

### 72R Series



#### Description

The 72R Series is designed to provide overcurrent protection to 72Vdc maximum voltage with a maximum 40A short circuit rating.

#### Features

- 72Vdc max voltage w/max 40A short circuit rating
- RoHS compliant, Lead-Free and Halogen Free\*
- Resettable feature
- Ideal for a broad range of general electronics using a low voltage power supply

#### Applications

- Load protection on wide range of low voltage power supplies
- Computers
- Computer peripherals
- General electronics

#### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E183209
	R50119318

#### Electrical Characteristics

Part Number	I <sub>hold</sub> (A)	I <sub>trip</sub> (A)	V <sub>max</sub> (Vdc)	I <sub>max</sub> (A)	P <sub>d</sub> typ. (W)	Maximum Time To Trip		Resistance		Agency Approvals	
						Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>1max</sub> (Ω)		
72R020X	0.20	0.40	72	40	0.41	1.00	2.20	1.830	4.400	X	X
72R025X	0.25	0.50	72	40	0.45	1.25	2.50	1.250	3.000	X	X
72R030X	0.30	0.60	72	40	0.49	1.50	3.00	0.880	2.100	X	X
72R040X	0.40	0.80	72	40	0.56	2.00	3.80	0.550	1.290	X	X
72R050X	0.50	1.00	72	40	0.77	2.50	4.00	0.500	1.170	X	X
72R065X	0.65	1.30	72	40	0.88	3.25	5.30	0.310	0.720	X	X
72R075X	0.75	1.50	72	40	0.92	3.75	6.30	0.250	0.600	X	X
72R090X	0.90	1.80	72	40	0.99	4.50	7.20	0.200	0.470	X	X
72R110X	1.10	2.20	72	40	1.50	5.50	8.20	0.150	0.380	X	X
72R135X	1.35	2.70	72	40	1.70	6.75	9.60	0.120	0.300	X	X
72R160X	1.60	3.20	72	40	1.90	8.00	11.40	0.090	0.220	X	X
72R185X	1.85	3.70	72	40	2.10	9.25	12.60	0.080	0.190	X	X
72R250X	2.50	5.00	72	40	2.50	12.50	15.60	0.050	0.130	X	X
72R300X	3.00	6.00	72	40	2.80	15.00	19.80	0.040	0.100	X	X
72R375X	3.75	7.50	72	40	3.20	18.75	24.00	0.030	0.080	X	X

I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20°C still air.

V<sub>max</sub> = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>)

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>)

P<sub>d</sub> = Power dissipated from device when in the tripped state at 20°C still air.

R<sub>min</sub> = Minimum resistance of device in initial (un-soldered) state.

R<sub>1max</sub> = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

**Caution:** Operation beyond the specified rating may result in damage and possible arcing and flame.

\* Effective January 1, 2010, all 72R PTC products will be manufactured Halogen Free (HF). Existing Non-Halogen Free 72R PTC products may continue to be sold, until supplies are depleted.

### Temperature Derating

Part Number	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
72R020X	0.31	0.27	0.24	0.20	0.16	0.14	0.13	0.11	0.08
72R025X	0.39	0.34	0.30	0.25	0.20	0.18	0.16	0.14	0.10
72R030X	0.47	0.41	0.36	0.30	0.24	0.22	0.19	0.16	0.12
72R040X	0.62	0.54	0.48	0.40	0.32	0.29	0.25	0.22	0.16
72R050X	0.78	0.68	0.60	0.50	0.41	0.36	0.32	0.27	0.20
72R065X	1.01	0.88	0.77	0.65	0.53	0.47	0.41	0.35	0.26
72R075X	1.16	1.02	0.89	0.75	0.61	0.54	0.47	0.41	0.30
72R090X	1.40	1.22	1.07	0.90	0.73	0.65	0.57	0.49	0.36
72R110X	1.71	1.50	1.31	1.10	0.89	0.79	0.69	0.59	0.44
72R135X	2.09	1.84	1.61	1.35	1.09	0.97	0.85	0.73	0.54
72R160X	2.48	2.18	1.90	1.60	1.30	1.15	1.01	0.86	0.64
72R185X	2.87	2.52	2.20	1.85	1.50	1.33	1.17	1.00	0.74
72R250X	3.88	3.40	2.98	2.50	2.03	1.80	1.58	1.35	1.00
72R300X	4.65	4.08	3.57	3.00	2.43	2.16	1.89	1.62	1.20
72R375X	5.81	5.10	4.46	3.75	3.04	2.70	2.36	2.03	1.50

### Average Time Current Curves



The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

### Temperature Derating Curve



Note:  
Typical Temperature derating curve, refer to table for derating data

### Soldering Parameters - Wave Soldering

<b>Pre-Heating Zone</b>	Refer to the condition recommended by the flux manufacturer. Max. ramping rate should not exceed 4°C/Sec.
<b>Soldering Zone</b>	Max. solder temperature should not exceed 260°C Time within 5°C of actual Max. solder temperature within 3 - 5 seconds Total time from 25°C room to Max. solder temperature within 5 minutes including Pre-Heating time
<b>Cooling Zone</b>	Cooling by natural convection in air. Max. ramping down rate should not exceed 6°C/Sec.



