

ESTEL ELEKTROONIKA
ESTONIAMarch
2005**Series**
TFI473-1600**High Frequency Inverter grade**
Capsule Thyristor
Type TFI473-1600Low switching losses
Distributed amplified gate for high di/dt

Preliminary data

| | | | | | | | | |
|---|------|------|------|------|------|-----------|-----------------------------------|--|
| Maximum mean on-state current | | | | | | I_{TAV} | 1600 A | |
| Maximum repetitive peak off-state and reverse voltage | | | | | | U_{DRM} | 3400 ÷ 4400 V | |
| Turn-off time | | | | | | U_{RRM} | | |
| | | | | | | t_q | 125; 160 μs | |
| 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 2190 | $T_c=80^\circ C$, $T_c=55^\circ C$, 180° half-sine wave, 50 Hz |
| I_{TRMS} | RMS on-state current | A | 2512 | $T_c=80^\circ C$ |
| I_{TSM} | Surge on-state current | kA | 30,0 33,0 | $T_{vj}=125^\circ C$ $T_{vj}=25^\circ C$ |
| I^2t | Limiting load integral | kA^2s | 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 $t_p=10$ ms, Single pulse Gate open |
| $(di_T/dt)_{crit}$ | Critical rate of rise of on-state current : non - repetitive repetitive | A/ μ s | 1600 800 | $T_{vj}=125^\circ C$; $U_D=0,67 U_{DRM}$, Gate pulse : 10V, 5 Ω , 1 μ s rise time, 10 μ 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 | 3,0 | $T_{vj}=25^\circ C$, $I_{TM}=3,14 I_{TAV}$ |
| $U_{T(To)}$ | Threshold voltage | V | 1,1 | $T_{vj}=125^\circ C$ |
| R_T | On-state slope resistance | m Ω | 0,25 | 1,57 $I_{TAV} < I_T < 4,71 I_{TAV}$ |
| I_{DRM} I_{RRM} | Repetitive peak off-state and reverse current | mA | 200 200 | $T_{vj}=125^\circ C$, $U_D = U_{DRM}$ $U_R = U_{RRM}$ |

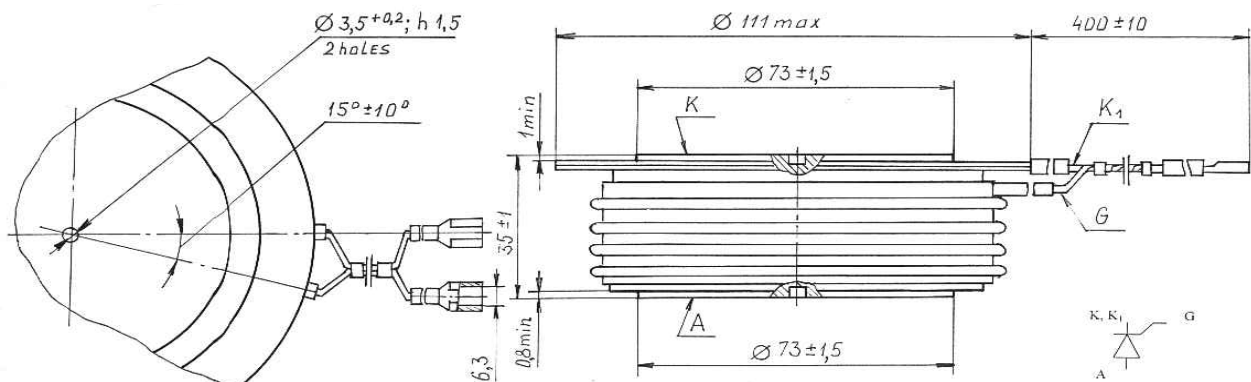
CHARACTERISTICS

| 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 Ω , 1 μs rise time, 10 μs |
| 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 | $T_{vj}=25^{\circ}\text{C}$, $T_{vj}=-60^{\circ}\text{C}$ |
| 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 | μs | 2,5 | $T_{vj}=25^{\circ}\text{C}, U_D=500\text{V}$ $I_{TM} = 1600 \text{ A}$ |
| t_{gt} | Turn-on time | μs | 4,0 | Gate pulse : 10V, 5 Ω , 1 μs rise time, 10 μs |
| t_q | Turn-off time | μs | 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 | μC | 3300 | |
| t_{rr} | Reverse recovery time | μs | 14 | $T_{vj}=125^{\circ}\text{C}, I_{TM}=1600 \text{ A}$ |
| I_{rrM} | Peak reverse recovery current | A | 470 | $di_R/dt = 50 \text{ A}/\mu\text{s}, U_R=100\text{V}$ |
| $(du_D/dt)_{crit}$ | 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 | $^{\circ}\text{C}/\text{W}$ | 0,013 | Direct current, double side cooled |

ORDERING

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

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



Mounting force : 36 ÷ 46 kN
Weight : 1200 grams