Product Name: KS3 Experimental Boards LED Discovery Soldering Training Kit
Model No.: OKLED-KS3DK-1

1. Product Overview

The OKLED-KS3DK-1 is a full kitting and soldering training kit designed specifically for UK Key Stage 3 (Year 7–9, Ages 11–14) D&T (Design and Technology) compulsory curriculum. This kit provides students with all discrete loose components required to build functional electronic products from scratch, including night lights, alarm indicator circuits and solar-powered demonstration circuits.

The kit features an unpopulated blank black PCB, loose through-hole LEDs, discrete color-ring carbon film resistors and solar power accessories, enabling students to practice manual through-hole soldering as their first formal soldering training stage. All components are separately packed in transparent bags for easy sorting and classroom management.

2. Safety Compliance & KS3 Curriculum Suitability

• High soldering demand: Fully aligned with UK KS3 D&T compulsory syllabus where students learn basic soldering techniques for the first time — the golden stage for hand-soldering skill development.

• Loose color-ring resistors: 1/4W carbon film resistors provided separately for color code reading and resistance calculation training, which is a core KS3 assessment requirement.

• Low voltage operation: Standard DC 4.5V battery power supply with insulated component leads ensures safe classroom operation under teacher supervision.

• All-in-one transparent bag kitting: Each component category is individually packed for easy inventory, sorting and classroom distribution.

• Curriculum coverage: Covers static indicator lights, single-digit segment displays, solar auxiliary power and multi-module circuit building objectives required by KS3 D&T standards.

3. Kit Contents

Section 1 — 5mm Steady Through-hole LEDs

Section 2 — 5mm Flashing Through-hole LEDs (1.8Hz, 1/2 duty cycle)

Section 3 — RGB Color Changing LED

Section 4 — Digital Display Modules

Section 5 — Power & PCB Hardware

Section 6 — Loose Discrete Resistors (1/4W ±0.5% Carbon Film)

4. Material & Technical Features

• Light source: 5mm discrete through-hole diffused LEDs without built-in internal resistance; external series resistor matching is required — students must calculate and select appropriate resistors themselves.
• Operating voltage: DC 4.5V (battery power); auxiliary solar input DC 5.5V for green energy experiments.
• Operation type: Full manual through-hole soldering assembly on blank PCB; breadboard pre-testing is available before permanent soldering.
• Resistor configuration: Loose color-ring 1/4W carbon film resistors in the range of 220Ω – 1KΩ, specifically provided for color code identification and Ohm's law calculation training.
• PCB feature: Unpopulated blank black through-hole PCB with standard 2.54mm pad pitch grid layout; no pre-soldered components — students populate everything from scratch.
• Packaging: Transparent separate bag kitting for each component category, supporting classroom inventory and student self-management.
• Solar module: 5.5V polycrystalline silicon solar panel for renewable energy and green technology learning extensions.

5. KS3 Student Practical Operation (Lesson Workflow)

Lesson Step 1 — Component Identification & Sorting (15 min)
Students unpack the kit, sort all components by category, and read color-ring resistor values using the color code chart. Teacher verifies each student's resistance calculations.
Lesson Step 2 — Breadboard Pre-testing (20 min)
Students build a test circuit on a breadboard using alligator clips to verify LED polarity, resistor matching and correct circuit functionality before soldering.
Lesson Step 3 — PCB Layout Planning (10 min)
Students plan the component placement on the blank black PCB, designing the circuit layout for a night light or alarm indicator project.
Lesson Step 4 — Manual Soldering Practice (40 min)
Under teacher supervision, students solder all components onto the PCB — resistors, LEDs, digit display and connection terminals — practicing proper through-hole soldering technique.
Lesson Step 5 — Circuit Testing & Troubleshooting (15 min)
Students connect the battery box and test the completed circuit. They identify and fix any soldering defects, polarity reversals or incorrect resistor values.
Lesson Step 6 — Solar Power Extension (20 min)
Students swap the battery power source with the solar module to observe solar-driven LED operation, exploring renewable energy concepts.

