





FAST RECOVERY DIODE DF173-1600

<ul style="list-style-type: none">◆ $V_{RRM} = \underline{3600-4400\text{ V}}$◆ $I_{F(AV)} = \underline{1630\text{ A}}$ ($T_C = 85\text{ °C}$)◆ $I_{FSM} = \underline{32\text{ kA}}$ ($t_p = 10\text{ ms}$)		
<ul style="list-style-type: none">◆ Small recovered time and charge◆ Acceptable for series and parallel connections◆ Press-pack design		

MAXIMUM RATED VALUES

Parameter and conditions	Symbol	Values	Units
Repetitive peak reverse voltage, $T_j = -60 \dots +140\text{ °C}$	V_{RRM}	3600...4400	V
Non-repetitive peak reverse voltage, $T_j = -60 \dots +140\text{ °C}$	V_{RSM}	3700...4500	
Repetitive peak reverse current, $T_j = 140\text{ °C}$, $V_R = V_{RRM}$	I_{RRM}	100	mA
Maximum average forward current, $T_C = 85\text{ °C}$, $f = 50\text{ Hz}$	$I_{F(AV)}$	1630	A
RMS forward current, $T_C = 85\text{ °C}$, $f = 50\text{ Hz}$	I_{FRMS}	2559	
Surge non-repetitive current, $T_j = 140\text{ °C}$, $V_R = 0$, $t_p = 10\text{ ms}$	I_{FSM}	32	kA
Safety factor	I^2t	$5120 \cdot 10^3$	A ² s
Operation junction temperature range	T_j	-60 ... +140	°C
Storage temperature range	T_{stg}	-60 ... +50	

**DF173-1600**

ELECTRICAL CHARACTERISTICS					
Parameter and conditions	Symbol	Values			Units
		min	typ.	max	
Maximum peak forward voltage, $T_j = 25\text{ °C}$, $I_F = 5000\text{ A}$	V_{FM}	-	-	2,8	V
On-state threshold voltage, $T_j = 140\text{ °C}$, $I_F = 2000 - 6000\text{ A}$	V_{TO}	-	-	1,4	
On-state slope resistance, $T_j = 140\text{ °C}$, $I_F = 2000 - 6000\text{ A}$	r_T	-	-	0,35	mΩ
Reverse recovery current $T_j = 140\text{ °C}$, $I_F = 800\text{ A}$, $di_F/dt = -50\text{ A}/\mu\text{s}$, $V_R \geq 100\text{ V}$	I_{rr}	-	-	320	A
Reverse recovery charge $T_j = 140\text{ °C}$, $I_F = 800\text{ A}$, $di_F/dt = -50\text{ A}/\mu\text{s}$, $V_R \geq 100\text{ V}$	Q_{rr}	-	-	1700	μAs
THERMAL PARAMETERS					
Thermal resistance junction to case, DC per diode double side cooled anode side cooled cathode side cooled	$R_{th(j-c)}$	-	-	0,012 0,024 0,024	°C/W
Thermal resistance case to heatsink, double side cooled single side cooled	$R_{th(c-h)}$	-	-	0,003 0,006	
MECHANICAL PARAMETERS					
Weight	w	-	1,1	-	kg
Mounting force	F	40	-	50	kN
Maximum acceleration (at nominal mounting force)	a	-	-	100	m/s ²

DF173-1600

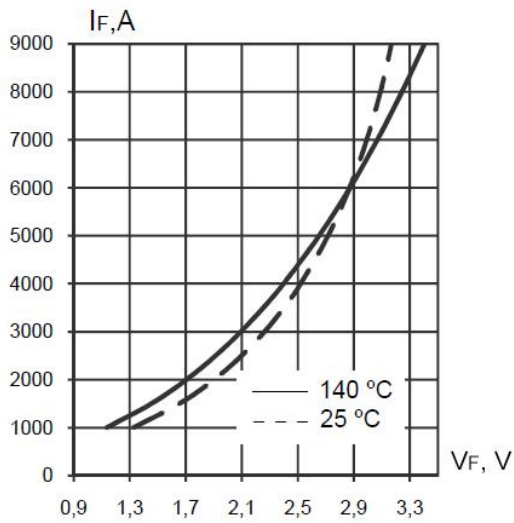


Fig. 1. Maximum forward characteristics

Forward characteristics model

$$V_F = A + B \cdot I_F + C \cdot \ln(I_F + 1) + D \cdot \sqrt{I_F}$$

Valid for $I_F = 1000 - 9000\text{ A}$

	$T_j = 140\text{ }^\circ\text{C}$	$T_j = 25\text{ }^\circ\text{C}$
A	-2	-2,001
B	$-3,51 \cdot 10^{-5}$	$-1,814 \cdot 10^{-4}$
C	0,326	0,32
D	0,029	0,041

