

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

Fast Thyristor Type FDT40-630-22

Low switching losses / Low reverse recovery charge
Distributed amplified gate for high di_T/dt

| | | |
|-----------------------------------|------------|--------------------------------|
| Mean on-state current | I_{TAV} | 630 A |
| Repetitive peak off-state voltage | V_{DRM} | 2000...2200 V |
| Repetitive peak reverse voltage | V_{RRM} | |
| Turn-off time | t_q | 32.0, 40.0, 50.0, 63.0 μs |
| V_{DRM}, V_{RRM}, V | 2000 | 2200 |
| Voltage code | 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 | 537 630 800 | $T_c = 85^\circ C$; Double side cooled; $T_c = 75^\circ C$; Double side cooled; $T_c = 55^\circ C$; Double side cooled; 180° half-sine wave; 50 Hz |
| I_{TRMS} | RMS on-state current | A | 989 | $T_c = 75^\circ C$; Double side cooled; 180° half-sine wave; 50 Hz |
| I_{TSM} | Surge on-state current | kA | 10.5 12.0 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 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; $t_{GP} = 50$ μs ; $di_G/dt = 1$ A/ μs |
| | | | 11.0 12.5 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 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; $t_{GP} = 50$ μs ; $di_G/dt = 1$ A/ μs |
| I^2t | Safety factor | $A^2s \cdot 10^3$ | 550 720 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 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; $t_{GP} = 50$ μs ; $di_G/dt = 1$ A/ μs |
| | | | 500 640 | $T_j = T_{jmax}$ $T_j = 25^\circ C$ 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; $t_{GP} = 50$ μs ; $di_G/dt = 1$ A/ μs |
| BLOCKING | | | | |
| V_{DRM}, V_{RRM} | Repetitive peak off-state and Repetitive peak reverse voltages | V | 2000...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 | 2100...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 | 2.50 | $T_j = 25$ $^{\circ}$ C; $I_{TM} = 1978$ A | |
| $V_{T(TO)}$ | On-state threshold voltage, max | V | 1.397 | $T_j = T_{j\max}$; | |
| r_T | On-state slope resistance, max | m Ω | 0.600 | $0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$ | |
| 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 | 50.00 | Direct gate current | |
| SWITCHING | | | | | |
| t_{gd} | Delay time, max | μ s | 0.75 | $T_j = 25$ $^{\circ}$ 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 | 32.0, 40.0, 50.0, 63.0 | $dv_D/dt = 50$ V/ μ s; | |
| | | | 40.0, 50.0, 63.0, 80.0 | $dv_D/dt = 200$ V/ μ s; | |
| Q_{rr} | Total recovered charge, max | μ C | 350 | $T_j = T_{j\max}$; $I_{TM} = 630$ A; | |
| t_{rr} | Reverse recovery time, typ | μ s | 5.0 | $di_R/dt = -50$ A/ μ s; | |
| I_{rrM} | Peak reverse recovery current, max | A | 155 | $V_R = 100$ V | |

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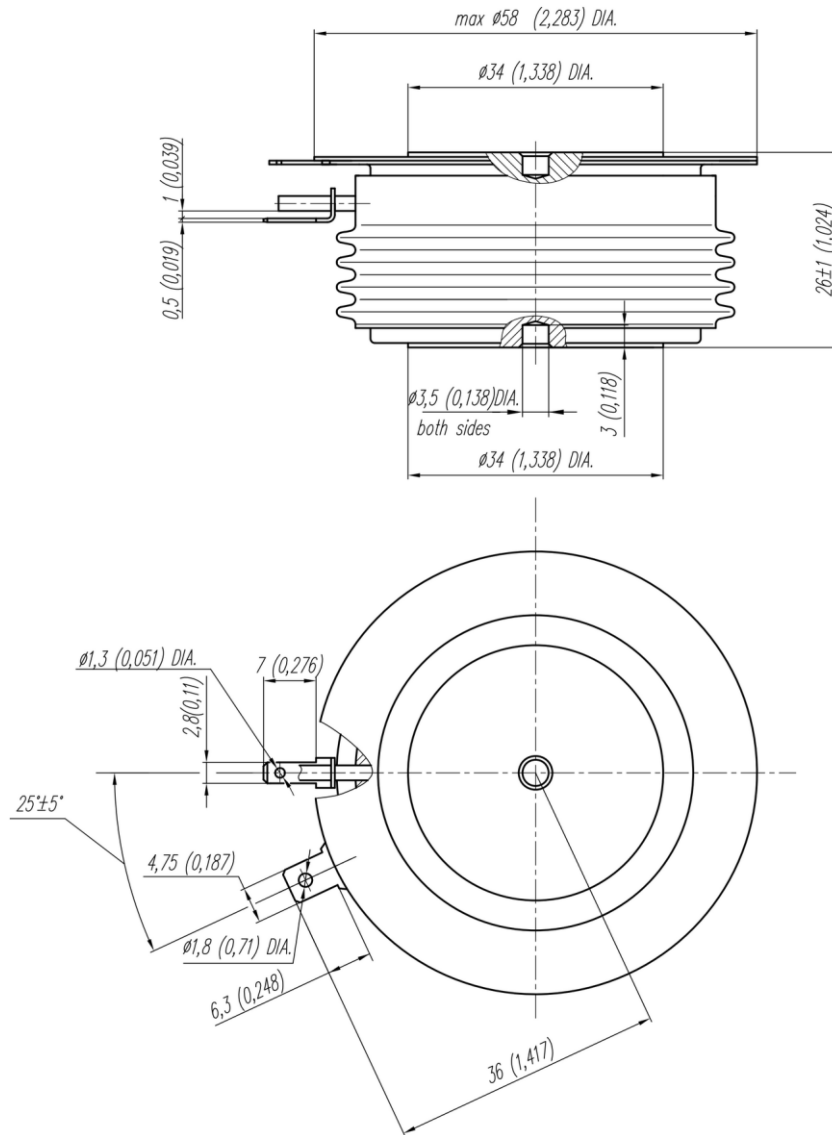
| THERMAL | | | | | |
|-------------------|---|--------------|------------------|----------------|---------------------|
| R_{thjc} | Thermal resistance, junction to case, max | °C/W | 0.0340 | Direct current | Double side cooled |
| R_{thjc-A} | | | 0.0748 | | Anode side cooled |
| R_{thjc-K} | | | 0.0612 | | Cathode side cooled |
| R_{thck} | Thermal resistance, case to heatsink, max | °C/W | 0.0060 | Direct current | |
| MECHANICAL | | | | | |
| w | Weight, max | g | 280 | | |
| D_s | Surface creepage distance | mm (inch) | 27.60 (1.087) | | |
| D_a | Air strike distance | mm (inch) | 16.00 (0.630) | | |

