



**TET ESTEL AS**  
ESTONIA

**June**  
**2013**

**Series**  
**TFI473-1600**

**High Frequency Inverter grade**  
**Capsule Thyristor**  
**Type TFI473-1600**

Low switching losses  
Distributed amplified gate for high di/dt

Maximum mean on-state current	$I_{TAV}$	<b>1600 A</b>				
Maximum repetitive peak off-state and reverse voltage	$U_{DRM}$	<b>3400 ÷ 4400 V</b>				
Turn-off time	$U_{RRM}$	<b>125; 160 <math>\mu</math>s</b>				
$U_{DRM}, U_{RRM}, V$	3400	3600	3800	4000	4200	4400
Voltage code	34	36	38	40	42	44
$T_{vj}, ^\circ C$	- 60 ÷ 125					

**MAXIMUM ALLOWABLE RATINGS**

Symbols and parameters		Units	TFI473-1600	Conditions
$I_{TAV}$	Mean on-state current	A	1600 2070	$T_c=77^\circ C$ , $T_c=55^\circ C$ , 180° half-sine wave, 50 Hz
$I_{TRMS}$	RMS on-state current	A	2512	$T_c=77^\circ C$
$I_{TSM}$	Surge on-state current	kA	30,0 33,0	$T_{vj}=125^\circ C$ $T_{vj}=25^\circ C$ tp=10 ms $U_R=0$
$I^2t$	Limiting load integral	kA <sup>2</sup> s	4500 5445	$T_{vj}=125^\circ C$ $T_{vj}=25^\circ C$
$U_{DRM}, U_{RRM}$	Repetitive peak off-state and reverse voltage	V	3400÷4400	$T_j \min \leq T_{vj} \leq T_{jM}$ 180° half-sine wave, 50 Hz Gate open
$U_{DSM}, U_{RSM}$	Non-repetitive peak off-state and reverse voltage	V	3500÷4500	$T_j \min \leq T_{vj} \leq T_{jM}$ 180° half-sine wave tp=10 ms, Single pulse Gate open
(di <sub>T</sub> /dt) crit	Critical rate of rise of on-state current : non - repetitive repetitive	A/ $\mu$ s	1600 800	$T_{vj}=125^\circ C$ ; $U_D=0,67 U_{DRM}$ , Gate pulse : 10V, 5 $\Omega$ , 1 $\mu$ s rise time, 10 $\mu$ s
$U_{RGM}$	Peak reverse gate voltage	V	5	$T_j \min \leq T_{vj} \leq T_{jM}$
$T_{stg}$	Storage temperature	$^\circ C$	-60÷80	
$T_{vj}$	Junction temperature	$^\circ C$	-60÷125	

**CHARACTERISTICS**

$U_{TM}$	Peak on-state voltage	V	2,7	$T_{vj}=25^\circ C$ , $I_{TM}=3,14 I_{TAV}$
$U_{T(TO)}$	Threshold voltage	V	1,44	$T_{vj}=125^\circ C$
$R_T$	On-state slope resistance	m $\Omega$	0,27	1,57 $I_{TAV} < I_T < 4,71 I_{TAV}$
$I_{DRM}$ $I_{RRM}$	Repetitive peak off-state and reverse current	mA	150 150	$T_{vj}=125^\circ C$ , $U_D = U_{DRM}$ $U_R = U_{RRM}$

