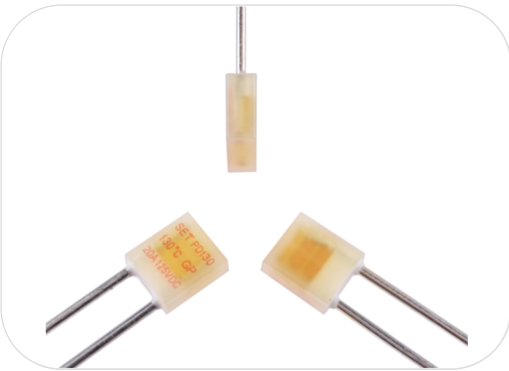# DC-ATCO
Direct Current Thermal-Link (Alloy Type)

PD Series

Description

The Direct Current Thermal-Link Alloy Type (DC-ATCO) is defined as a non-resettable protective device functioning one time only. It is widely used in electrical equipment. ATCO is mainly consist of fusible alloy, flux resin, case, sealant and lead wires. Normally, fusible alloy is jointed to the two lead wires. Under abnormal conditions, when the temp. reaches to the fusing temp. of ATCO, the fusible alloy melts and quickly retracts to the two lead wire ends with the aid of the flux resin and disconnects the circuit completely.

SETsafe | SETfuse Direct Current Thermal-Link Alloy Type (DC-ATCO) PD series Rated Functioning Temp. from 102 ℃ to 150 ℃, Rated Current: 20 A, complies with RoHS and REACH.

Features

- Non-Resettable
- High Accuracy of Functioning Temp.
- High Surge Capacity
- RoHS & REACH Compliant
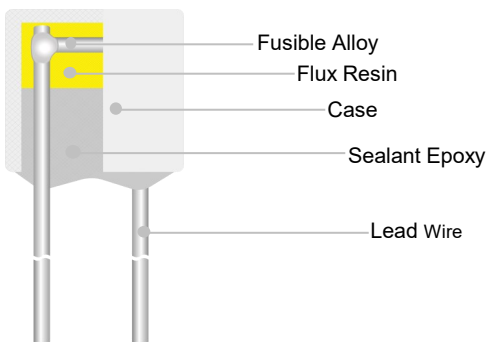
Applications

- Surge Protective Devices
- Switched-Mode Power Supplies
- Batteries

Customization

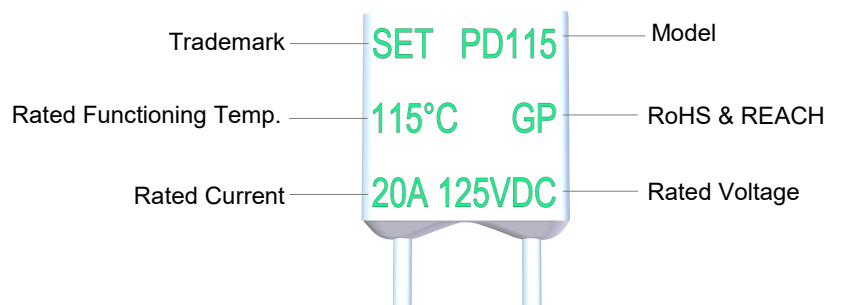- Other Temp.
- The Length of Lead Wires
- Leads Forming Types

Structure Diagrams

Radial

Fusible Alloy
Flux Resin
Case
Sealant Epoxy
Lead Wire

Marking

Radial (Color for reference only)

Trademark —— SET PD115 —— Model

Rated Functioning Temp. —— 115℃   GP —— RoHS & REACH

Rated Current —— 20A 125VDC —— Rated Voltage

Remark: The Date Code means Year and quarter: A stands for 2000, B stands for 2001 and 01 stands for the first quarter, 02 stands for the second quarter，and so on.

Dimensions (mm)
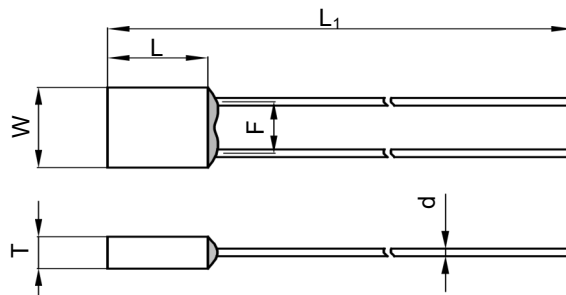
L	L₁	W	T	d	F
11.8 ± 0.5	50.0 ± 2.0	10.7 ± 0.5	4.8 ± 0.2	1.60 ± 0.05	6.6 ± 0.8

