Pressure contact
Low switching losses
Low reverse recovery charge
High power cycling capability
Distributed amplified gate for high $di_T/dt$

# Fast Inverter Stud Thyristor
# Type TFI261-125-14

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mean on-state current | | | $I_{TAV}$ | | 125 A | | |
| Repetitive peak off-state voltage | | | $V_{DRM}$ | | 800 ÷ 1400 V | | |
| Repetitive peak reverse voltage | | | $V_{RRM}$ | | | | |
| Turn-off time | | | $t_q$ | | 16.0, 20.0, 25.0, 32.0 µs | | |
| $V_{DRM}$, $V_{RRM}$, V | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 |
| Voltage code | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| $T_j$, °C | – 60 ÷ 125 | | | | | | |

## MAXIMUM ALLOWABLE RATINGS

| Symbols and parameters | | Units | Values | Test conditions | |
|---|---|---|---|---|---|
| **ON-STATE** | | | | | |
| $I_{TAV}$ | Mean on-state current | A | 125<br>235 | $T_c$=97 °C;<br>$T_c$=55 °C;<br>180° half-sine wave; 50 Hz | |
| $I_{TRMS}$ | RMS on-state current | A | 196 | $T_c$=97 °C;<br>180° half-sine wave; 50 Hz | |
| $I_{TSM}$ | Surge on-state current | kA | 3.5<br>4.0 | $T_j$=$T_{j\,max}$<br>$T_j$=25 °C | 180° half-sine wave;<br>$t_p$=10 ms; single pulse;<br>$V_D$=$V_R$=0 V;<br>Gate pulse:$I_G$=$I_{FGM}$; $V_G$=20 V;<br>$t_{GP}$=50 µs; $di_G/dt$=1 A/µs |
| | | | 3.5<br>4.0 | $T_j$=$T_{j\,max}$<br>$T_j$=25 °C | 180° half-sine wave;<br>$t_p$=8.3 ms; single pulse;<br>$V_D$=$V_R$=0 V;<br>Gate pulse:$I_G$=$I_{FGM}$; $V_G$=20 V;<br>$t_{GP}$=50 µs; $di_G/dt$=1 A/µs |
| $I^2t$ | Safety factor | $A^2s\cdot10^3$ | 60<br>80 | $T_j$=$T_{j\,max}$<br>$T_j$=25 °C | 180° half-sine wave;<br>$t_p$=10 ms; single pulse;<br>$V_D$=$V_R$=0 V;<br>Gate pulse:$I_G$=$I_{FGM}$; $V_G$=20 V;<br>$t_{GP}$=50 µs; $di_G/dt$=1 A/µs |
| | | | 50<br>60 | $T_j$=$T_{j\,max}$<br>$T_j$=25 °C | 180° half-sine wave;<br>$t_p$=8.3 ms; single pulse;<br>$V_D$=$V_R$=0 V;<br>Gate pulse:$I_G$=$I_{FGM}$; $V_G$=20 V;<br>$t_{GP}$=50 µs; $di_G/dt$=1 A/µs |
| **BLOCKING** | | | | | |
| $V_{DRM}$, $V_{RRM}$ | Repetitive peak off-state and Repetitive peak reverse voltages | V | 800÷1400 | $T_{j\,min}$< $T_j$ <$T_{j\,max}$;<br>180° half-sine wave; 50 Hz;<br>Gate open | |
| $V_{DSM}$, $V_{RSM}$ | Non-repetitive peak off-state and Non-repetitive peak reverse voltages | V | 900÷1500 | $T_{j\,min}$< $T_j$ <$T_{j\,max}$;<br>180° half-sine wave; single pulse; Gate open | |
| $V_D$, $V_R$ | Direct off-state and Direct reverse voltages | V | 0.6·$V_{DRM}$<br>0.6·$V_{RRM}$ | $T_j$=$T_{j\,max}$;<br>Gate open | |

| | | | | |
|---|---|---|---|---|
| **TRIGGERING** | | | | |
| $I_{FGM}$ | Peak forward gate current | A | 5 | $T_j=T_{j\,max}$ |
| $V_{RGM}$ | Peak reverse gate voltage | V | 5 | |
| $P_G$ | Gate power dissipation | W | 3 | $T_j=T_{j\,max}$ for DC gate current |
| **SWITCHING** | | | | |
| $(di_T/dt)_{crit}$ | Critical rate of rise of on-state current non-repetitive (f=1 Hz) | A/μs | 1000 | $T_j=T_{j\,max}$; $V_D=0.67 \cdot V_{DRM}$; $I_{TM}=2\ I_{TAV}$; Gate pulse: $I_G=2$ A; $V_G=20$ V; $t_{GP}=50$ μs; $di_G/dt=2$ A/μs |
| **THERMAL** | | | | |
| $T_{stg}$ | Storage temperature | °C | -60 ÷ 50 | |
| $T_j$ | Operating junction temperature | °C | -60 ÷ 125 | |
| **MECHANICAL** | | | | |
| M | Tightening torque | Nm | 20 ÷ 30 | |
| a | Acceleration | $m/s^2$ | 100 | |

