LP-USML-HFSeries

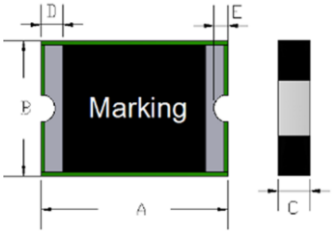
Current Sensing Resistor

Features

- Small size of 3225mm/1210mils
- Lead-free and compliant with the European Union RoHS Directive (EU)2015/863
- Fast tripping resettable circuit protection
- Surface mount packaging for automated assembly
- Normal working temperature with -40ºC ~85ºC
- Agency Recognition: UL 、TUV

Product Dimension (mm)

Part number	A	B	C	D	E
	Max.	Max.	Max.	Min.	Min.
LP-USML350HF	3.55	2.75	0.60	0.25	0.05
LP-USML350/12HF	3.55	2.75	1.00	0.25	0.05
LP-USML400HF	3.55	2.75	0.60	0.25	0.05
LP-USML400/12HF	3.55	2.75	1.00	0.25	0.05
LP-USML450HF	3.55	2.75	1.00	0.25	0.05
LP-USML450/12HF	3.55	2.75	1.00	0.25	0.05
LP-USML500HF	3.55	2.75	1.00	0.25	0.05
LP-USML500/12HF	3.55	2.75	1.20	0.25	0.05
LP-USML550HF	3.55	2.75	1.00	0.25	0.05
LP-USML550/12HF	3.55	2.75	1.20	0.25	0.05
LP-USML600HF	3.55	2.75	1.00	0.25	0.05
LP-USML600/12HF	3.55	2.75	1.20	0.25	0.05
LP-USML650HF	3.55	2.90	1.00	0.25	0.05
LP-USML700HF	3.55	2.90	1.00	0.25	0.05
LP-USML750HF	3.55	2.90	1.00	0.25	0.05
LP-USML800HF	3.55	2.90	1.20	0.25	0.05
LP-USML850HF	3.55	2.90	1.20	0.25	0.05
LP-USML900HF	3.55	2.90	1.20	0.25	0.05
LP-USML1000HF	3.55	2.90	1.20	0.25	0.05



Electrical Characteristics

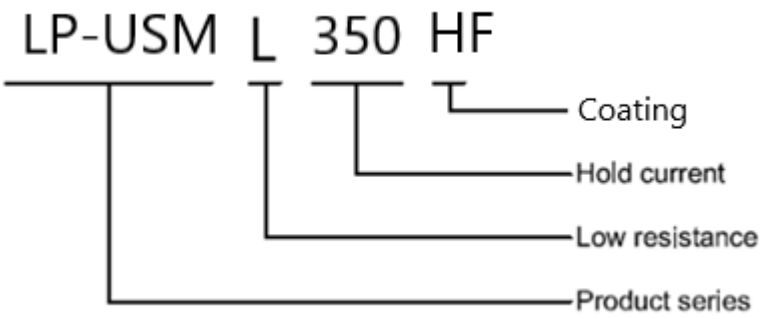
Part number	I_H	I_T	V_{max}	I_{max}	Max.Time-to-trip		Pd_{typ}	R_{min}	R_{1max}
	(A)	(A)	(V)	(A)	(A)	(S)	(W)	(Ω)	(Ω)
LP-USML350HF	3.50	7.00	6	50	17.50	5.0	1.5	0.002	0.018
LP-USML350/12HF	3.50	7.00	12	50	17.50	5.0	1.5	0.002	0.018
LP-USML400HF	4.00	8.00	6	50	20.00	5.0	1.5	0.002	0.016
LP-USML400/12HF	4.00	8.00	12	50	20.00	5.0	1.5	0.002	0.016
LP-USML450HF	4.50	9.00	6	50	22.50	5.0	1.5	0.002	0.014
LP-USML450/12HF	4.50	9.00	12	50	22.50	5.0	1.5	0.002	0.014
LP-USML500HF	5.00	10.00	6	50	25.00	5.0	1.5	0.002	0.012
LP-USML500/12HF	5.00	10.00	12	50	25.00	5.0	1.5	0.002	0.012
LP-USML550HF	5.50	11.00	6	50	27.50	5.0	1.5	0.002	0.010
LP-USML550/12HF	5.50	11.00	12	50	27.50	5.0	1.5	0.002	0.010
LP-USML600HF	6.00	12.00	6	50	30.00	5.0	1.5	0.001	0.010
LP-USML600/12HF	6.00	12.00	12	50	30.00	5.0	1.5	0.001	0.010
LP-USML650HF	6.50	13.00	6	50	32.50	5.0	1.5	0.001	0.009
LP-USML700HF	7.00	14.00	6	50	35.00	5.0	1.5	0.001	0.008
LP-USML750HF	7.50	15.00	6	50	37.50	5.0	1.5	0.001	0.007
LP-USML800HF	8.00	16.00	6	50	40.00	5.0	1.5	0.001	0.006
LP-USML850HF	8.50	17.00	6	50	42.50	5.0	1.5	0.001	0.006
LP-USML900HF	9.00	18.00	6	50	45.00	5.0	1.5	0.001	0.005
LP-USML1000HF	10.00	20.00	6	50	50.00	5.0	1.5	0.001	0.004