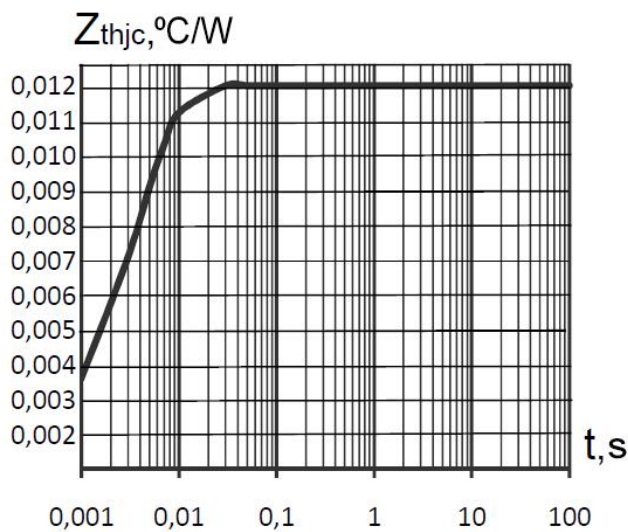


Fig. 2. Transient thermal impedance junction to case (DC)

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^n R_i \left(1 - e^{-\frac{t}{\tau_i}} \right)$$

i	1	2	3	4	5
$R_i, \text{ }^\circ\text{C/W}$	0,0038	0,004	0,0029	0,0012	0,0001
$\tau_i, \text{ s}$	2	0,202	0,103	0,0115	0,00245

DF173-1600

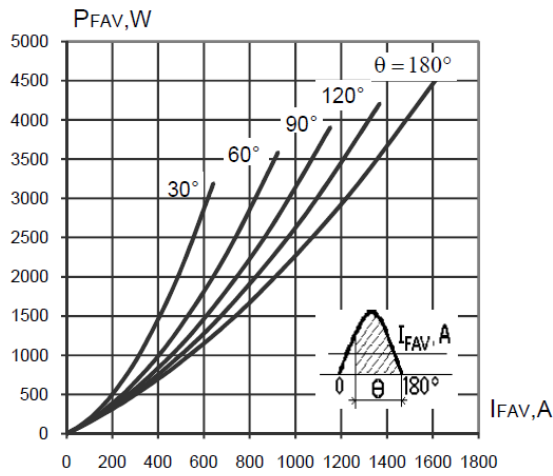


Fig. 3. Power loss vs. forward current (sine)

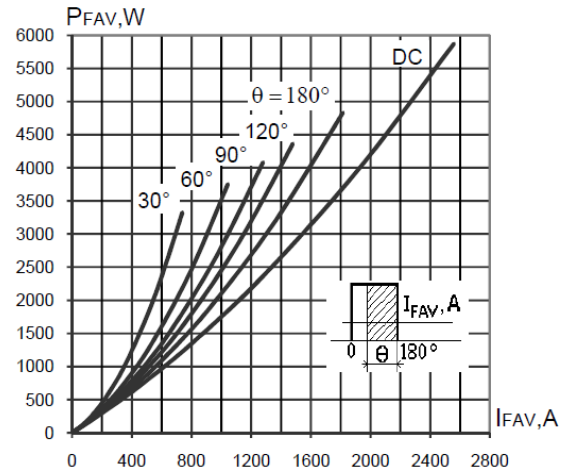


Fig. 4. Power loss vs. forward current (rectangular)

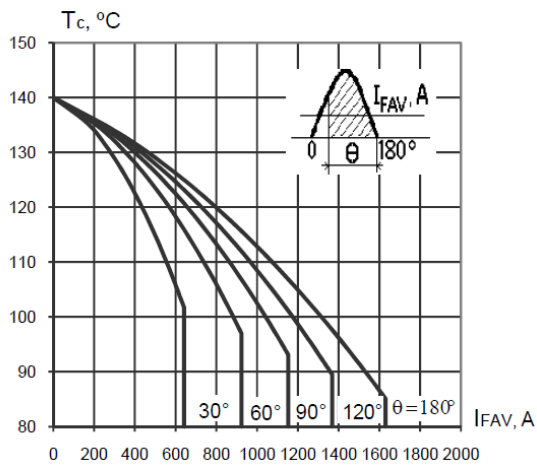


Fig. 5. Maximum allowable case temperature vs. forward current (sine, double side cooled)

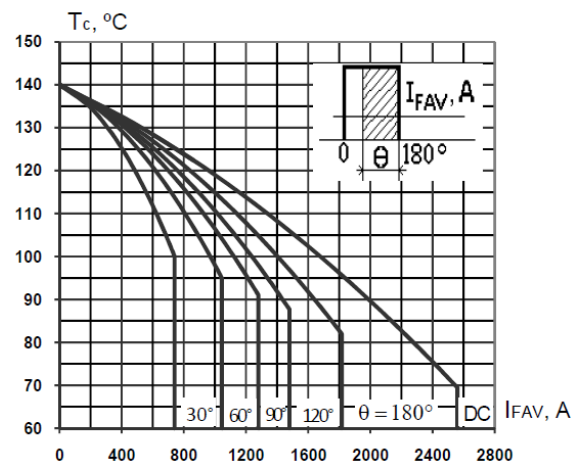


Fig. 6. Maximum allowable case temperature vs. forward current (rectangular, double side cooled)

