

**RoHS  HF 435 Series Fuse**

**Description**

The 435 Series are fast-acting surface mount thin-film fuses. Their ultra-small size (0402 size) makes them ideal for secondary protection of circuits used in space constrained applications such as hand-held portable electronic devices.

This series is 100% lead-free and meet the requirements of the RoHS directive. New Halogen-Free 435 Series fuses are available—to order use the “HF” suffix. See Part Numbering section for additional information.

**Features**

- 35A interrupt rating at 32VDC
- Small size with current ratings of 0.25 to 5.0 amperes
- RoHS compliant, lead-free and halogen-free
- Maximum protection of sensitive circuits as fuses are designed to open consistently in <5sec at 200% overload.
- Enhanced Breaking Capacity, High I<sup>2</sup>t

**Agency Approvals**

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
	E10480	0.250 - 5.0A
	LR 29862	0.250 - 5.0A

**Electrical Characteristics for Series**

% of Ampere Rating	Ampere Rating	Opening Time at 25°C
100%	0.250A - 5A	4 hours, Minimum
200%	0.375A - 5A	5 secs., Maximum
300%	0.250A	5 secs., Maximum
300%	0.375A - 5A	0.2 sec., Maximum

**Applications**

Secondary protection for space constrained applications such as:

- Cell phones
- Battery packs
- Digital cameras
- DVD players
- Hard disk drives.

**Electrical Specifications by Item**

Ampere Rating (A)	Amp Code	Max Voltage Rating (V)	Interrupting Rating	Nominal Cold Resistance (Ohms)	Nominal Melting I <sup>2</sup> t (A <sup>2</sup> sec)	Nom Voltage Drop (mV)	Nom Power Dissipation (W)	Agency Approvals	
									
0.250	.250	32	35A @32V DC	0.2265	0.0025	60.67	0.01517	x	x
0.375	.375	32		0.1930	0.0035	84.64	0.03174	x	x
0.500	.500	32		0.1600	0.0053	93.35	0.04668	x	x
0.750	.750	32		0.1050	0.0120	101.84	0.07638	x	x
1.00	001.	32		0.0730	0.0200	87.45	0.08745	x	x
1.25	1.25	32		0.0600	0.0350	96.37	0.12046	x	x
1.50	01.5	32		0.0470	0.0560	86.70	0.13005	x	x
1.75	1.75	32		0.0390	0.0750	81.13	0.14198	x	x
2.00	002.	32		0.0300	0.1000	70.62	0.14120	x	x
2.50	02.5	32		0.0185	0.1560	55.25	0.13813	x	x
3.00	003.	32		0.0165	0.2032	60.58	0.18740	x	x
3.50	03.5	32		0.0135	0.3017	57.84	0.20244	x	x
4.00	004.	32		0.0115	0.3084	57.00	0.22800	x	x
5.00	005.	32		0.0085	0.5310	52.44	0.26220	x	x

1. Measured at 10% of rated current, 25°C.

2. Measured at rated voltage.

## Temperature Derating Curve



Note:

1. Derating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

Example:

For continuous operation at 70 degrees celsius, the fuse should be derated as follows:

$$I = (0.75)(0.80)I_{RAT} = (0.60)I_{RAT}$$

2. The temperature derating curve represents the nominal conditions. For questions about temperature derating curve, please consult Littelfuse technical support for assistance.

## Average Time Current Curves



## Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (Min to Max) ( $t_s$ )	60 – 120 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		5°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		5°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		250 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		260°C



Wave Soldering	260°C, 10 seconds max.
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### Product Characteristics

<b>Materials</b>	<b>Body:</b> Epoxy / Glass Substrate; Parts with 'HF' suffix: Halogen Free Epoxy / Glass <b>Terminations:</b> 100% Tin over Nickel over Copper <b>Device Weight:</b> 0.316mg
<b>Terminal Strength</b>	MIL-STD-202F, Method 211A, Test Condition A
<b>Insulation Resistance</b>	After Opening: Greater than 10,000Ohms

<b>Operating Temperature</b>	-55°C to 90°C. Consult temperature derating curve chart. For operation above 90°C please contact Littelfuse.
<b>Thermal Shock</b>	Withstands 5 cycles of -55°C to 125°C
<b>Vibration</b>	MIL-STD-202F

### Dimensions



	A	B	C	D
inch min	0.037	0.018	0.008	0.005
inch max	0.041	0.022	0.016	0.012
mm min	0.94	0.457	0.190	0.127
mm max	1.04	0.559	0.394	0.305

### Part Marking System

Amp Code	Marking Code
.250	⊠X⊠
.375	⊠⊠⊠
.500	⊠·⊠
.750	⊠⊠⊠
001.	⊠⊠⊠
1.25	⊠·⊠
01.5	⊠⊠⊠
1.75	⊠⊠⊠
002.	⊠·⊠
02.5	⊠⊠⊠
003.	⊠⊠⊠
03.5	⊠⊠⊠
004.	⊠⊠⊠
005.	⊠⊠⊠

### Part Numbering System



### Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
8mm Tape and Reel	EIA-481 Rev. D (IEC 60286, part 3)	10000	KR