



Fast Recovery Diode
Type DF233-400-28

Low switching losses
Low reverse recovery charge
High power cycling capability

Average forward current		I_{FAV}	400 A		
Repetitive peak reverse voltage		V_{RRM}	2000 ÷ 2800 V		
Reverse recovery time		t_{rr}	5.0 μ s		
V_{RRM} , V	2000	2200	2400	2600	2800
Voltage code	20	22	24	26	28
T_j , °C	- 60 ÷ 125				

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{FAV}	Average forward current	A	400 715	$T_c=94$ °C; Double side cooled; $T_c=55$ °C; Double side cooled; 180° half-sine wave; 50 Hz	
I_{FRMS}	RMS forward current	A	628	$T_c=94$ °C; Double side cooled; 180° half-sine wave; 50 Hz	
I_{FSM}	Surge forward current	kA	7.0 8.1	$T_j=T_{j\max}$ $T_j=25$ °C	180° half-sine wave; 50 Hz ($t_p=10$ ms); single pulse; $V_R=0$ V;
			8.0 9.2	$T_j=T_{j\max}$ $T_j=25$ °C	180° half-sine wave; 60 Hz ($t_p=8.3$ ms); single pulse; $V_R=0$ V;
I^2t	Safety factor	$A^2s \cdot 10^3$	245 325	$T_j=T_{j\max}$ $T_j=25$ °C	180° half-sine wave; 50 Hz ($t_p=10$ ms); single pulse; $V_R=0$ V;
			265 350	$T_j=T_{j\max}$ $T_j=25$ °C	180° half-sine wave; 60 Hz ($t_p=8.3$ ms); single pulse; $V_R=0$ V;
BLOCKING					
V_{RRM}	Repetitive peak reverse voltages	V	2000÷2800	$T_{j\min} < T_j < T_{j\max}$; 180° half-sine wave; 50 Hz;	
V_{RSM}	Non-repetitive peak reverse voltages	V	2100÷2900	$T_{j\min} < T_j < T_{j\max}$; 180° half-sine wave; 50 Hz; single pulse;	
V_R	Reverse continuous voltages	V	$0.75 \cdot V_{RRM}$	$T_j = T_{j\max}$;	
THERMAL					
T_{stg}	Storage temperature	°C	- 60 ÷ 125		
T_j	Operating junction temperature	°C	- 60 ÷ 125		
MECHANICAL					
F	Mounting force	kN	9.0 ÷ 11.0		
a	Acceleration	m/s^2	50	Device unclamped	
			100	Device clamped	

JSC "PROTON-ELECTROTEX"

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CHARACTERISTICS

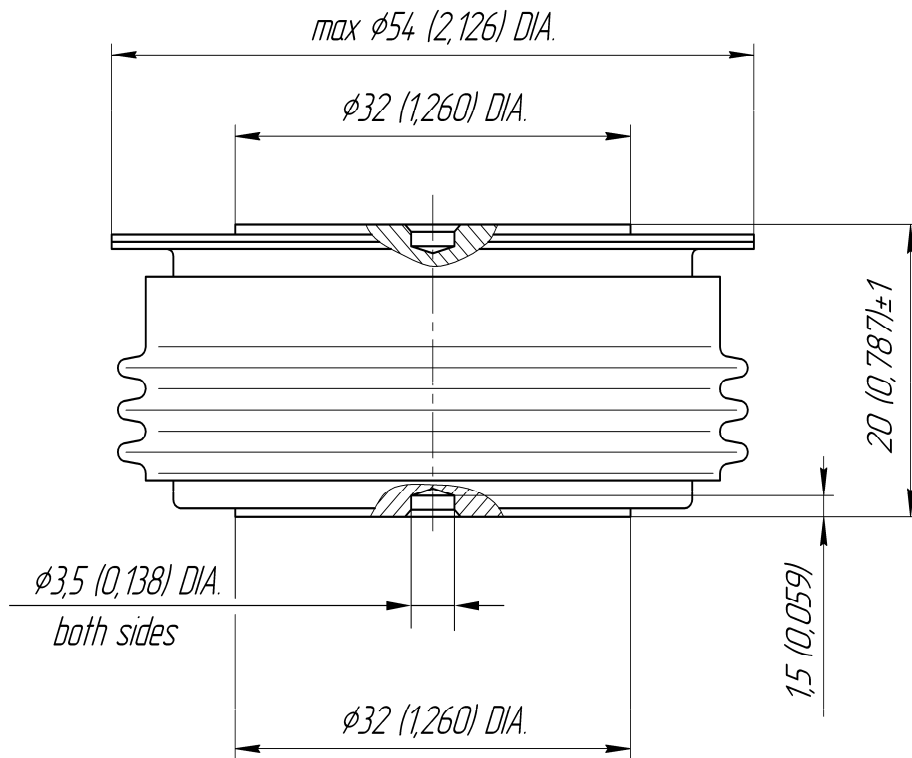
Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{FM}	Peak forward voltage, max	V	1.90	$T_j=25\text{ }^\circ\text{C}; I_{FM}=1256\text{ A}$	
$V_{F(TO)}$	Forward threshold voltage, max	V	1.20	$T_j=T_{j\text{ max}};$ $0.5\pi I_{FAV} < I_T < 1.5\pi I_{FAV}$	
r_T	Forward slope resistance, max	m Ω	0.700		
BLOCKING					
I_{RRM}	Repetitive peak reverse current, max	mA	50	$T_j=T_{j\text{ max}};$ $V_R=V_{RRM}$	
SWITCHING					
Q_{rr}	Total recovered charge, max	μC	650	$T_j=T_{j\text{ max}}; I_{FM}=I_{FAV};$ $di_R/dt=-100\text{ A}/\mu\text{s};$ $V_R=100\text{ V};$	
t_{rr}	Reverse recovery time, max	μs	5.0		
I_{rrM}	Peak reverse recovery current, max	A	260		
THERMAL					
R_{thjc}	Thermal resistance, junction to case, max	$^\circ\text{C}/\text{W}$	0.0400	Direct current	Double side cooled
R_{thjc-A}			0.0880		Anode side cooled
R_{thjc-K}			0.0720		Cathode side cooled
R_{thck}	Thermal resistance, case to heatsink, max	$^\circ\text{C}/\text{W}$	0.0080	Direct current	
MECHANICAL					
w	Weight, typ	g	180		
D_s	Surface creepage distance	mm (inch)	23.69 (0.933)		
D_a	Air strike distance	mm (inch)	19.10 (0.752)		

PART NUMBERING GUIDE						GROUP OF RECOVERY TIME	
DF	233	400	28	E4	N	Group Symbol	
1	2	3	4	5	6	$t_{rr}, \mu\text{s}$	E4
1. Fast recovery diode 2. Design version 3. Average forward current, A 4. Voltage code 5. Group of reverse recovery time 6. Ambient conditions: N – normal; T – tropical						5.0	

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All dimensions in millimeters (inches)

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