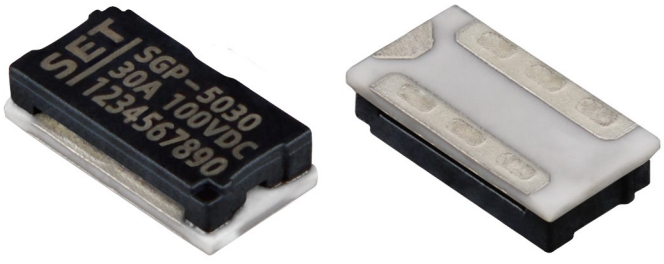
Heat CutOff

HCO

· Surface Mount
· Non-Resettable
· Overcurrent Protection
· Overcharging Protection
· Controlled Fusing Time ≤ 60 s
· Low Impedance, Low Power Consumption
· Halogen free and RoHS compliant
Please refer to the datasheet of each series.

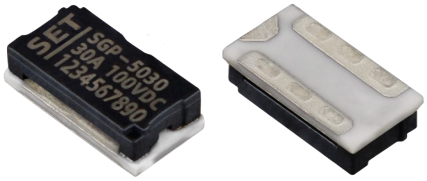


https://setsafe.com/Products/Active-Protection/Heat-Cutoff-HCO.html

2024

SETsafe | SETfuse

Providing a Total Solution for High Standard Safety Circuit Protection



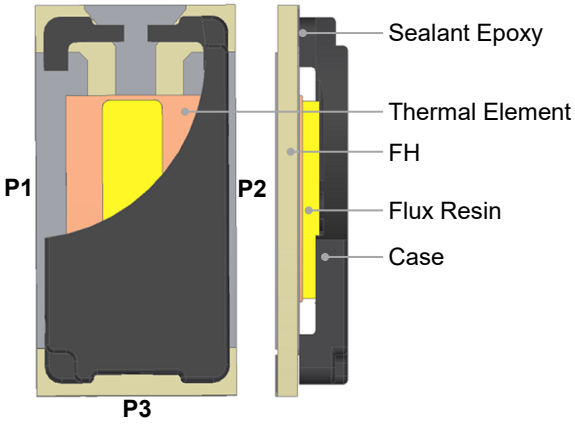
Description

Heat CutOff (HCO) is a fuse that triggers action in the event of over-current or over-charge, also known as a three-terminal fuse. The body of the Heat CutOff (HCO) product is composed of Sealant Epoxy, Fusible Alloy, FH, Flux Resinn and Case.

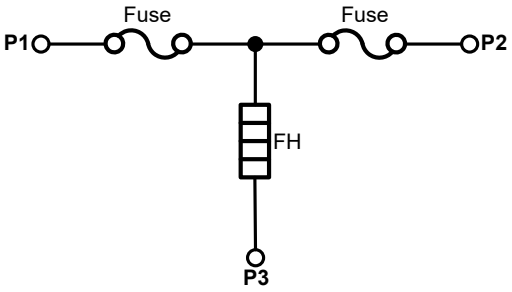
Heat CutOff (HCO) is primarily used in the secondary protection scheme of lithium battery charging and discharging circuits. It involves adding a secondary protection element, Heat CutOff (HCO), to the primary protection circuit. During the charge and discharge process of lithium batteries, Heat CutOff (HCO) is triggered when over-current or over-charge occurs, thereby reducing the risk of fire or explosion. When the circuit current exceeds a certain threshold, the fusible alloy within the Heat CutOff (HCO) heats up and fuses, passively cutting off the protection circuit. Similarly, in the case of over-charging where the primary protection circuit IC or main circuit FET fails, the secondary protection IC activates the FET connected to Heat CutOff (HCO). The Heat CutOff (HCO) then turns on the heating resistor (Heater), generating heat to actively fuse the fusible alloy and disconnect the charge and discharge circuit, while simultaneously cutting off the Heater circuit. This dual protection mechanism provides safeguards against both over-current and over-charge situations.

The main features of the SETsafe | SETfuse Heat CutOff (HCO) product include a rated current of (30, 45) A, rated voltage of 100 VDC, and a range of operating voltage from 3.1 to 100.4 VDC. It carries UL, cUL, TUV approvals and is RoHS and REACH compliant.

