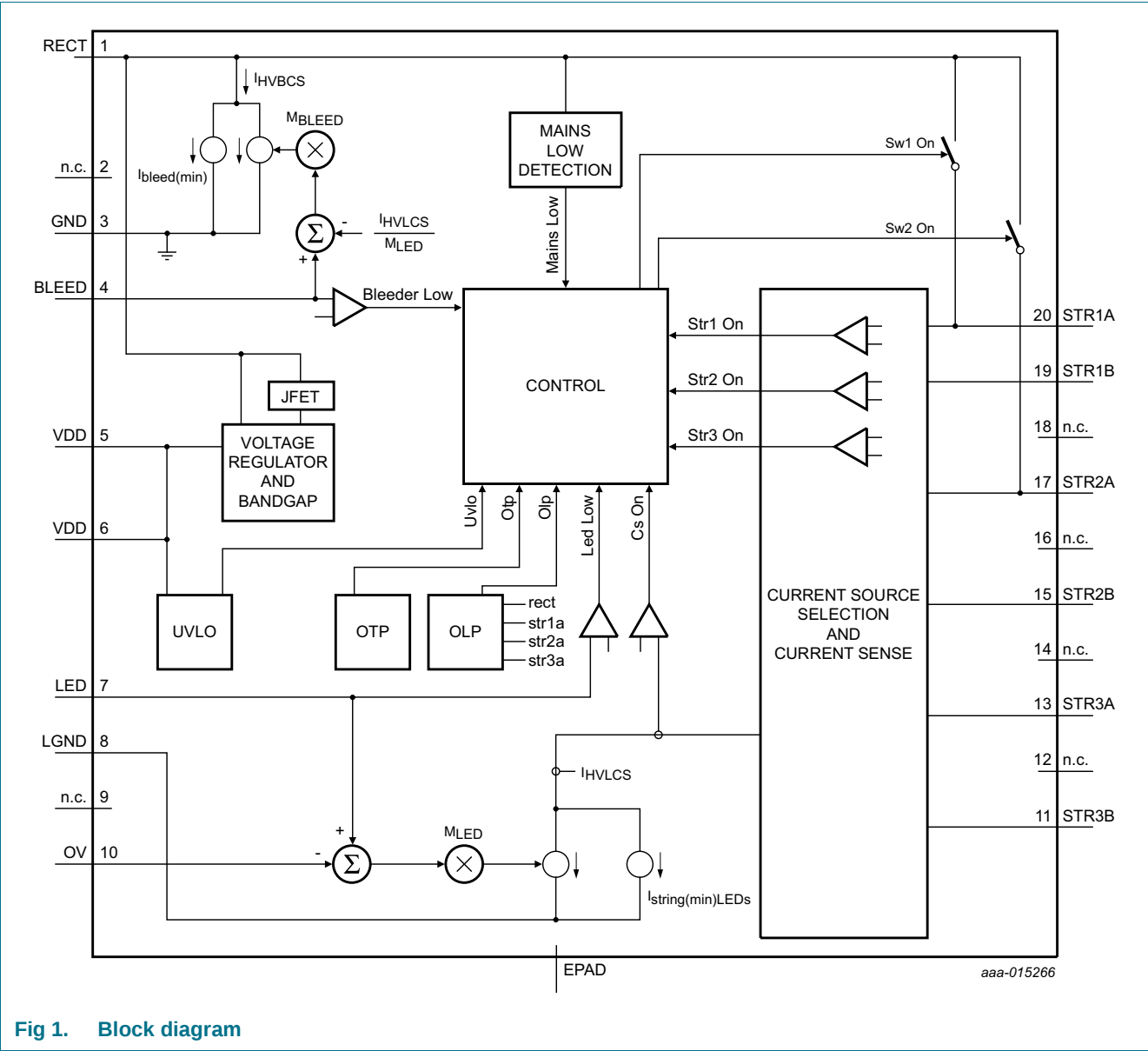
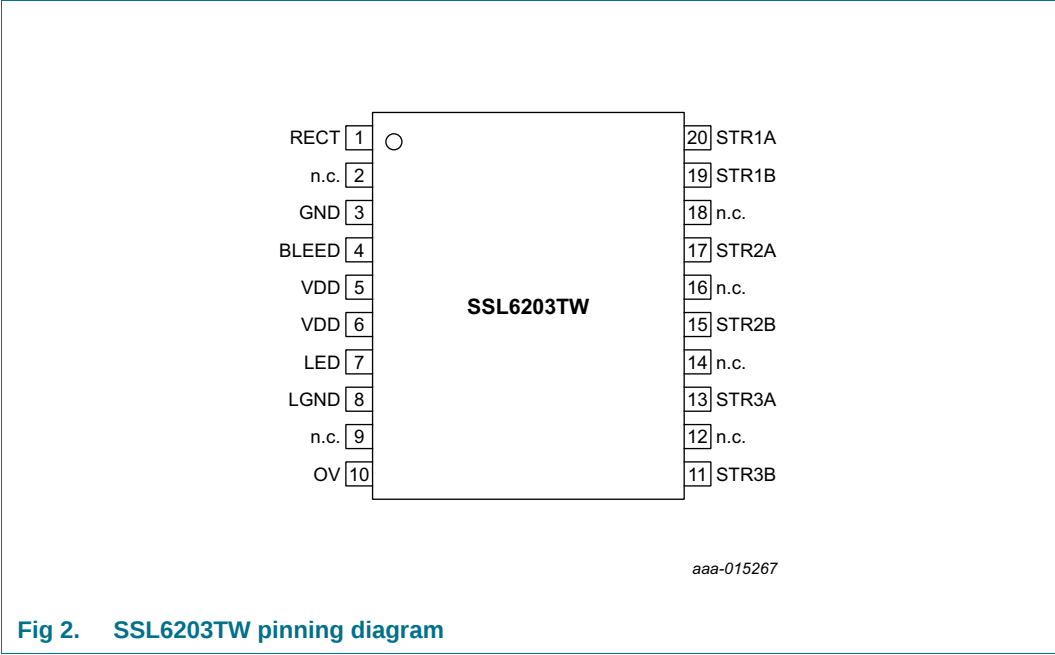