6. Educational Learning Objectives (KS3 Match)

• Soldering skill mastery: Acquire basic through-hole manual soldering techniques, including proper temperature control, solder application and joint quality inspection.

• Resistor color code proficiency: Read and calculate resistance values from color bands on 1/4W carbon film resistors — a compulsory KS3 D&T assessment criterion.

• Circuit design ability: Design and layout functional electronic products (night light, alarm indicator) on a blank PCB from schematic to physical assembly.

• Component knowledge: Distinguish between steady LEDs, automatic flashing LEDs and RGB color-changing LEDs; understand their operating principles and applications.

• Fault diagnosis: Develop circuit troubleshooting skills by identifying and correcting soldering defects, polarity errors and resistor mismatches.

• Renewable energy awareness: Understand solar power conversion and green technology principles through hands-on solar module experiments.

• Safety awareness: Practice safe soldering procedures, including proper tool handling, eye protection and heat management.

7. Conclusion

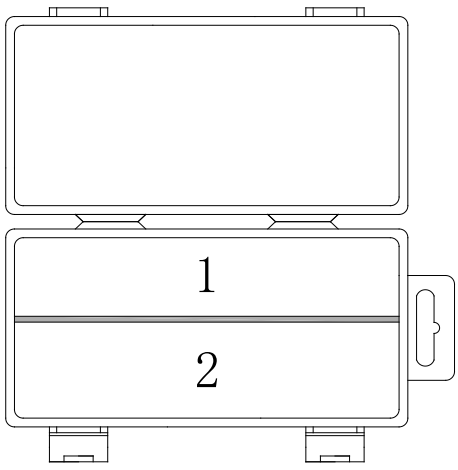
The OKLED-KS3DK-1 provides a comprehensive, curriculum-aligned soldering and electronics manufacturing solution for UK Key Stage 3 D&T education. With its blank PCB approach, loose color-ring resistors and full discrete component set, it delivers exactly the hands-on soldering training experience that KS3 students need as their first formal electronics manufacturing stage. The all-in-one transparent bag kitting service ensures easy classroom management, while the solar module extension adds green technology learning value. This kit is an ideal teaching resource for schools delivering KS3 D&T compulsory electronics units.

■Kit Parts List

Section	Contents	Pcs	P/N	Spec
1	5mm LED, Red	5	OSR5JA5A34A	Page 4
	5mm LED, Yellow	5	OSY5JA5A34A	
	5mm LED, Blue	5	OSB5YU5A34A	
	5mm LED, Pure Green	5	OSG5TA5A34A	
	5mm LED, Warm White	5	OSM5YK5A32A	
	5mm LED, Cool White	5	OSW5YK5A32A	
	5mm Flashing LED, Red	2	OSR5JS5A34A	Page 5
	5mm Flashing LED, Yellow	2	OSY5JS5A34A	
	5mm Flashing LED, Blue	2	OSB5YS5A34A	
	5mm Flashing LED, Pure Green	2	OSG5TS5A34A	
	5mm Flashing LED, Warm White	2	OSM5YS5A32A	
	5mm Flashing LED, Cool White	2	OSW5YS5A32A	
	5mm Color Changing LED, RGB	2	OST1DA5B32A	Page 6
2	0.56 Inch Single Digit Display, Red	1	OSL10561-XR	Page 7
	0.56 Inch Single Digit Display, Yellow Green	1	OSL10561-XYG	
	Battery box No. 5, 3 batteries, 4.5V	1	OECB534V	Page 8
	5.5V Small Solar Module	1	OSSFA6540BP-WH100	Page 9
	Black PCB	1	OEB4060PCB	Page 10
	Breadboards	1	OEB5585D0-W	Page 11
	Breadboards connector wires	30		
	220Ω Carbon Film Resistor，0.25W±0.5%	20		Page 12
	330Ω Carbon Film Resistor，0.25W±0.5%	20		
	470Ω Carbon Film Resistor，0.25W±0.5%	20		

■ Product Picture

140pcs/Box (Dimensions: 200*135*45mm)