DF173-1600

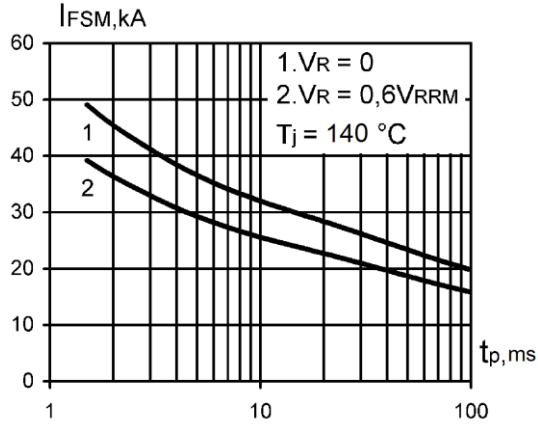


Fig. 7. Surge current vs. pulse length (half-sine)

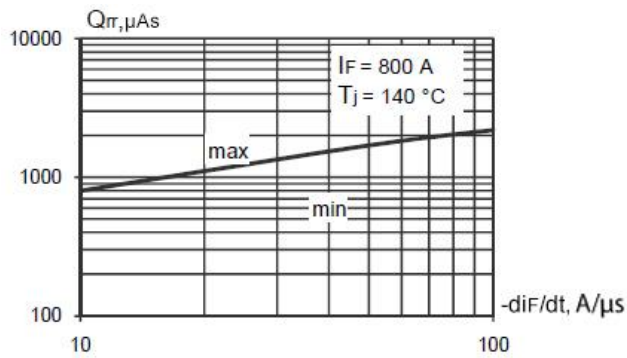


Fig. 8. Recovery charge vs. decay rate current

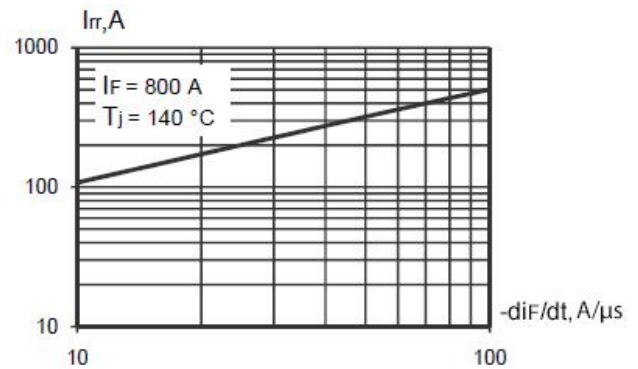
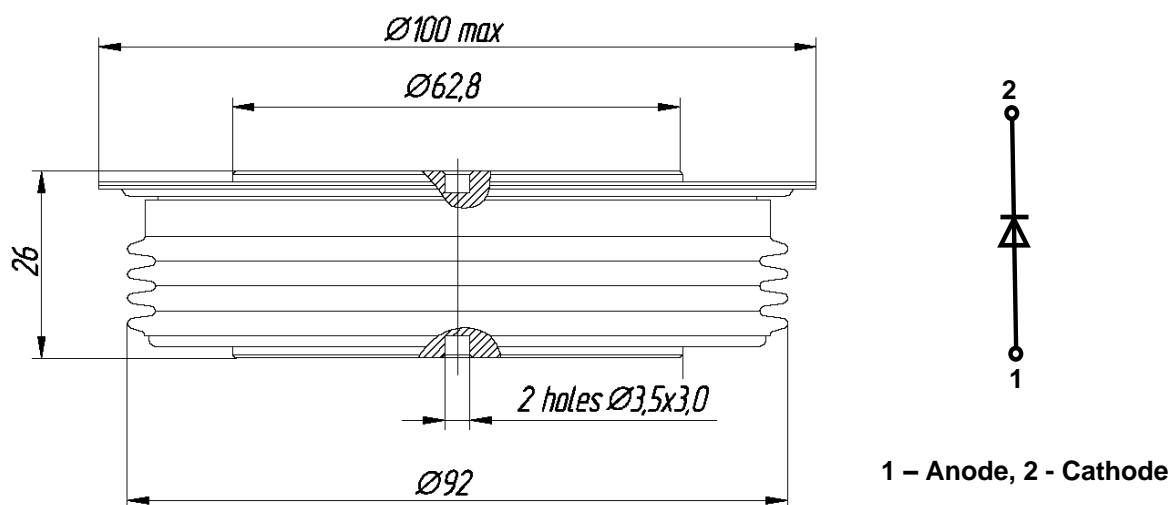


Fig. 9. Peak reverse recovery current vs. decay rate current



DF173-1600



1 – Anode, 2 - Cathode

Fig. 10. Device Outline Drawing
(dimensions in mm)



126, Proletarskaya str.,
430001, Saransk, Republic Mordovia, Russia
T: +7(8342) 47-04-30
F: +7 (8342) 47-15-01
E: vpruvs@elvpr.ru
I: www.elvpr.ru