Fig 1. Block diagram

6. Pinning information

6.1 Pinning



6.2 Pin description

Table 2. SSL6203TW pin description

| Symbol | Pin | Description                     |
|--------|-----|---------------------------------|
| RECT   | 1   | rectified mains                 |
| n.c.   | 2   | not connected                   |
| GND    | 3   | ground                          |
| BLEED  | 4   | bleeder reference current input |
| VDD    | 5   | IC supply voltage               |
| VDD    | 6   | IC supply voltage               |
| LED    | 7   | LED reference current input     |
| LGND   | 8   | LED current source ground       |
| n.c.   | 9   | not connected                   |
| OV     | 10  | overvoltage feedback            |
| STR3B  | 11  | string 3B connection            |
| n.c.   | 12  | not connected                   |
| STR3A  | 13  | string 3A connection            |
| n.c.   | 14  | not connected                   |
| STR2B  | 15  | string 2B connection            |
| n.c.   | 16  | not connected                   |
| STR2A  | 17  | string 2A connection            |

Table 2. SSL6203TW pin description ...continued

| Symbol | Pin | Description          |
|--------|-----|----------------------|
| n.c.   | 18  | not connected        |
| STR1B  | 19  | string 1B connection |
| STR1A  | 20  | string 1A connection |

## 7. Functional description

### 7.1 Linear LED driver operation

The linear LED driver in the SSL6203TW operates as a high-voltage linear current source. This current source is used to drive the LEDs. Figure 3 shows a basic application diagram. Depending on the momentary value of the rectified mains voltage, the LED current flows through one or more LED strings.

To equalize the LED string on-times, integrated high-side switches short-circuit the LED strings at the appropriate moment. To set the required LED current ripple, additional capacitors can be added across every LED string. The application can be dimmed. Close to the mains zero crossing the LED current is off. To keep the dimmer in the on-state, a bleeder current starts to draw current.

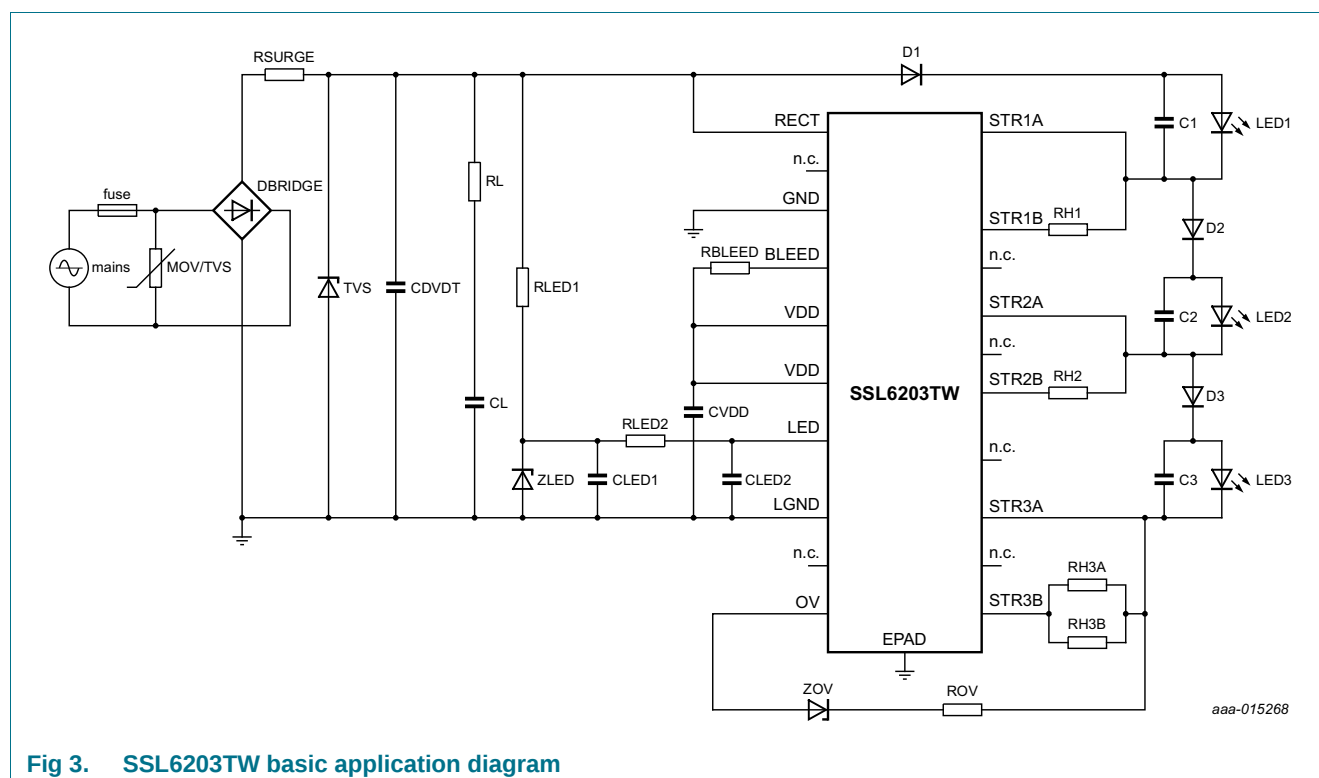


Fig 3. SSL6203TW basic application diagram

## 7.2 Protection mode and VDD supply generation

During start-up, the voltage on the VDD pin is  $< V_{DD(stop)}$ . The IC is in protection mode. When the mains voltage is applied to the SSL6203TW system (see [Figure 1](#)), an integrated JFET enables the supply voltage generation. The VDD control loop charges the external capacitor  $C_{VDD}$  and regulates the VDD voltage.

After  $C_{VDD}$  has been charged to  $> V_{DD(start)}$  level, the IC proceeds to start-up mode. Should the voltage on the VDD pin drop to below  $V_{DD(stop)}$ , the IC enters the protection mode again.

## 7.3 Start-up mode

After the supply voltage has been ramped up and no other protections are active, the IC proceeds to start-up mode. To ensure a fast start-up without excessive dissipation in the IC, the charging current of the LED capacitor is dynamically adjusted to the mains voltage in start-up mode.