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Light It Up

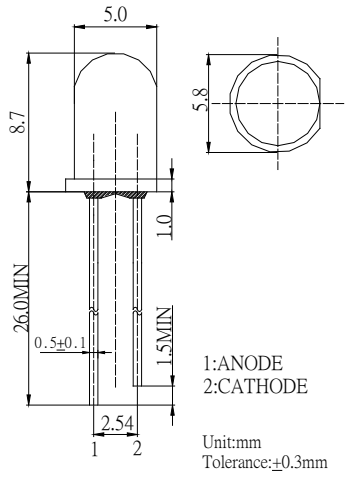
5mm Round LED

OSXXXX5A3XA

▪Features

- High Luminous Intensity
- 5mm Round Standard Directivity
- Long Lifetime Operation
- UV Resistance
- Color Diffused / White Diffused (W, M only)

▪Outline Dimension



▪Applications

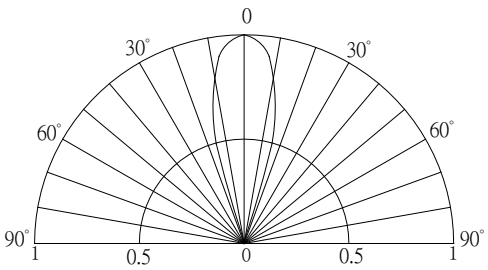
- General Purpose Indicators
- Decorations
- Toys & Games
- General Use

▪Absolute Maximum Rating (Ta=25℃)

Item	Symbol	Value		Unit
		W/B	R/Y/YG	
DC Forward Current	I_F	30	30	mA
Pulse Forward Current#	I_{FP}	100	100	mA
Reverse Voltage	V_R	5	5	V
Power Dissipation	P_D	102	78	mW
Operating Temperature	Topr	-30 ~ +85		℃
Storage Temperature	Tstg	-40~ +100		℃
Lead Soldering Temperature	Tsol	260℃/5sec		-

#Pulse width Max 0.1ms, Duty ratio max 1/10

▪Directivity



▪Electrical -Optical Characteristics (Ta=25℃)

Part Number	Color			V_F (V)			I_R(μA)	Iv(mcd)*			λD(nm)*			2θ1/2(deg)
				Min.	Typ.	Max.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Typ.
				I_F=20mA			V_R=5V	I_F=20mA						
OSW5YK5A32A	Cool White	W		-	2.9	3.4	10	1120	1560	-	CCT:8500-18000K			30
OSM5YK5A32A	Warm White	M		-	2.9	3.4	10	750	1120	-	CCT:2700-3300K			30
OSB5YU5A34A	Blue	B	■	-	2.9	3.4	10	220	330	-	465	470	475	30
OSG5TA5A34A	Pure Green	PG	■	-	2.9	3.4	10	1120	1560	-	520	525	530	30
OSY5JA5A34A	Yellow	Y	■	-	2.1	2.6	10	220	330	-	585	590	595	30
OSR5JA5A34A	Red	R	■	-	2.1	2.6	10	220	330	-	620	625	630	30

*1 Tolerance of measurements of dominant wavelength is ±1nm *2 Tolerance of measurements of chromaticity coordinate is ±10%

*3 Tolerance of measurements of luminous intensity is ±15% *4 Tolerance of measurements of forward voltage is±0.1V

LED & Application Technologies

ISO 9001: 2008

RoHS Compliant EU 2002/95/EC

REACH The new EU chemicals legislation

ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

OptoSupply
Light It Up

5mm Round Flashing LED
1.8Hz 1/2 Duty Cycle

OSXXXS5A3XA

■Features

- High Luminous Intensity
- 5mm Round Standard Directivity
- UV Resistant Epoxy
- Color Diffused / White Diffused (W, M only)

