



## ITV9550 45A Series



### Description

ITV9550 Series is a chip type surface mountable device that can protect against both overcurrent and overcharging. It comprises a fuse element to ensure stable operation under normal electrical current and to cut off the current when overcurrent occurs. It also comprises a resistive heating element that could be used in combination with a voltage detecting means, such as IC and FET. When overvoltage is detected, the heating element is electrically excited to generate heat to blow the fuse element to achieve overvoltage protection.

### Agency Approvals

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
	E10480	45 A
	TBD	45 A

### Thermal Derating Characteristics

Ambient Operating Temperature			
	25°C	40°C	60°C
Recommend Rated Current (A)	49.0	44.5	37.0



### Features

- Halogen Free
- Surface Mount
- Fast response
- Protection for both overcurrent and overcharging

### Applications

- Vacuum cleaner
- Power tools
- E-scooter
- E-bike
- UPS

### Electrical Characteristics

Part Number	Ordering Code	I <sub>rated</sub> (A)	Cells in Series	V <sub>max</sub> (Vdc)	I <sub>break</sub> (A)	V <sub>OP</sub> (V)	Resistance		Agency Approvals	
							R <sub>heater</sub> (Ω)	R <sub>fuse</sub> (mΩ)		
ITV9550L1245	ITV9550L1245MR	45	3	62	120	9.8 ~ 13.5	1.9 ~ 3.4	0.4 ~ 2.0	X	X
ITV9550L1445	ITV9550L1445MR	45	4	62	120	13.0 ~ 18.4	3.4 ~ 6.0	0.4 ~ 2.0	X	X
ITV9550L2045	ITV9550L2045MR	45	5	62	120	16.7 ~ 23.5	5.6 ~ 9.9	0.4 ~ 2.0	X	X
ITV9550L3045	ITV9550L3045MR	45	6~7	62	120	22.3 ~ 31.5	10.0 ~ 17.7	0.4 ~ 2.0	X	X
ITV9550L4045	ITV9550L4045MR	45	9~10	62	120	33.0 ~ 46.9	22.0 ~ 38.7	0.4 ~ 2.0	X	X
ITV9550L5045	ITV9550L5045MR	45	12~14	62	120	43.7 ~ 62.0	38.5 ~ 68.0	0.4 ~ 2.0	X	X
Current Capacity		100% x I <sub>rated</sub> No Melting								
Cut Time		200% x I <sub>rated</sub> < 1 min								
Interrupting Current		150A, power on 5 ms, power off 995 ms, 10000 cycles No Melting								
Over Voltage Operation		In operation voltage range, the fusing time is <1min.								

#### Notes:

I<sub>rated</sub> = Current carrying capacity that is measured at 40°C thermal equilibrium condition

I<sub>break</sub> = The current that the fuse element is able to interrupt

V<sub>max</sub> = The maximum voltage that can be cut off by fuse

V<sub>OP</sub> = Range of operation voltage

R<sub>heater</sub> = The resistance of the heating element

R<sub>fuse</sub> = The resistance of the fuse element

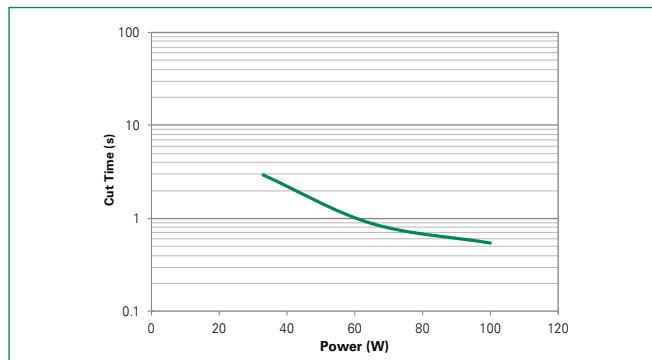
Cells in series = Number of battery cells connected in series in the circuit for ITV device to protect.