Structure Diagrams



Product Schematic



- P1 ~ P2 Main Circuit（MC）
- P1 / P2 ~ P3 Control Circuit（CC）

Application

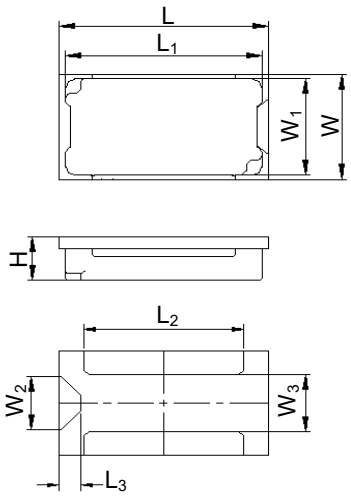
- Electric Tool
- Storage Battery
- Portable Power Supply
- Electric Motorcycle
- Electric Bicycle
- Household Energy Storage

Features

- Surface Mount
- Overcurrent Protection
- Overcharging Protection
- Low Impedance, Low Power Consumption
- Controlled Fusing Time ≤ 60 s
- Non-Resettable
- RoHS & REACH Compliant

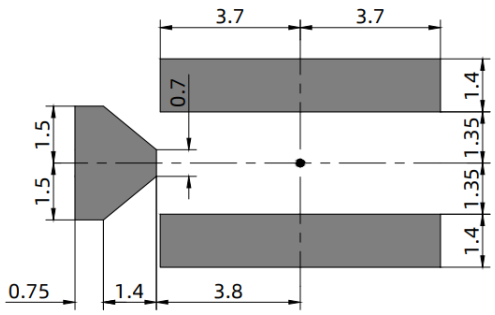
All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Dimensions (Unit: mm)

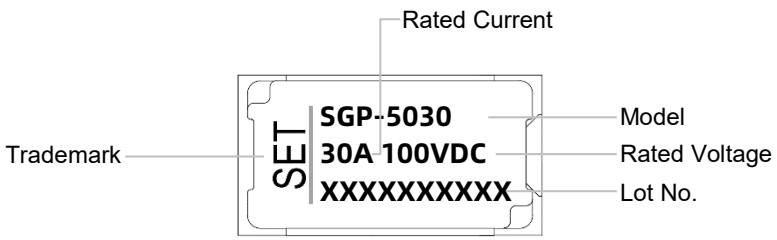


L	L_1	L_2	L_3	W	W_1	W_2	W_3	H
9.50 ± 0.30	8.90 ± 0.20	7.20 ± 0.20	1.00 ± 0.20	5.00 ± 0.30	4.60 ± 0.20	2.55 ± 0.20	2.40 ± 0.20	1.90 ± 0.20

Recommended Land Pattern



Marking



Part Number System

SGP - 5030

Rated Current (A)
30, 45

Rated Operating Voltage (VDC)
06, 12, 14, 20, 30, 40, 50

Series
SGP

All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Specifications

Model	I_r	U_r	Cells in series	Breaking Capacity	Range of Operating Voltage	Resistance		Agency Information			RoHS REACH
						R_{Fuse}	R_{FH}				
	(A)	DC (V)	(Cells)	(A)	(VDC)	(mΩ)	(Ω)	UL	cUL	TUV	
SGP-0630	30	100	2	80	6.0 ~ 9.6	≤ 2.0	0.6 ~ 1.3	●	●	●	●
SGP-1230	30	100	3	80	8.4 ~ 13.2	≤ 2.0	1.5 ~ 3.5	●	●	●	●
SGP-1430	30	100	4	80	11.1 ~ 18.4	≤ 2.0	2.8 ~ 4.5	●	●	●	●
SGP-2030	30	100	5	80	14.0 ~ 23.5	≤ 2.0	4.6 ~ 6.8	●	●	●	●
SGP-3030	30	100	6 ~ 7	80	20.2 ~ 31.5	≤ 2.0	8.5 ~ 15.0	●	●	●	●
SGP-4030	30	100	9 ~ 10	80	28.0 ~ 46.9	≤ 2.0	17.0 ~ 27.0	●	●	●	●
SGP-5030	30	100	12 ~ 17	80	39.6 ~ 72.0	≤ 2.0	38.0 ~ 65.0	●	●	●	●
SGP-1245	45	100	3	120	9.8 ~ 13.5	≤ 1.6	1.6 ~ 3.5	●	●	●	●
SGP-1445	45	100	4	120	13.0 ~ 18.4	≤ 1.6	3.0 ~ 5.6	●	●	●	●
SGP-2045	45	100	5	120	16.7 ~ 23.5	≤ 1.6	4.6 ~ 9.0	●	●	●	●
SGP-3045	45	100	6 ~ 7	120	22.3 ~ 31.5	≤ 1.6	10.0 ~ 17.5	●	●	●	●
SGP-4045	45	100	9 ~ 10	120	33.0 ~ 46.9	≤ 1.6	22.0 ~ 37.0	●	●	●	●
SGP-5045	45	100	12 ~ 14	120	43.7 ~ 62.0	≤ 1.6	35.0 ~ 65.0	●	●	●	●
Current Carrying Capacity	100% x I_r, no melting										
Current Fusing Time	200% x I_r the fusing time is < 1 min										
Controlled Fusing Time	In operation voltage range, the fusing time is <1min										
Endurance Test	500% x I_r power on 5 ms, power off 995 ms, 100,000 cycles										