## 7.4 Normal mode

The IC proceeds to normal operation if none of the protections (UVLO, OTP, or OLP) are active and the LED capacitors have been sufficiently charged. Measuring the current into the OV pin detects that the LED capacitors are sufficiently charged. When the current into the OV drops to below  $I_{th(OV)}$ , the transition to normal mode can be made. In normal mode, the internal High-Voltage LED Current Source (HVLCS) is operational. The selected string output (STR1x, STR2x, STR3x) conducts.

The HVLCS current can be calculated with [Equation 1](#):

$$I_{HVLCS} = I_{string(min)LEDs} + \max\{M_{LED} \cdot (I_{I(LED)} - I_{I(OV)}), 0\} \quad (1)$$

During normal operation, the bleeder system is enabled. The High-Voltage Bleeder Current Source (HVBCS) ensures that the dimmer is always biased with a minimum current (hold current). The HVBCS current can be calculated with [Equation 2](#):

$$I_{HVBCS} = I_{bleed(min)} + \max\left\{M_{BLEED} \cdot \left(I_{I(BLEED)} - \frac{I_{HVLCS}}{M_{LED}}\right), 0\right\} \quad (2)$$

The currents described by [Equation 1](#) and [Equation 2](#) reflect the DC values of the current. In an application with a leading-edge dimmer, the mains is phase-cut, resulting in a reduced average current because of a reduced duty cycle. The average LED current can drop to below a few percents of the maximum value.

## 7.5 IC dissipation reduction

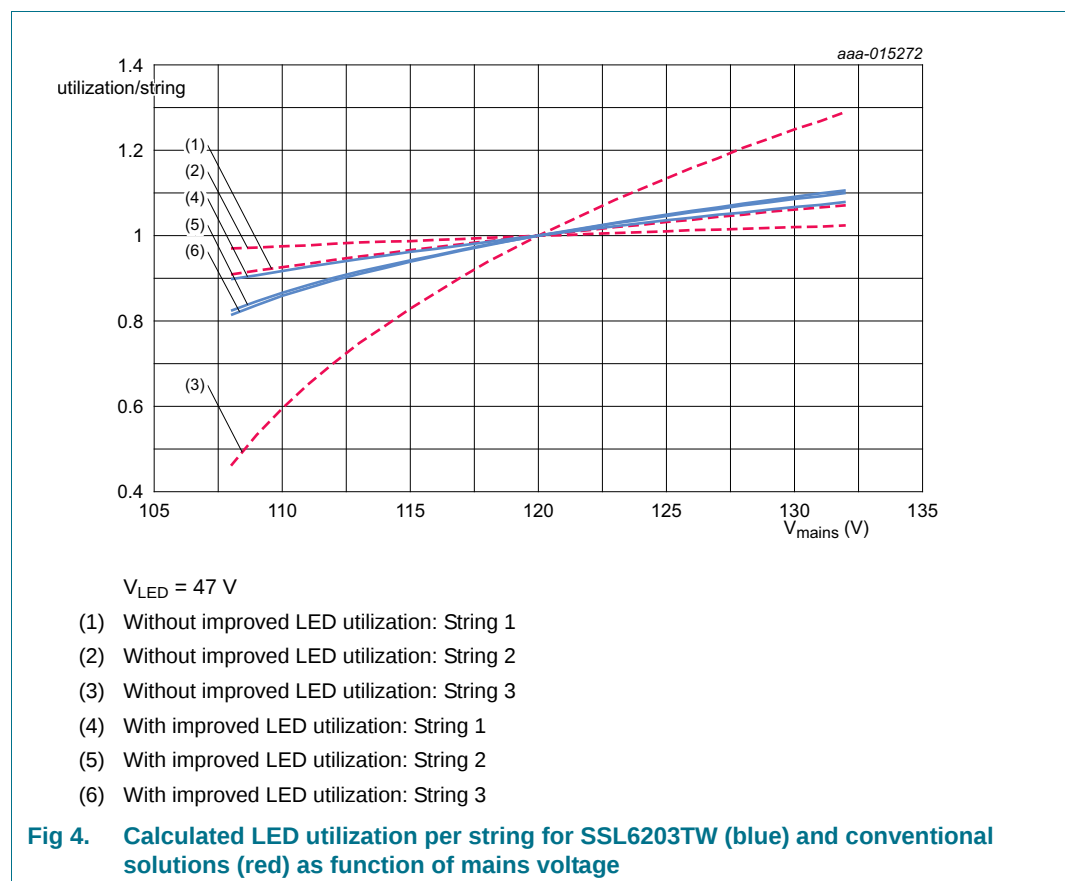
In normal operation, the number of series connected LED strings is selected according to the available RECT voltage. This selection maximizes the efficiency and minimizes the dissipation in the HVLCS.

