



TET ESTEL AS
ESTONIA

May
2016

Series
TFI133-400

High Frequency Inverter grade
Capsule Thyristor
Type TFI133-400

Low turn-off time
Low reverse recovery charge
Distributed amplified gate for high di/dt

| | | | | | | | | | | |
|---|------------|-----|-----|-----|-----|-----------|--|------|------|--|
| Maximum mean on-state current | | | | | | I_{TAV} | 400 A | | | |
| Maximum repetitive peak off-state and reverse voltage | | | | | | U_{DRM} | 300 ÷ 1100 V | | | |
| Turn-off time | | | | | | U_{RRM} | | | | |
| | | | | | | t_q | 8; 10; 12,5; 16 μs | | | |
| U_{DRM}, U_{RRM}, V | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | |
| Voltage code | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | |
| $T_{vj}, ^\circ C$ | - 60 ÷ 125 | | | | | | | | | |

MAXIMUM ALLOWABLE RATINGS

| Symbols and parameters | | Units | TFI133-400 | Conditions |
|------------------------|---|------------|--------------|--|
| I_{TAV} | Mean on-state current | A | 400 660 | $T_c=90^\circ C,$ $T_c=55^\circ C,$ 180° half-sine wave, 50 Hz |
| I_{TRMS} | RMS on-state current | A | 628 | $T_c=90^\circ C$ |
| I_{TSM} | Surge on-state current | kA | 7,0 7,7 | $T_{vj}=125^\circ C$ $T_{vj}=25^\circ C$ tp=10 ms |
| I^2t | Limiting load integral | kA^2s | 245 296 | $T_{vj}=125^\circ C$ $T_{vj}=25^\circ C$ $U_R=0$ |
| U_{DRM}, U_{RRM} | Repetitive peak off-state and reverse voltage | V | 300÷1100 | $T_j \min \leq T_{vj} \leq T_{jM}$ 180° half-sine wave, 50 Hz Gate open |
| U_{DSM}, U_{RSM} | Non-repetitive peak off-state and reverse voltage | V | 330÷1210 | $T_j \min \leq T_{vj} \leq T_{jM}$ 180° half-sine wave tp=10 ms, Single pulse Gate open |
| (diT/dt) crit | Critical rate of rise of on-state current : non - repetitive repetitive | A/ μ s | 1600 1000 | $T_{vj}=125^\circ C ; U_D=0,67 U_{DRM},$ Gate pulse : 10V, 5 $\Omega,$ 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 | 2,3 | $T_{vj}=25^\circ C, I_{TM}=3,14 I_{TAV}$ |
| $U_{T(To)}$ | Threshold voltage | V | 1,5 | $T_{vj}=125^\circ C$ |
| R_T | On-state slope resistance | m Ω | 0,7 | 1,57 $I_{TAV} < I_T < 4,71 I_{TAV}$ |
| I_{DRM} I_{RRM} | Repetitive peak off-state and reverse current | mA | 50 50 | $T_{vj}=125^\circ C,$ $U_D = U_{DRM}$ $U_R = U_{RRM}$ |