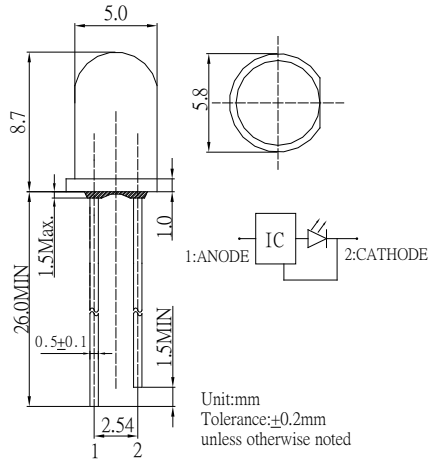
■Applications

- Toys
- Games
- Audio / Other Lighting

■Warning

- Do not install in reverse

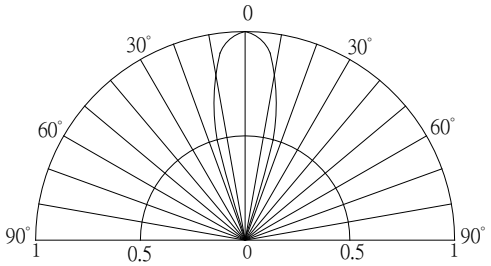
■Outline Dimension



■Absolute Maximum Rating (Ta=25℃)

Item	Symbol	Value	Unit
Power Supply	Voltage	5	V
Duty Cycle	Duty	1/2	-
Operating Temperature	Topr	-30 ~ +85	℃
Storage Temperature	Tstg	-40~ +100	℃
Lead Soldering Temperature	Tsol	260℃/5sec	-

■Directivity



■Electrical -Optical Characteristics (Ta=25℃)

Part Number	Color			V_F (V)			Iv(mcd)*			λD(nm)*			Fled (Hz)*	2θ1/2(deg)
				Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Typ.	Typ
				I_F =20mA			I_F =20mA							
OSW5YS5A32A	Cool White	W		3.0	3.5	5.0	1120	1560	-	CCT:8500-18000K			1.8	30
OSM5YS5A32A	Warm White	M		3.0	3.5	5.0	750	1120	-	CCT:2700-3300K				
OSB5YS5A34A	Blue	B		3.0	3.5	5.0	220	330	-	465	470	475		
OSG5TS5A34A	Pure Green	G		3.0	3.5	5.0	1120	1560	-	520	525	530		
OSY5JS5A34A	Yellow	Y		3.0	3.5	5.0	220	330	-	585	590	595		
OSR5JS5A34A	Red	R		3.0	3.5	5.0	220	330	-	620	625	630		

*1 Tolerance of measurements of chromaticity coordinates is ±10%
*2 Tolerance of measurements of dominant wavelength is ±1nm
*3 Tolerance of measurements of luminous intensity is ±15%
*4 Tolerance of measurements of forward voltage is ±0.1V
*5 Tolerance of measurements of Frequency is ±20%

OptoSupply
Light It Up

5mm Round Color Changing Red & Blue & Green LED

OST1DA5B32A

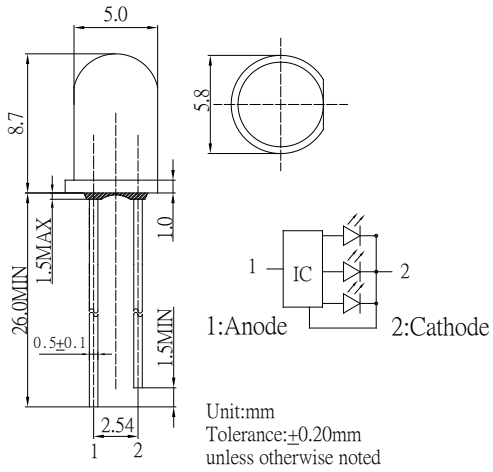
▪Features

- High Luminous Intensity
- 5mm Round Standard Directivity
- Color Changing Type
- White Diffused Type

▪Applications

- General Purpose Indicators
- Decorations
- Toys & Games
- General Use

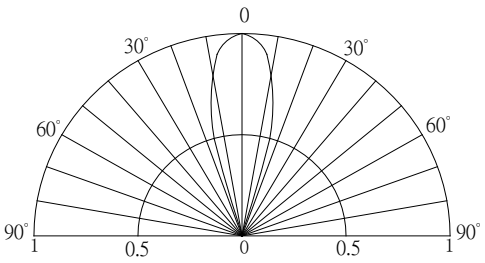
▪Outline Dimension



▪Absolute Maximum Rating (Ta=25℃)

