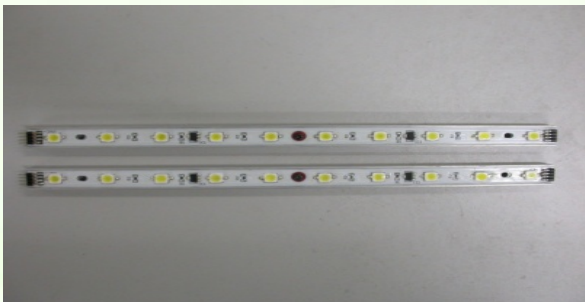




July 27, 2009

LED HARD STRIP (Non-waterproof)

SPECIFICATION



US Patent Pending (US 61/079,042)

cULus listed  US LISTED E321933

RoHS Compliant  

World-class optoelectronic device manufacturing facility since 1969
25 million products manufactured daily
ISO14001 / ISO9001 / TS16949 Certified
White Licensed



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Introduction

VaOpto Light Emitting Diode (LED) Hard Strips Series saves energy and lasts a long life.

Environmentally Conscious

Energy efficient, lead free, and long lasting meaning fewer replacements.

Outstanding Energy Efficiency

Compare to standard light strips, VaOpto LED Hard Strips Series reduces energy consumption by 70%-80%.

Long Life = Labor Savings

Delivers at least 70% of initial light output after at least 50,000 hours.

