365nm UVC LED

- SMD
  - low, medium & high power
- Chip on Board (COB)
- Light Bars (12x1)

Boston Electronics

www.boselec.com
uv@boselec.com
shop.boselec.com
617.566.3821
365nm UVA LED

Contents

SMD
• medium power - 775 mW, 60 deg.
• high power - 2850 mW, 90 deg.

COB
• medium power
• high power
• 12 x 1 light bar

Driver Board
• UPS Driver
VS5252C45L6-365 Mid Power UVA LED SMD

**VS5252C45L6-365** is a UV LED Surface Mount Device (SMD) offering UV radiation at a peak wavelength of 365±5nm. Each SMD is structured based on the patented 3-PAD LED Flip Chip and unique low temperature bonding technologies to further boost lighting efficiency and decrease the thermal resistance. The VS5252C45L6 series is packaged in a single-chip structure equipped with a 60° lens for mid power UV output.

**FEATURES & BENEFITS**

- Optical output up to 800mW
- Dimensions: 5.2x5.2mm
- Equipped with 60° fused silica lens
- Ideal for mid power applications

**THE VIOLUMAS DIFFERENCE**

- 3-PAD flip chip structure
- Lowest thermal resistance at 0.9°C/W
- Minimal thermal decay with higher output
- Industry-leading reliability & lifetime
### Electro-Optical Characteristics at $T=25^\circ C$ and $I_F = 700mA$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Unit</th>
<th>Min</th>
<th>Typical</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Wavelength</td>
<td>$\lambda_y$</td>
<td>nm</td>
<td>360</td>
<td>365</td>
<td>370</td>
</tr>
<tr>
<td>Forward Voltage</td>
<td>$V_F$</td>
<td>V</td>
<td>-</td>
<td>4.1</td>
<td>-</td>
</tr>
<tr>
<td>Radiant Flux</td>
<td>$P_O$</td>
<td>mW</td>
<td>750</td>
<td>775</td>
<td>800</td>
</tr>
<tr>
<td>Full Width of Half Magnitude</td>
<td>$\Delta \lambda$</td>
<td>nm</td>
<td>-</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Radiant Angle</td>
<td>$2\Phi_{1/2}$</td>
<td>Degree</td>
<td>-</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Solder Joint</td>
<td>$R_{th}(J-S)$</td>
<td>°C/W</td>
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<td>0.9</td>
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</tr>
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### Absolute Maximum Ratings

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<th>Parameter</th>
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<td>1000</td>
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<tr>
<td>Reverse Voltage</td>
<td>$V_R$</td>
<td>V</td>
<td>5</td>
</tr>
<tr>
<td>Power</td>
<td>$P_O$</td>
<td>W</td>
<td>4.2</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_J$</td>
<td>°C</td>
<td>115</td>
</tr>
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### Reliability

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<td>$I_F = 350mA, T=25^\circ C$</td>
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</table>
Mid Power UVA LED SMD

Violumas

Mechanical Dimensions

Top View

Side View

Bottom View

Optical Reference

R2.00

Anode

Pillar

Cathode

Radiation Pattern

www.boselec.com | uv@boselec.com | shop.boselec.com | 617.566.3821
Soldering Guidelines

Recommended MCPCB

Violumas recommends the use of the Pillar MCPCB with Violumas LEDs for maximum performance and reliability. The data presented in this document is measured from the use of exclusive Flip Chip Opto patented products - the 3-PAD LED Flip Chip and the Pillar MCPCB. Please consult the Violumas engineering team for further recommendations on MCPCB options.

Handling & Usage Precautions

- Exhibit extreme care when handling LEDs. Do not touch the LED with bare hands as doing so may contaminate and affect the optical characteristics of the LED. When using tweezers, do not apply excessive force, especially to the glass lens. Do not drop the LED as doing so may cause product damage.
- Ensure that electrostatic discharge specifications are followed. Static electricity and surge voltages may cause product damage. Proper electrostatic discharge protection equipment, working machinery, and protected mounting equipment are recommended.
- Do not expose the LEDs to volatile organic compounds as well as hazardous, acidic, and corrosive substances during storage and operation to avoid product damage.
- Do not apply excess mechanical force and vibration while handling the product.
- Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.
- Ensure that the PCB is suitable for the product and be wary of LED placement and possible PCB warpage.
Storage Precautions

- Perform soldering as soon as the moisture-proof packaging is opened.
- After the storage duration has exceeded the recommended time, products may need to be baked before soldering.
- Store all products in a controlled environment under 30°C free of dust. Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.
- Please consult the Violumas engineering team for further information on storage precautions.