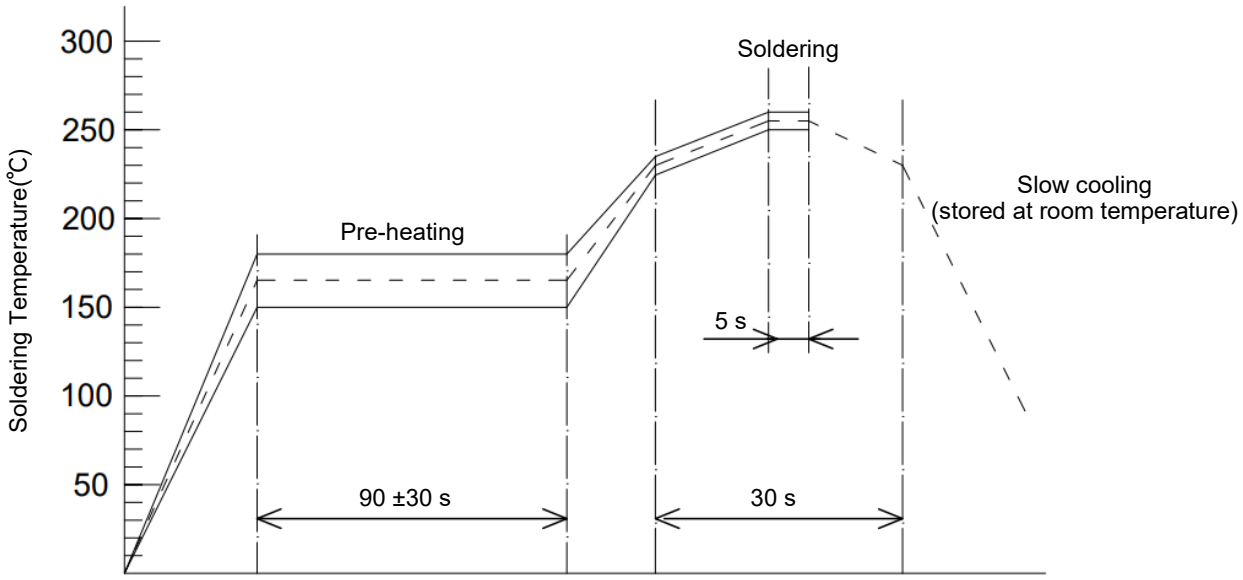
Note:

1. For P1 - P2, please refer to the structure diagram;
2. "●" Means certificated, "○" Means non-certificated;
3. RoHS & REACH Comply.

All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Soldering Parameters

1. Reflow Soldering Method (For Reference Only)



Peak Temp: (255 ±5)℃ 5 s
(230 ±5)℃ 30 s

2. Recommended Soldering Parameters

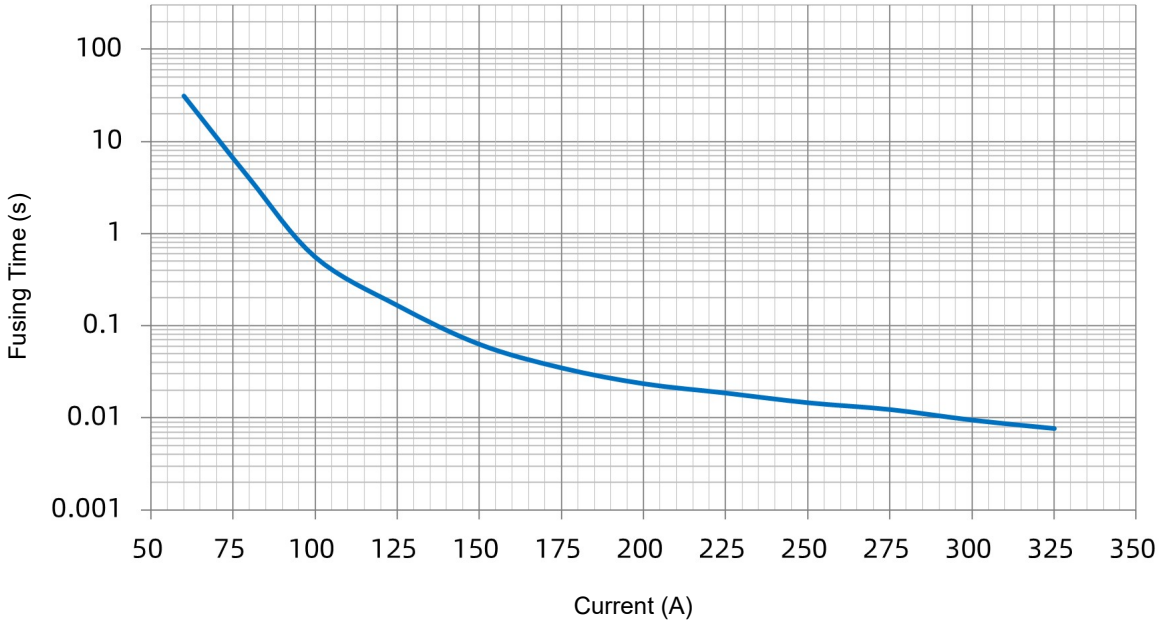
Solder Iron Temp: (300 ± 5) ℃
Soldering Time: ≤ 3 s