Various Colors

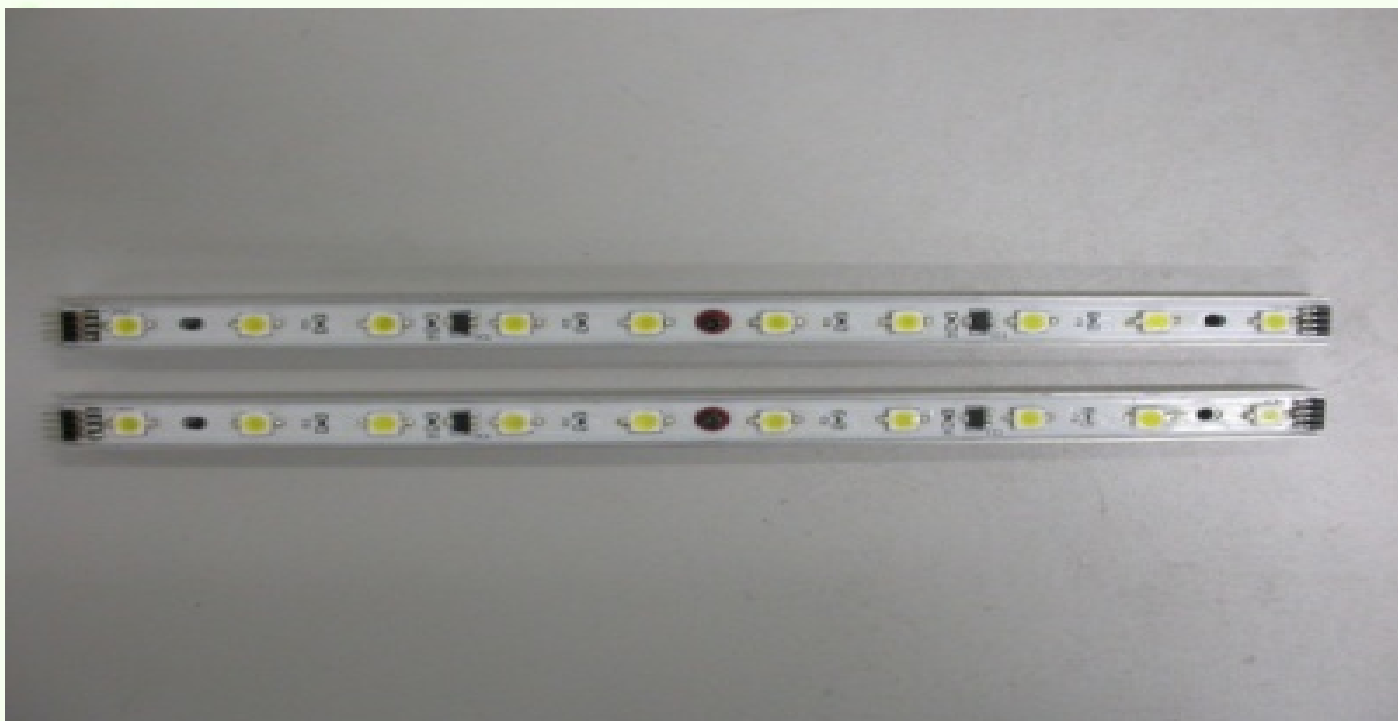
Red/Amber/Yellow/Green/Blue/RGB

Cool White (5000-10000K)

Neutral White (3700-5000K)

Warm White (2600-3700K)

VO-HS-X-12T0/VO-HS-X-24T0 series where X may be: R, Y, G, B, CW, NW, or WW

**Features:**

- Use high brightness 0.5W SMD PLCC-2 LEDs as lighting source
- Even light with 120° viewing angle
- Each strip is 1 ft long
- Convenient connector between two strips
- Up to 4 feet strips (40 LEDs) can be connected
- RoHS compliant

Applications:

- Path & contour marking
- Elegant interior decoration
- Backlighting for large sized ad-signs
- Signal lighting

Optical Parameters at Ta=77 °F (25 °C)

Part Number	Color	Size (mm)	PCB Size (mm)	Lumens (lm)	Wavelength	LED no. per strip	Segment Number	Viewing Angle
VO-HS-R-12T0	Red	300x12x10	300x12x3.2	100	624nm	10 LEDs	1	120
VO-HS-Y-12T0	Yellow	300x12x10	300x12x3.2	100	590nm	10 LEDs	1	120
VO-HS-G-12T0	Green	300x12x10	300x12x3.2	100	515nm	10 LEDs	1	120
VO-HS-B-12T0	Blue	300x12x10	300x12x3.2	50	470nm	10 LEDs	1	120
VO-HS-CW-12T0	Cool White	300x12x10	300x12x3.2	200	5000-10000K	10 LEDs	1	120
VO-HS-NW-12T0	Neutral White	300x12x10	300x12x3.2	180	3700-5000K	10 LEDs	1	120
VO-HS-WW-12T0	Warm White	300x12x10	300x12x3.2	160	2600-3700K	10 LEDs	1	120

Electrical Parameters

Parameters	Symbol	Values	Unit
Operating Voltage	Vopr	12 (+/-5%)	V
Power Dissipation Max.	PD	6	W
Operating Temperature	Topr	-30 - +85 (-22 - +185)	°C (°F)
Storage Temperature	Tstg	-30 - +85 (-22 - +185)	°C (°F)

Optical Parameters at Ta=77 °F (25 °C)

Part Number	Color	Size (mm)	PCB Size (mm)	Lumens (lm)	Wavelength	LED no. per strip	Segment Number	Viewing Angle
VO-HS-R-24T0	Red	300x12x10	300x12x3.2	100	624nm	10 LEDs	1	120
VO-HS-Y-24T0	Yellow	300x12x10	300x12x3.2	100	590nm	10 LEDs	1	120
VO-HS-G-24T0	Green	300x12x10	300x12x3.2	100	515nm	10 LEDs	1	120
VO-HS-B-24T0	Blue	300x12x10	300x12x3.2	50	470nm	10 LEDs	1	120
VO-HS-CW-24T0	Cool White	300x12x10	300x12x3.2	200	5000-10000K	10 LEDs	1	120
VO-HS-NW-24T0	Neutral White	300x12x10	300x12x3.2	180	3700-5000K	10 LEDs	1	120
VO-HS-WW-24T0	Warm White	300x12x10	300x12x3.2	160	2600-3700K	10 LEDs	1	120