Eye Safety Precautions

- Avoid exposure to UV light during LED operation. Do not look directly into the UV light during LED operation. Do not look directly into the UV light during optical measurements even through optical instruments. Protect the body, skin, and eyes with UV protective equipment.
- Attach warning labels on all products and systems that use UV LEDs.

Cleaning Precautions

- Do not use brushes or organic solvents for cleaning the LEDs.
- Perform electrical and optical measurements before and after cleaning to ensure optimal performance.

Static Electricity Precautions

- Ensure that equipment and machinery are properly grounded.
- Anti-electrostatic attire (wristbands, gloves, footwear, etc.) is recommended.
- Damage inspection is recommended while performing characteristics inspection of LEDs.

Disclaimers

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VS7272C45L9-365 High Power UVA LED SMD

VS7272C45L9-365 is a UV LED Surface Mount Device (SMD) offering UV radiation at a peak wavelength of 365±5nm. Each SMD is structured based on the patented 3-PAD LED Flip Chip and unique low temperature bonding technologies to further boost lighting efficiency and decrease the thermal resistance. The VS7272C45L9 series is packaged in a single-chip structure equipped with a 90° lens for high power UV output.

FEATURES & BENEFITS

• Optical output up to 3100mW
• Dimensions: 7.2x7.2mm
• Equipped with 90° fused silica lens
• Ideal for high power applications

THE VIOLUMAS DIFFERENCE

• 3-PAD flip chip structure
• Lowest thermal resistance at 0.2°C/W
• Minimal thermal decay with higher output
• Industry-leading reliability & lifetime
Electro-Optical Characteristics at T=25°C and I_F = 1400mA

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<tr>
<td>Forward Voltage</td>
<td>( V_F )</td>
<td>V</td>
<td>-</td>
<td>8.2</td>
<td>-</td>
</tr>
<tr>
<td>Radiant Flux</td>
<td>( P_o )</td>
<td>mW</td>
<td>2600</td>
<td>2850</td>
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<td>Radiant Angle</td>
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<td>90</td>
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<td>-</td>
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Absolute Maximum Ratings

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<td>2000</td>
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<td>Reverse Voltage</td>
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<td>W</td>
<td>16.8</td>
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<td>( T_j )</td>
<td>°C</td>
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</tr>
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Reliability

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Handling & Usage Precautions

- Exhibit extreme care when handling LEDs. Do not touch the LED with bare hands as doing so may contaminate and affect the optical characteristics of the LED. When using tweezers, do not apply excessive force, especially to the glass lens. Do not drop the LED as doing so may cause product damage.
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- Do not expose the LEDs to volatile organic compounds as well as hazardous, acidic, and corrosive substances during storage and operation to avoid product damage.
- Do not apply excess mechanical force and vibration while handling the product.
- Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.
- Ensure that the PCB is suitable for the product and be wary of LED placement and possible PCB warpage.

Recommended MCPCB

Violumas recommends the use of the Pillar MCPCB with Violumas LEDs for maximum performance and reliability. The data presented in this document is measured from the use of exclusive Flip Chip Opto patented products - the 3-PAD LED Flip Chip and the Pillar MCPCB. Please consult the Violumas engineering team for further recommendations on MCPCB options.
Storage Precautions

- Perform soldering as soon as the moisture-proof packaging is opened.
- After the storage duration has exceeded the recommended time, products may need to be baked before soldering.
- Store all products in a controlled environment under 30°C free of dust. Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.
- Please consult the Violumas engineering team for further information on storage precautions.

Eye Safety Precautions

- Avoid exposure to UV light during LED operation. Do not look directly into the UV light during LED operation. Do not look directly into the UV light during optical measurements even through optical instruments. Protect the body, skin, and eyes with UV protective equipment.
- Attach warning labels on all products and systems that use UV LEDs.

Cleaning Precautions

- Do not use brushes or organic solvents for cleaning the LEDs.
- Perform electrical and optical measurements before and after cleaning to ensure optimal performance.

Static Electricity Precautions

- Ensure that equipment and machinery are properly grounded.
- Anti-electrostatic attire (wristbands, gloves, footwear, etc.) is recommended.
- Damage inspection is recommended while performing characteristics inspection of LEDs.