All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

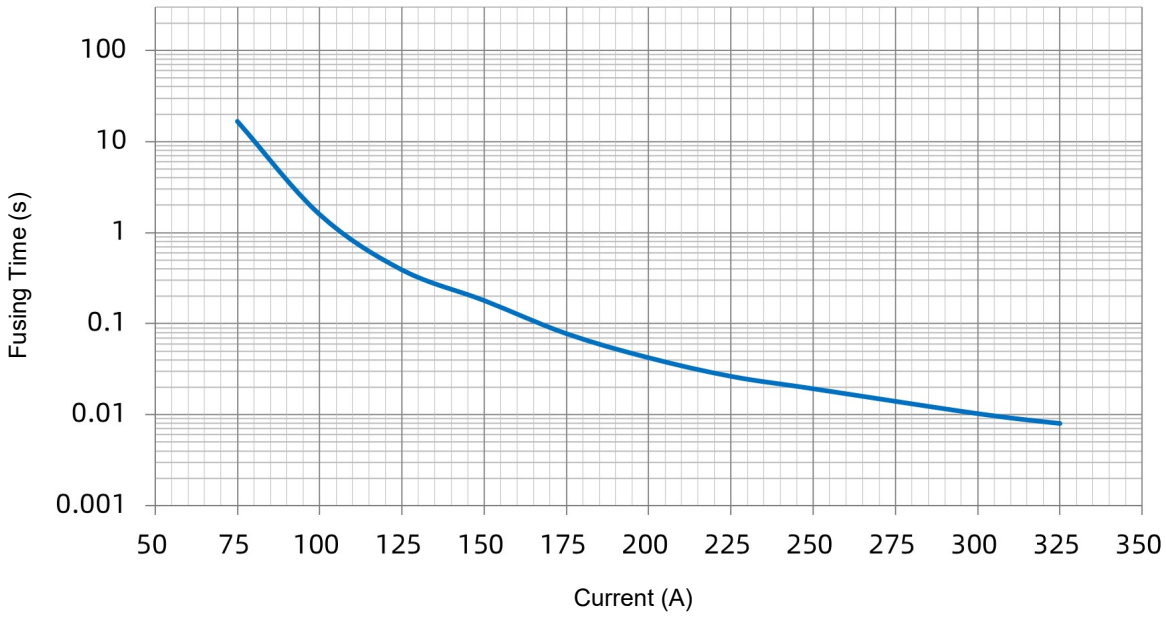
Product Current-Time Curve (Reference)

The Current-Time curve shows functioning time at multi-times rated current at room temperature.