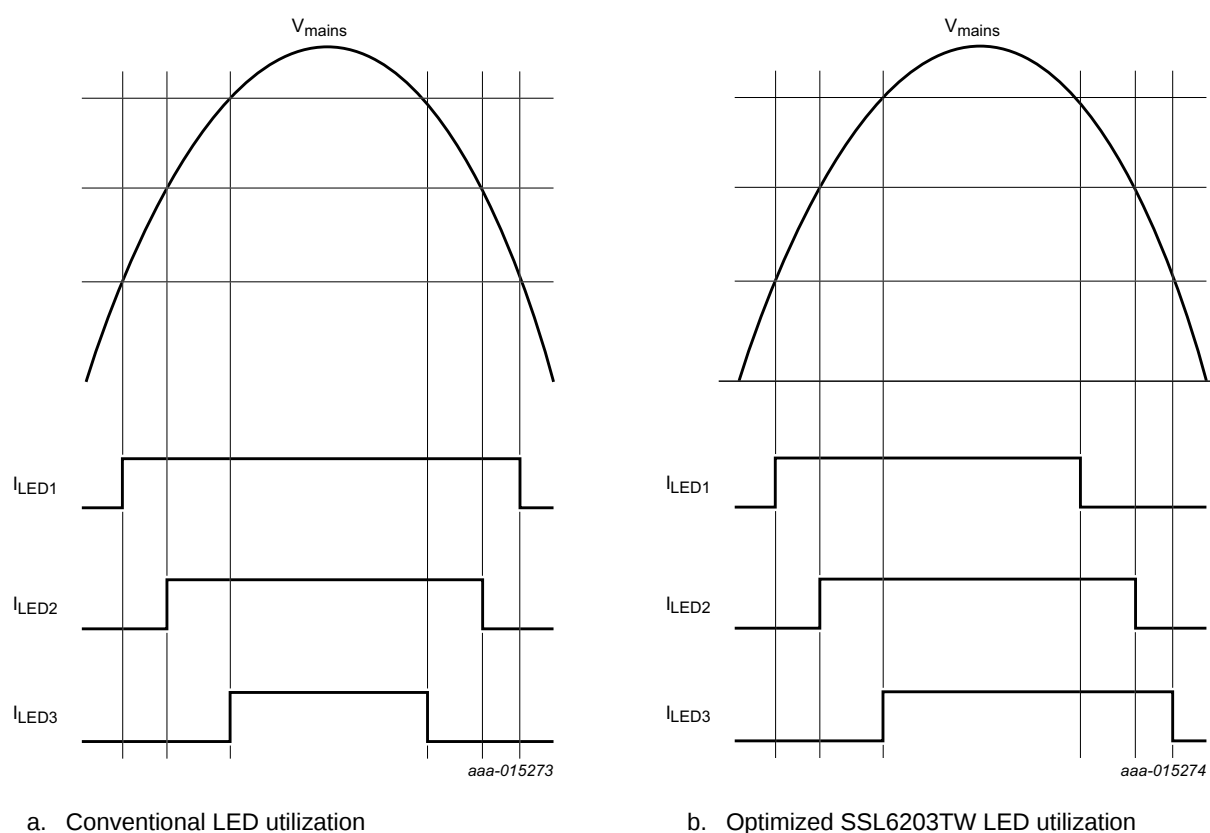
Adding a series resistor to the STR1B, STR2B, and STR3B paths can further reduce the IC dissipation. The SSL6203TW prioritizes the HVLCS current through these paths so that dissipation takes place in the external resistors rather than in the IC. The remaining current flows into the STR1A, STR2A, and STR3A branches so that the total string current matches the LED current setting.

## 7.6 LED utility enhancement

The SSL6203TW optimizes the LED string switching pattern ensuring that at full power the average current of all the LED strings is almost identical. The optimization causes all LEDs to be used at maximum performance. [Figure 4](#) shows the calculated normalized LED utilization per string for the SSL6203TW versus the average utilization per string in conventional solutions.

If insufficient voltage is available to operate the IC and three high-voltage LEDs, the conventional LED utilization scheme is used (see [Figure 5](#)).