I_H=Hold current: maximum current at which the device will not trip at 25°C still air.
I_T=Trip current: minimum current at which the device will always trip at 25°C still air.
V_{max}=Maximum voltage device can withstand without damage at rated current.
I_{max}=Maximum fault current device can withstand without damage at rated voltage.
Max. Time-to-trip =Maximum time to trip(s) at assigned current.
Pd_{typ}=Typical power dissipation: typical amount of power dissipated by the device when in state air environment.
R_{min}=Minimum device resistance at 25°C prior to tripping.
R_{1max}=Maximum device resistance measured in the nontripped state 1 hour post one reflow.

Thermal Derating

Part number	Maximum Ambient Temperature								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
LP-USML350HF	5.18	4.67	4.06	3.50	3.08	2.71	2.47	2.15	1.68
LP-USML350/12HF	5.18	4.67	4.06	3.50	3.08	2.71	2.47	2.15	1.68
LP-USML400HF	5.92	5.33	4.64	4.00	3.52	3.09	2.83	2.45	1.93
LP-USML400/12HF	5.92	5.33	4.64	4.00	3.52	3.09	2.83	2.45	1.93
LP-USML450HF	6.12	5.39	5.16	4.50	3.85	3.35	3.00	2.56	2.01
LP-USML450/12HF	6.12	5.39	5.16	4.50	3.85	3.35	3.00	2.56	2.01
LP-USML500HF	7.40	6.67	5.80	5.00	4.40	3.87	3.53	3.07	2.40
LP-USML500/12HF	7.40	6.67	5.80	5.00	4.40	3.87	3.53	3.07	2.40
LP-USML550HF	8.14	7.34	6.38	5.50	4.84	4.26	3.88	3.38	2.64
LP-USML550/12HF	8.14	7.34	6.38	5.50	4.84	4.26	3.88	3.38	2.64
LP-USML600HF	8.65	7.91	6.93	6.00	5.23	4.45	4.00	3.63	2.85
LP-USML600/12HF	8.65	7.91	6.93	6.00	5.23	4.45	4.00	3.63	2.85
LP-USML650HF	9.20	8.45	7.45	6.50	5.60	4.65	4.30	3.89	3.00
LP-USML700HF	9.84	9.00	7.95	7.00	5.96	4.95	4.50	4.16	3.20
LP-USML750HF	10.50	9.65	8.50	7.50	6.40	5.30	4.80	4.45	4.42
LP-USML800HF	10.85	10.25	8.85	8.00	7.20	5.80	5.50	5.50	4.60
LP-USML850HF	11.25	10.50	9.25	8.50	7.50	6.20	6.10	5.70	4.80
LP-USML900HF	13.05	11.70	10.40	9.00	8.00	7.35	6.75	6.05	5.00
LP-USML1000HF	13.60	12.50	10.90	10.00	9.00	8.15	7.05	6.45	5.70

