

EVLYS LTD. - POWER SEMICONDUCTORS DEVICES - Wholesale and Retail.

Fast Thyristor Type FDT40-400-22

Low switching losses
Distributed amplified gate for high di_T/dt

| | | | | |
|-----------------------------------|------------|------|--------------------------------|------|
| Mean on-state current | I_{TAV} | | 400 A | |
| Repetitive peak off-state voltage | V_{DRM} | | 1600...2200 V | |
| Repetitive peak reverse voltage | V_{RRM} | | | |
| Turn-off time | t_q | | 25.0, 32.0, 40.0, 50.0 μs | |
| V_{DRM}, V_{RRM}, V | 1600 | 1800 | 2000 | 2200 |
| Voltage code | 16 | 18 | 20 | 22 |
| $T_j, ^\circ C$ | -60...+125 | | | |

MAXIMUM ALLOWABLE RATINGS

| Symbols and parameters | | Units | Values | Test conditions |
|------------------------|--|-------------------|--|--|
| ON-STATE | | | | |
| I_{TAV} | Mean on-state current | A | 400 417 622 | $T_c = 87^\circ C$; Double side cooled; $T_c = 85^\circ C$; Double side cooled; $T_c = 55^\circ C$; Double side cooled; 180° half-sine wave; 50 Hz |
| I_{TRMS} | RMS on-state current | A | 628 | $T_c = 87^\circ C$; Double side cooled; 180° half-sine wave; 50 Hz |
| I_{TSM} | Surge on-state current | kA | 9.0 10.5 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 10$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$; $V_G = 20$ V; $t_{GP} = 50 \mu s$; $di_G/dt = 1$ A/ μs |
| | | | 9.5 11.0 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 8.3$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$; $V_G = 20$ V; $t_{GP} = 50 \mu s$; $di_G/dt = 1$ A/ μs |
| I^2t | Safety factor | $A^2s \cdot 10^3$ | 400 550 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 10$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$; $V_G = 20$ V; $t_{GP} = 50 \mu s$; $di_G/dt = 1$ A/ μs |
| | | | 370 500 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 8.3$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$; $V_G = 20$ V; $t_{GP} = 50 \mu s$; $di_G/dt = 1$ A/ μs |
| BLOCKING | | | | |
| V_{DRM}, V_{RRM} | Repetitive peak off-state and Repetitive peak reverse voltages | V | 1600...2200 | $T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; 50 Hz; Gate open |
| V_{DSM}, V_{RSM} | Non-repetitive peak off-state and Non-repetitive peak reverse voltages | V | 1700...2300 | $T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; single pulse; Gate open |
| V_D, V_R | Direct off-state and Direct reverse voltages | V | $0.6 \cdot V_{DRM}$ $0.6 \cdot V_{RRM}$ | $T_j = T_{jmax}$; Gate open |

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| TRIGGERING | | | | |
|--------------------|---|------------------|-------------|--|
| I_{FGM} | Peak forward gate current | A | 8 | $T_j = T_{j\max}$ |
| V_{RGM} | Peak reverse gate voltage | V | 5 | |
| P_G | Gate power dissipation | W | 8 | $T_j = T_{j\max}$ for DC gate current |
| SWITCHING | | | | |
| $(di_T/dt)_{crit}$ | Critical rate of rise of on-state current non-repetitive (f=1 Hz) | A/ μ s | 2000 | $T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; $I_{TM} = 2500$ A; Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ μ s; $di_G/dt = 2$ A/ μ s |
| THERMAL | | | | |
| T_{stg} | Storage temperature | $^{\circ}$ C | -60...+50 | |
| T_j | Operating junction temperature | $^{\circ}$ C | -60...+125 | |
| MECHANICAL | | | | |
| F | Mounting force | kN | 14.0...16.0 | |
| a | Acceleration | m/s ² | 50 | Device clamped |