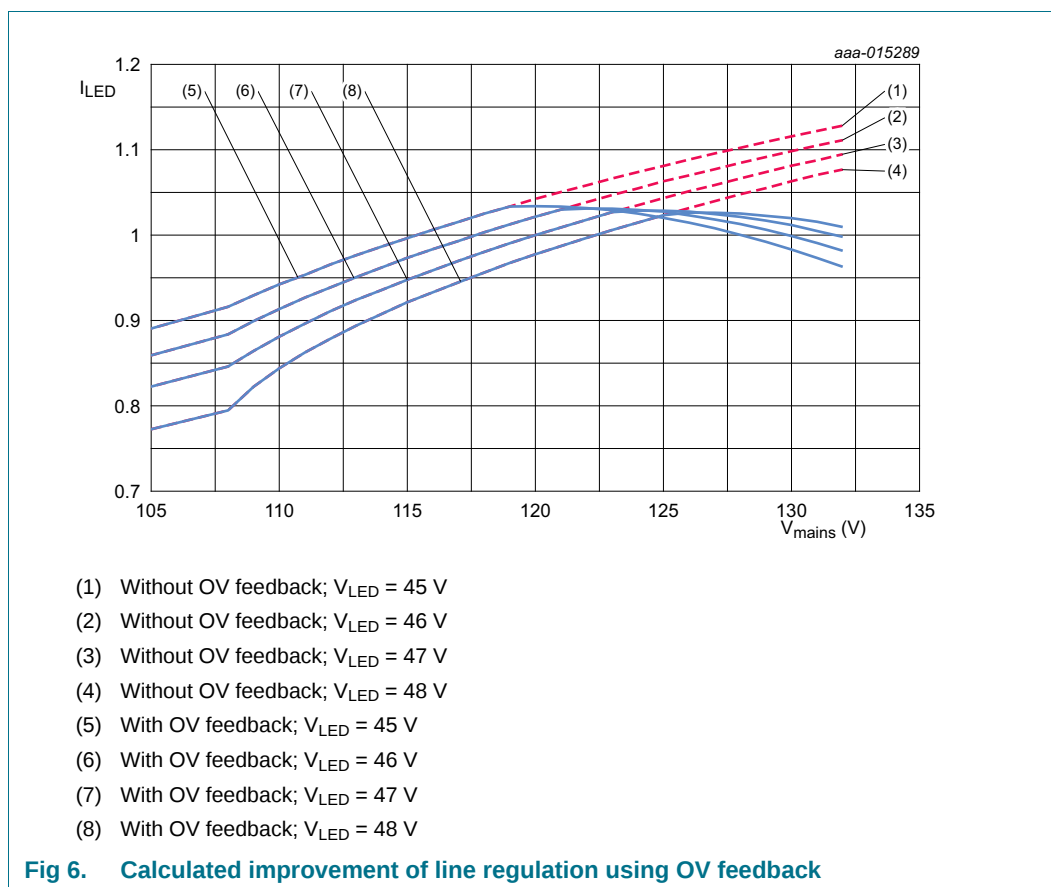


**Fig 5. Comparison of conventional and SSL6203TW LED utilization**

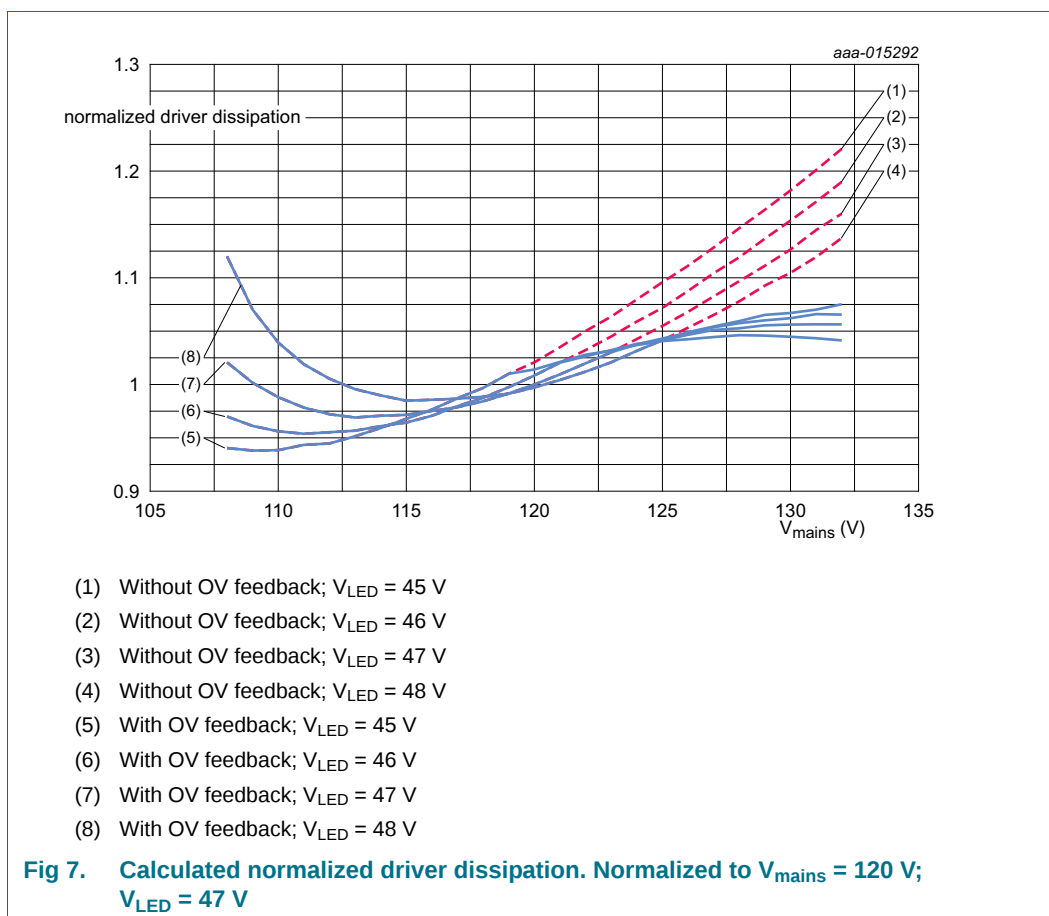
## 7.7 Line/load regulation

A linear LED driver is sensitive to line and load variations as they affect the on-time of the LEDs (which influences the emitted light) and the dissipation in the IC. To get a more stable line/load regulation and a more constant IC dissipation, negative feedback is available through the OV pin. The feedback reduces the LED current as the mains current voltage increases, stabilizing the IC dissipation. Zener diode ZOV and resistor ROV (see [Figure 3](#)) can set the starting point and the sensitivity of the feedback.

[Figure 6](#) shows the calculated effect of this feedback and with resulting line/load regulation.



The OV feedback also limits the driver dissipation at higher mains voltages. [Figure 7](#) shows the effect.



## 7.8 OverTemperature Protection (OTP)

The OTP is triggered when the die temperature reaches the  $T_{\text{th(act)otp}}$  level. In that case, the IC changes to protection mode and the currents through the high-voltage current sources (both the LED and bleeder) are switched off. If the die temperature drops to below  $T_{\text{th(rel)otp}}$ , normal operation is resumed.

## 7.9 Open LED Protection (OLP)

If an LED string is open, the differential string voltage continues to rise. To protect the external buffer capacitor, an overvoltage threshold  $V_{\text{olp}}$  has been created. When the string voltage exceeds  $V_{\text{olp}}$ , the IC enters the protection mode and the LED current is stopped, preventing further charging of the capacitor and destructive failure.

## 8. LED selection

### 8.1 Introduction

The SSL6203TW is designed to drive three LED strings in a 120 V (AC) mains application. For a proper operation of the application, it is important to select suitable LEDs. Below some guidelines are given. Detailed information can be found in the *SSL6203TW Application Note*.

### 8.2 LED voltage rating

Suitable LEDs for use in an SSL6203TW application are 48 V high-voltage LEDs. A series connection of lower voltage LEDs, which sum up to about the same voltage level is also possible. Some considerations for selecting the LED voltage:

- When 10 % mains voltage variation is assumed the minimum peak voltage of the mains in a 120 V (AC) system equals:  $0.9 \times 120 \times \sqrt{2} = 152.7 \text{ V}$
- The bridge rectifier and the surge resistor have some voltage drop (see [Figure 3](#))
- Voltage drop on series diodes D1, D2, and D3
- Voltage head room required for the SSL6203TW LED current source. For proper operation of the high-side switches the IC must have 14 V on the internal LED current source
- LED voltage at its operating temperature

The remaining voltage must be high enough to accommodate three LED string voltages. The SSL6203TW incorporates an integrated Open LED Protection (OLP). The voltage of the selected LED must be lower than the  $V_{olpx}$  level (See [Section 12](#)).

### 8.3 LED current rating

The maximum LED string current of the SSL6203TW can be set using the LED pin current biasing. The maximum set LED string current must be 120 mA or less. The selected LEDs must be able to handle the set LED string current. It is possible to place LEDs in parallel to divide the total string current over more LEDs.