### Physical Specifications

<b>Lead Material</b>	0.20-0.40A: Tin-plated Copper clad steel 0.50-3.75A: Tin-plated Copper
<b>Soldering Characteristics</b>	Solderability per MIL-STD-202, Method 208
<b>Insulating Material</b>	Cured, flame retardant epoxy polymer meets UL 94V-0 requirements.
<b>Lead Solderability</b>	Marked with 'LF', voltage, current rating, and date code.

### Environmental Specifications

<b>Operating/Storage Temperature</b>	-40°C to +85°C
<b>Maximum Device Surface Temperature in Tripped State</b>	125°C
<b>Passive Aging</b>	+85°C, 1000 hours -/+5% typical resistance change
<b>Humidity Aging</b>	+85°C, 85% R.H. 1000 hours -/+5% typical resistance change
<b>Thermal Shock</b>	+85°C to -40°C 10 times -/+5% typical resistance change
<b>Solvent Resistance</b>	MIL-STD-202, Method 215
<b>Moisture Sensitivity Level</b>	Level 1, J-STD-020

### Additional Information



Datasheet



Resources



Samples

### Dimensions



### Part Marking System



Part Number	A		B		C		D		E		F		Physical Characteristics		
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Lead (dia)		Material
	Max.	Max.	Max.	Max.	Typ.	Typ.	Min.	Min.	Max.	Max.	Typ.	Typ.	Inches	mm	
72R020X	0.29	7.4	0.46	11.7	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/CuFe
72R025X	0.29	7.4	0.50	12.7	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/CuFe
72R030X	0.29	7.4	0.50	12.7	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/CuFe
72R040X	0.30	7.6	0.53	13.5	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/CuFe
72R050X	0.31	7.9	0.54	13.7	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/Cu
72R065X	0.37	9.4	0.57	14.5	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/Cu
72R075X	0.40	10.2	0.60	15.2	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/Cu
72R090X	0.44	11.2	0.62	15.8	0.20	5.1	0.30	7.6	0.12	3.1	0.047	1.2	0.02	0.51	Sn/Cu
72R110X	0.51	13.0	0.72	18.2	0.20	5.1	0.30	7.6	0.12	3.1	0.055	1.4	0.03	0.81	Sn/Cu
72R135X	0.53	13.58	0.78	19.8	0.20	5.1	0.30	7.6	0.12	3.1	0.055	1.4	0.03	0.81	Sn/Cu
72R160X	0.60	15.36	0.85	21.6	0.20	5.1	0.30	7.6	0.12	3.1	0.055	1.4	0.03	0.81	Sn/Cu
72R185X	0.66	16.76	0.91	23.0	0.20	5.1	0.30	7.6	0.12	3.1	0.055	1.4	0.03	0.81	Sn/Cu
72R250X	0.78	19.93	1.03	26.2	0.40	10.2	0.30	7.6	0.12	3.1	0.055	1.4	0.03	0.81	Sn/Cu
72R300X	0.91	23.11	1.15	29.3	0.40	10.2	0.30	7.6	0.12	3.1	0.055	1.4	0.03	0.81	Sn/Cu
72R375X	1.04	26.3	1.22	31.1	0.40	10.2	0.30	7.6	0.12	3.1	0.055	1.4	0.03	0.81	Sn/Cu