SGP 30A Current-Time Curve



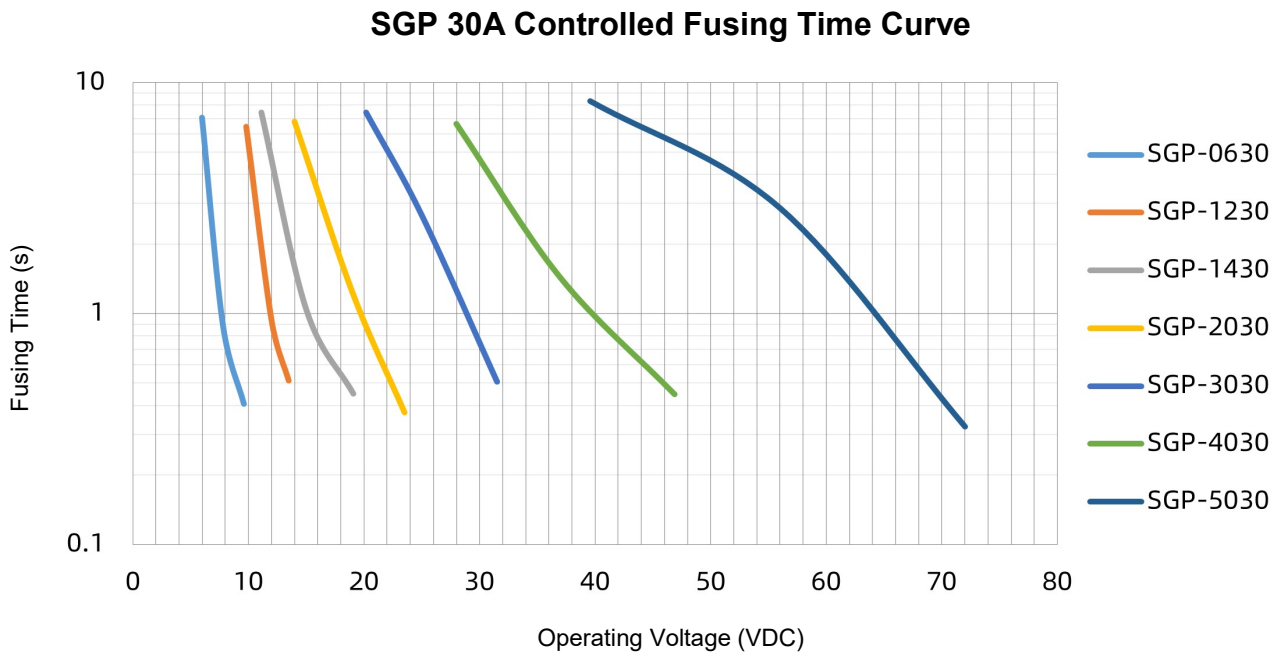
SGP 45A Current-Time Curve

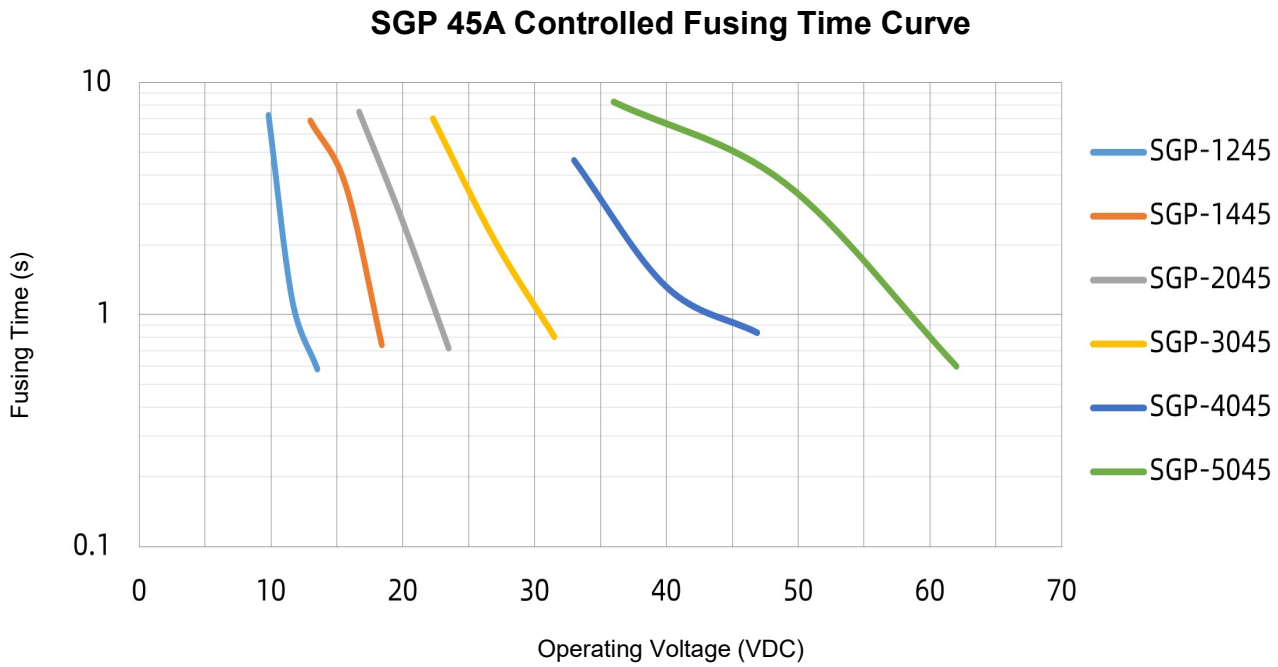


All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Controlled Fusing Time Curve (Reference)

The FH applies the operating voltage at room temperature, and collects the disconnection time of P1-P2.