## 9. Limiting values

**Table 3. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol          | Parameter                  | Conditions                        | Min  | Max      | Unit    |
|-----------------|----------------------------|-----------------------------------|------|----------|---------|
| <b>Voltages</b> |                            |                                   |      |          |         |
| $V_{I(RECT)}$   | input voltage on pin RECT  |                                   | -0.4 | +200     | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{I(STR1A)}$  | input voltage on pin STR1A |                                   | -0.4 | +200 V   | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{I(STR1B)}$  | input voltage on pin STR1B |                                   | -0.4 | +200     | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{I(STR2A)}$  | input voltage on pin STR2A |                                   | -0.4 | +200     | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{I(STR2B)}$  | input voltage on pin STR2B |                                   | -0.4 | +200     | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{I(STR3A)}$  | input voltage on pin STR3A |                                   | -0.4 | +200     | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{I(STR3B)}$  | input voltage on pin STR3B |                                   | -0.4 | +200     | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{I(OV)}$     | input voltage on pin OV    |                                   | -0.4 | +200     | V       |
|                 |                            | transient mains voltage; < 100 ms | -0.4 | +330     | V       |
| $V_{DD}$        | supply voltage             |                                   | -0.4 | +15      | V       |
| $V_{I(LED)}$    | input voltage on pin LED   |                                   | -0.4 | $V_{DD}$ | V       |
| $V_{I(BLEED)}$  | Bleeder ref. current input |                                   | -0.4 | $V_{DD}$ | V       |
| $V_{LGND}$      | voltage on pin LGND        |                                   | -0.4 | +0.4     | V       |
| <b>Currents</b> |                            |                                   |      |          |         |
| $I_{I(RECT)}$   | input current on pin RECT  |                                   | -    | 120      | mA      |
| $I_{I(STR1A)}$  | input current on pin STR1A |                                   | -120 | +120     | mA      |
| $I_{I(STR1B)}$  | input current on pin STR1B |                                   | -    | 120      | mA      |
| $I_{I(STR2A)}$  | input current on pin STR2A |                                   | -120 | +120     | mA      |
| $I_{I(STR2B)}$  | input current on pin STR2B |                                   | -    | 120      | mA      |
| $I_{I(STR3A)}$  | input current on pin STR3A |                                   | -    | 120      | mA      |
| $I_{I(STR3B)}$  | input current on pin STR3B |                                   | -    | 120      | mA      |
| $I_{I(OV)}$     | input current on pin OV    |                                   | -    | 1        | mA      |
| $I_{I(BLEED)}$  | input current on pin BLEED |                                   | -    | 30       | $\mu$ A |
| $I_{I(LED)}$    | input current on pin LED   |                                   | -    | 105      | $\mu$ A |

**Table 3. Limiting values ...continued**

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol         | Parameter                       | Conditions                                                  | Min  | Max  | Unit |
|----------------|---------------------------------|-------------------------------------------------------------|------|------|------|
| <b>General</b> |                                 |                                                             |      |      |      |
| $T_j$          | junction temperature            | normal operation to the maximum junction temperature        | -40  | +125 | °C   |
| $T_{stg}$      | storage temperature             |                                                             | -55  | +150 | °C   |
| $V_{ESD}$      | electrostatic discharge voltage | Human Body Model (HBM) <a href="#">[1]</a>                  |      |      |      |
|                |                                 | pins RECT, STR1A, STR1B, STR2A, STR2B, STR3A, STR3B, OV     | -800 | +800 | V    |
|                |                                 | all other pins                                              | -2   | +2   | kV   |
|                |                                 | Charged Device Model (CDM): <a href="#">[2]</a><br>all pins | -500 | +500 | V    |

[1] HBM: Equivalent to discharging a 100 pF capacitor through a 1.5 k $\Omega$  series resistor.[2] CDM: Equivalent to charging the IC and the subsequent discharging of each pin down to 0 V over a 1  $\Omega$  resistor.

## 10. Recommended operating conditions

**Table 4. Operating conditions**

| Symbol         | Parameter                    | Conditions | Min | Max | Unit    |
|----------------|------------------------------|------------|-----|-----|---------|
| $I_{I(LED)}$   | input current on pin LED     |            | -   | 105 | $\mu$ A |
| $I_{I(BLEED)}$ | input current on pin BLEEDER |            | -   | 30  | $\mu$ A |

## 11. Thermal characteristics

**Table 5. Thermal characteristics**

| Symbol        | Parameter                                | Conditions        | Typ | Unit |
|---------------|------------------------------------------|-------------------|-----|------|
| $R_{th(j-c)}$ | thermal resistance from junction to case | on NXP demo board | 10  | K/W  |

## 12. Characteristics

**Table 6. Characteristics**

$T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $V_{DD} = 14.25\text{ V}$ ; all voltages are measured with respect to ground (pin 3); currents are positive when flowing into the IC; unless otherwise specified.