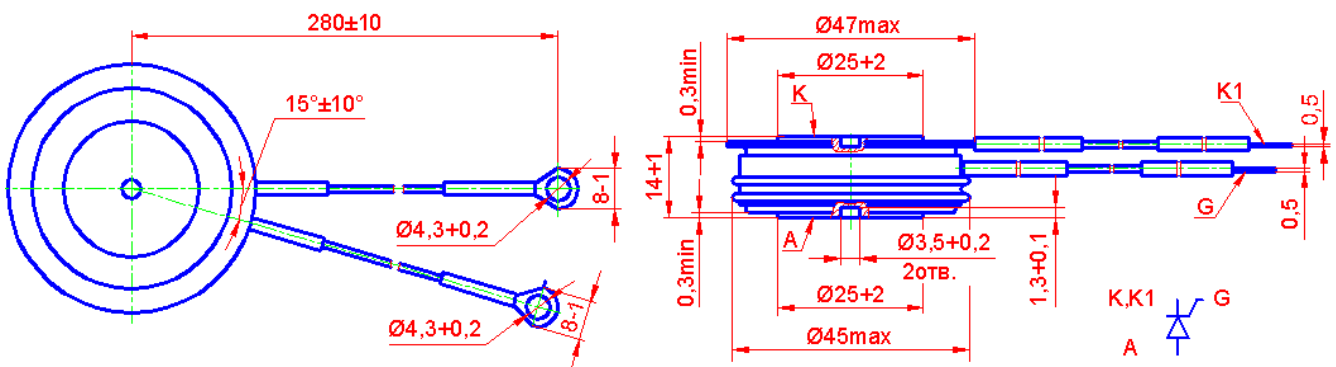
CHARACTERISTICS

| Symbols and parameters | | Units | TFI133-400 | Conditions |
|------------------------|--|-----------------------------|---------------|--|
| I_L | Latching current | A | 5 | $T_{vj}=25^{\circ}\text{C}, U_D=12\text{V}$ Gate pulse : 10V, 5Ω , 1 μs rise time, 10 μs |
| I_H | Holding current | A | 0,5 | $T_{vj}=25^{\circ}\text{C}, U_D=12\text{V}, \text{Gate open}$ |
| 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 | 0,3 0,85 | $T_{vj}=25^{\circ}\text{C},$ $T_{vj}=-60^{\circ}\text{C}$ |
| U_{GD} | Gate non-trigger direct voltage | V | 0,25 | $T_{vj}=125^{\circ}\text{C}, U_D = 0,67 U_{DRM}$ Direct gate current |
| I_{GD} | Gate non-trigger direct current | mA | 10 | |
| tgd | Delay time | μs | 1,6 | $T_{vj}=25^{\circ}\text{C}, U_D=500\text{V}$ $I_{TM} = 400 \text{ A}$ |
| tgt | Turn-on time | μs | 2,5 | Gate pulse : 10V, 5Ω , 1 μs rise time, 10 μs |
| tq | Turn-off time | μs | 8÷16 10÷20 | $T_{vj}=125^{\circ}\text{C}, I_{TM} = 400 \text{ A}$ $di_R/dt = 10 \text{ A}/\mu\text{s}, U_R=100\text{V}$ $U_D = 0,67 U_{DRM}$ $du_D/dt=50 \text{ V}/\mu\text{s}$ $du_D/dt=200 \text{ V}/\mu\text{s}$ |
| Qrr | Recovered charge | μC | 100 | |
| trr | Reverse recovery time | μs | 2,5 | $T_{vj}=125^{\circ}\text{C}, I_{TM} = 400 \text{ A}$ |
| Irrm | Peak reverse recovery current | A | 80 | $di_R/dt = 50 \text{ A}/\mu\text{s}, U_R=100\text{V}$ |
| $(du_D/dt)_{crit}$ | Critical rate of rise of off-state voltage | V/ μs | 500 1000 | $T_{vj}=125^{\circ}\text{C}, U_D = 0,67 U_{DRM}$ Gate open |
| Rthjc | Thermal resistance junction to case | $^{\circ}\text{C}/\text{W}$ | 0,04 | Direct current, double side cooled |

ORDERING

| | TFI | 133 | 400 | 10 | 7 | 8 | 3 | |
|--|-----|-----|-----|----|---|---|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

- Fast thyristor with interdigitated gate structure.
- Design version.
- Mean on-state current, A.
- Voltage code (10=1000 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 ($du_D/dt=50 \text{ V}/\mu\text{s}$, $7 \leq 16 \mu\text{s}$, $8 \leq 12,5\mu\text{s}$, $A4 \leq 10 \mu\text{s}$, $9 \leq 8 \mu\text{s}$).
- Group of turn-on time ($3 \leq 2,5 \mu\text{s}$).



Mounting force : 9÷12 kN
Weight : 120 grams