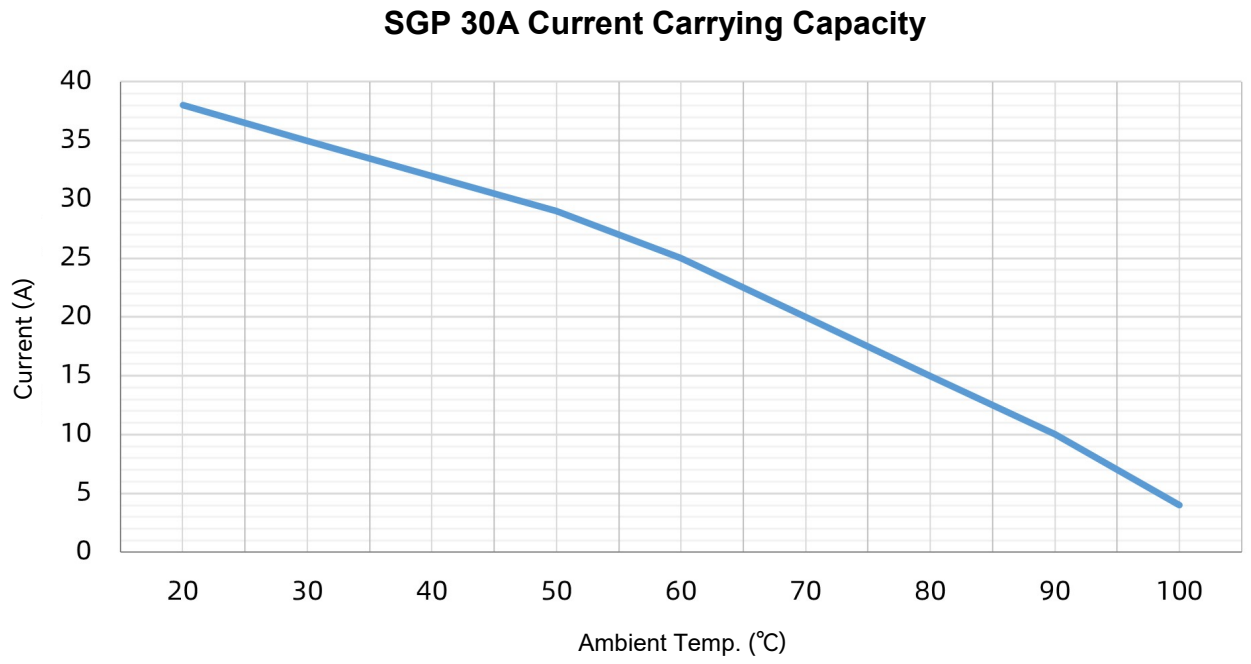


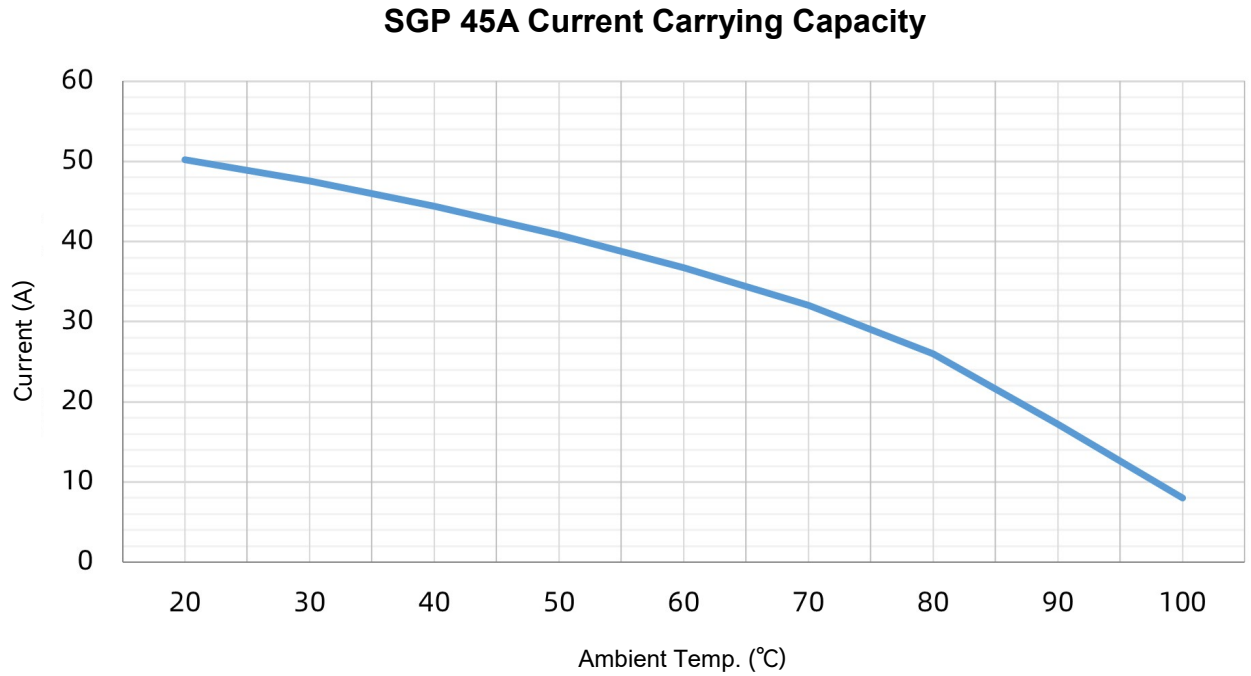


All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Current Carrying Capacity (Reference)

Under different temperatures apply test current, the surface temperature is 100 ℃ as the highest point, and the load value is obtained.

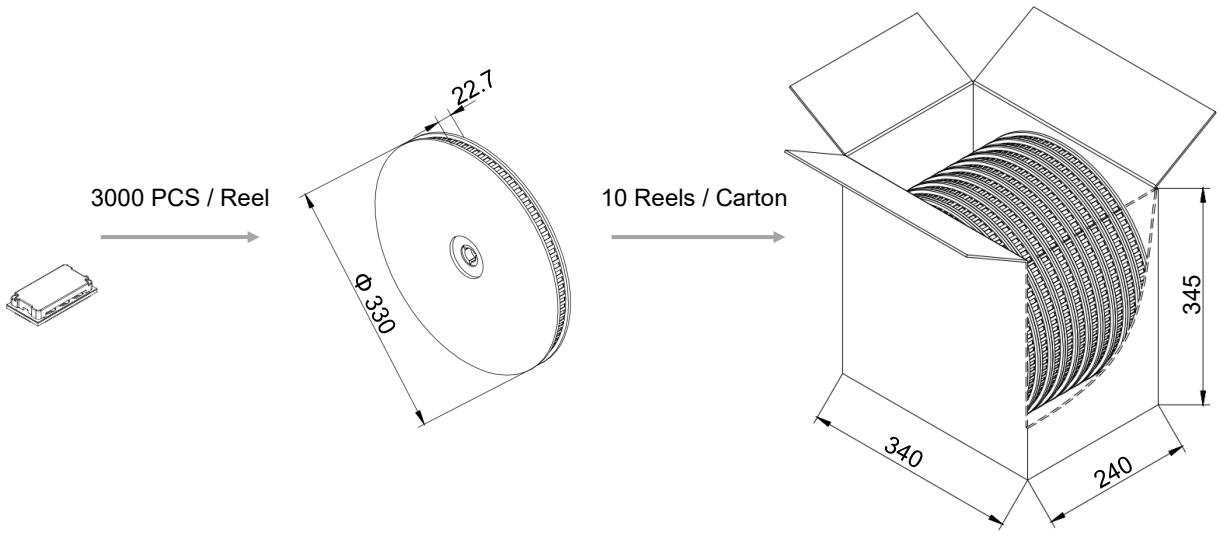




All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Packaging Information

Item	Reel	Carton
Dimensions (mm)	Φ 330 × 22.7	340 × 240 × 345
Quantity (PCS)	3000	30000
Gross Weight (kg)	11 ± 10%	



All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Description

In the charge / discharge loop, the addition of the Heat CutOff (HCO) can provide secondary protection for the lithium-ion

Item	Description
HCO	**Heat CutOff (HCO)** With Feed Heater，A Protector that turns on a Feed Heater to cut off circuit.
MC	**Main Circuit (MC)** All conductive components used in switching devices for closing or disconnecting circuits in a circuit.
CC	**Control Circuit (CC)** In addition to the main circuit, all conductive parts of the switching apparatus used in the access circuit as the closing operation and / or opening operation of the switching apparatus.
I_r	**Rated Current** The current used to classify an HCO, which is the Maximum current that HCO allows to carry and is able to cut off the circuit safely.
U_r	**Rated Voltage** The voltage used to classify an HCO, which is the Maximum voltage that HCO allows to carry and is able to cut off the circuit safely.
FH	**Feed Heater** Electric appliances that use electric energy to achieve heating effect.
Breaking Capacity	**Breaking Capacity** Value of prospective current that a fuse-link is capable of breaking at a stated voltage under prescribed conditions of use and behavior.
Range of Operation Voltage	**Range of Operation Voltage** Under specified conditions, the protector can operate normally to disconnect the voltage.