| Symbol                    | Parameter                                                                              | Conditions                                                                                                                                                           | Min  | Typ   | Max  | Unit |
|---------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|------|------|
| <b>High voltage</b>       |                                                                                        |                                                                                                                                                                      |      |       |      |      |
| $I_{ch(reg)min(RECT)}$    | minimum regulated charge current on pin RECT                                           | $V_{I(RECT)} = 30\text{ V}$ ; $V_{DD} = 11\text{ V}$                                                                                                                 | 8    | -     | -    | mA   |
| $I_{ch(reg)max(RECT)}$    | maximum regulated charge current on pin RECT                                           | $V_{I(RECT)} = 30\text{ V}$ ; $V_{DD} = 0\text{ V}$                                                                                                                  | -    | -     | 16   | mA   |
| <b>Supply</b>             |                                                                                        |                                                                                                                                                                      |      |       |      |      |
| $V_{reg(VDD)}$            | regulation voltage on pin VDD                                                          | $I_{I(VDD)} = -1\text{ mA}$                                                                                                                                          | 13.5 | 14.25 | 15   | V    |
| $V_{DD(start)}$           | start supply voltage                                                                   |                                                                                                                                                                      | 11.3 | 11.9  | 12.5 | V    |
| $V_{DD(stop)}$            | stop supply voltage                                                                    |                                                                                                                                                                      | 9.3  | 9.8   | 10.3 | V    |
| $I_{DD}$                  | supply current                                                                         | normal operation;<br>$I_{I(BLEED)} = 30\text{ }\mu\text{A}$ ;<br>$I_{I(LED)} = 105\text{ }\mu\text{A}$                                                               | 0.5  | 0.8   | 1.1  | mA   |
| $I_{DD(pd)}$              | power-down supply current                                                              | power-down;<br>$V_{I(BLEED)} < V_{th(BLEED)}$ ;<br>$V_{I(LED)} < V_{th(LED)}$                                                                                        | -    | -     | 0.4  | mA   |
| <b>Mains detection</b>    |                                                                                        |                                                                                                                                                                      |      |       |      |      |
| $V_{th(det)RECT(L)}$      | LOW-level detection threshold voltage on pin RECT                                      | falling RECT voltage                                                                                                                                                 | 5.5  | 5.6   | 5.7  | V    |
| $V_{th(det)RECT(H)}$      | HIGH-level detection threshold voltage on pin RECT                                     | rising RECT voltage                                                                                                                                                  | 8.9  | 9.0   | 9.1  | V    |
| <b>Bleeder</b>            |                                                                                        |                                                                                                                                                                      |      |       |      |      |
| $V_{I(BLEED)}$            | input voltage on pin BLEED                                                             | $I_{I(BLEED)} = 30\text{ }\mu\text{A}$                                                                                                                               | 1.65 | 1.75  | 1.85 | V    |
| $V_{th(BLEED)}$           | threshold voltage on pin BLEED                                                         | to enable power-down mode                                                                                                                                            | 500  | -     | -    | mV   |
| $M_{BLEED}$               | ratio between RECT bleeder current variation and $I_{I(BLEED)}$ bias current variation | $\Delta I_{I(BLEED)} = 4\text{ }\mu\text{A}$ around<br>$I_{I(BLEED)} = 28\text{ }\mu\text{A}$ ;<br>$V_{I(RECT)} = 20\text{ V}$                                       | 910  | 1012  | 1114 | -    |
| $I_{bleed(min)}$          | minimum bleeder current                                                                | pin RECT;<br>floating BLEED pin;<br>$V_{I(RECT)} = 20\text{ V}$                                                                                                      | 1.0  | 1.4   | 1.8  | mA   |
| $I_{bleed(startup)}$      | start-up bleeder current                                                               | pin RECT; start-up state;<br>$V_{I(RECT)} = 20\text{ V}$                                                                                                             | 7    | 9     | 11   | mA   |
| <b>LED string current</b> |                                                                                        |                                                                                                                                                                      |      |       |      |      |
| $V_{I(LED)}$              | input voltage on pin LED                                                               | $I_{I(LED)} = 105\text{ }\mu\text{A}$                                                                                                                                | -    | 2.4   | -    | V    |
| $V_{th(LED)}$             | threshold voltage on pin LED                                                           | to enable power-down mode                                                                                                                                            | 500  | -     | -    | mV   |
| $M_{LED}$                 | Ratio between LED string current variation and $I_{LED}$ bias current variation        | $\Delta I_{I(LED)} = 10\text{ }\mu\text{A}$ around<br>$I_{I(LED)} = 100\text{ }\mu\text{A}$ ;<br>$I_{I(OV)} = 0\text{ }\mu\text{A}$ ;<br>$V_{I(STRX)} = 13\text{ V}$ | 945  | 985   | 1025 | -    |
| $I_{string(min)LEDs}$     | minimum string current LEDs                                                            | $V_{I(RECT)} = 20\text{ V}$ ;<br>$V_{I(STR3A)} = 13\text{ V}$ ;<br>$I_{I(LED)} = 0\text{ }\mu\text{A}$ ; $I_{I(OV)} = 0\text{ }\mu\text{A}$                          | 12   | 17    | 23   | mA   |

**Table 6.** Characteristics ...continued

$T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $V_{DD} = 14.25\text{ V}$ ; all voltages are measured with respect to ground (pin 3); currents are positive when flowing into the IC; unless otherwise specified.

| Symbol                           | Parameter                                                   | Conditions                                                                                                | Min   | Typ | Max   | Unit |
|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------|-----|-------|------|
| Start-up state                   |                                                             |                                                                                                           |       |     |       |      |
| I <sub>th(OV)</sub>              | threshold current on pin OV                                 |                                                                                                           | 120   | 160 | 200   | μA   |
| I <sub>string(startup)LEDs</sub> | start-up string current LEDs                                | V <sub>I(RECT)</sub> = 20 V;<br>V <sub>I(STR3A)</sub> = 13 V;<br>I <sub>I(OV)</sub> > I <sub>th(OV)</sub> | 12    | 17  | 23    | mA   |
|                                  |                                                             | V <sub>I(RECT)</sub> = 20 V;<br>V <sub>I(STR3A)</sub> = 13 V;<br>I <sub>I(OV)</sub> < I <sub>th(OV)</sub> | 27    | 34  | 43    | mA   |
| Overvoltage feedback             |                                                             |                                                                                                           |       |     |       |      |
| I <sub>th(OV)</sub>              | OV input current threshold                                  | OV enabled                                                                                                | 120   | 160 | 200   | μA   |
| V <sub>I(OV)</sub>               | input voltage on pin OV                                     | I <sub>I(OV)</sub> = 60 μA; OV enabled                                                                    | <tbd> | 2.8 | <tbd> | V    |
| V <sub>th(OV)</sub>              | threshold voltage on pin OV                                 |                                                                                                           | <tbd> | 1.4 | <tbd> | V    |
| LED string short switches        |                                                             |                                                                                                           |       |     |       |      |
| V <sub>sw(RECT-STR1A)</sub>      | switch voltage from pin RECT to pin STR1A                   | I <sub>I(STR1A)</sub> = −120 mA                                                                           | -     | -   | 5.5   | V    |
| V <sub>sw(RECT-STR2A)</sub>      | switch voltage from pin RECT to pin STR2A                   | I <sub>I(STR2A)</sub> = −120 mA                                                                           | -     | -   | 5.5   | V    |
| Open LED protection              |                                                             |                                                                                                           |       |     |       |      |
| V <sub>olp</sub>                 | open-LED protection voltage                                 | V <sub>I(RECT)</sub> to V <sub>I(STR1A)</sub>                                                             | 57    | 63  | 69    | V    |
|                                  |                                                             | V <sub>I(STR1A)</sub> to V <sub>I(STR2A)</sub>                                                            | 57    | 63  | 69    | V    |
|                                  |                                                             | V <sub>I(STR2A)</sub> to V <sub>I(STR3A)</sub>                                                            | 57    | 63  | 69    | V    |
| Temperature protection           |                                                             |                                                                                                           |       |     |       |      |
| T <sub>th(act)otp</sub>          | overtemperature protection activation threshold temperature |                                                                                                           | -     | 170 | -     | °C   |
| T <sub>th(rel)otp</sub>          | overtemperature protection release threshold temperature    |                                                                                                           | -     | 120 | -     | °C   |

