



**THE DATASHEET OF
TFI143S-500-12_14MM**





TET ESTEL AS
ESTONIA

November
2016

Series
TFI143S-500

High Frequency Inverter grade
Capsule Thyristor
Type TFI143S-500

Strong distributed amplified gate
and low turn-off time thyristor for
high frequency applications to 20 kHz

| | | | | | |
|---|------------------------|---------------------------------|------|------|------|
| Maximum mean on-state current | I_{TAV} | 500 A | | | |
| Maximum repetitive peak off-state and reverse voltage | U_{DRM} U_{RRM} | 800 ÷ 1200 V | | | |
| Turn-off time | t_q | 6,3; 8 μs | | | |
| U_{DRM}, U_{RRM}, V | 800 | 900 | 1000 | 1100 | 1200 |
| Voltage code | 8 | 9 | 10 | 11 | 12 |
| $T_{vj}, ^\circ C$ | - 60 ÷ 125 | | | | |

MAXIMUM ALLOWABLE RATINGS

| Symbols and parameters | | Units | TFI143S-500 | Conditions |
|------------------------|---|------------|--------------|---|
| I_{TAV} | Mean on-state current | A | 500 830 | $T_c=87^\circ C$, $T_c=55^\circ C$, 180° half-sine wave, 50 Hz |
| I_{TRMS} | RMS on-state current | A | 785 | $T_c=87^\circ C$ |
| I_{TSM} | Surge on-state current | kA | 10 11 | $T_{vj}=125^\circ C$ $T_{vj}=25^\circ C$ tp=10 ms $U_R=0$ |
| I^2t | Limiting load integral | kA^2s | 500 605 | $T_{vj}=125^\circ C$ $T_{vj}=25^\circ C$ |
| U_{DRM}, U_{RRM} | Repetitive peak off-state and reverse voltage | V | 800÷1200 | $T_j \min \leq T_{vj} \leq T_j \max$ 180° half-sine wave, 50 Hz Gate open |
| U_{DSM}, U_{RSM} | Non-repetitive peak off-state and reverse voltage | V | 880÷1300 | $T_j \min \leq T_{vj} \leq T_j \max$ 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 | 2000 1250 | $T_{vj}=125^\circ C$; $U_D=0,67 U_{DRM}$, Gate pulse : 10V,5 Ω , 1 μ s rise time, 10 μ s |
| U_{RGM} | Peak reverse gate voltage | V | 5 | $T_j \min \leq T_{vj} \leq T_j \max$ |
| T_{stg} | Storage temperature | $^\circ C$ | -60÷80 | |
| T_{vj} | Junction temperature | $^\circ C$ | -60÷125 | |

CHARACTERISTICS

| | | | | |
|------------------------|---|------------|----------|--|
| U_{TM} | Peak on-state voltage | V | 2,5 | $T_{vj}=25^\circ C$, $I_{TM}=3,14 I_{TAV}$ |
| $U_{T(To)}$ | Threshold voltage | V | 1,4 | $T_{vj}=125^\circ C$ |
| R_T | On-state slope resistance | m Ω | 0,4 | 1,57 $I_{TAV} < I_T < 4,71 I_{TAV}$ |
| I_{DRM} I_{RRM} | Repetitive peak off-state and reverse current | mA | 50 50 | $T_{vj}=125^\circ C$, $U_D = U_{DRM}$ $U_R = U_{RRM}$ |