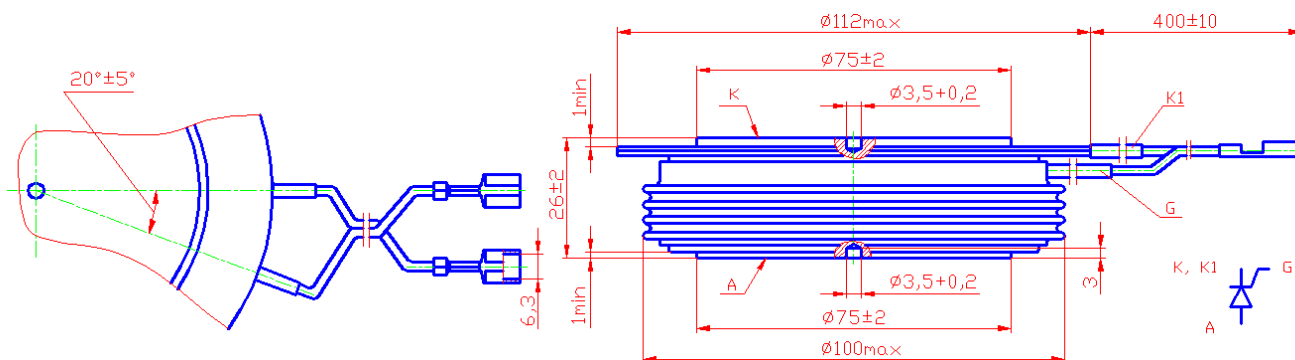
## CHARACTERISTICS

Symbols and parameters		Units	TFI473-1600	Conditions
$I_L$	Latching current	A	15	$T_{vj}=25^{\circ}\text{C}, U_D=12\text{V}$ Gate pulse : 10V, 5 $\Omega$ , 1 $\mu\text{s}$ rise time, 10 $\mu\text{s}$
$I_H$	Holding current	A	1,0	$T_{vj}=25^{\circ}\text{C}, U_D=12\text{V}$ , Gate open
$U_{GT}$	Gate trigger direct voltage	V	2,5 5,0	$T_{vj}=25^{\circ}\text{C}$ , $T_{vj}=-60^{\circ}\text{C}$ $U_D=12\text{V}$
$I_{GT}$	Gate trigger direct current	A	0,35 0,85	$T_{vj}=25^{\circ}\text{C}$ , $T_{vj}=-60^{\circ}\text{C}$
$U_{GD}$	Gate non-trigger direct voltage	V	0,25	$T_{vj}=125^{\circ}\text{C}, U_D = 0,67 U_{DRM}$
$I_{GD}$	Gate non-trigger direct current	mA	10	Direct gate current
$t_{gd}$	Delay time	$\mu\text{s}$	2,5	$T_{vj}=25^{\circ}\text{C}, U_D=500\text{V}$ $I_{TM} = 1600 \text{ A}$
$t_{gt}$	Turn-on time	$\mu\text{s}$	4,0	Gate pulse : 10V, 5 $\Omega$ , 1 $\mu\text{s}$ rise time, 10 $\mu\text{s}$
$t_q$	Turn-off time	$\mu\text{s}$	125; 160 160; 200	$T_{vj}=125^{\circ}\text{C}, I_{TM}=1600 \text{ A}$ $di_R/dt = 10 \text{ A}/\mu\text{s}, U_R=100\text{V}$ $U_D = 0,67 U_{DRM}$ $du_D/dt=50 \text{ V}/\mu\text{s}$ $du_D/dt=200 \text{ V}/\mu\text{s}$
$Q_{rr}$	Recovered charge	$\mu\text{C}$	3000	$T_{vj}=125^{\circ}\text{C}, I_{TM}=1600 \text{ A}$
$t_{rr}$	Reverse recovery time	$\mu\text{s}$	14	
$I_{rrM}$	Peak reverse recovery current	A	430	$di_R/dt = 50 \text{ A}/\mu\text{s}, U_R=100\text{V}$
$(du_D/dt)_{crit}$	Critical rate of rise of off-state voltage	$\text{V}/\mu\text{s}$	500 1000	$T_{vj}=125^{\circ}\text{C}, U_D = 0,67 U_{DRM}$ Gate open
$R_{thjc}$	Thermal resistance junction to case	$^{\circ}\text{C}/\text{W}$	0,012	Direct current, double side cooled

## ORDERING

	TFI	473	1600	40	7	T2	1	
	1	2	3	4	5	6	7	

- Fast thyristor with interdigitated gate structure.
- Design version.
- Mean on-state current, A.
- Voltage code (40=4000 V).
- Critical rate of rise of off-state voltage ( $6 \geq 500 \text{ V}/\mu\text{s}$ ,  $7 \geq 1000 \text{ V}/\mu\text{s}$ ).
- Group of turn-off time ( $du_D/dt=50 \text{ V}/\mu\text{s}$ ,  $T_2 \leq 160 \mu\text{s}$ ,  $X_2 \leq 125 \mu\text{s}$ ).
- Group of turn-on time ( $1 \leq 4 \mu\text{s}$ ).



Mounting force : 36 ÷ 46 kN  
Weight : 1200 grams