DC-ATCO
Direct Current Thermal-Link (Alloy Type)

PD Series

Specifications

Rated Functioning Temp. (T_f) °C	Model	Fusing Temp. (°C)	T_h (°C)	T_m (°C)	I_r (A)	U_r (V)	RoHS REACH
150	PD150	145 ± 2	117	160	20	DC 125	●
136	PD136	131 ± 2	102	160	20	DC 125	●
130	PD130	125 ± 2	97	160	20	DC 125	●
125	PD125	121 ± 2	90	160	20	DC 125	●
115	PD115	111 ± 2	82	160	20	DC 125	●
102	PD102	98 ± 2	66	160	20	DC 125	●

Note:

1: "●"Means certificated, "○"Means non-certificated.

2: RoHS & REACH Compliant .

Soldering

Hand-Soldering

1. Soldering should be carried out according to Table T-1.

2. The thermal element of ATCO is fusible alloy with low melting point, which is jointed with ATCO lead wires. Improper soldering operation (too high soldering temp. , too long soldering time, too short lead wire etc.) may transfer more heat to the thermal element and ATCO may open in advance.

3. When soldering conditions are more severe than those listed in Table T-1, a heat sink fixture should be used between soldering point and ATCO body.

4. When soldering, please do not pull / push or twist ATCO body or lead wires.

5. After soldering, let it naturally cool for longer than 20 seconds. During cooling, never move the ATCO body or lead wires.
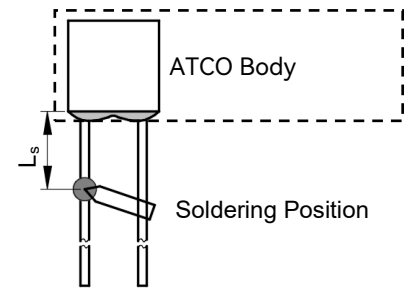
ATCO Body

L_s

Soldering Position

FIGURE T-1

TABLE T-1 Hand-Soldering Time

Rated Functioning Temp. (T_f)	Max. Allowable Soldering Time for Different Lead Wire Length (Fig.T-1)									Max. Soldering Temp.
	L_s Length	Time		L_s Length	Time		L_s Length	Time		
		Tinned Copper Wire	CP Wire		Tinned Copper Wire	CP Wire		Tinned Copper Wire	CP Wire	
(°C)	(mm)	(s)	(s)	(mm)	(s)	(s)	(mm)	(s)	(s)	(°C)
102 to 115	10	1[a]	4	20	2	5	30	3	6	
116 to 135	10	1[a]	4	20	3	6	30	5	8	400
136 to 150	10	3	6	20	5	8	30	5	8	

Note:
a: Auxiliary Heat Sink Fixture is Required to Avoid ATCO Cutting off Unexpectedly.
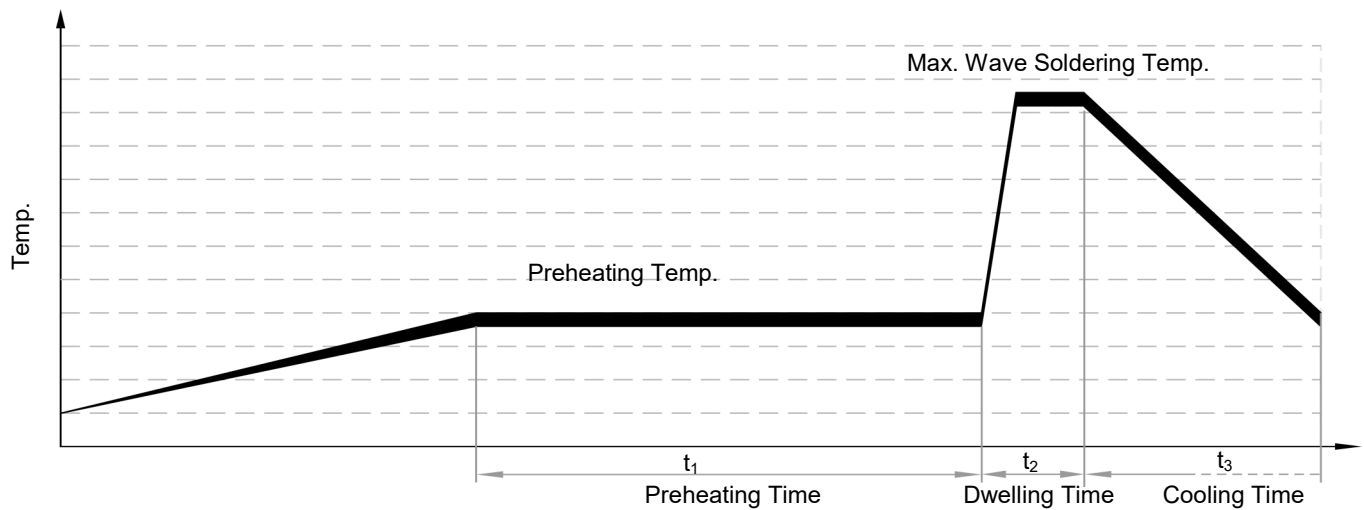
Wave Soldering