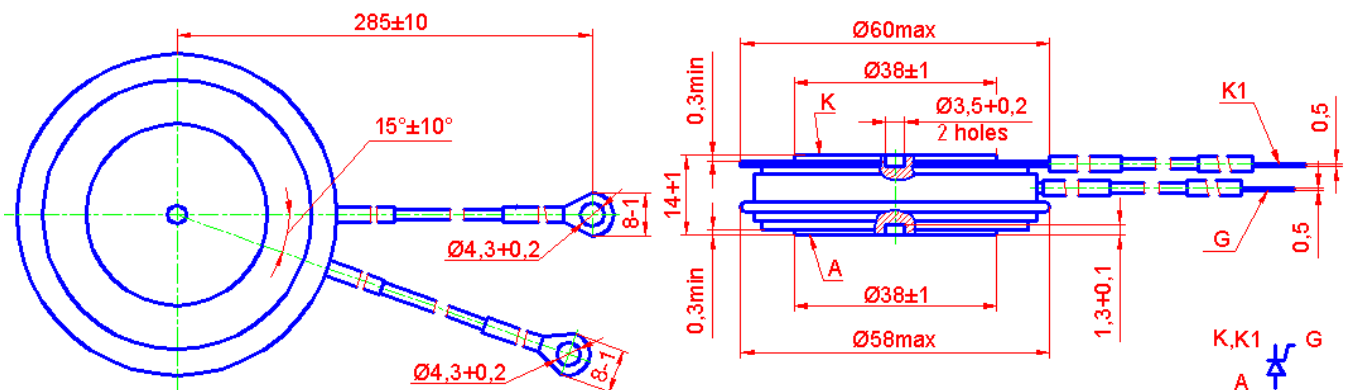
CHARACTERISTICS

| Symbols and parameters | | Units | TFI143S-500 | Conditions |
|-------------------------------|--|-----------------------------|-----------------------|--|
| I_L | Latching current | A | 16 | $T_{vj}=25^{\circ}\text{C}, U_D=12\text{V}$ Gate pulse : 10V, 5 Ω , 1 μs rise time, 10 μs |
| I_H | Holding current | A | 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 | 0,35 0,85 | $T_{vj}=25^{\circ}\text{C},$ $T_{vj}=-60^{\circ}\text{C}$ |
| U_{GD} | Gate non-trigger direct voltage | V | 0,25 | $T_{vj}=125^{\circ}\text{C}, U_D = 0,67 U_{DRM}$ Direct gate current |
| I_{GD} | Gate non-trigger direct current | mA | 10 | |
| tg _d | Delay time | μs | 1,6 | $T_{vj}=25^{\circ}\text{C}, U_D=500\text{V}$ $I_{TM} = 500 \text{ A}$ |
| tg _t | Turn-on time | μs | 2,5 | Gate pulse : 10V, 5 Ω , 1 μs rise time, 10 μs |
| t _q | Turn-off time | μs | 6,3; 8,0 8,0; 10,0 | $T_{vj}=125^{\circ}\text{C}, I_{TM}=500 \text{ A}$ $di_R/dt = 10 \text{ A}/\mu\text{s}, U_R=100\text{V}$ $U_D = 0,67 U_{DRM}$ $du_D/dt=50 \text{ V}/\mu\text{s}$ $du_D/dt=200 \text{ V}/\mu\text{s}$ |
| Q _{rr} | Recovered charge | μC | 110 | |
| t _{rr} | Reverse recovery time | μs | 2,5 | $T_{vj}=125^{\circ}\text{C}, I_{TM}=500 \text{ A}$ |
| I _{rrm} | Peak reverse recovery current | A | 88 | $di_R/dt = 50 \text{ A}/\mu\text{s}, U_R=100\text{V}$ |
| (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 |
| R _{thjc} | Thermal resistance junction to case | $^{\circ}\text{C}/\text{W}$ | 0,038 | Direct current, double side cooled |

ORDERING

| | TFI | 143 | S | 500 | 10 | 7 | C4 | 3 | |
|--|-----|-----|---|-----|----|---|----|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |

- Fast thyristor with interdigitated gate structure.
- Design version.
- Strong distributed amplified gate.
- Mean on-state current, A.
- Voltage code (10=1000 V).
- Critical rate of rise of off-state voltage (6 \geq 500 V/ μs , 7 \geq 1000 V/ μs).
- Group of turn-off time ($du_D/dt=50 \text{ V}/\mu\text{s}$, 9 \leq 8 μs , C4 \leq 6,3 μs).
- Group of turn-on time (3 \leq 2,5 μs).



Mounting force : 13÷19 kN

Weight : 210 grams

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