



**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 $\mu$ s		
$V_{RRM}$ , V	2000	2200	2400	2600	2800
Voltage code	20	22	24	26	28
$T_j$ , °C	- 60 ÷ 125				

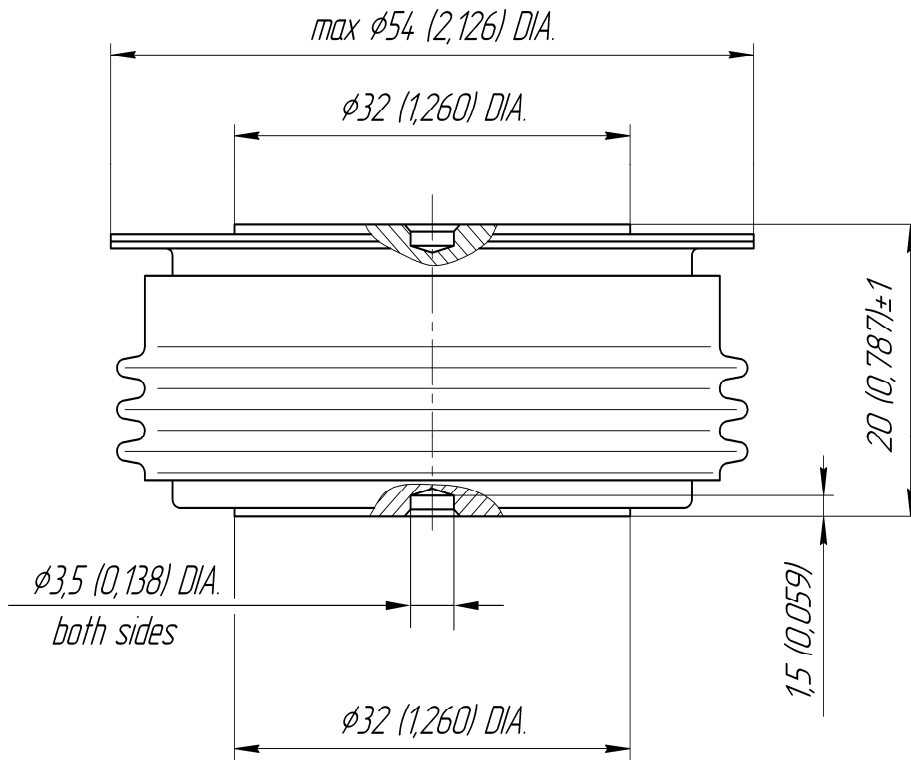
**MAXIMUM ALLOWABLE RATINGS**

Symbols and parameters		Units	Values	Test conditions	
<b>ON-STATE</b>					
$I_{FAV}$	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;
<b>BLOCKING</b>					
$V_{RRM}$	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	$0.75 \cdot V_{RRM}$	$T_j=T_{j\ max}$ ;	
<b>THERMAL</b>					
$T_{stg}$	Storage temperature	°C	- 60 ÷ 125		
$T_j$	Operating junction temperature	°C	- 60 ÷ 125		
<b>MECHANICAL</b>					
F	Mounting force	kN	9.0 ÷ 11.0		
a	Acceleration	$m/s^2$	50	Device unclamped	
			100	Device clamped	

## CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
<b>ON-STATE</b>					
$V_{FM}$	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	$T_j=T_{j\text{ max}};$	
$r_T$	Forward slope resistance, max	m $\Omega$	0.700	$0.5\pi I_{FAV} < I_T < 1.5\pi I_{FAV}$	
<b>BLOCKING</b>					
$I_{RRM}$	Repetitive peak reverse current, max	mA	50	$T_j=T_{j\text{ max}};$ $V_R=V_{RRM}$	
<b>SWITCHING</b>					
$Q_{rr}$	Total recovered charge, max	$\mu\text{C}$	650	$T_j=T_{j\text{ max}}; I_{FM}=I_{FAV};$	
$t_{rr}$	Reverse recovery time, max	$\mu\text{s}$	5.0	$di_R/dt=-100\text{ A}/\mu\text{s};$	
$I_{rrM}$	Peak reverse recovery current, max	A	260	$V_R=100\text{ V};$	
<b>THERMAL</b>					
$R_{thjc}$	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	
<b>MECHANICAL</b>					
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	



All dimensions in millimeters (inches)