### Part Ordering Number System



### Packaging

Part Number	Ordering Part Number	$I_{hold}$ (A)	$I_{hold}$ Code	Packaging Option	Quantity	Quantity & Packaging Codes
72R020X	72R020XU	0.20	020	Bulk	500	U
	72R020XPR			Tape and Ammo	2000	PR
72R025X	72R025XU	0.25	025	Bulk	500	U
	72R025XPR			Tape and Ammo	2000	PR
72R030X	72R030XU	0.30	030	Bulk	500	U
	72R030XPR			Tape and Ammo	2000	PR
72R040X	72R040XU	0.40	040	Bulk	500	U
	72R040XPR			Tape and Ammo	2000	PR
72R050X	72R050XU	0.50	050	Bulk	500	U
	72R050XPR			Tape and Ammo	2000	PR
72R065X	72R065XU	0.65	065	Bulk	500	U
	72R065XPR			Tape and Ammo	2000	PR
72R075X	72R075XU	0.75	075	Bulk	500	U
	72R075XPR			Tape and Ammo	2000	PR
72R090X	72R090XU	0.90	090	Bulk	500	U
	72R090XPR			Tape and Ammo	2000	PR
72R110X	72R110XU	1.10	110	Bulk	500	U
	72R110XMR			Tape and Ammo	1000	MR
72R135X	72R135XF	1.35	135	Bulk	200	F
	72R135XMR			Tape and Ammo	1000	MR
72R160X	72R160XF	1.60	160	Bulk	200	F
	72R160XMR			Tape and Ammo	1000	MR
72R185X	72R185XF	1.85	185	Bulk	200	F
	72R185XMR			Tape and Ammo	1000	MR
72R250X	72R250XF	2.50	250	Bulk	200	F
	72R250XMR			Tape and Ammo	1000	MR
72R300X	72R300XF	3.00	300	Bulk	200	F
	72R300XMR			Tape and Ammo	1000	MR
72R375X	72R375XH	3.75	375	Bulk	100	H

### Tape and Ammo Specifications

Devices taped using EIA468-B/IE286-2 standards. See table below and Figure 1 for details.

Dimension	EIA Mark	IEC Mark	Dimensions	
			Dim. (mm)	Tol. (mm)
Carrier tape width	<b>W</b>	<b>W</b>	18	-0.5 / +1.0
Hold down tape width	<b>W<sub>4</sub></b>	<b>W<sub>0</sub></b>	11	min.
Top distance between tape edges	<b>W<sub>6</sub></b>	<b>W<sub>2</sub></b>	3	max.
Sprocket hole position	<b>W<sub>5</sub></b>	<b>W<sub>1</sub></b>	9	-0.5 / +0.75
Sprocket hole diameter*	<b>D<sub>0</sub></b>	<b>D<sub>0</sub></b>	4	-0.32 / +0.2
Abscissa to plane (straight lead)	<b>H</b>	<b>H</b>	18.5	-/+ 3.0
Abscissa to plane (kinked lead)	<b>H<sub>0</sub></b>	<b>H<sub>0</sub></b>	16	-/+ 0.5
Abscissa to top 72R020X-72R090X	<b>H<sub>1</sub></b>	<b>H<sub>1</sub></b>	32.2	max.
Abscissa to top 72R110X-72R300X	<b>H<sub>1</sub></b>		47.5	max.
Overall width without lead protrusion: 72R020X-72R090X	<b>C<sub>1</sub></b>		42.5	max.
Overall width without lead protrusion: 72R110X-72R300X			57	
Overall width with lead protrusion: 72R020X-72R090X	<b>C<sub>2</sub></b>		43.2	max.
Overall width with lead protrusion: 72R110X-72R300X		<b>58</b>		
Lead protrusion	<b>L<sub>1</sub></b>	<b>I<sub>1</sub></b>	1.0	max.
Protrusion of cut out	<b>L</b>	<b>L</b>	11	max.
Protrusion beyond hold-down tape	<b>I<sub>2</sub></b>	<b>I<sub>2</sub></b>	Not specified	
Sprocket hole pitch: 72R020X-72R090X	<b>P<sub>0</sub></b>	<b>P<sub>0</sub></b>	12.7	-/+ 0.3
Sprocket hole pitch: 72R110X-72R300X	<b>P<sub>0</sub></b>	<b>P<sub>0</sub></b>	25.4	-/+ 0.5
Pitch tolerance			20 consecutive.	-/+ 1
Device pitch: 72R020X-72R090X			12.7	
Device pitch: 72R110X-72R300X			25.4	
Tape thickness	<b>t</b>	<b>t</b>	0.9	max.
Tape thickness with splice	<b>t<sub>1</sub></b>		2.0	max.
Splice sprocket hole alignment			0	-/+ 0.3
Body lateral deviation	<b>Δh</b>	<b>Δh</b>	0	-/+ 1.0
Body tape plane deviation	<b>Δp</b>	<b>Δp</b>	0	-/+ 1.3
Ordinate to adjacent component lead*: 72R020X-72R090X	<b>P<sub>1</sub></b>	<b>P<sub>1</sub></b>	3.81	-/+ 0.7
Ordinate to adjacent component lead*: 72R110X-72R300X			7.62	-/+ 0.7
Lead spacing: 72R020X-72R185X	<b>F</b>	<b>F</b>	5.08	-/+ 0.8
Lead spacing: 72R250X-72R300X	<b>F</b>	<b>F</b>	10.18	-/+ 0.8

\*Differs from EIA Specification

**Tape and Ammo Diagram**

**Figure 1**



**WARNING**

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage (L di/dt) above the rated voltage of the PPTC device.

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