CHARACTERISTICS

| Symbols and parameters | | Units | Values | Conditions | |
|------------------------|---|------------|---------------------------------------|--|--|
| ON-STATE | | | | | |
| V_{TM} | Peak on-state voltage, max | V | 2.85 | $T_j = 25$ $^{\circ}$ C; $I_{TM} = 1256$ A | |
| $V_{T(TO)}$ | On-state threshold voltage, max | V | 1.821 | $T_j = T_{j\max}$; | |
| r_T | On-state slope resistance, max | m Ω | 0.976 | $0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$ | |
| I_H | Holding current, max | mA | 500 | $T_j = 25$ $^{\circ}$ C; $V_D = 12$ V; Gate open | |
| BLOCKING | | | | | |
| I_{DRM}, I_{RRM} | Repetitive peak off-state and Repetitive peak reverse currents, max | mA | 100 | $T_j = T_{j\max}$; $V_D = V_{DRM}$; $V_R = V_{RRM}$ | |
| $(dv_D/dt)_{crit}$ | Critical rate of rise of off-state voltage ¹⁾ , min | V/ μ s | 200, 320, 500, 1000, 1600, 2000, 2500 | $T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; Gate open | |
| TRIGGERING | | | | | |
| V_{GT} | Gate trigger direct voltage, max | V | 3.00 2.50 1.50 | $T_j = T_{j\min}$ $T_j = 25$ $^{\circ}$ C $T_j = T_{j\max}$ | $V_D = 12$ V; $I_D = 3$ A; Direct gate current |
| I_{GT} | Gate trigger direct current, max | mA | 500 300 150 | $T_j = T_{j\min}$ $T_j = 25$ $^{\circ}$ C $T_j = T_{j\max}$ | |
| V_{GD} | Gate non-trigger direct voltage, min | V | 0.35 | $T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; | |
| I_{GD} | Gate non-trigger direct current, min | mA | 55.00 | Direct gate current | |
| SWITCHING | | | | | |
| t_{gd} | Delay time, max | μ s | 0.90 | $T_j = 25$ $^{\circ}$ C; $V_D = 1000$ V; $I_{TM} = I_{TAV}$; $di/dt = 200$ A/ μ s; | |
| t_{gt} | Turn-on time ²⁾ , max | μ s | 1.60, 2.00, 2.50, 3.20 | Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ μ s; $di_G/dt = 2$ A/ μ s | |
| t_q | Turn-off time ³⁾ max | μ s | 25.0, 32.0, 40.0, 50.0 | $dv_D/dt = 50$ V/ μ s | $T_j = T_{j\max}$; $I_{TM} = I_{TAV}$; $di_R/dt = -10$ A/ μ s; $V_R = 100$ V; $V_D = 0.67 V_{DRM}$ |
| | | | 32.0, 40.0, 50.0, 63.0 | $dv_D/dt = 200$ V/ μ s | |