Part Numbering System

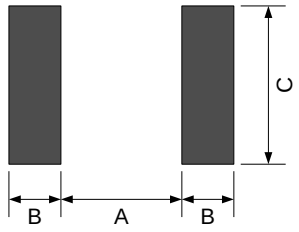


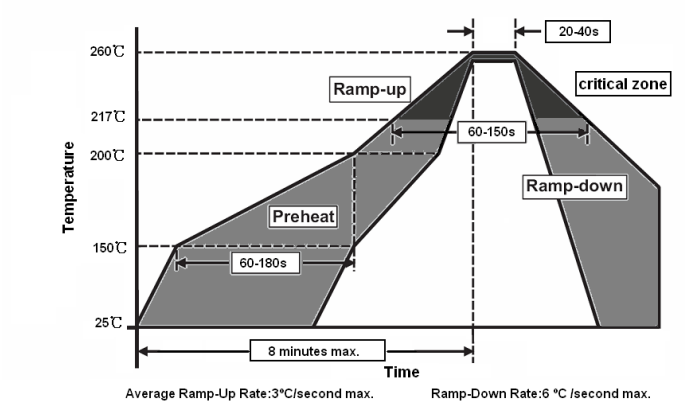
Test Procedures And Requirements

Test	Test Conditions	Accept/Reject Criteria
Resistance	In still air @ 25°C	$R_{min} \leqslant R \leqslant R_{max}$
Time to Trip	Specified current, V_{max}, 25°C	T≤maximum Time to Trip
Hold Current	60min, at I_H	No trip
Trip Cycle Life	V_{max}, I_{max}, 100cycles	No arcing or burning
Trip Endurance	V_{max}, 2hours	No arcing or burning

Packaging and Marking Information

Part number	Tape & Reel Quantity	Tape spc code	Part Marking	Recommended Pad Layout Figures[mm]			Agency Recognition
				Dimension A(Nom.)	Dimension B(Nom.)	Dimension C(Nom.)	
LP-USML350HF	4000	1210A	D5	2.0	1.0	2.2	UL,TUV
LP-USML350/12HF	4000	1210A	D5	2.0	1.0	2.2	UL,TUV
LP-USML400HF	4000	1210A	D7	2.0	1.0	2.2	UL,TUV
LP-USML400/12HF	4000	1210A	D7	2.0	1.0	2.2	UL,TUV
LP-USML450HF	4000	1210A	D9	2.0	1.0	2.2	UL,TUV
LP-USML450/12HF	4000	1210A	D9	2.0	1.0	2.2	UL,TUV
LP-USML500HF	4000	1210A	D-	2.0	1.0	2.2	UL,TUV
LP-USML500/12HF	4000	1210A	D2	2.0	1.0	2.2	UL,TUV
LP-USML550HF	4000	1210A	D9	2.0	1.0	2.2	UL,TUV
LP-USML550/12HF	4000	1210A	D2	2.0	1.0	2.2	UL,TUV
LP-USML600HF	4000	1210A	B6	2.0	1.0	2.2	UL,TUV
LP-USML600/12HF	4000	1210A	B6	2.0	1.0	2.2	UL,TUV
LP-USML650HF	4000	1210A	B65	2.0	1.0	2.5	UL,TUV
LP-USML700HF	4000	1210A	B7	2.0	1.0	2.5	UL,TUV
LP-USML750HF	4000	1210A	B75	2.0	1.0	2.5	UL,TUV
LP-USML800HF	4000	1210B	B8	2.0	1.0	2.5	UL
LP-USML850HF	4000	1210B	B85	2.0	1.0	2.5	UL
LP-USML900HF	4000	1210B	B9	2.0	1.0	2.5	UL
LP-USML1000HF	3500	1210B	B10	2.0	1.0	2.5	UL





* commended reflow methods: IR, Vapor phase, hot air oven.

Notes:

- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Devices are not designed to be wave soldered to the bottom side of the board.

Package Information

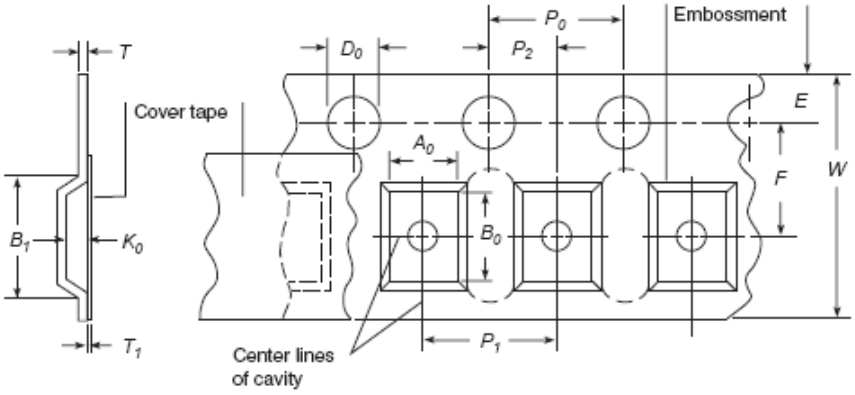
Tape & Reel: 4000pcs per reel.