The wave soldering parameters as Table T-2, for reference only, when ATCO is for practice use, you need to do some validation experiments. For example, using X-RAY to see the fusible alloy of ATCO whether damage after wave soldering.

TABLE T-2 Wave Soldering Parameters Setting

| Rated Functioning Temp. (T_f)	Max. Allowable Preheating Temp. When the Length of Lead Wire is Different （Fig.T-1）				Preheating Time (t_1)	Max. Wave Soldering Temp.	Dwelling Time (t_2)	Cooling Time (t_3)
	L_s Length	Preheating Temp.	L_s Length	Preheating Temp.				
(°C)	(mm)	(°C)	(mm)	(°C)	(s)	(°C)	(s)	(s)
102 to 130	建议手工焊接							
131 to 150	20	80	30	90	< 60	≤ 260	≤ 3	≤ 10

Product Temp.-Time Curve (Reference)

The Temp.-Time Curve of Thermal-Link in different temp. oil bath.
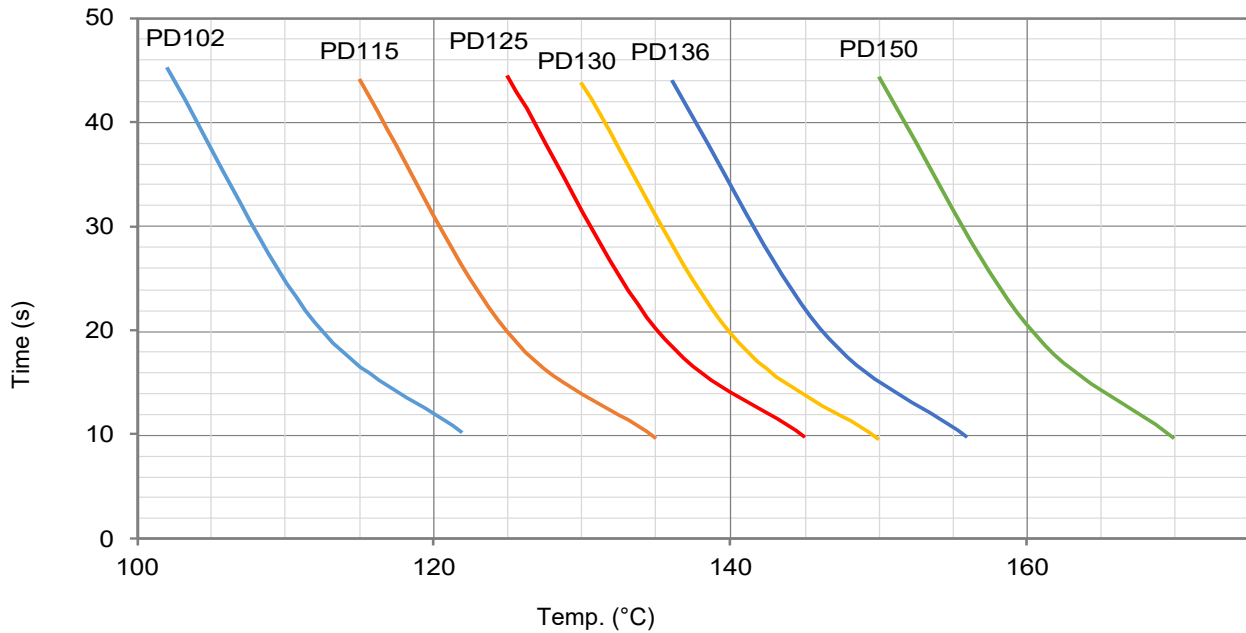
Product Current-Time Curve (Reference)