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VC1X1C45L6-365 is a UV LED Chip on Board (COB) module offering UV radiation at a peak wavelength of 365±5nm. Each COB is structured based on the patented 3-PAD LED Flip Chip mounted directly onto the Super Pillar MCPCB to further boost output efficiency and decrease the thermal resistance. The VC1X1C45L6 series is ready for plug and play with no soldering required and is equipped with a 60° lens for mid power UV output.

FEATURES & BENEFITS

- Dimensions: 15x15x3.0mm
- Ready for plug and play (solder-free)
- Equipped with 60° fused silica lens
- TVS built in for ESD protection

THE VIOLUMAS DIFFERENCE

- 3-PAD flip chip structure
- Lowest thermal resistance at 0.9°C/W
- Minimal thermal decay with higher output
- Industry-leading reliability & lifetime
### Electro-Optical Characteristics at T=25°C and $I_F = 700$mA

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<td>$I_F = 350$mA, $T=25°C$</td>
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</tbody>
</table>
Product Overview

COB modules are ready for plug and play with no soldering required. All Violumas COBs are equipped with connectors for direct wiring and TVS protection against ESD and voltage issues.

60° Fused Silica Lens

3-PAD Flip Chip

TVS Protection

Super Pillar MCPCB

Radiation Pattern
Handling & Usage Precautions

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• Do not apply excess mechanical force and vibration while handling the product.
• Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.
• Ensure that the PCB is suitable for the product and be wary of LED placement and possible PCB warpage.

Storage Precautions

• Perform soldering as soon as the moisture-proof packaging is opened.
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Cleaning Precautions

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VC2X2C45L9-365 High Power UVA LED COB

VC2X2C45L9-365 is a UV LED Chip on Board (COB) module offering UV radiation at a peak wavelength of 365±5nm. Each COB is structured based on the patented 3-PAD LED Flip Chip mounted directly onto the Super Pillar MCPCB to further boost output efficiency and decrease the thermal resistance. The VC2X2C45L9 series is ready for plug and play with no soldering required and is equipped with a 90° lens for high power UV output.

FEATURES & BENEFITS

- Dimensions: 20x20x4.9mm
- Ready for plug and play (solder-free)
- Equipped with 90° fused silica lens
- TVS built in for ESD protection

THE VIOLUMAS DIFFERENCE

- 3-PAD flip chip structure
- Lowest thermal resistance at 0.2°C/W
- Minimal thermal decay with higher output
- Industry-leading reliability & lifetime
### Electro-Optical Characteristics at T=25°C and I_F = 1400mA

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Product Overview

COB modules are ready for plug and play with no soldering required. All Violumas COBs are equipped with connectors for direct wiring and TVS protection against ESD and voltage issues.
Spectral Output

Forward Current vs. Relative Radiant Flux

Forward Voltage vs. Forward Current
Handling & Usage Precautions

• Exhibit extreme care when handling LEDs. Do not touch the LED with bare hands as doing so may contaminate and affect the optical characteristics of the LED. When using tweezers, do not apply excessive force, especially to the glass lens. Do not drop the LED as doing so may cause product damage.

• Ensure that electrostatic discharge specifications are followed. Static electricity and surge voltages may cause product damage. Proper electrostatic discharge protection equipment, working machinery, and protected mounting equipment are recommended.

• Do not expose the LEDs to volatile organic compounds as well as hazardous, acidic, and corrosive substances during storage and operation to avoid product damage.

• Do not apply excess mechanical force and vibration while handling the product.

• Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.

• Ensure that the PCB is suitable for the product and be wary of LED placement and possible PCB warpage.

Storage Precautions

• Perform soldering as soon as the moisture-proof packaging is opened.

• After the storage duration has exceeded the recommended time, products may need to be baked before soldering.

• Store all products in a controlled environment under 30°C free of dust. Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.

• Please consult the Violumas engineering team for further information on storage precautions.

Eye Safety Precautions

• Avoid exposure to UV light during LED operation. Do not look directly into the UV light during LED operation. Do not look directly into the UV light during optical measurements even through optical instruments. Protect the body, skin, and eyes with UV protective equipment.

• Attach warning labels on all products and systems that use UV LEDs.

Cleaning Precautions

• Do not use brushes or organic solvents for cleaning the LEDs.

• Perform electrical and optical measurements before and after cleaning to ensure optimal performance.

Static Electricity Precautions

• Ensure that equipment and machinery are properly grounded.

• Anti-electrostatic attire (wristbands, gloves, footwear, etc.) is recommended.