Item	Symbol	Value	Unit
IC Output Current	Iop	100	mA
Blinking Cycle	T	33	S
Power Supply	Voltage	5.0	V
Operating Temperature	Topr	-30 ~ +85	℃
Storage Temperature	Tstg	-40 ~ +100	℃
Lead Soldering Temperature	Tsol	260℃/5sec	℃

▪Directivity



▪Electrical -Optical Characteristics (Ta=25℃)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
DC Forward Voltage	Vdd	I_F=20mA	3.8	4.5	5	V
DC Reverse Current	I_R	V_R=5V	-	-	10	μA
Domi. Wavelength	λ_D (Red)	I_F=20mA	620	625	640	nm
	λ_D (Blue)	I_F=20mA	465	470	475	nm
	λ_D (Green)	I_F=20mA	520	525	530	nm
Luminous Intensity	Iv(Red)	I_F=20mA	220	330	500	mcd
	Iv(Blue)	I_F=20mA	330	500	750	mcd
	Iv(Green)	I_F=20mA	500	750	1120	mcd
50% Power Angle	$2\theta_{1/2}$	I_F=20mA	-	30	-	deg

*1 Tolerance of measurements of forward voltage is ±0.1V
*2Tolerance of measurements of Frequency is ±20%
*3 Tolerance of measurements of dominant wavelength is ±1nm
*4 Tolerance of measurements of luminous intensity is ±15%

LED & Application Technologies

ISO 9001: 2008

RoHS Compliant EU 2002/95/EC

REACH The new EU chemicals legislation

ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

OptoSupply
Light It Up

0.56 Inch Single Digit Display
OSL10561-IX (Common Anode type)
OSL10561-LX (Common Cathode type)

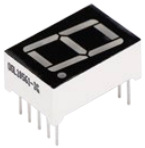
■ Features

- 0.56 Inch Single Digit Display
- Long lifetime operation
- IC compatible
- Low power dissipation
- Black surface & white segment or dot

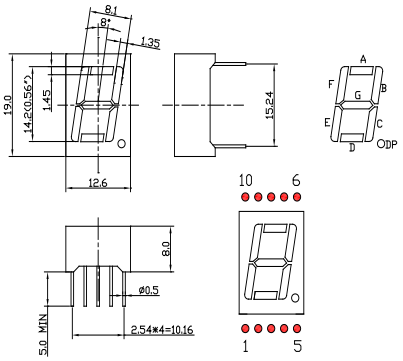
■ Applications

- Counting device
- Clock

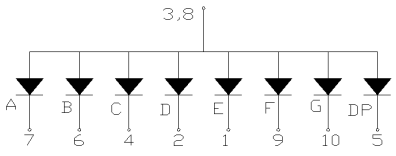
■ Photo



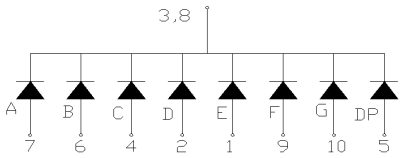
■ Package Dimensions and Pin function



Common Anode type



Common Cathode type



■ Absolute Maximum Rating (Ta=25℃)

Item	Symbol	Value	Unit
DC Forward Current	I_F	20	mA
Pulse Forward Current#	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Power Dissipation	P_t	50	mW
Operating Temperature	Topr	-30 ~ +70	℃
Storage Temperature	Tstg	-40~ +85	℃
Lead Soldering Temperature (1.6mm from seating plane)	Tsol	260℃/5sec	℃

#Pulse width Max.10ms Duty ratio max 1/10

■ Electrical -Optical Characteristics (Ta=25℃)