• Value specified is determined by using the PWB with 25mm\*2oz copper traces, AWG8 covered wire, and 0.6mm glass epoxy PCB.

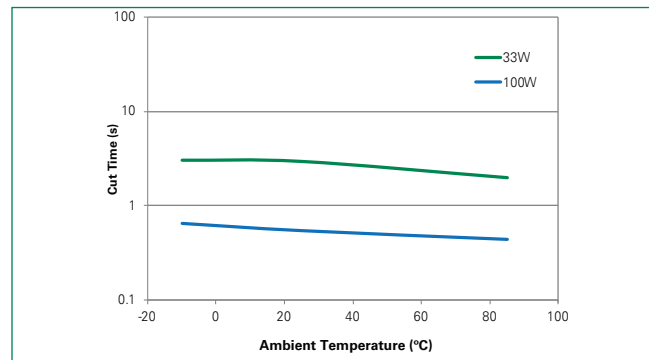
• Specifications are subject to change without notice.

## Cut Time by Heater Operation

Various heater wattage at 25°C ambient temperature

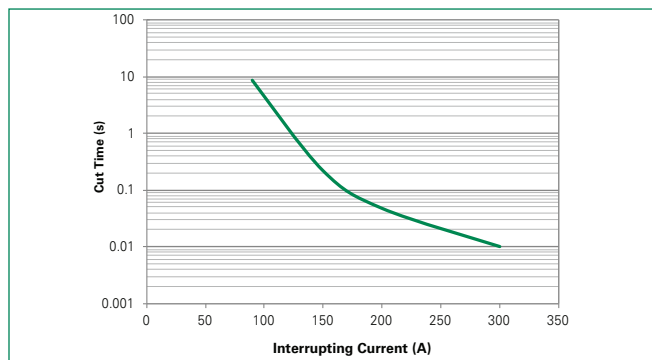


Constant heater wattage at various ambient temperature

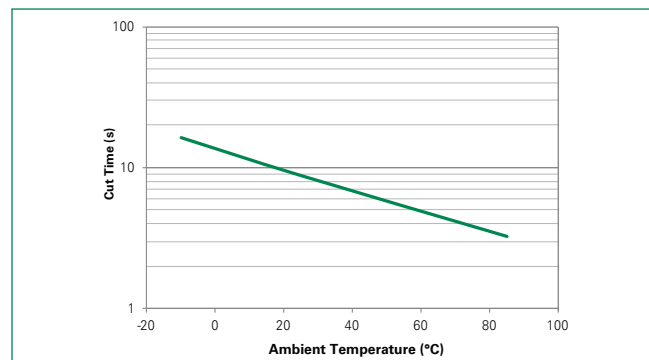


## Cut Time by Current Operation

Various interrupting current at 25°C ambient temperature



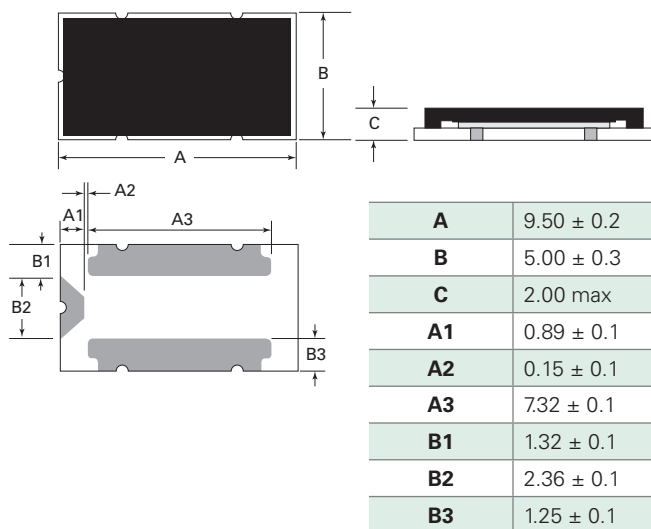
Constant 2x rated current at various ambient temperature