## CHARACTERISTICS

| Symbols and parameters | | Units | Values | Conditions | |
|---|---|---|---|---|---|
| **ON-STATE** | | | | | |
| $V_{TM}$ | Peak on-state voltage, max | V | 2.30 | $T_j=25$ °C; $I_{TM}=393$A | |
| $V_{T(TO)}$ | On-state threshold voltage, max | V | 1.45 | $T_j=T_{j\,max}$; $0.5\ \pi\ I_{TAV} < I_T < 1.5\ \pi\ I_{TAV}$ | |
| $r_T$ | On-state slope resistance, max | mΩ | 2.500 | | |
| $I_H$ | Holding current, max | mA | 250 | $T_j=25$ °C; $V_D=12$ V; Gate open | |
| **BLOCKING** | | | | | |
| $I_{DRM}$, $I_{RRM}$ | Repetitive peak off-state and Repetitive peak reverse currents, max | mA | 50 | $T_j=T_{j\,max}$; $V_D=V_{DRM}$; $V_R=V_{RRM}$ | |
| $(dv_D/dt)_{crit}$ | Critical rate of rise of off-state voltage[1)], min | V/μs | 200, 320, 500, 1000 | $T_j=T_{j\,max}$; $V_D=0.67 \cdot V_{DRM}$; Gate open | |
| **TRIGGERING** | | | | | |
| $V_{GT}$ | Gate trigger direct voltage, max | V | 4.00<br>2.50<br>2.00 | $T_j=T_{j\,min}$<br>$T_j=25$ °C<br>$T_j=T_{j\,max}$ | $V_D=12$ V; $I_D=3$ A; Direct gate current |
| $I_{GT}$ | Gate trigger direct current, max | mA | 400<br>250<br>200 | $T_j=T_{j\,min}$<br>$T_j=25$ °C<br>$T_j=T_{j\,max}$ | |
| $V_{GD}$ | Gate non-trigger direct voltage, min | V | 0.45 | $T_j=T_{j\,max}$; $V_D=0.67 \cdot V_{DRM}$; Direct gate current | |
| $I_{GD}$ | Gate non-trigger direct current, min | mA | 10.00 | | |
| **SWITCHING** | | | | | |
| $t_{gd}$ | Delay time, max | μs | 0.62 | $T_j=25$ °C; $V_D=600$ V; $I_{TM}=I_{TAV}$; $di/dt=200$ A/μs; Gate pulse: $I_G=2$ A; $V_G=20$ V; $t_{GP}=50$ μs; $di_G/dt=2$ A/μs | |
| $t_{gt}$ | Turn-on time[2)] | μs | 1.60, 2.00, 2.50, 3.20 | | |
| $t_q$ | Turn-off time[3)] | μs | 16.0, 20.0, 25.0, 32.0 | $dv_D/dt=50$ V/μs; $T_j=T_{j\,max}$; $I_{TM}=I_{TAV}$; $di_R/dt=-10$ A/μs; $V_R=100$V; $V_D=0.67\ V_{DRM}$ | |
| $Q_{rr}$ | Total recovered charge, max | μC | 125 | $T_j=T_{j\,max}$; $I_{TM}=I_{TAV}$; $di_R/dt=-50$ A/μs; $V_R=100$ V | |
| $t_{rr}$ | Reverse recovery time, typ | μs | 2.5 | | |
| $I_{rrM}$ | Peak reverse recovery current, max | A | 100 | | |

| THERMAL | | | | |
|---|---|---|---|---|
| $R_{thjc}$ | Thermal resistance, junction to case, max | °C/W | 0.1000 | Direct current |
| **MECHANICAL** | | | | |
| w | Weight, max | g | 260 | |
| $D_s$ | Surface creepage distance | mm (inch) | 12.4 (4.882) | |
| $D_a$ | Air strike distance | mm (inch) | 12.4 (4.882) | |

## PART NUMBERING GUIDE

| TFI | 261 | 125 | 14 | A2 | T3 | T4 | N |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

1. Fast Inverter Thyristor
2. Design version
3. Mean on-state current, A
4. Voltage code
5. Critical rate of rise of off-state voltage
6. Group of turn-off time ($dv_D/dt$=50 V/μs)
7. Group of turn-on time
8. Ambient conditions: N – normal; T – tropical

## NOTES

[1] Critical rate of rise of off-state voltage

| Symbol of group | P2 | K2 | E2 | A2 |
|---|---|---|---|---|
| $(dv_D/dt)_{crit}$, V/μs | 200 | 320 | 500 | 1000 |