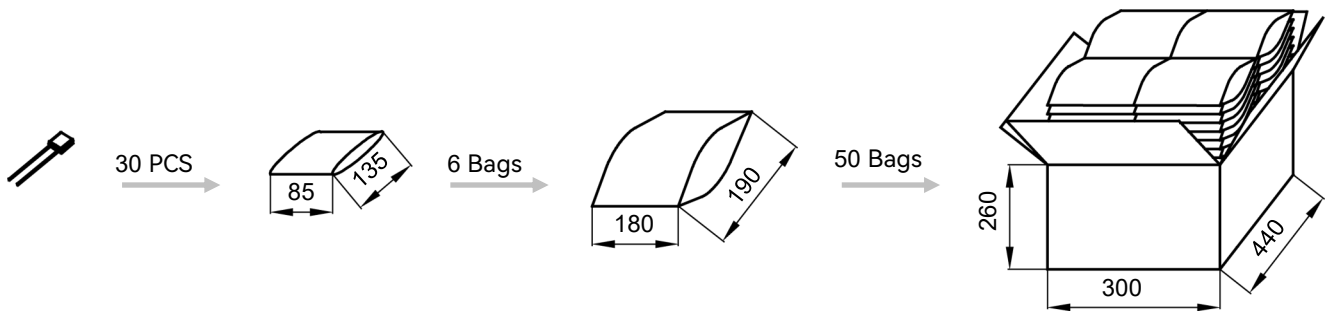The Current-Time Curve shows functioning time at multi-times rated current at room temperature 25 ± 2 °C.
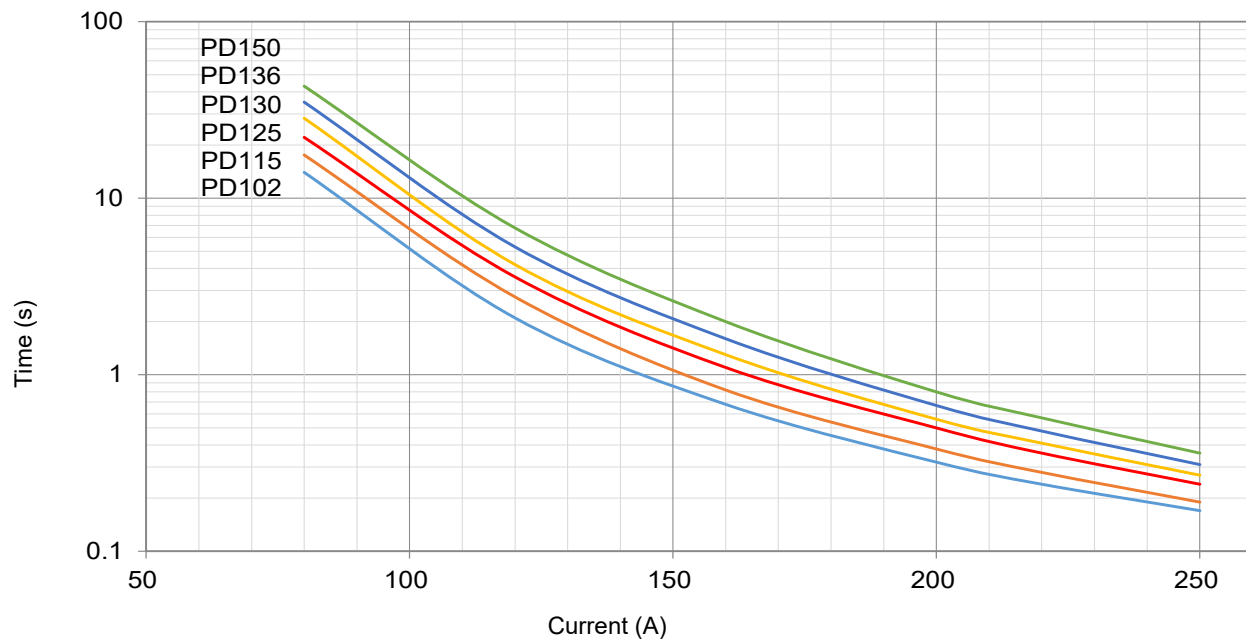
Packaging Information

Bulk

Item	PE Bag	PE Bag	Carton
Dimensions (mm)	135 × 85	190 × 180	440 × 300 × 260
Quantity (PCS)	30	180	9000
Gross Weight (kg)			23.0 ± 10%

30 PCS → 85 × 135 → 6 Bags → 180 × 190 → 50 Bags → 260 × 300 × 440

Part Numbering System

ATCO – PD115 - A N N A B - 001

Other Options

Packing

B	Bulk
T	Taping

Leads Forming

A	Straight Lead
B	Single Lead Bending
C	Leads Bending
D	Leads Kinking
E	Leads Bending and Kinking

Color of Insulation Tube

W	White
Y	Yellow
R	Red
K	Black
N	None

Insulation Tube Material

T	Teflon
P	Polyester
N	None

Lead Wire Type

A	Tinned Copper Wire
B	Tinned Copper Plated Wire

Rated Functioning Temp.