Electrical Parameters

Parameters	Symbol	Values	Unit
Operating Voltage	Vopr	24 (+/-5%)	V
Power Dissipation Max.	PD	6	W
Operating Temperature	Topr	-30 - +85 (-22 - +185)	°C (°F)
Storage Temperature	Tstg	-30 - +85 (-22 - +185)	°C (°F)

VO-HS-X-12T2-HL/VO-X-24T2-HL where X may be: R, Y, G, B, CW, NW, or WW; L may be 1, 2, or 3



Features:

- Use high brightness 0.5W SMD PLCC-6 LEDs as lighting source
- Even light with 120° viewing angle
- Convenient connector between two strips
- RoHS compliant

Applications:

- Path and contour marking
- Elegant interior decoration
- Backlighting for large sized ad-signs
- Signal lighting

Product Nomenclature:

Example: VO-HS-xx-xTx-Hx

VO-HS-xx-xTx-Hx
 ① ② ③ ④⑤⑥

Note:

- ①: VAOPTO LED hard strips Series
- ②: Color: CW-Cool white, NW-Neutral White, WW-Warm White, R-Red, G-Green, etc.
- ③: Input voltage: 12V or 24V DC
- ④: Even (0,2,4,6,8): non-waterproof; Odd (1,3,5,7,9): waterproof
- ⑤: H: with Aluminum alloy shell
- ⑥: Products length: 1=1ft, 2=2ft, 3=3ft, 4=4ft, 5=5ft, 6=6ft

Optical Parameters at Ta=77 °F (25 °C)

Part No.	Color	LED Qty. [PCS]	Viewing Angle [°]	Wavelength or Color Temperature	Luminous flux [lm]
VO-HS-CW-12 T 2-H1	Cool white	18	120	5000-10000k	270
VO-HS-CW-12 T 2-H2		36	120		540
VO-HS-CW-12 T 2-H3		54	120		810
VO-HS-NW-12 T 2-H1	Neutral White	18	120	3700-5000k	235
VO-HS-NW-12 T 2-H2		36	120		470
VO-HS-NW-12 T 2-H3		54	120		700
VO-HS-WW-12 T 2-H1	Warm white	18	120	2600-3700k	180
VO-HS-WW-12 T 2-H2		36	120		360
VO-HS-WW-12 T 2-H3		54	120		540
VO-HS-R-12 T 2-H1	Red	18	120	625nm	160
VO-HS-R-12 T 2-H2		36	120		325
VO-HS-R-12 T 2-H3		54	120		485
VO-HS-Y-12 T 2-H1	Yellow	18	120	590nm	160
VO-HS-Y-12 T 2-H2		36	120		325
VO-HS-Y-12 T 2-H3		54	120		485
VO-HS-G-12 T 2-H1	Green	18	120	515nm	235
VO-HS-G-12 T 2-H2		36	120		470
VO-HS-G-12 T 2-H3		54	120		700
VO-HS-B-12 T 2-H1	Blue	18	120	470nm	50
VO-HS-B-12 T 2-H2		36	120		105
VO-HS-B-12 T 2-H3		54	120		160
VO-HS-RGB-12 T 2-H1	Red/Green/Blue	18	120	625/525/470	160/235/50
VO-HS-RGB-12 T 2-H2	Red/Green/Blue	36	120	625/525/470	325/470/105
VO-HS-RGB-12 T 2-H3	Red/Green/Blue	54	120	625/525/470	485/700/160

Electrical Parameters

Parameters	Symbol	Values	Unit
Operating Voltage	Vopr	12 (+/-5%)	V
Power Dissipation Max.	PD	Red/Yellow	2.88
		Green /Blue/Cool White/Neutral White/Warm White	4.32
Operating Temperature	Topr	-30 - +85 (-22 - +185)	°C (°F)
Storage Temperature	Tstg	-30 - +85 (-22 - +185)	°C (°F)