| PART NUMBERING GUIDE | | | | | | | | NOTES | | | | | | | | | | | | | | | | | | | | | | | |
|--|------|------|------|------|------|------|------|--|--|--|--|--|--|--|--|-----------------|---|---|---|---|-----------------|------|------|-----------------------------|------|-----|-----|------|------|------|------|
| FDT | 40 | 630 | 22 | 7 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 1) Critical rate of rise of off-state voltage | | | | | | | | | | | | | | | | | | | | | | | |
| 1. FDT — Fast Inverter Disc Thyristor | | | | | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #cccccc;">Symbol of Group</th> <th style="background-color: #cccccc;">4</th> <th style="background-color: #cccccc;">5</th> <th style="background-color: #cccccc;">6</th> <th style="background-color: #cccccc;">7</th> <th style="background-color: #cccccc;">8</th> <th style="background-color: #cccccc;">8,5</th> <th style="background-color: #cccccc;">9</th> </tr> </thead> <tbody> <tr> <td>$(dv_D/dt)_{crit}, V/\mu s$</td> <td>200</td> <td>320</td> <td>500</td> <td>1000</td> <td>1600</td> <td>2000</td> <td>2500</td> </tr> </tbody> </table> | | | | | | | | Symbol of Group | 4 | 5 | 6 | 7 | 8 | 8,5 | 9 | $(dv_D/dt)_{crit}, V/\mu s$ | 200 | 320 | 500 | 1000 | 1600 | 2000 | 2500 |
| Symbol of Group | 4 | 5 | 6 | 7 | 8 | 8,5 | 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| $(dv_D/dt)_{crit}, V/\mu s$ | 200 | 320 | 500 | 1000 | 1600 | 2000 | 2500 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Design version | | | | | | | | 2) Turn-on time | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Mean on-state current, A | | | | | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #cccccc;">Symbol of group</th> <th style="background-color: #cccccc;">6</th> <th style="background-color: #cccccc;">5</th> <th style="background-color: #cccccc;">4</th> <th style="background-color: #cccccc;">3</th> </tr> </thead> <tbody> <tr> <td>$t_{gt}, \mu s$</td> <td>1.60</td> <td>2.00</td> <td>2.50</td> <td>3.20</td> </tr> </tbody> </table> | | | | | | | | Symbol of group | 6 | 5 | 4 | 3 | $t_{gt}, \mu s$ | 1.60 | 2.00 | 2.50 | 3.20 | | | | | | |
| Symbol of group | 6 | 5 | 4 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $t_{gt}, \mu s$ | 1.60 | 2.00 | 2.50 | 3.20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Voltage code | | | | | | | | 3) Turn-off time ($dv_D/dt=50 V/\mu s$) | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Critical rate of rise of off-state voltage | | | | | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #cccccc;">Symbol of group</th> <th style="background-color: #cccccc;">4</th> <th style="background-color: #cccccc;">3</th> <th style="background-color: #cccccc;">2</th> <th style="background-color: #cccccc;">1</th> </tr> </thead> <tbody> <tr> <td>$t_q, \mu s$</td> <td>32.0</td> <td>40.0</td> <td>50.0</td> <td>63.0</td> </tr> </tbody> </table> | | | | | | | | Symbol of group | 4 | 3 | 2 | 1 | $t_q, \mu s$ | 32.0 | 40.0 | 50.0 | 63.0 | | | | | | |
| Symbol of group | 4 | 3 | 2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $t_q, \mu s$ | 32.0 | 40.0 | 50.0 | 63.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Group of turn-off time ($dv_D/dt=50 V/\mu s$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Group of turn-on time | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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OVERALL DIMENSIONS

Package type: T.C3



All dimensions in millimeters (inches)

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