115	115 °C, See Specifications

Series

PD	Series See Specifications

Product Category

ATCO	Alloy Thermal-Link

Glossary

Item	Description
TCO	**Thermal-Link** A non-resettable device incorporating a THERMAL ELEMENT which will open a circuit once only when exposed for a sufficient length of time to a temperature in excess of that for which it has been designed. — (GB 9816.1)
ATCO	**Alloy Thermal-Link** Alloy Type Thermal-Link, Alloy is the thermal element. — (GB 9816.1)
T_f	**Rated Functioning Temp.** The temperature of the Alloy Thermal-Link which causes it to change the state of conductivity with a detection current up to 10 mA as the only load. — (GB 9816.1) Tolerance: T_f °C (GB 9816.1, EN 60691, K60691). Tolerance: $T_f \pm 7$ °C (J60691).
Fusing Temp.	**Fusing Temp.** The temperature of the Alloy Thermal-Link which causes it to change its state of conductivity is measured with silicone oil bath in which the temperature is increased at the rate of 0.5 °C to 1 °C / minute, with a detection current up to 10 mA as the only load. — (GB 9816.1)
T_h	**Holding Temp.** The Maximum temperature at which a Alloy Thermal-Link will not change its state of conductivity when conducting rated current for 168 hours. — (GB 9816.1)
T_m	**Maximum Temp. Limit** The temperature of the Alloy Thermal-Link stated by the manufacturer, up to which the mechanical and electrical properties of the Alloy Thermal-Link having changed its state of conductivity, will not be impaired for a given time. — (GB 9816.1)
I_r	**Rated Current** The current used to classify a Alloy Thermal-Link, which is the Maximum current that Alloy Thermal-Link allows to carry and is able to cut off the circuit safely. — (GB 9816.1)
U_r	**Rated Voltage** The voltage used to classify a Alloy Thermal-Link, which is the Maximum voltage that Alloy Thermal-Link allows to carry and is able to cut off the circuit safely. — (GB 9816.1)
I_n	**Nominal Discharge Current** Being able to withstand 15 peak currents of waveform 8/20 μs to test the product's durability of withstanding pulse current. — (UL 1449)
I_{max}	**Max. Discharge Current** Being able to withstand 1 peak current of waveform 8/20 μs to test max. pulse current that the product can withstand. — (UL 1449)

ATTENTION

Usage

1. When atmosphere pressure is from 80 kPa to 106 kPa, the related altitude shall be from 2000 meters to - 500 meters.
2. Operating voltage less than rated voltage of ATCO, operating current less than rated current of ATCO.
3. Do not touch the ATCO body or lead wires directly when power is on, to avoid burn or electric shock.

Replace

ATCO is a non-repairable product. For safety sake, it shall be replaced by an equivalent ATCO from the same manufacturer, and mounted in the same way.

Storage

Do not store the ATCO at the high temp., high humidity or corrosive gas environment, avoid influencing the solder-ability of the lead wires, the product shall be used up within 1 year after receiving the goods.

Installation

Make Sure the Temp. of Installation Position.
1. It is recommended that a dummy ATCO with inbuilt thermo-couple shall be used to determine the proper temp.
2. The terminal product should be tested to ensure that potential abnormal conditions do not cause ambient temp. to exceed the T_m of the ATCO.
3. Mount the ATCO at the location where temp. rises evenly.

Installation position of mechanical performance requirements.
1. Do not locate the ATCO in a place where severe vibration always occurs.
2. Ensure that the lead wire is long enough, and avoid actions such as press, tensile or twist.
3. The seal or body of ATCO must not be damaged, burned or over heated.

Mechanical Connection

Riveting

1. Choose small resistivity riveting material and be riveted.
2. A flexible lead or lead with low resistance should be used to rivet the ATCO.
3. Contact resistance should be minimal, large contact resistance will lead to higher temp., ATCO Functioning in advance.

Crimping

1. Choose small resistivity crimping material and be crimped.
2. A flexible lead or lead with low resistance should be used to rivet the ATCO.
3. Contact resistance should be minimal, large contact resistance will lead to higher Temp., ATCO Functioning in advance.