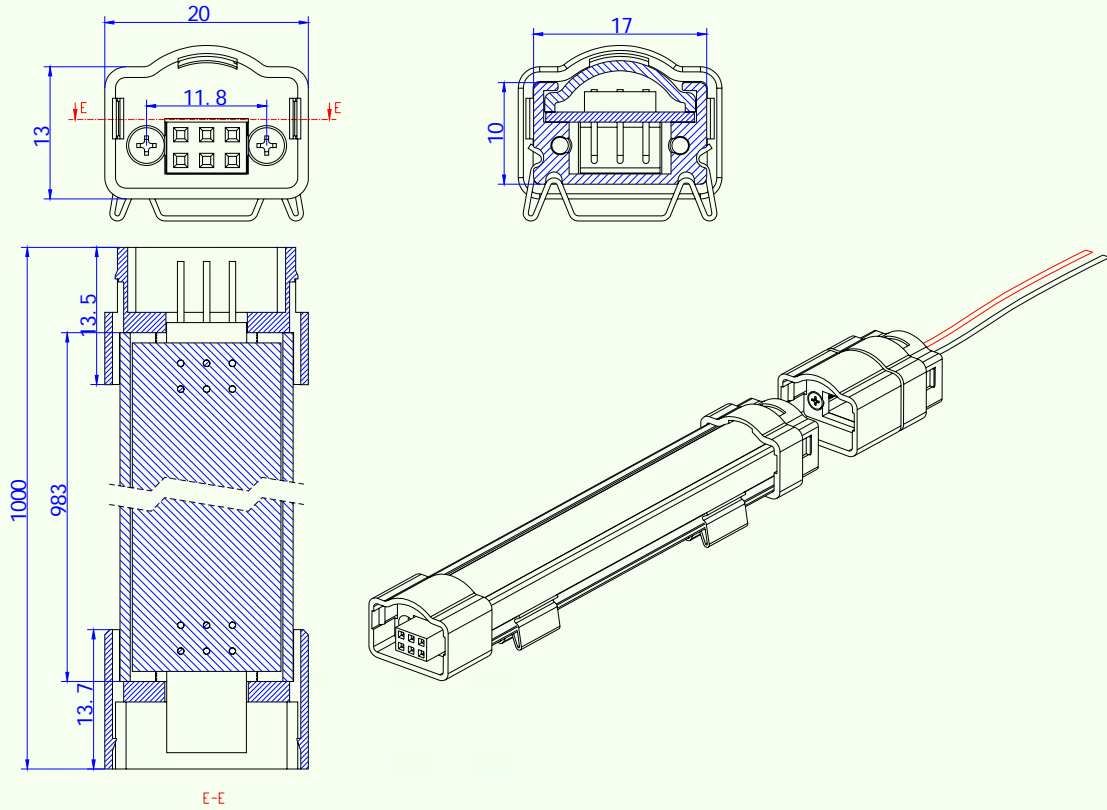
Optical Parameters at Ta=77 °F (25 °C)

Part No.	Color	LED Qty. [PCS]	Viewing Angle [°]	Wavelength or Color Temperature	Luminous flux [lm]
VO-HS-CW-24 T 2-H1	Cool white	18	120	5000-10000k	270
VO-HS-CW-24 T 2-H2		36	120		540
VO-HS-CW-24 T 2-H3		54	120		810
VO-HS-NW-24 T 2-H1	Neutral White	18	120	3700-5000k	235
VO-HS-NW-24 T 2-H2		36	120		470
VO-HS-NW-24 T 2-H3		54	120		700
VO-HS-WW-24 T 2-H1	Warm white	18	120	2600-3700k	180
VO-HS-WW-24 T 2-H2		36	120		360
VO-HS-WW-24 T 2-H3		54	120		540
VO-HS-R-24 T 2-H1	Red	18	120	625nm	160
VO-HS-R-24 T 2-H2		36	120		325
VO-HS-R-24 T 2-H3		54	120		485
VO-HS-Y-24 T 2-H1	Yellow	18	120	590nm	160
VO-HS-Y-24 T 2-H2		36	120		325
VO-HS-Y-24 T 2-H3		54	120		485
VO-HS-G-24 T 2-H1	Green	18	120	515nm	235
VO-HS-G-24 T 2-H2		36	120		470
VO-HS-G-24 T 2-H3		54	120		700
VO-HS-B-24 T 2-H1	Blue	18	120	470nm	50
VO-HS-B-24 T 2-H2		36	120		105
VO-HS-B-24 T 2-H3		54	120		160
VO-HS-RGB-24 T 2-H1	Red/Green/Blue	18	120	625/525/470	160/235/50
VO-HS-RGB-24 T 2-H2	Red/Green/Blue	36	120	625/525/470	325/470/105
VO-HS-RGB-24 T 2-H3	Red/Green/Blue	54	120	625/525/470	485/700/160