All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

ATTENTION

Usage

1. When atmosphere press is from 80 kPa to 106 kPa, the related altitude shall be from 2,000 meter to -500 meter.
2. Do not touch the HCO body or electrode lead directly when power is on, to avoid burning or electric shocking.
3. It is necessary to foresee there are possibilities that “Current Carrying Capacity” and “Controlled Fusing Time” may be varied along with the condition change in the substrate thermal capacity, etc. therefore you should check it on your PCB. Generally, when thermal capacity of PCB increases, Current carrying capacity will increase accordingly and Cleaning-time will be longer.
4. This product is designed and produced for only general-use of electronics devices. Therefore, we do not suppose that it is used for the. applications [Military, Medical and so on] which may cause direct damages on life, bodies or properties of third party.

Installation

1. Patch type surface mounting.
2. Do not apply mechanical stress to the protection body during or after the installation.
3. Ultrasonic-cleaning or immersion-cleaning and so on must not be done to HCO before and after mounted. When cleaning is done, flux on element would flow, and it would not be satisfied its specification. Moreover, a similar influence happens when the product comes in contact with cleaning-solution. These products after cleaning will not be guaranteed.
4. Please do not re-use of the HCO removed by the solder correction.
5. Please avoid contacting HCO and resin-mold. The resin might infiltrate into the product, and it doesn’t meet the specification when the resin-mold is done to this product. These products after resin-mold will not be guaranteed.
6. Make sure that the terminals of this product are connected property on the land of circuit board, and the value falls in the rated heater resistance between Terminal P1 - P3 and P2 - P3.

All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Replacement

HCO is a non-repairable product. For safety aspect, it shall be replaced by an equivalent HCO, and mounted in the same way.

Storage

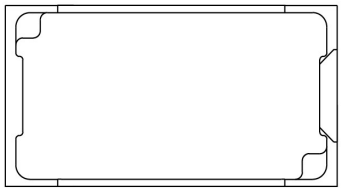
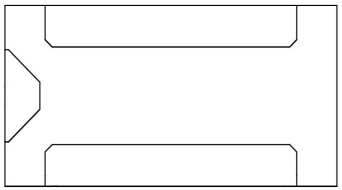
1. HCO must be stored in shaded area where it is not too dusty, with temp. (10 to 30) °C or less with no sudden temperature change, humidity within (30 to 70) % RH, and no corrosive gas in the air. please use them up within 1 year after receiving the goods .
2. This product's terminals use Ag plating. Ag terminals tend to easily get sulfurized or tarnished, please be cautious about their storage environment as follows.

(1) Unopen packages also must be stored under the storage condition described in Storage Section 1.

(2) After opening packages, products shall be sealed in a bag with high gas barrier property (e.g. aluminum laminated bag), and must be stored under the storage condition described in Storage Section 1.

All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

Heat CutOff (HCO) Features & Model List Overview

Rated Operation Voltage U_r (V)	Page	Model	Model
50		SGP-5030	SGP-5045
40		SGP-4030	SGP-4045
30		SGP-3030	SGP-3045
20		SGP-2030	SGP-2045
14		SGP-1430	SGP-1445
12		SGP-1230	SGP-1245
06		SGP-0630	○
I_r (A) Rated Current		30	45
U_r (VDC) Rated Voltage		100	
Product Structure			

+86-592-571-5838 www.SETfuse.com www.SETsafe.com E-mail : sales@SETfuse.com

All Rights Reserved by Xiamen SET Electronics Co., Ltd. 2024-2026 V1.0

www.SETsafe.com
www.SETfuse.com

20+

OVER 20 YEARS OF DESIGNING, MANUFACTURING AND SELLING OF CIRCUIT PROTECTION COMPONENTS

40+

SOLD TO MORE THAN 40 COUNTRIES AND REGIONS

Automatic

AUTOMATIC PROCESS PRODUCTION

500

A BRAND CHOSEN BY FORTUNE 500 COMPANIES

SET safe | SET fuse

NO. 8067, 8001 West Xiang'an Road,Torch High-tech industrial District, Xiang'an 361101 Xiamen P.R. China
+ 86 592-5715-838 sales@SETfuse.com

All Rights Reserved by Xiamen SET Electronics Co., Ltd. Ver. 2024 - 2026