Lead Wire Forming

1. If lead wire has to be bent, please pay attention to the distance between body and bending point. Refer to Table T-3.
2. When bending leads, please use pincher or similar tools to fix the product as shown in Fig.T-2, to avoid damaging the product.
3. During forming and mounting, lead wire should not be cut, nicked, bent sharply, to avoid breaking the product.
4. Tangential forces on the leads must be avoided (i.e. pushing or pulling on the leads at angle to ATCO body) as such forces may damage the seal of ATCO.
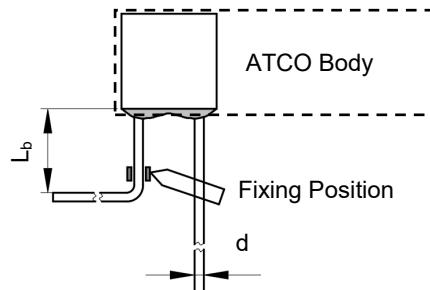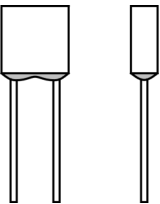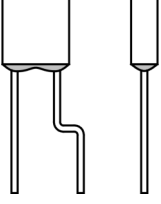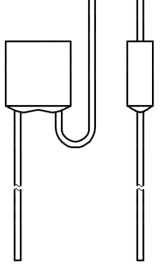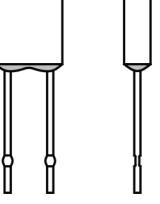

FIGURE T-2
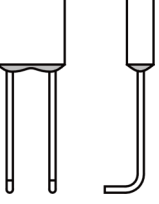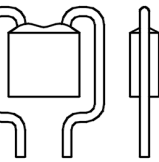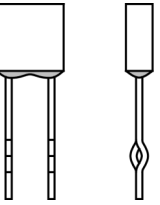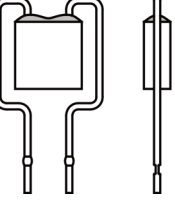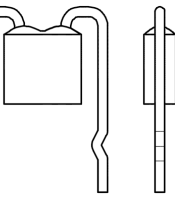
TABLE T-3 Distance between Body and Bending Point

Circular lead	d	(mm)	< 1.0	1.0 - 1.2	> 1.2
	L_b	(mm)	≥ 3	≥ 5	≥ 10

Leads Forming Types

The below leads forming is for reference, more leads forming can be customized.
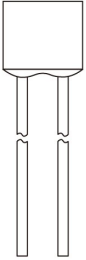
Radial

A	B	C	D	E

Direct Current Thermal-Link Alloy Type (DC-ATCO) Features & Model List Overview

Rated Functioning Temp. (T_r) °C

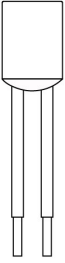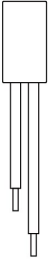| T_r (°C)									
230									
221									
205									
200									
187	TGH187-HVS^	ASL187A-LSF^	RSK187A-KSS^	RVH187-HSF^	ARL187-LRA^			RQF187-FQS^	
160									
150	TGH150-HVS^	ASL150A-LSF^	RSK150A-KSS^	RVH150-HSF^	ARL150-LRA^	RPK150-HRZ^	TG150C-HQZ^	RQF150-FQS^	TG150C-JPZ^
145									
139									
136	TGH136-HVS^	ASL136A-LSF^	RSK136A-KSS^	RVH136-HSF^	ARL136-LRA^	RPK136-HRZ^	TG136C-HQZ^	RQF136-FQS^	TG136C-JPZ^
135									
133									
130	TGH130-HVS^			RVH130-HSF^				RQF130-FQS^	
125	TGH125-HVS^	ASL125A-LSF^	RSK125A-KSS^	RVH125-HSF^	ARL125-LRA^	RPK125-HRZ^	TG125C-HQZ^	RQF125-FQS^	TG125C-JPZ^
123									
120									
115	TGH115-HVS^	ASL115A-LSF^	RSK115A-KSS^	RVH115-HSF^	ARL115-LRA^	RPK115-HRZ^	TG115C-HQZ^	RQF115-FQS^	TG115C-JPZ^
105									
102	TGH102-HVS^	ASL102A-LSF^	RSK102A-KSS^	RVH102-HSF^	ARL102-LRA^	RPK102-HRZ^	TG102C-HQZ^	RQF102-FQS^	TG102C-JPZ^
97									
93									
86					ARL86-LRA^		TG86C-HQZ^	RQF86-FQS^	
76									
I_r (A) Rated Current	15	30	25	15	30	15	15	10	20
U_r (VDC)^ Rated Voltage	850	600			500		450		400
U_r (VAC)* Rated Voltage									
Product Structure	Axial Shape	Radial Shape		Axial Shape	Radial Shape		Axial Shape	Radial Shape	Axial Shape

