



# PROTON-ELECTROTEX RUSSIA

High power cycling capability  
Low on-state and switching losses  
Optimized for line frequency rectifiers  
Designed for traction and industrial applications

## Rectifier Diode Type D233-500-44

Average forward current		$I_{FAV}$	500 A	
Repetitive peak reverse voltage		$V_{RRM}$	3800 ÷ 4400 V	
$V_{RRM}$ , V	3800	4000	4200	4400
Voltage code	38	40	42	44
$T_j$ , °C	-60 ÷ 150			

### MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions
<b>ON-STATE</b>				
$I_{FAV}$	Average forward current	A	500 550	$T_c=106$ °C; Double side cooled; $T_c=100$ °C; Double side cooled; 180° half-sine wave; 50 Hz
$I_{FRMS}$	RMS forward current	A	785	$T_c=106$ °C; Double side cooled; 180° half-sine wave; 50 Hz
$I_{FSM}$	Surge forward current	kA	7.5 8.6	$T_j=T_{j\ max}$ $T_j=25$ °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	$A^2s \cdot 10^3$	280 365	$T_j=T_{j\ max}$ $T_j=25$ °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	3800 ÷ 4400	$T_{j\ min} < T_j < T_{j\ max}$ ; 180° half-sine wave; 50 Hz;
$V_{RSM}$	Non-repetitive peak reverse voltages	V	3900 ÷ 4500	$T_{j\ min} < T_j < T_{j\ max}$ ; 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 ÷ 150	
$T_j$	Operating junction temperature	°C	-60 ÷ 150	
<b>MECHANICAL</b>				
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	
<b>ON-STATE</b>					
$V_{FM}$	Peak forward voltage, max	V	2.00	$T_j=25\text{ }^\circ\text{C}; I_{FM}=1570\text{ A}$	
$V_{F(TO)}$	Forward threshold voltage, max	V	1.05	$T_j=T_{j\text{ max}}$	
$r_T$	Forward slope resistance, max	m $\Omega$	0.900	$0.5\pi I_{FAV} < I_T < 1.5\pi I_{FAV}$	
<b>BLOCKING</b>					
$I_{RRM}$	Repetitive peak reverse current, max	mA	50	$T_j=T_{j\text{ max}};$ $V_R=V_{RRM}$	
<b>THERMAL</b>					
$R_{thjc}$	Thermal resistance, junction to case, max	$^\circ\text{C/W}$	0.040	Direct current	Double side cooled
$R_{thjc-A}$			0.088		Anode side cooled
$R_{thjc-K}$			0.072		Cathode side cooled
$R_{thck}$	Thermal resistance, case to heatsink, max	$^\circ\text{C/W}$	0.008	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

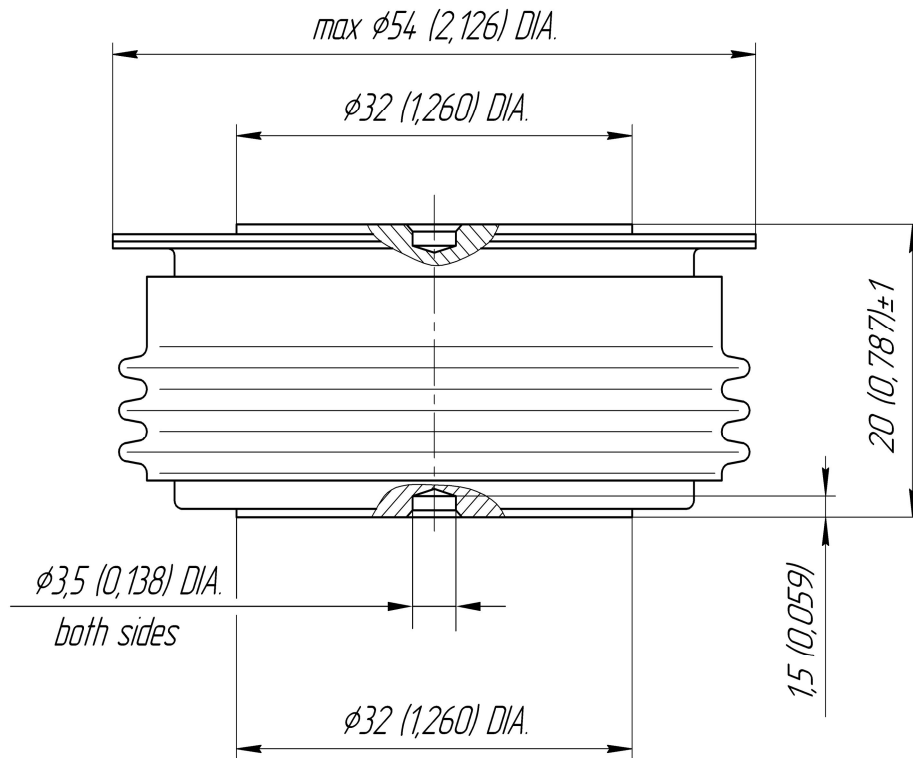
D	233	500	44	N
1	2	3	4	5

1. D — Rectifier Diode
2. Design version
3. Average forward current, A
4. Voltage code
5. Ambient conditions: N – normal; T – tropical

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All dimensions in millimeters (inches)

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