Electrical Parameters

Parameters	Symbol	Values	Unit
Operating Voltage	Vopr	24 (+/-5%)	V
Power Dissipation Max.	PD	Red/Yellow	2.88
		Green /Blue/Cool White/Neutral White/Warm White	4.32
Operating Temperature	Topr	-30 - +85 (-22 - +185)	°C (°F)
Storage Temperature	Tstg	-30 - +85 (-22 - +185)	°C (°F)

Outline Dimensions (Unit: mm)



Connection Between Two Strips



VO-HS-X-24T4 Series where X may be: CW, NW, or WW



Features:

- Use high brightness 0.5W SMD LEDs as lighting source
- Even light with 120° viewing angle
- Each strip is 1 ft long
- Convenient connector between two strips
- RoHS compliant

Applications:

- Path & contour marking
- Elegant interior decoration
- Backlighting for large sized ad signs
- Signal lighting

Optical Parameters at Ta=77 °F (25 °C)

Part Number	Color	Lumens (lm)	Wavelength	LED no. per strip	Segment Number	Viewing Angle (°)
VO-HS-CW-24T4	Cool White	180	5000-10000K	10 LEDs	1	120
VO-HS-NW-24T4	Neutral White	160	3700-5000K	10 LEDs	1	120
VO-HS-WW-24T4	Warm White	140	2600-3700K	10 LEDs	1	120

Electrical Parameters

Parameters	Symbol	Values	Unit
Operating Voltage	Vopr	12 (+/-5%)	V
Power Dissipation Max.	PD	6	W
Operating Temperature	Topr	-20 - +75 (-4 - +167)	°C (°F)
Storage Temperature	Tstg	-30 - +90 (-22 - +194)	°C (°F)

VO-HS-X-12T6/VO-HS-X-24T6 Series where X may be: R, Y, G, B, CW, NW, or WW



Features:

- Use high brightness 0.5W SMD PLCC-6 LEDs as lighting source
- Even light with 120° viewing angle
- Convenient connector between two strips
- RoHS compliant

Applications:

- Path & contour marking
- Elegant interior decoration
- Backlighting for large sized ad signs
- Signal lighting

Product Nomenclature:

Example: VO-HS-xx-xTx-Hx

VO-HS-xx-xT x-H x
 ① ② ③ ④⑤⑥

Note:

- ①: VAOPTO LED hard strips Series
- ②: Color: CW-Cool white, NW-Neutral White, WW-Warm White, R-Red, G-Green, etc.
- ③: Input voltage: 12V or 24V DC
- ④: Even (0,2,4,6,8): non-waterproof; Odd (1,3,5,7,9): waterproof
- ⑤: H: with Aluminum alloy shell
- ⑥: Products length: 1=1ft, 2=2ft, 3=3ft, 4=4ft, 5=5ft, 6=6ft

Optical Parameters at Ta=77 °F (25 °C)