Model

Direct Current Thermal-Link Alloy Type (DC-ATCO) Features & Model List Overview

Rated Functioning Temp. (T_f) °C

T_f (°C)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
230	○	○	○	○	○	○	○	○	○	○	○	○
221	○	○	○	○	○	○	○	○	○	○	○	○
205	○	○	○	○	○	○	○	○	○	○	○	○
200	○	○	○	○	○	○	○	○	○	○	○	○
187	○	○	○	○	○	○	○	○	○	○	○	○
160	○	○	○	○	○	○	○	○	○	○	○	○
150	TG150C-JSZ*	○	○	○	HN150^*	HP150^*	HS150^*	○	QD150^	PD150^	TD150^	SD150^
145	○	○	○	○	○	○	○	○	○	○	○	○
139	○	○	○	○	○	○	○	○	○	○	○	○
136	TG136C-JSZ*	○	○	○	HN136^*	HP136^*	HS136^*	○	QD136^	PD136^	TD136^	SD136^
135	○	○	○	○	○	○	○	○	○	○	○	○
133	○	○	○	○	○	○	○	○	○	○	○	○
130	○	○	○	○	○	○	○	○	QD130^	PD130^	TD130^	SD130^
125	TG125C-JSZ*	○	○	○	HN125^*	HP125^*	HS125^*	ALP125-PLZ^	QD125^	PD125^	TD125^	SD125^
123	○	○	○	○	○	○	○	○	○	○	○	○
120	○	○	○	○	○	○	○	○	○	○	○	○
115	TG115C-JSZ*	○	○	ALP115-HLZ^	○	○	○	○	QD115^	PD115^	TD115^	SD115^
105	○	○	○	○	○	○	○	○	○	○	○	○
102	TG102C-JSZ*	○	○	○	○	○	○	ALP102-PLZ^	QD102^	PD102^	TD102^	SD102^
97	○	○	○	○	○	○	○	○	○	○	○	○
93	○	○	○	○	○	○	○	○	○	○	○	○
86	○	TG86C-HSZ*	RPF86-FPF^	○	○	○	○	○	○	○	○	○
76	○	○	○	○	○	○	○	○	○	○	○	○

Model

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
I_r (A) Rated Current	20	15	10	15	15	10	5	60	20	15 / 16	10	25
U_r (VDC)^ Rated Voltage	○	400			200			180	125			
U_r (VAC)* Rated Voltage	600	○	○	690		500		○	○			

Product Structure

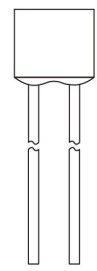| Axial Shape	Radial Shape		Axial Shape				Radial Shape

SET safe | SET fuse

PD Series

Direct Current Thermal-Link Alloy Type (DC-ATCO) Features & Model List Overview

Rated Functioning Temp. (T_r) °C / **Model**

T_r (°C)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
230													ADN230B-NEZ
221													
205													
200													
187													
160													
150											S150^	T150^	
145													
139													
136	Q136^*	Q136*	Q136*	P136^*	P136*	P136*	TB136-UHZ^	TB136-UJZ*	TS136-RHZ^	TS136-RJZ*	S136^	T136^	
135													
133													
130							TB130-UHZ^	TB130-UJZ*					
125	Q125^*			P125^*			TB125-UHZ^	TB125-UJZ*	TS125-RHZ^	TS125-RJZ*			
123													
120													
115	Q115^*	Q115*	Q115*	P115^*	P115*	P115*	TB115-UHZ^	TB115-UJZ*	TS115-RHZ^	TS115-RJZ*	S115^	T115^	
105													
102	Q102^*			P102^*	P102*	P102*	TB102-UHZ^	TB102-UJZ*	TS102-RHZ^	TS102-RJZ*	S102^	T102^	
97													
93													
86													
76													

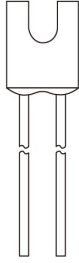|	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
I_r (A) Rated Current	25			20			200		100		10	15 / 16	50
U_r (VDC)^ Rated Voltage	120						100		100		100		60
U_r (VAC)* Rated Voltage	400	300	250	400	300	250		125		125			

