

AS ENERGI™ company has been manufacturing power semiconductors for various industries in many countries of the world for many years.

One of the important industries for which our company produces and supplies power semiconductors is the railway sector.



For the railway sector, the company produces a range of diodes and thyristors stud type, mainly for currents from 200A to 400A, and disc (tablet) type for currents from 800A to 9000A, voltage up to 6500V. Diodes and thyristors are used in traction locomotives of trains, electric trains and freight trains, including for high-speed railroads.



One of the main diodes produced by **AS ENERGI™** for railroads are avalanche diodes.

The main feature of such diodes is to provide controlled avalanche formation.

That is, the ability of avalanche diodes to quickly dissipate high power pulses that occur in networks of railway train equipment, to protect these networks from overvoltages.

Diodes are produced in both forward and reverse polarity. For example, one railroad locomotive contains up to 1500 units of these diodes for 200 amperes.

Power diodes can withstand high loads, thereby providing the necessary traction force and continuous performance of locomotives and electric locomotives.



Power diodes and thyristors produced by AS ENERGI™ for the railway industry also have the following features:

- low static and dynamic losses;
- high values of $I_{T(AV)M}$, V_{DRM} , V_{RRM} ;
- voltage range from 100V to 6500V;
- current range from 200A to 9000A;
- high reliability means minimum downtime;
- high resistance to electrical and thermal cycling;
- optimized for industrial applications;
- extensive application experience in various industries;
- natural or forced air cooling.



General specifications of power diodes and thyristors for railway application

Type	$I_{F(AV)M}$ $I_{T(AV)M}$ ($T_{case}, ^\circ C$)	V_{RRM} V_{DRM}	I_{FSM} I_{TSM}	V_{FO} V_{TO}	r_T	$T_{vj\ max}$	W	Design
	A	V	kA	V	m Ω	$^\circ C$	kg	
Avalanche Diodes								
DL161-200	200 (115)	400 - 1800	7.5	0.92	0.68	150	0.27	stud
DL171-320	320 (115)	400 - 1800	10	1.00	0.50	150	0.46	stud
VL200	200 (100)	600 - 1300	6.0	0.92	0.68	150	0.50	stud
DL123-320	320 (113)	400 - 1600	5.5	0.90	0.83	150	0.07	disc
DL133-500	500 (113)	400 - 1600	12.0	0.85	0.41	150	0.18	disc
DL153-1250	1250 (115)	2400 - 3200	26.0	1.10	0.35	175	0.55	disc
ADA 1100-xx-D-02	1310 (85)	1100 - 1700	15.0	0.74	0.25	160	0.23	disc
ADA 1400-xx-F-07	1410 (85)	3800 - 5000	17.5	1.13	0.44	160	0.46	disc
ADA 1600-xx-F-06	1620 (85)	3200 - 3800	20.5	1.03	0.32	160	0.46	disc
ADA 1900-xx-F-05	1870 (85)	2900 - 3200	23.5	0.95	0.23	160	0.46	disc
ADA 2100-xx-F-04	2110 (85)	2600 - 3200	26.0	0.89	0.17	160	0.46	disc
ADA 2400-xx-F-03	2350 (85)	1700 - 2300	29.0	0.84	0.13	160	0.46	disc
Rectifier Diodes								
AD855-320	320 (117)	1200 - 1600	5.5	0.875	1.18	190	0.46	stud
ADD 1800N	1800 (100)	4000 - 4800	27.5	0.85	0.25	160	0.60	disc
ADD 2200N	2200 (100)	2000 - 2400	35.0	0.83	0.15	160	0.60	disc
ADD 2400-28-F-00	2600 (85)	2800	30.0	0.910	0.135	160	0.49	disc
Phase Control Thyristors								
ATR955-250 NKL	250 (80)	1200 - 1400	5.5	0.99	1.10	125	0.46	stud
T853-800	930 (85)	2800	17.0	1.12	0.447	125	0.55	disc
ATP 1200-42-F-00	1190 (70)	4200	17.3	1.01	0.545	125	0.60	disc
ATD5715-xx-EE	5715 (55)	2400 - 2800	11.2	0.84	0.085	125	2.0	disc
ATD7905-xx-FE	7850 (55)	1800 - 2200	15.4	0.77	0.056	125	2.9	disc
ATD8800-xx-FA	8800 (55)	1800 - 2200	17.2	0.77	0.056	125	2.2	disc

The production has a reliable and time-tested product quality control system.

In the final stages of production, tests of the main parameters of each product are carried out. Test reports are provided to customers along with the delivered products. The products of our company are of high and guaranteed quality. The warranty period for AS ENERGI™ products is 2 years.

**AVALANCHE DIODE
ADA1400-50-F-07**

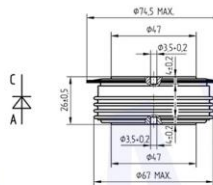
TECHNICAL PASSPORT



1. General product information and technical data

1.1 Date of manufacture: May 2022 y.

1.2 Overall, mounting and connection dimensions and weight of the diode



A – Anode
C – Cathode
Mounting force – 20-24 kN
Weight, max – 0.46 kg

1.3 Certificate of acceptance

Diode ADA1400-50-F-07

in the amount of 10 pieces correspond to the requirements and norms, and recognized serviceable.

Quality Control Department *[Signature]* May 2022 y.



1.4 Electrical characteristics of the diode ADA1400-50-F-07

Max. average forward current (Case temperature)	I_{FAV}	1410 A (85°C)
Repetitive peak reverse voltage	V_{RSM}	5000 V
RMS forward current	I_{RMS}	2210 A
Surge non-repetitive current	I_{FSM}	17.5 kA
Safety factor	i^2t	1531 kA ² ·s
Peak forward voltage, max	V_{FM}	2.40 V
Peak current	I_{FM}	4000 A
On-state threshold voltage, max	$V_{(TOS)}$	1.13 V
On-state slope resistance, max	r_r	0.440 mΩ
Repetitive peak reverse currents, max	I_{RSM}	50 mA
Temperature of p-n junction, max	T_{jmax}	160 °C
Thermal resistance, junction to case, max	$R_{th(j-c)}$	0.020 °C/W

When the consumer verifies the compliance of diodes to the standards of current technical specifications tests should be carried out in accordance the defined modes and methods.

2.0 Warranty policy

2.1 The manufacturer guarantees compliance of the diodes with the requirements and norms.

The warranty period is 2 years from the date of purchase, provided the operating rules and regulations are observed.

3.0 Contents of delivery

3.1 The delivery set includes: a batch of diodes in accordance with section 1.3; diode technical passport.

4.0 Manufacturer



Our company has been a long-time supplier of power semiconductors - diodes, thyristors and other equipment for railroads in different countries of the world.

