	TET ESTEL AS ESTONIA	**April** **2017**

Series
TL233-400

Avalanche Press-Pack Thyristor
Type TL233-400

Center amplifying gate
Guaranted avalanche power dissipation in reverse direction
Designed for traction and industrial applications

Maximum mean on-state current				I_{TAV}	**400 A**	
Maximum repetitive peak off-state and reverse voltage				U_{DRM} U_{RRM}	**600 ÷1100 V**	
Turn-off time				**tq**	**80; 100; 125 µs**	
U_{DRM}, U_{RRM}, V	600	700	800	900	1000	1100
Voltage code	6	7	8	9	10	11
Tvj, °C	- 60 ÷ 140					

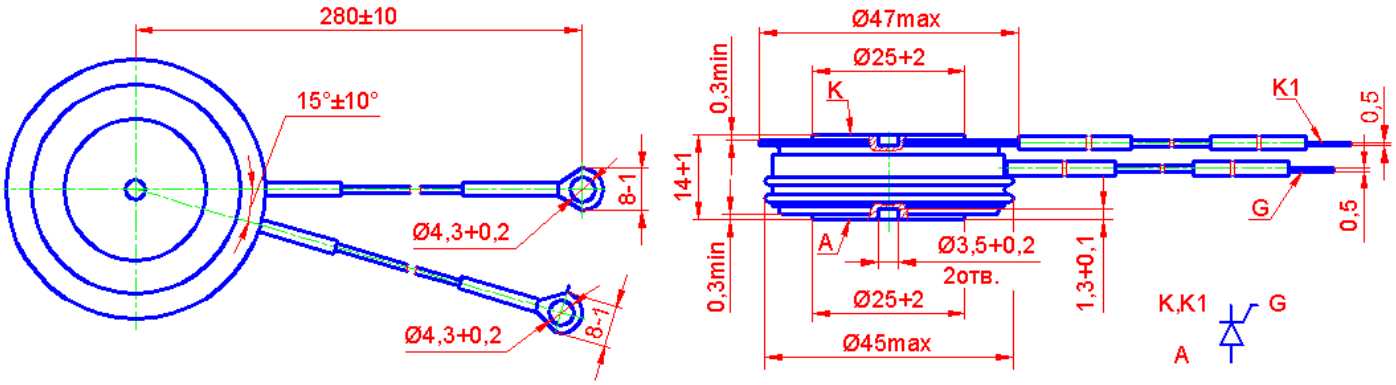
MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	TL233-400	Conditions	
I_{TAV}	Mean on-state current	A	400 690	Tc=102 °C, Tc=55 °C 180° half-sine wave, 50 Hz	
I_{TRMS}	RMS on-state current	A	628	Tc=102 °C	
I_{TSM}	Surge on-state current	kA	8,0 9,0	Tvj=140°C Tvj=25°C	tp=10 ms U_R=0
I^2t	Limiting load integral	kA^2s	320 405	Tvj=140°C Tvj=25°C	
U_{DRM},U_{RRM}	Repetitive peak off-state and reverse voltage	V	600÷1100	Tj min≤Tvj≤Tjм 180° half-sine wave, 50 Hz Gate open	
U_{DSM},U_{RSM}	Non-repetitive peak off-state and reverse voltage	V	660÷1210	Tj min≤Tvj≤Tjм 180° half-sine wave tp=10 ms, Single pulse Gate open	
(di$_T$/dt) crit	Critical rate of rise of on-state current : non - repetitive repetitive	A/µs	 250 125	Tvj=140°C ; U_D=0,67 U_{DRM}, Gate pulse : 10V,5 Ω, 1µs rise time, 10 µs	
U_{RGM}	Peak reverse gate voltage	V	5	Tj min≤Tvj≤Tjм	
P_{RSM}	Surge reverse power dissipation	kW	40	Tvj=140°C; tp = 10µs 180° half-sine wave	
Tstg	Storage temperature	°C	-60÷80		
Tvj	Junction temperature	°C	-60÷140		
CHARACTERISTICS					
U_{TM}	Peak on-state voltage	V	2,2	Tvj=25°C, I_{TM}=3,14 I_{TAV}	
$U_{T(TO)}$	Threshold voltage	V	1,2	Tvj=140°C 1,57 I_{TAV}< I_T <4,71 I_{TAV}	
R_T	On-state slope resistance	mΩ	0,9		
I_{DRM} I_{RRM}	Repetitive peak off-state and reverse current	mA	 35 35	Tvj=140°C, U_D = U_{DRM} U_R= U_{RRM}	

CHARACTERISTICS					
Symbols and parameters		Units	TL233-400	Conditions	
I_L	Latching current	A	0,7	Tvj=25°C,U_D=12V Gate pulse : 10V, 5Ω, 1 µs rise time, 10µs	
I_H	Holding current	A	0,3	Tvj=25°C,U_D=12V, Gate open	
U_{GT}	Gate trigger direct voltage	V	2,5 5,0	Tvj=25°C, Tvj=-60°C	U_D=12V
I_{GT}	Gate trigger direct current	A	0,3 0,85	Tvj=25°C, Tvj=-60°C	
U_{GD}	Gate non-trigger direct voltage	V	0,4	Tvj=140°C, U_D = 0,67 U_{DRM}	
I_{GD}	Gate non-trigger direct current	мА	6	Direct gate current	
tgd	Delay time	µs	1,6	Tvj=25°C,U_D=500V I_{TM} = 400 A Gate pulse : 10V, 5Ω, 1 µs rise time, 10µs	
tgt	Turn-on time	µs	3,2		
tq	Turn-off time	µs	80÷125	Tvj=140°C, I_{TM}=400 A di_R/dt =10 A/µs, U_R=100V U_D = 0,67 U_{DRM} du_D/dt=50 V/µs	
Qrr	Recovered charge	µC	700	Tvj=140°C, I_{TM}=400 A di_R/dt =10 A/µs, U_R=100V	
trr	Reverse recovery time	µs	6		
Irr_M	Peak reverse recovery current	A	230		
$(du_D/dt)_{crit}$	Critical rate of rise of off-state voltage	V/µs	500 1000	Tvj=140°C, U_D = 0,67 U_{DRM} Gate open	
Rthjc	Thermal resistance junction to case	°C/W	0,045	Direct current, double side cooled	

ORDERING							
	TL	**233**	**400**	**11**	**7**	**4**	
	1	**2**	**3**	**4**	**5**	**6**	

1. Avalanche thyristor.
2. Design version.
3. Mean on-state current, A.
4. Voltage code (11=1100V).
5. Critical rate of rise of off-state voltage (6 ≥ 500 V/µs, 7 ≥1000 V/µs).
6. Group of turn-off time (du_D/dt=50 V/µs, X2 ≤ 125 µs, 4 ≤ 100 µs, B3 ≤ 80 µs, 0-not limited).



Tightening torgue : 9 ÷ 12 kN
Weight : 120 grams