13. Package outline

HTSSOP20: plastic thermal enhanced thin shrink small outline package; 20 leads;  
body width 4.4 mm; exposed die pad

SOT527-1

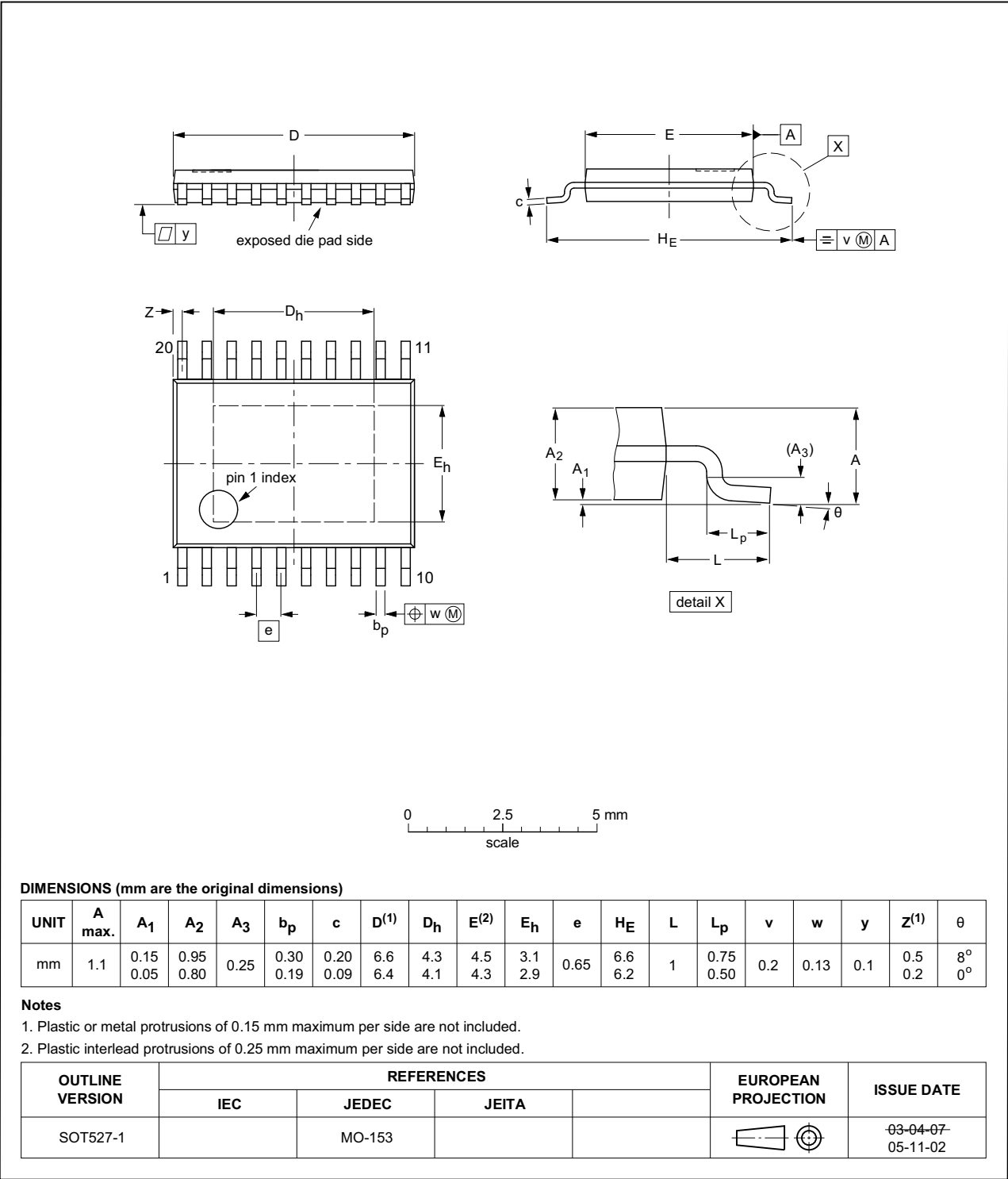


Fig 8. SOT527-1 (HTSSOP20)

## 14. Abbreviations

Table 7. Abbreviations

| Acronym | Description                         |
|---------|-------------------------------------|
| EMI     | ElectroMagnetic Interference        |
| HF      | High Frequency                      |
| HVBCS   | High-Voltage Bleeder Current Source |
| IC      | Integrated Circuit                  |
| HVLCS   | High-Voltage LED Current Source     |
| JFET    | Junction Field Effect Transistor    |
| LED     | Light-Emitting Diode                |
| MOV     | Metal Oxide Varistor                |
| OLP     | Open-LED Protection                 |
| OTP     | OverTemperature Protection          |
| PCB     | Printed-Circuit Board               |
| THD     | Total Harmonic Distortion           |
| TVS     | Transient Voltage Suppressor        |
| UVLO    | UnderVoltage LockOut                |

## 15. Revision history

Table 8. Revision history

| Document ID   | Release date | Data sheet status    | Change notice | Supersedes |
|---------------|--------------|----------------------|---------------|------------|
| SSL6203TW v.1 | 20141103     | Objective data sheet | -             | -          |

## 16. Legal information

### 16.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | Definition                                                                            |
|-----------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet      | Development                   | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet    | Qualification                 | This document contains data from the preliminary specification.                       |
| Product [short] data sheet        | Production                    | This document contains the product specification.                                     |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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## 18. Contents

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