Effectivity: Reference documents shall be the issue in effect on the date of invitation for bid.

Caution: Operation beyond the rated voltage or current may result in rupture electrical arcing or flame.

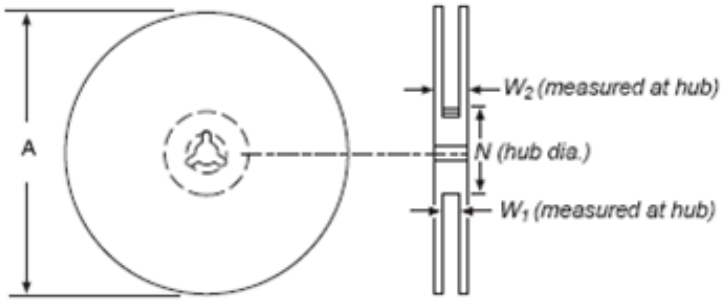
Tape Specification And Reel Dimensions

1210(A)	W	P0	P1	P2	A0	B0
	8.00±0.20	4.00±0.10	4.00±0.10	2.00±0.10	2.87±0.20	3.56±0.20
	D0	F	E	T	K0	/
	1.50-0/+0.1	3.50±0.05	1.75±0.10	0.22±0.05	1.03±0.10	/
1210(B)	W	P0	P1	P2	A0	B0
	8.00±0.20	4.00±0.10	4.00±0.10	2.00±0.10	3.00±0.20	3.75±0.20
	D0	F	E	T	K0	/
	1.50-0/+0.1	3.50±0.05	1.75±0.10	0.22±0.05	1.25±0.10	/



Reel Dimensions

Tape spc code	A	N	W_1	W_2
1210	180+0/-1.5	60+1/-0	9.0+1/-0	13.0+1/-0



Contact Information

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Product Specification Statement

1.The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2.The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

3.WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

4.Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

5.The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.

6.Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. WAYON shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.

Cautions for SMD PTC Use

1.Operation beyond the maximum voltage or current may result in device damage, PTC arcing, resistance increasing, even burning.

2.The Hold current specified at different temperatures in the datasheet is the conventional performance of after one reflow welding. PTC can hold 1 hour at the current corresponding to different temperatures. But this current is not the condition that PTC can charging or discharging current for long time.

3.All resistance and the electronic characteristics specified in the datasheet are based on the test tested on the specified testing board which is after one reflow welding. The applicability needs to be verified because above parameters may be attenuated if customer has other processes, like twice soldering or injection.

4.PTC is thermal sensitive device. It is recommended that no heat source devices be designed to around in order to reduce the outside heat source impact.

5.SMD PTC is designed for SMT technology, and its reflow soldering. Please refer to the Wayon recommended soldering curve. If the soldering temperature exceeds the recommended value, the PTC might be damaged. Manual PTC welding is prohibited. Heat gun is not allowed to use in the rework of other components on the board.

6.When assembling and applying PTC, the material mark and application parameters (Temperature, Time, and etc.) of all injection or plastic materials, like dhesives, silica gels and etc. should be verified to ensure the consistency between the products and the processing technology. Only it is confirmed that would not influent PTC then can be used.

7.When assembling and applying PTC, it is not recommended that using washer water or other cleaner to clean PTC. If it is required, it is necessary to verify the applicability of various cleaner, washer water and solvents, it is also confirmed that they will not affect the PTC performance. Chemicals that are known to have an effect on PTC include, but are not limited to, highly solubility and destructive organic compounds such as ethers, benzenes, ketones, and lipids. Placing the product in open environment for at least 24 hours to volatilize the residual solvents.

8.Please do not smash, clamp, pull, dent, twist and etc. to PTC during assembling process to avoid the performance degradation.

9.In the application, after the PTC soldered in the board, please finish the injection or glue as soon as possible. IF the time lag between the injection and glue more than 1 month, PTC needs to reserve in the closed space so as to avoid PTC expose to the air too long.

10.PTC is resettable protector, which shall not be used as switch. The hold current will reduced after repeated tripping.

11.If PTC applied in the charging terminal, the PP material is recommended as inner membrane, TPE or PVC materials are prohibited.

12.The MSL level of SMD PTC is 2a, which is sealed packed. If any damaged package is found by customer, please isolate them. If there is rest parts, needs repack it as the previous package and reserve hermetically.

13.When the product is finally discarded, it can be treated recycled in accordance with local laws and regulations, and raw material compositions of PPTC can be referred to MSDS.