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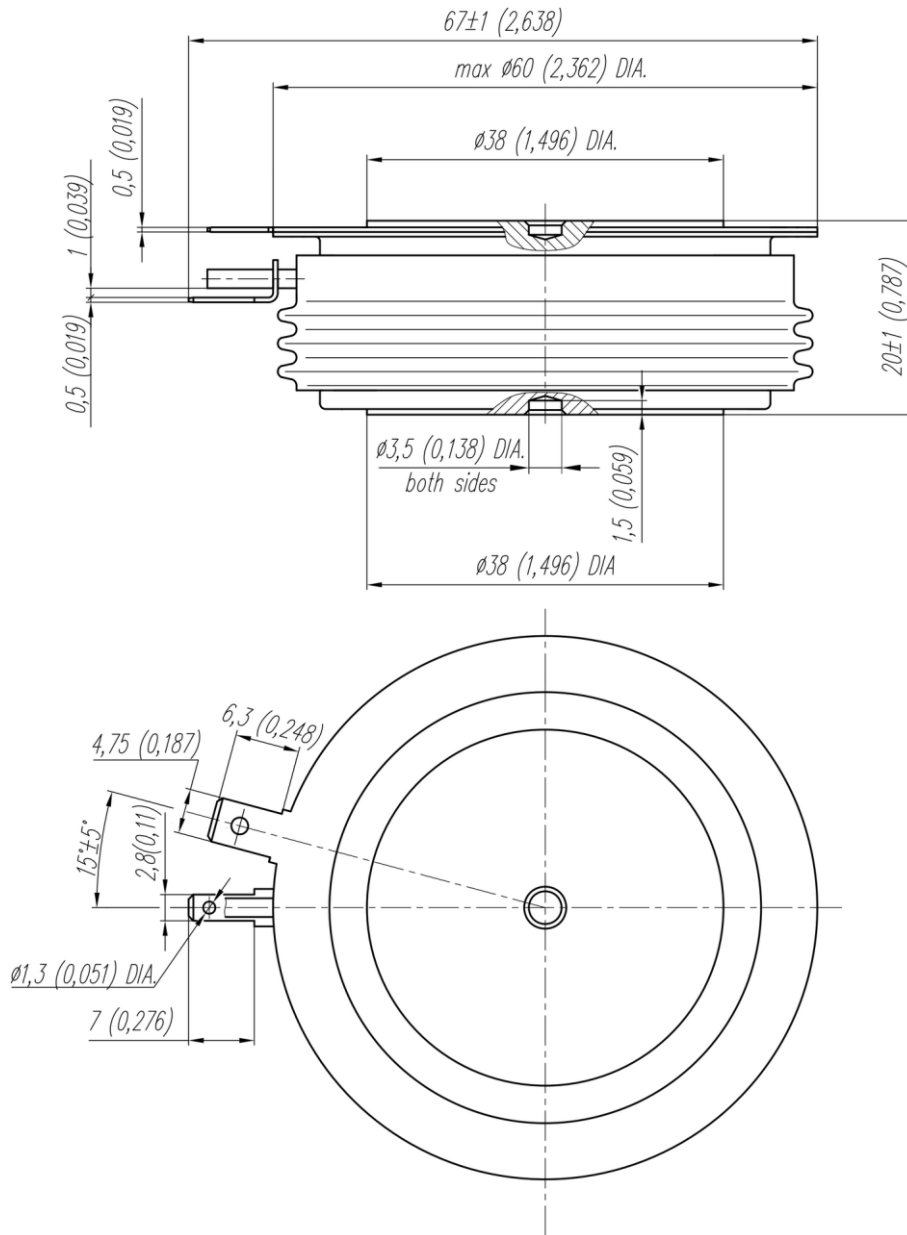
| THERMAL | | | | | |
|-------------------|---|--------------|------------------|----------------|---------------------|
| R_{thjc} | Thermal resistance, junction to case, max | °C/W | 0.0340 | Direct current | Double side cooled |
| R_{thjc-A} | | | 0.0748 | | Anode side cooled |
| R_{thjc-K} | | | 0.0612 | | Cathode side cooled |
| R_{thck} | Thermal resistance, case to heatsink, max | °C/W | 0.006 | Direct current | |
| MECHANICAL | | | | | |
| w | Weight, max | g | 240 | | |
| D_s | Surface creepage distance | mm (inch) | 19.44 (0.765) | | |
| D_a | Air strike distance | mm (inch) | 12.10 (0.476) | | |

| PART NUMBERING GUIDE | | | | | | | | NOTES | | | | | | | | | | | | |
|---|----|-----|----|---|---|---|--|--|--|--|--|------|------|------|------|------|------|------|--|--|
| FDT | 40 | 400 | 22 | 7 | 5 | 4 | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 1) Critical rate of rise of off-state voltage | | | | | | | | | | | | |
| 1. FDT — Fast Disc Thyristor | | | | | | | | Symbol of Group | | | | 4 | 5 | 6 | 7 | 8 | 8.5 | 9 | | |
| 2. Element Diameter | | | | | | | | (dv _D /dt) _{crit} , V/μs | | | | 200 | 320 | 500 | 1000 | 1600 | 2000 | 2500 | | |
| 3. Mean on-state current, A | | | | | | | | 2) Turn-on time | | | | | | | | | | | | |
| 4. Voltage code | | | | | | | | Symbol of group | | | | 6 | 5 | 4 | 3 | | | | | |
| 5. Critical rate of rise of off-state voltage | | | | | | | | t _{gr} , μs | | | | 1.60 | 2.00 | 2.50 | 3.20 | | | | | |
| 6. Group of turn-off time (dv _D /dt=50 V/μs) | | | | | | | | 3) Turn-off time (dv _D /dt=50 V/μs) | | | | | | | | | | | | |
| 7. Group of turn-on time | | | | | | | | Symbol of group | | | | 5 | 4 | 3 | 2 | | | | | |
| | | | | | | | | t _{qr} , μs | | | | 25.0 | 32.0 | 40.0 | 50.0 | | | | | |

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OVERALL DIMENSIONS

Package type: T.C2



All dimensions in millimeters (inches)