• Damage inspection is recommended while performing characteristics inspection of LEDs.

Disclaimers

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VC12X1C45/48  UV LED Light Bar COB

VC12X1C45/48 is UV LED Light Bar Chip on Board (COB) module with 12 chips bonded in a linear structure. Each COB is structured based on the patented 3-PAD LED Flip Chip mounted directly onto the Super Pillar MCPCB to further boost output efficiency and decrease the thermal resistance. The VC12X1C45/48 series is ready for plug and play with no soldering required and is equipped with a 60° lens.

FEATURES & BENEFITS

- Dimensions: 304mm x20mm
- Ready for plug and play (solder-free)
- Equipped with 60° fused silica lens
- TVS built in for ESD protection

THE VIOLUMAS DIFFERENCE

- 3-PAD flip chip structure
- Lowest thermal resistance at 0.11°C/W
- Minimal thermal decay with higher output
- Industry-leading reliability & lifetime
Electro-Optical Characteristics for UVA (T=25°C and $I_F = 700mA$)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Wavelength</th>
<th>Typ. Output</th>
<th>Forward Voltage</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC12X1C45L6-405</td>
<td>405nm</td>
<td>12W</td>
<td>43.5V</td>
<td>30.5W</td>
</tr>
<tr>
<td>VC12X1C45L6-395</td>
<td>395nm</td>
<td>13W</td>
<td>43.5V</td>
<td>30.2W</td>
</tr>
<tr>
<td>VC12X1C45L6-385</td>
<td>385nm</td>
<td>12W</td>
<td>43.5V</td>
<td>30.2W</td>
</tr>
<tr>
<td>VC12X1C45L6-375</td>
<td>375nm</td>
<td>9W</td>
<td>43.5V</td>
<td>30.2W</td>
</tr>
<tr>
<td>VC12X1C45L6-365</td>
<td>365nm</td>
<td>6W</td>
<td>46.8V</td>
<td>30.8W</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings for UVA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Current</td>
<td>$I_F$</td>
<td>mA</td>
<td>1000</td>
</tr>
<tr>
<td>Reverse Voltage</td>
<td>$V_R$</td>
<td>V</td>
<td>60</td>
</tr>
<tr>
<td>Power</td>
<td>$P_O$</td>
<td>W</td>
<td>48.0</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_J$</td>
<td>°C</td>
<td>115</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>$T_{OPR}$</td>
<td>°C</td>
<td>-30 ~ 80</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{STG}$</td>
<td>°C</td>
<td>-40 ~ 100</td>
</tr>
</tbody>
</table>

Reliability

<table>
<thead>
<tr>
<th>Test</th>
<th>Condition</th>
<th>Test Duration</th>
<th>Test Failed/Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Shock</td>
<td>-45°C ~ 125°C</td>
<td>2000 Cycles</td>
<td>0/10</td>
</tr>
</tbody>
</table>
Electro-Optical Characteristics for UVC (T=25°C and Iᵢₚ =1400mA)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Wavelength</th>
<th>Typ. Output</th>
<th>Forward Voltage</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC12X1C48L6-310</td>
<td>310nm</td>
<td>0.6W</td>
<td>36.0V</td>
<td>50.4W</td>
</tr>
<tr>
<td>VC12X1C48L6-275</td>
<td>275nm</td>
<td>0.6W</td>
<td>39.6V</td>
<td>55.4W</td>
</tr>
<tr>
<td>VC12X1C48L6-265</td>
<td>265nm</td>
<td>0.5W</td>
<td>38.4V</td>
<td>53.8W</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings for UVB & UVC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Current</td>
<td>Iᵢₚ</td>
<td>mA</td>
<td>2000</td>
</tr>
<tr>
<td>Reverse Voltage</td>
<td>Vᵣ</td>
<td>V</td>
<td>30</td>
</tr>
<tr>
<td>Power</td>
<td>Pₒ</td>
<td>W</td>
<td>84</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>Tₗ</td>
<td>°C</td>
<td>115</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>Tᵢₒₚ</td>
<td>°C</td>
<td>-30 ~ 80</td>
</tr>
<tr>
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<td>Tᵢₒₜ</td>
<td>°C</td>
<td>-40 ~ 100</td>
</tr>
</tbody>
</table>

Reliability

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<th>Condition</th>
<th>Test Duration</th>
<th>Test Failed/Tested</th>
</tr>
</thead>
<tbody>
<tr>
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<td>-45°C ~ 125°C</td>
<td>2000 Cycles</td>
<td>0/10</td>
</tr>
</tbody>
</table>
Product Overview

COB modules are ready for plug and play with no soldering required. All Violumas COBs are equipped with connectors for direct wiring and TVS protection against ESD and voltage issues.