Part No.	Color	LED Qty. [PCS]	Viewing Angle [°]	Wavelength or Color Temperature	Luminous flux [lm]
VO-HS-CW-12 T 6 -H1	Cool white	18	120	5000-10000k	270
VO-HS-CW-12 T 6 -H2		36	120		540
VO-HS-CW-12 T 6 -H3		54	120		810
VO-HS-NW-12 T 6 -H1	Neutral White	18	120	3700-5000k	235
VO-HS-NW-12 T 6 -H2		36	120		470
VO-HS-NW-12 T 6 -H3		54	120		700
VO-HS-WW-12 T 6 -H1	Warm white	18	120	2600-3700k	180
VO-HS-WW-12 T 6 -H2		36	120		360
VO-HS-WW-12 T 6 -H3		54	120		540
VO-HS-R-12 T 6 -H1	Red	18	120	625nm	160
VO-HS-R-12 T 6 -H2		36	120		325
VO-HS-R-12 T 6 -H3		54	120		485
VO-HS-Y-12 T 6 -H1	Yellow	18	120	590nm	160
VO-HS-Y-12 T 6 -H2		36	120		325
VO-HS-Y-12 T 6 -H3		54	120		485
VO-HS-G-12 T 6 -H1	Green	18	120	515nm	235
VO-HS-G-12 T 6 -H2		36	120		470
VO-HS-G-12 T 6 -H3		54	120		700
VO-HS-B-12 T 6 -H1	Blue	18	120	470nm	50
VO-HS-B-12 T 6 -H2		36	120		105
VO-HS-B-12 T 6 -H3		54	120		160

Electrical Parameters

Parameters	Symbol	Values	Unit
Operating Voltage	Vopr	12 (+/-5%)	V
Power Dissipation Max.	PD	Red/Yellow	2.88
		Green /Blue/Cool White/Neutral White/Warm White	4.32
Operating Temperature	Topr	-30 - +85 (-22 - +185)	°C (°F)
Storage Temperature	Tstg	-30 - +85 (-22 - +185)	°C (°F)

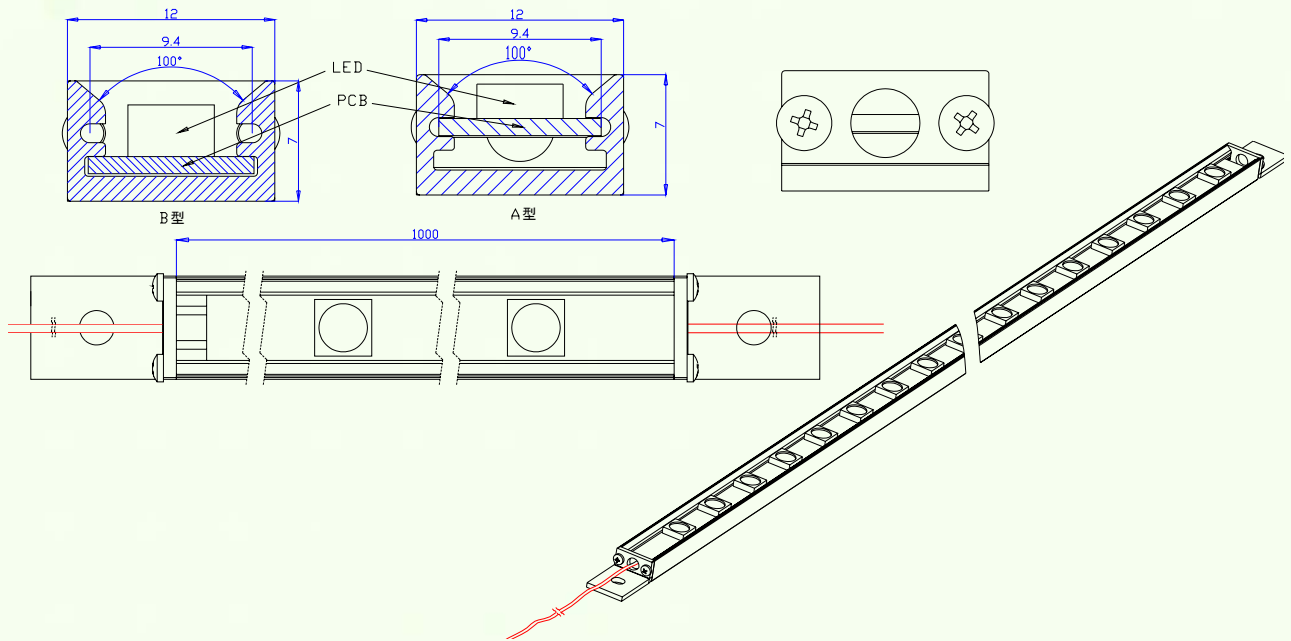
Optical Parameters at Ta=77 °F (25 °C)