## Environmental Specifications

<b>Storage Temperature</b>	0~35°C, ≤70%RH 3 months after shipment
<b>Operating Temperature</b>	-10°C to +65°C
<b>Hot Passive Aging</b>	100±5°C, 250 hours No structural damage and functional failure
<b>Humidity Aging</b>	60°C±2°C, 90~95% R.H. 250 hours No structural damage and functional failure
<b>Cold Passive Aging</b>	-20±3°C, 500 hours No structural damage and functional failure
<b>Thermal Shock</b>	MIL-STD-202 Method 107G +125°C/-55°C, 100 times No structural damage and functional failure

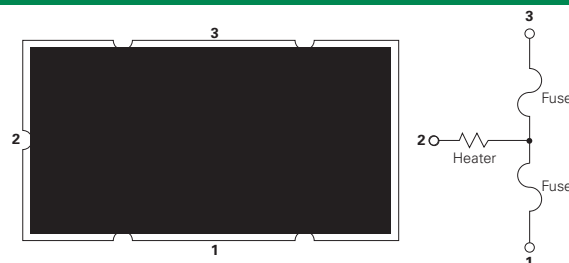
### Physical Dimension (mm)



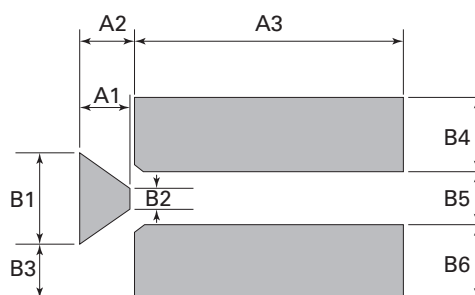
### Physical Specifications

<b>Material</b>	Glass Epoxy PCB
<b>Base Thickness</b>	0.6mm
<b>Copper Thickness</b>	0.07mm
<b>Covered Wire</b>	AWG8

### Device Circuit



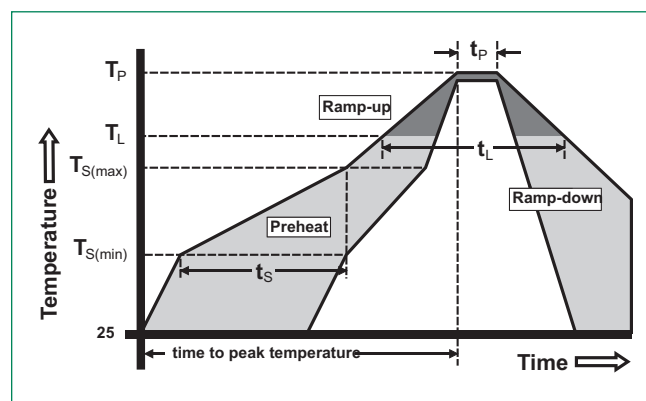
### Board and Solder Layout Recommend (mm)



<b>A1</b>	$1.30 \pm 0.1$
<b>A2</b>	$1.52 \pm 0.1$
<b>A3</b>	$7.60 \pm 0.1$
<b>B1</b>	$3.10 \pm 0.1$
<b>B2</b>	$0.75 \pm 0.1$
<b>B3</b>	$1.95 \pm 0.1$
<b>B4</b>	$2.50 \pm 0.1$
<b>B5</b>	$2.00 \pm 0.1$
<b>B6</b>	$2.50 \pm 0.1$