When driving at higher currents for extended periods of time, Violumas 3-PAD chips exhibit less thermal decay, allowing for more UV intensity than conventional chips at the same driving current.

The specialized chip architecture works with the Pillar MCPCB to redirect the heat away module, minimizing the need for large heat sinks.
Handling & Usage Precautions

- Exhibit extreme care when handling LEDs. Do not touch the LED with bare hands as doing so may contaminate and affect the optical characteristics of the LED. When using tweezers, do not apply excessive force, especially to the glass lens. Do not drop the LED as doing so may cause product damage.
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The Boston Electronics Universal Photon Source (UPS) Driver delivers! It is a flexible, compact, low cost, configurable board, including power supply, that drives a **WIDE** range of light sources. The driver can control pulsed and CW sources, which makes it suitable for driving ultraviolet (UV), visible and infrared (IR) sources, light emitting diodes (LEDs) and lasers over a frequency range of MHz to DC.

Control is provided by easy to use PC software. The last used drive parameters are stored in the non-volatile EEPROM memory; thus, the configuration is remembered. The UPS Driver is equipped with voltage and current monitors, trigger output, power and communication inputs and anode/cathode connections for the sources.

**The UPS Driver is compatible with UV, visible and IR sources, LEDs and lasers.**
UPS Driver Specifications

Electrical parameters:

- Power supply: - USB from computer or +5 ... +6 V, connected to the DC Jack connector
- Average power delivered to connected source
  - max. 1.5W, for the power supply from USB
  - max. 10W, for the power supply connected to the DC Jack connector
- Adjustable output voltage supply, in the range 0.5 – 25V, 4095 steps
- Maximum current: 10 A (tested with QCL at 20 V and 100 ns pulse width)
- Monitor for the supply voltage source (ADC)
- Master clock period / frequency:
  - main clock period / frequency
    25 ns / 20 MHz
    50 ns / 10 MHz
    100 ns / 5 MHz
    200 ns / 2.5 MHz
    1600 ns / 0.312 MHz
    6.4 μs / 78 kHz
    25.6 μs / 19.5 kHz
  - output signal max. period / min. frequency
    1.638 ms / 610 Hz
    3.27 ms / 305 Hz
    6.55 ms / 152 Hz
    13.1 ms / 76.3 Hz
    104 ms / 9.54 Hz
    420 ms / 2.38 Hz
    1.677 s / 0.594 Hz
- Pulse repetition period - adjustable in the range 1 ... 65535 times the period of the master clock
- Pulse duration - adjustable in the range 1 ... 65535 times the period of the master clock
  - if pulse duration is higher than the period, source stays on – CW operation
- Driving signal rise / fall times < 3 ns.
- Pulse jitter: 6 ns pp
- Trigger output starts 50 ns before the IR pulse
  - adjustable duration time in the range 1 ... 65535 times the period of the master clock
- Power supply monitor
- Source average current monitor - time constant 100 ms
- All parameters have their equivalent – minimum/maximum to provide for safe operation
- Anode of the source is connected to ground, cathode below ground potential

Software

- The UPS Driver is configured using PC software, or text protocols.

Connections:

- trigger output—SMA connector
  - output impedance 50 Ω
  - standard LV TTL: logic 0 - 0 V, logic 1 – 3.3 V @ Hi-imp, 1.65 V @ 50 Ω
- output current monitor—SMA connector
  - DC offset ~ 100 mV @ 50 Ω
  - current sensitivity 0.1 V/A @ 50 Ω / can be modified
  - 100 MHz BW
- output voltage monitor—SMA connector
  - DC offset ~ 100 mV @ 50 Ω
  - voltage sensitivity 50mV/V @ 50 Ω / can be modified
  - 100 MHz bandwidth
- micro-USB connector
  - communication with PC, virtual COM port
  - power supply, if current consumption of the driver does not exceed 0.5 A (USB 2.0 standard)
- DC power jack 2.5/5.5
  - power supply, if driver requires more than 0.5A (USB 2.0 standard), or if the PC is not used (configuration is restored from the memory)

Size:

- PCB dimensions 60x50x15mm (width x height x depth), including connectors