[2] Turn-on time

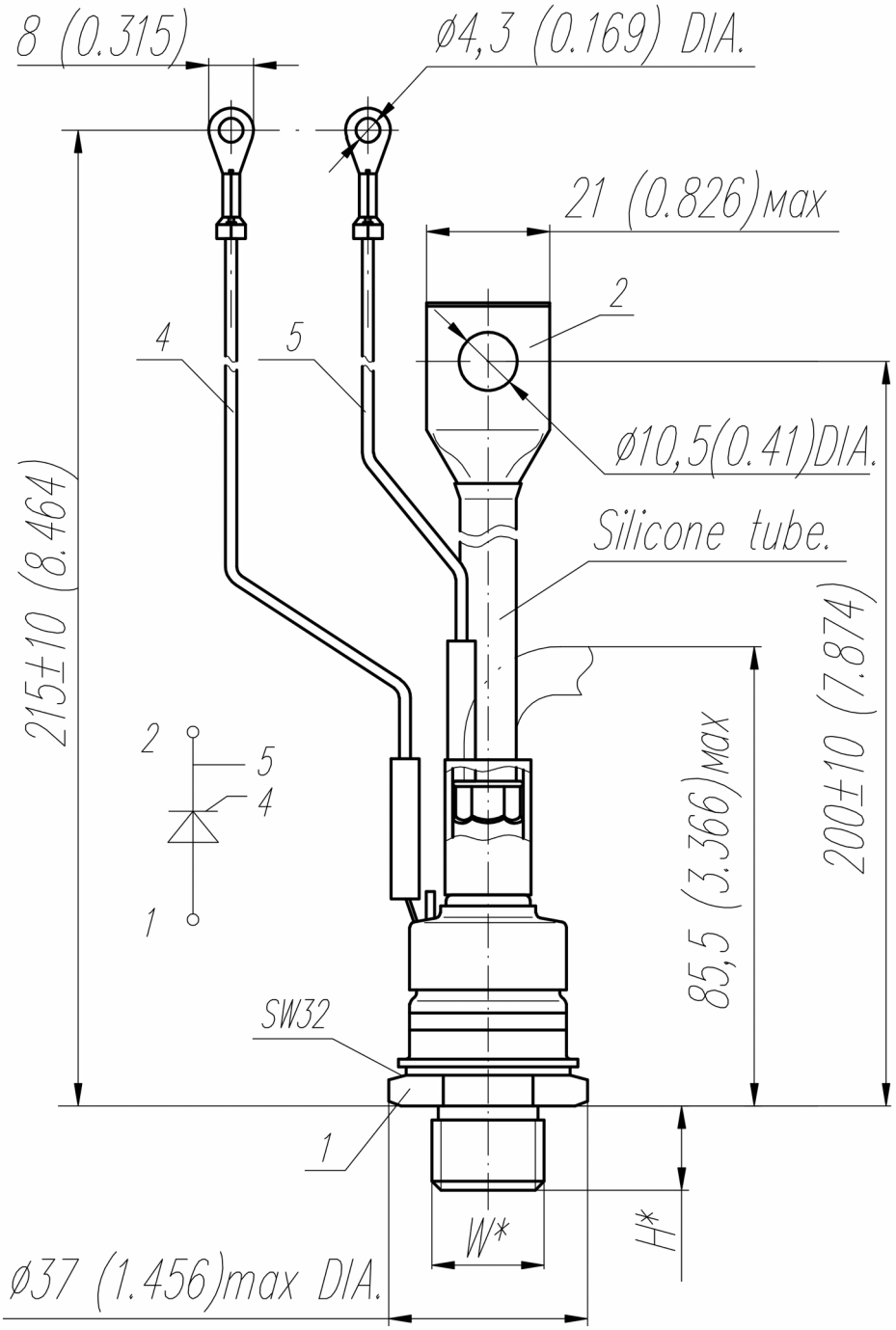
| Symbol of group | T4 | P4 | M4 | K4 |
|---|---|---|---|---|
| $t_{gt}$, μs | 1.60 | 2.00 | 2.50 | 3.20 |

[3] Turn-off time ($dv_D/dt$=50 V/μs)

| Symbol of group | T3 | P3 | M3 | K3 |
|---|---|---|---|---|
| $t_q$, μs | 16.0 | 20.0 | 25.0 | 32.0 |

## OVERALL DIMENSIONS

**Package type: T.SA1**




| Type of screw | W | H |
|---|---|---|
| Metric Screw Type A | M16x1,5 – 8g | 13 |
| Metric Screw Type B(upon request) | M20x1,5 – 8g | 15 |

| Polarity | Example of code designation | Reference designation | Colors | | |
|---|---|---|---|---|---|
| | | | Anode | Cathode | Gate |
| Anode to stud | TFI261-125-14 |  | - | Red tube | White |

All dimensions in millimeters (inches)