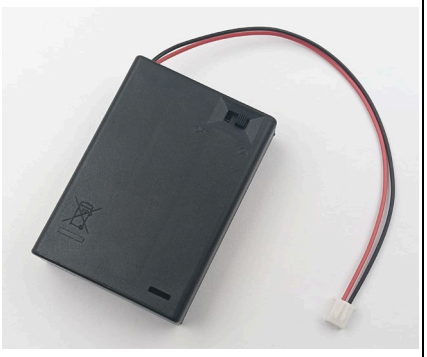
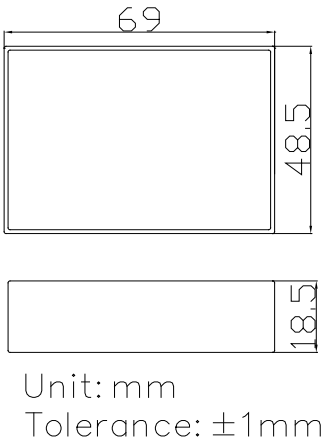
Part Number	Color			V_F (V)			I_R(μA)	Iv(mcd)			λD(nm)		
				Min.	Typ.	Max.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
				I_F=20mA			V_R=5V	I_F=20mA					
OSL10561-IYG(LYG)	Yellow Green	YG		-	2.1	2.5	10	-	20	-	565	570	575
OSL10561-IR(LR)	Red	R		-	2.1	2.5	10	-	30	-	625	630	640

*1 Tolerance of measurements of dominant wavelength is ±1nm
*2 Tolerance of measurements of luminous intensity is ±15%
*3 Tolerance of measurements of forward voltage is ±0.1V

Battery Box

Color:	Black

■Product Information & Outline Dimension:

P/N	Item	Product Picture	Outline Dimension
OECB534V	Battery box No. 5, 3 batteries, 4.5V		

OptoSupply
Light It Up

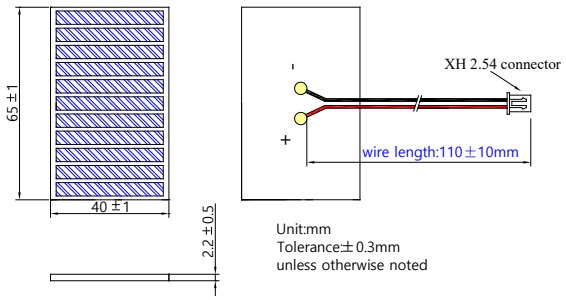
Small Solar Module Series
OSSFA6540BP-WH100

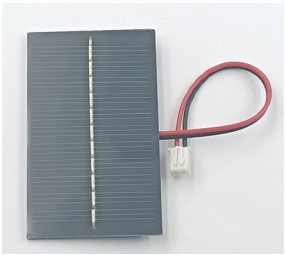
Features:

Copes easily with devices required drive voltage

Since multiple cells can be simultaneously connected in a series when the solar cells are formed, unlike the fabrication technique used with crystalline silicon solar cells in which multiple solar cells are severed and connected, it is easy to create cells with a variety of voltages.

Outline Dimension:





View of Electrical Properties of Amorton:

Voc : Open-circuit voltage

Isc : Short-circuit current

Vpm : Optimum power operating voltage

Ipm : Optimum power operating current

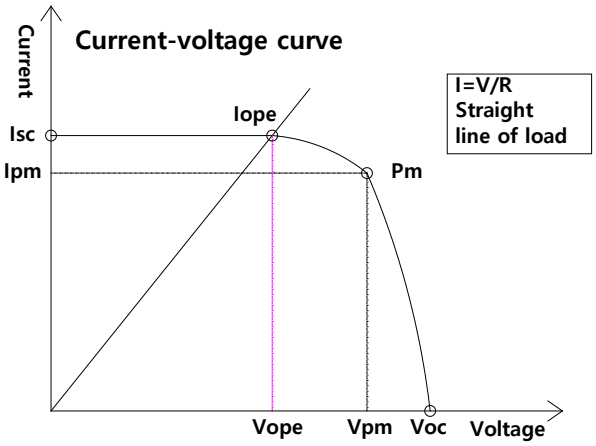
Pm : Maximum power =Vpm x Ipm

Vope : Operating voltage (specified voltage)

Iope : Operating current

※Current drastically changes under Vpm or higher.