Product Structure

Radial Shape

Axial Shape

Direct Current Thermal-Link Alloy Type (DC-ATCO) Features & Model List Overview

Rated Functioning Temp. (T_r) °C / **Model**

T_r °C	15	10	9	8.5	8	6	5	4	3	2.5	2	1	4	3	2	1
230																
221	R31^*	U31^*				C31^*			B31^*	H31^*	V31^*	V31*		X31*	K31*	
205	R32^*	U32^*				C32^*			B32^*	H32^*	V32^*	V32*		X32*	K32*	
200																
187														X17^*	K17^*	
160	R16^*	U16^*				C16^*				H16^*	V16^*			X16^*	K16^*	F16*
150	R7^*	U7^*												X7*	K7*	F7*
145	R6^*	U6^*	C6^				X6^	K6^					F6^	X6*	K6*	F6*
139		CR13^	M13^	C13^			V13^	SF13^					F13^			F13*
136							X9^	K9^						X9*	K9*	
135	R5^*	U5^*												X5*	K5*	
133							V8^	SF8^					F8^	X8*	K8*	F8*
130	R4^*	U4^*					V4^	SF4^					F4^	X4*	K4*	F4*
125	R3^*	U3^*								H3^*				X3^*	K3^*	F3*
123																
120																
115	R2^*	U2^*			C2^		V2^	SF2^					F2^	X2^*	K2^*	F2*
105																
102	R1^*	U1^*											F1^	X1^*	K1^*	F1*
97																
93																
86	R18^*	U18^*			C18^		V18^						F18^	X18^*	K18^*	F18*
76	R0^*	U0^*												X0*	K0*	F0*

	15	10	9	8.5	8	6	5	4	3	2.5	2	1	4	3	2	1
I_r (A) Rated Current	15	10	9	8.5	8	6	5	4	3	2.5	2	1	4	3	2	1
U_r (VDC)^ Rated Voltage	60 (all columns)															
U_r (VAC)* Rated Voltage	250	250				250	250		250		125			250		

Product Structure

Axial Shape

Radial Shape

Direct Current Thermal-Link Alloy Type (DC-ATCO) Features & Model List Overview

DC-ATCO — Direct Current Thermal-Link (Alloy Type) — PD Series

Rated Functioning Temp. (T_f) °C

T_f (°C)	XG	KG	C(^)	C(*)	B(^)	B(*)	H(^)	H(*)	V(^)	V(*)	ADN230B-NDZ	ADN230B-PDZ	ADN205B-NDZ	ADN230B-QBZ
230											ADN230B-NDZ^	ADN230B-PDZ^		ADN230B-QBZ^
221	XG31*	KG31*		C31*		B31*		H31*					ADN205B-NDZ^	
205	XG32*	KG32*		C33*		B32*		H32*						
200														
187														
160	XG16*	KG16*				B16*								
150	XG7*	KG7*	C7^	C7*	B7^*		H7^*		V7^*					
145	XG6*	KG6*	C6^	C6*	B6^*		H6^*		V6^*					
139			C13^	C13*	B13^*		H13^*		V13^*					
136	XG9*	KG9*	C9^	C9*	B9^*		H9^*		V9^*					
135	XG5*	KG5*	C5^	C5*	B5^*		H5^*		V5^*					
133	XG8*	KG8*	C8^	C8*	B8^*		H8^*		V8^*					
130	XG4*	KG4*	C4^	C4*	B4^*		H4^*		V4^*					
125	XG3^*	KG3^*	C3^	C3*	B3^*				V3^*					
123														
120														
115	XG2^*	KG2^*	C2^	C2*	B2^*		H2^*		V2^*					
105														
102	XG1^*	KG1^*	C1^*	C1*	B1^*	B1*	H1^*	H1*	V1^*	V1*				
97				C21^*	B21^*		H21^*		V21^*					
93														
86	XG18^*	KG18^*	C18^*	C18*	B18^*	B18*	H18^*	H18*	V18^*	V18*				
76	XG0*	KG0*		C0*	B0^*	B0*	H0^*	H0*	V0^*	V0*				
I_r (A) Rated Current	3	2	7	5	3		2		1		50	55	50	80
U_r (VDC)^ Rated Voltage	60	60	50	50	50	50	50	50	50	50	49	48	48	24
U_r (VAC)* Rated Voltage	250	250		250	125	250	125	250	125					

Model

Product Structure

Radial Shape — Axial Shape