



# LED Module Horticulture

Higher performing LED Module family LED with well known superior robustness, high reliability, long lifetime, low thermal resistance. Perfectly addressing applications demanding for high efficiency and long lifetime requirement. LEDs engineered to deliver the precise wavelengths of light needed to improve crop yield.

The LED Module Series is purpose-built to enable ease of system design for Horticulture applications. The LED Module Series offers the only LEDs available today that are binned and tested based on Photosynthetic Photon Flux (PPF).

**Features:**

- LED Module Viewing angle at 50 % IV: 120°
- LED package options 5.0mm x5.0mm for design freedom.
- Color: 660 nm (Deep red), White (4000K).
- RoHS compliant, lead free and Reach.
- LM 80

**Applications:**

- Horticulture

## 1. Mechanical Dimension



Item	Unit	Dimension	Tolerance	Remark
Module Length	mm	450	± 0.3	
Module Width	mm	118	± 0.3	
Module Height	mm	2.0	± 0.1	
Screw Hole	mm	-	-	
Module Weight	g			

## 2. Performance Characteristics

### 1.1 Absolute maximum ratings

Table 1. Absolute maximum ratings

Item	Unit	Typical
Rated Life time	Hours	>50000H
Ingress Protection (IP)	-	-
Ambient / Operating Temperature (ta)	°C	-20°C~50°C
Storage Temperature	°C	-30°C~80°C
DC Forward Current/ Operating Temperature	mA	6000
Working voltage for insulation	V	51-54
Limiting power	W	300
Typical Temperature Coefficient of Forward Voltage	mV/°C	-22
Typical Thermal Resistance—Junction Minimum Typical MAXIMUM to Solder Pad	°C/W	10
Electrostatic Limit (ESD)	V	2000 HBM
Junction Temperature	°C	120

#### Notes for Tables

1. Measured Tj=25°C.
2. Ta: Ambient temperature.
3. Rated Life time, Ta<85°C.
4. Max power and positive current mean the maximum setting value of the bottom temperature of led light source by using the appropriate heat sink
5. In order to keep the Tj temperature below the rated, you should make sure that the radiator has enough heat dissipation performance. Measurement of Surface Temperature: TC on this point is shown in the figure below. The lifespan of the lamp can be judged according to the TC Temperature. Product data sheet is

corresponding to the lifespan of TC temperature

## 2.2 Electrical - Optical Characteristics

Table 2. Optical characteristics for LED Module Series at specified test conditions IF=DC 6000mA, Tj=25°C.

Item	Unit	Typical
Luminous Flux	lm	48000
Luminous Efficacy	Lm /W	160 lm/W
Operating Voltage	V	51-54
Power Consumption Power	W	300
PPF	u mol/s	1069.45
PPE	u mol/j	3.56

Notes for Tables

1. TYF LED Module maintains a tolerance of Luminous Flux  $\pm 8\%$  for LED Module Horticulture.
2. TYF LED Module maintains a tolerance of PPF  $\pm 8\%$  for LED Module Horticulture.
3. TYF LED Module maintains a tolerance of PPF  $\pm 8\%$  for LED Module Horticulture.
4. TYF LED Module maintains a tolerance of Operating  $\pm 2V$  for LED Module Horticulture

## 2.3 Product Selection Guide.

Table 3. Product performance of LED Module at IF=DC6000mA, Tj=25°C.