Part No.	Color	LED Qty. [PCS]	Viewing Angle [°]	Wavelength or Color Temperature	Luminous flux [lm]
VO-HS-CW-24 T 6 -H1	Cool white	18	120	5000-10000k	270
VO-HS-CW-24 T 6 -H2		36	120		540
VO-HS-CW-24 T 6 -H3		54	120		810
VO-HS-NW-24 T 6 -H1	Neutral White	18	120	3700-5000k	235
VO-HS-NW-24 T 6 -H2		36	120		470
VO-HS-NW-24 T 6 -H3		54	120		700
VO-HS-WW-24 T 6 -H1	Warm white	18	120	2600-3700k	180
VO-HS-WW-24 T 6 -H2		36	120		360
VO-HS-WW-24 T 6 -H3		54	120		540
VO-HS-R-24 T 6 -H1	Red	18	120	625nm	160
VO-HS-R-24 T 6 -H2		36	120		325
VO-HS-R-24 T 6 -H3		54	120		485
VO-HS-Y-24 T 6 -H1	Yellow	18	120	590nm	160
VO-HS-Y-24 T 6 -H2		36	120		325
VO-HS-Y-24 T 6 -H3		54	120		485
VO-HS-G-24 T 6 -H1	Green	18	120	515nm	235
VO-HS-G-24 T 6 -H2		36	120		470
VO-HS-G-24 T 6 -H3		54	120		700
VO-HS-B-24 T 6 -H1	Blue	18	120	470nm	50
VO-HS-B-24 T 6 -H2		36	120		105
VO-HS-B-24 T 6 -H3		54	120		160

Electrical Parameters

Parameters	Symbol	Values	Unit
Operating Voltage	Vopr	24 (+/-5%)	V
Power Dissipation Max.	PD	Red/Yellow	2.88
		Green /Blue/Cool White/Neutral White/Warm White	4.32
Operating Temperature	Topr	-30 - +85 (-22 - +185)	°C (°F)
Storage Temperature	Tstg	-30 - +85 (-22 - +185)	°C (°F)

Outline Dimensions: (Unit: mm)



Connection Between Two Strips



Accessories

Part No.	Description	Power (w)	Output Voltage (VDC)
VO-AC-PS-36-24	Top Switch Power Supply	36	24
VO-AC-PS-48-24	Top Switch Power Supply	48	24
VO-HS-SC-DC2.1	Connector with 2.1 DC Jack for single color strip		
VO-HS-FC-DC2.1	Connector with 2.1 DC Jack for full color strip		

General Precautions

- LEDs are static sensitive devices; precautions should be taken to ensure the LEDs are well protected from ESD during handling.
- ESD protection for GaP and AlGaAs based chips is still necessary even though the chips are safe in low static-electric discharge events.
- AllInGap, GaN and/or InGaN based chips are STATIC SENSITIVE devices and ESD protection must be taken into consideration in the initial design stages.
- Do not operate LEDs in reverse bias.

Warranty and Liability Information

- Three years limited warranty.
- The information contained herein is presented only as a guide for the applications of our products.
- No responsibility is assumed by VaOpto for any infringements of intellectual property or other infringements of the rights of third parties that may result from its use.
- VaOpto is committed to a process of continuous improvement of the quality and the features of its products and reserves the right to make changes that result in such improvements.
- VaOpto products are not intended for use in applications where extraordinarily high reliability is required to prevent the loss of human life or where failure could result in bodily injury.
- VaOpto limits the extent of our liability to the initial component cost and will, in the event of a failure, replace a failed component or refund the purchase price at VaOpto option.

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