### Soldering Parameters

<b>Average Ramp-Up Rate (<math>T_{s_{max}}</math> to <math>T_P</math>)</b>		3°C/second max.
<b>Preheat</b>	<b>Temperature Min (<math>T_{s_{min}}</math>)</b>	150°C
	<b>Temperature Max (<math>T_{s_{max}}</math>)</b>	200°C
	<b>Time (<math>T_{s_{min}}</math> to <math>T_{s_{max}}</math>)</b>	60-120 seconds
<b>Time maintained above:</b>	<b>Temperature (<math>T_L</math>)</b>	217°C
	<b>Time (<math>t_L</math>)</b>	60-105 seconds
<b>Peak Temperature (<math>T_P</math>)</b>		255°C
<b>Time within 5°C of actual Peak Temperature (<math>t_P</math>)</b>		5 seconds max.
<b>Ramp-Down Rate</b>		6°C/second max.
<b>Time 25°C to Peak Temperature</b>		8 minutes max.



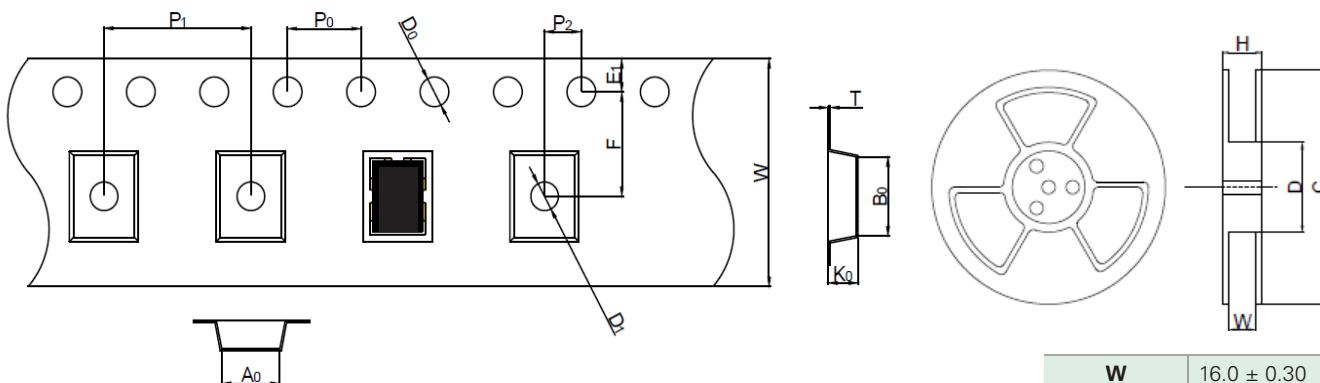
– All temperature refer to topside of the package, measured on the package body surface  
– If reflow temperature exceeds the recommended profile, devices may not meet the performance requirements

The schematic diagram illustrates the battery protection circuit for the PowerLite 12.6V 4.5Ah battery pack. The circuit includes the following components and connections:

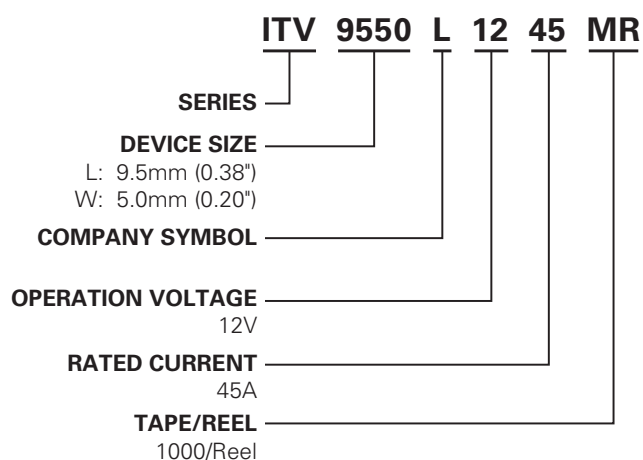
- Power Adapter** and **Laptop**: These are the external loads connected to the battery pack.
- ITV Module**: A module with three terminals (1, 2, 3) and a resistor. Terminal 1 is connected to the positive terminal of the battery pack ( $V_{pack+}$ ). Terminal 2 is connected to the negative terminal of the battery pack ( $V_{pack-}$ ). Terminal 3 is connected to the positive terminal of the battery pack ( $V_{pack+}$ ).
- Over-discharge Protection**: A diode connected in series with the negative terminal of the battery pack.
- Over-charge Protection**: A diode connected in series with the positive terminal of the battery pack.
- PPTC**: A Positive Temperature Coefficient (PTC) resistor connected in series with the positive terminal of the battery pack.
- Charge Control, Protection & Monitoring Circuitry**: A central control unit that monitors the battery pack's voltage and current. It is connected to the positive and negative terminals of the battery pack and the PPTC resistor.
- SP1003 x 4**: Four Schottky diodes connected in parallel between the positive and negative terminals of the battery pack.
- Current Sensor**: A resistor connected in series with the positive terminal of the battery pack.
- TCO**: A Temperature Coefficient of Resistance (TCR) resistor connected in series with the positive terminal of the battery pack.