TYF32

Part Number	PAR (W)	PPF ( $\mu$ mol/s)	PPE ( $\mu$ mol/s)	Total %
TMSHA2D5C0HH	Typical	Typical	Typical	Typical
380-800nm	222.72	1069.45	3.56	100.00%
400-700nm	210.03	1008.52	3.36	94.30%
300-400nm	0.14	0.65	0.00	0.06%
400-500nm	36.65	176.00	0.59	16.46%
500-600nm	60.70	291.48	0.97	27.25%
600-700nm	112.68	541.05	1.80	50.59%
700-800nm	12.30	59.06	0.20	5.52%

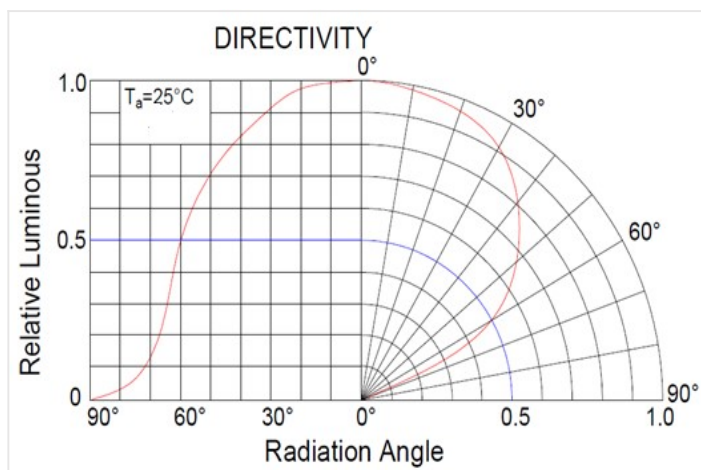
Notes for Tables

1. TYF maintains a tolerance of  $\pm 8\%$  on  $\mu$  mol/s for LED Module Horticulture.
2. PAR is the photosynthetic active radiation from 350 to 800nm.
3. PPF is the photosynthetic active radiation from 350 to 800nm.
4. Far Red typical PPF and Par is measured from 700 to 800nm

## 2.4 Optical Characteristics

Table 4. Optical characteristics for LED Module Series at specified test conditions 6000mA, Tc=85°C.

Part Number	Typical Total Included Angle	Typical Viewing Angle
TMSHA2D5C0HH	150	120



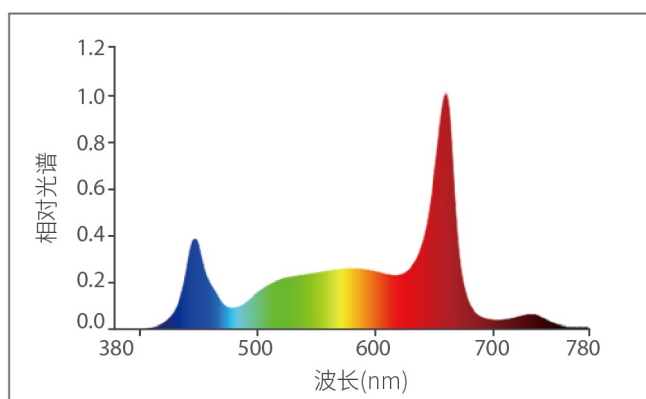
Notes for Table 2:

1. Total angle at which 90% of total luminous flux is captured.
2. Viewing angle is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.

## 3. Characteristic Curves

### 3.1 Spectral Power Distribution Characteristics

(TYF32)



## 4. Certification and Declaration

Item	Compliant to	Remark
Declaratio	ROHS	Hazardous Substance & Material
	REACH	Hazardous Substance & Material
	CE	EMC LVD
	LM80	Photon Flux Maintenance Q90>36000H
	62471	Photobiological Safety of lamps

## 5. CAUTION

### 5.1 CAUTION: RISK OF STATIC ELECTRICITY

5.1.1 The LEDs are sensitive to the static electricity and surge. It is recommended to use a wrist band or anti-electrostatic glove when handling the LED Modules. If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices. Damaged LEDs may show some unusual characteristics such as increase in leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

6.1.2 Handling of TYF LED SMD needs countermeasures against static electricity because this is a semiconductor product. Please take adequate measures to prevent any static electricity being produced such as the wearing of a wristband or anti-static gloves when handling this product. Every manufacturing facility in regard to the product (plant, equipment, machine, carrier machine and conveyance unit) should be connected to ground and please avoid the product to be electric-charged. ESD sensitivity of this product is 2000V (HBM, based on JEITA ED-4701/304). After assembling the LEDs into your final product(s), it is recommended to check whether the assembled LEDs are damaged by static electricity (electrical leak phenomenon) or not.