For keeping the stable current under the anticipated illumination level, set the Vope as high as or lower than the Vpm



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Specification and Selection Table:

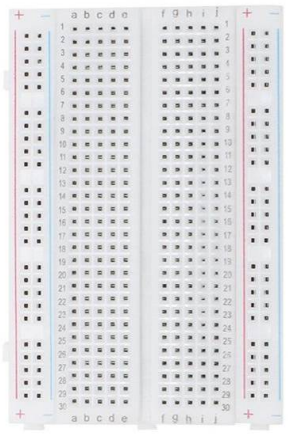
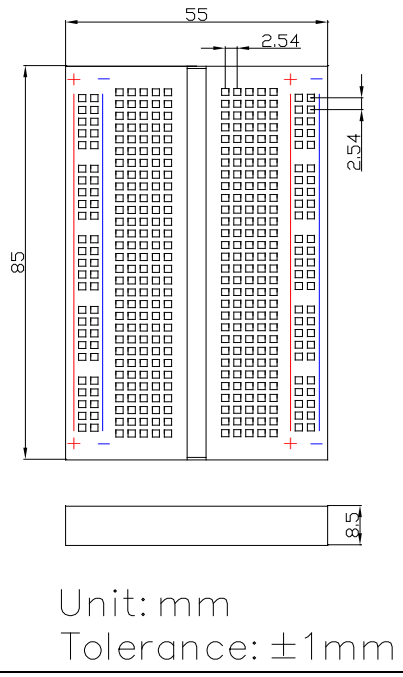
P/N	Dimension	Cells	Operating Current	Power	Short Circuit Current(Isc)	Operating Voltage	Open Circuit Voltage	Applications Cell
OSSFA6540BP-WH100	65*40*2.2mm	11	55mA	0.3W	58mA	5.5V	6.6V	3.7V

OptoSupply
Light It Up

Breadboards

Color:	White

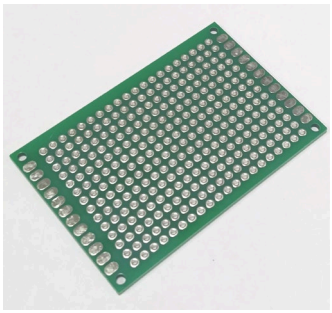
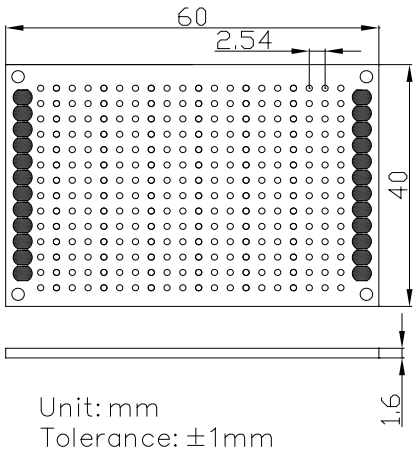
■Product Information & Outline Dimension:

P/N	Item	Product Picture	Outline Dimension
OEB5585D0-W	Breadboards		

Black PCB

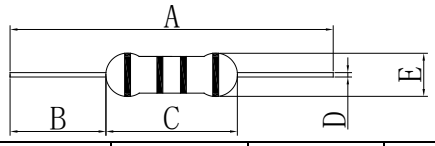
Color:	Green

■Product Information & Outline Dimension:

P/N	Item	Product Picture	Outline Dimension
OEB4060PCB	Black PCB		

Carbon Film Resistor

■ Specifications

Power Rating	Maximum Working Voltage	Maximum Overload Voltage	Dimension (mm)					Resistance Range
								
			A	B	C	D	E	
1/4W	250V	500V	45±3	19.5±3	6.0±1	0.35±0.1	2.3±0.3	0.1E-22M

■Color Coding

Color	1st digit	2nd digit	Multiplier	Tolerance
Black	0	0	1Ω	
Silver			0.01Ω	±10%
Golden			0.1Ω	±5%
Brown	1	1	10Ω	±1%
Red	2	2	100Ω	±2%
Orange	3	3	1KΩ	
Yellow	4	4	10KΩ	
Green	5	5	100KΩ	±0.5%
Blue	6	6	1MΩ	±0.25%
Violet	7	7	10MΩ	±0.1%
Gray	8	8		
White	9	9