- Before and after mounted, the ultrasonic-cleaning or immersion-cleaning must not be done to ITV device. The flux on element would flow, and it would not be satisfied its specification when cleaning is done. In addition, a similar influence happens when the product comes in contact with cleaning solution. These products after cleaning will not be guaranteed.
- Silicone-based oils, oils, solvents, gels, electrolytes, fuels, acids, and similar will adversely affect the properties of ITV devices, and shall not be used or applied.
- Please DO NOT reuse the ITV device removed by the soldering process.
- ITV devices are secondary protection devices and are used solely for sporadic, accidental overcurrent or overtemperature error condition, and shall NOT be used if or when constant or repeated fault conditions (such fault conditions may be caused by, among others, incorrect pin-connection of a connector) or over-extensive trip events may occur.
- Operation over the maximum rating or other forms of improper use may cause failure, arcing, flame and/or other damage to the ITV devices.
- The performance of ITV devices will be adversely affected if they are improperly used under electronic, thermal and/or mechanical procedures and/or conditions non-conformant to those recommended by manufacturer.
- Customers shall be responsible for determining whether it is necessary to have back-up, failsafe and/or fool-proof protection to avoid or minimize damage that may result from extra-ordinary, irregular function or failure of ITV devices.
- There should be minimum of 0.1mm spacing between ITV and surrounding compounds, to maintain the product characteristics and avoid damage other surrounding compounds.
- This product is designed and manufactured only for general-use of electronics devices. We do not recommend that it is used for the applications military, medical and so on which may cause direct damages on life, bodies or properties.

## Tape and Reel Specifications (mm)

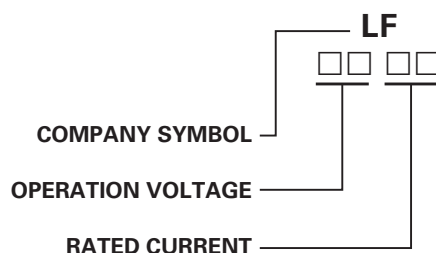


## Part Numbering System



<b>W</b>	16.0 ± 0.30
<b>F</b>	7.50 ± 0.10
<b>E1</b>	1.75 ± 0.10
<b>D0</b>	1.50 ± 0.10
<b>D1</b>	1.50 ± 0.10
<b>P0</b>	4.00 ± 0.10
<b>P1</b>	8.00 ± 0.10
<b>P2</b>	2.00 ± 0.10
<b>A0</b>	5.40 ± 0.10
<b>B0</b>	9.85 ± 0.10
<b>T</b>	0.30 ± 0.05
<b>K0</b>	2.48 ± 0.10
<b>H</b>	22.4 ± 0.1
<b>W</b>	16.4 ± 1.5
<b>D</b>	Ø100 ± 0.5
<b>C</b>	Ø330 ± 1.0

## Part Marking System



## Packaging

Part Number	Tape and Reel Quantity
ITV9550LXX45	1,000

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