6.1.3. Power Supply Select: This product is powered by using a constant current driver, and the output current of the power range meets the requirement of specifications book, if use constant voltage source or other conditions, please do risk assessment. Please consider the creepage and clearance distance at the end product.

6.1.4 The resin area is very sensitive, please do not handle, press, touch or rub it.

### 5.2 CAUTION: TEMPERATURE CONTROL

Suggested Temperature on Tc < 85 °C and phosphor Temperature on Tc < 115 °C, if exceeded, customer needs to make reliability assessment.

### 5.3 CAUTION: CHEMICAL EXPOSURE HAZARD

5.3.1 This LED Module should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use. When using other solvents it should be confirmed beforehand whether the solvents may react with the Module material. The banned Freon solvents should not be used. Do not clean using ultrasonic cleaner.

5.3.2 Exposure to some chemicals commonly used in luminaire manufacturing and assembly can cause damage to the LED SMD. Please consult TYF Installation Instruction for additional information. If use the product in any of the below conditions, please confirm the reliability. Such as: wet, frost, salt air, corrosive gases (C1, H2S, where NH3, SO2, NOX); Exposure under the sun, exposure outdoor, dusty. Water, oil, liquid medical and organic solvent.

5.3.3 VOCs (Volatile Organic Compounds) can be generated from adhesives, flux, hardener or organic additives used in luminaires (fixtures). Transparent LED silicone encapsulant is permeable to those

chemicals and they may lead a discoloration of encapsulant when they exposed to heat or light. This phenomenon can cause a significant loss of light emitted (output) from the luminaires (fixtures). In order to prevent these problems, we recommend users to know the physical properties of the materials used in luminaires, and they must be selected carefully.

**6.3.4 Risk of sulfurization (or tarnishing)** The LED uses a silver-plated lead frame and its surface color may change to black (or dark colored) when it is exposed to sulfur (S), chlorine (Cl) or other halogen compound. Sulfurization of lead frame may cause intensity degradation, change of chromaticity coordinates and, in extreme cases, open circuit. It requires caution. Due to possible sulfurization of lead frame, the LED Modules should not be used and stored together with oxidizing substances made of materials such as rubber, plain paper, lead solder cream, etc.

## 5.4 CONTACT WITH LIGHT EMITTING SURFACE (LES)

Avoid any contact with the LES. Do not touch the LES of the LED SMD or apply stress to the LES (yellow phosphor resin area). Contact may cause damage to the LED SMD. Optics and reflectors must not be mounted in contact with the LES (yellow phosphor resin area). Optical devices may be mounted on the top surface of the plastic housing of the TYF LED SMD. If LED surface is dirty, please use alcohol to clean it. Please let it dry for 2 hours before using it. Acetone or corrosive is not acceptable.

## 5.5 STORAGE

Storage condition: Before opening, the storage temperature should be from 5 ~ 30℃, relative humidity less than 60%. (After opening the bag, LED should be used within 24H.). For unused product, please do dehumidification, vacuum sealed. Dehumidifying conditions: 60℃ ± 5℃, 24H. Effective use for the sealed products is 3 months. If it is not used up in 24 hours after opening the package, the material should be dehumidified for 3 hours under at 60℃ ±5℃.

Do not store the Module in a dusty place or humid location.

Do not disassemble the Module.

Please use this product within 5 months, which is kept in its original packaging unopened when stocked.

## 5.6 EYE SAFETY

Eye safety classification for the use of TYF LED SMDs is in accordance with specification IEC/TR 62471: Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires. We classify TYF LED at 6500K RG1. Do not directly look into the lighted LED with naked eyes for a long period of time.