

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

## Fast Inverter Thyristor Type **FIDT56-1000-14**

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

Mean on-state current	$I_{TAV}$		1000 A		
Repetitive peak off-state voltage	$V_{DRM}$		1000...1400 V		
Repetitive peak reverse voltage	$V_{RRM}$				
Turn-off time	$t_q$		10.0, 12.5, 16.0, 20.0 $\mu s$		
$V_{DRM}, V_{RRM}, V$	1000	1100	1200	1300	1400
Voltage code	10	11	12	13	14
$T_j, ^\circ C$	-60...+125				

### MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
<b>ON-STATE</b>					
$I_{TAV}$	Mean on-state current	A	871 1000 1318	$T_c = 85^\circ C$ ; Double side cooled; $T_c = 77^\circ C$ ; Double side cooled; $T_c = 55^\circ C$ ; Double side cooled; 180° half-sine wave; 50 Hz	
$I_{TRMS}$	RMS on-state current	A	1570	$T_c = 77^\circ C$ ; Double side cooled; 180° half-sine wave; 50 Hz	
$I_{TSM}$	Surge on-state current	kA	23.0 26.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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; $t_{GP} = 50$ $\mu s$ ; $di_G/dt = 1$ A/ $\mu s$
			24.0 28.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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/ $\mu s$
$I^2t$	Safety factor	$A^2s \cdot 10^3$	2600 3300	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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/ $\mu s$
			2300 3200	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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/ $\mu s$
<b>BLOCKING</b>					
$V_{DRM}, V_{RRM}$	Repetitive peak off-state and Repetitive peak reverse voltages	V	1000...1400	$T_{jmin} < T_j < T_{jmax}$ ; 180° half-sine wave; 50 Hz; Gate open	
$V_{DSM}, V_{RSM}$	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	1100...1500	$T_{jmin} < T_j < T_{jmax}$ ; 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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<b>TRIGGERING</b>				
$I_{FGM}$	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
<b>SWITCHING</b>				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current non-repetitive (f=1 Hz)	A/ $\mu$ s	2500	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; $I_{TM} = 2200$ A; Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ $\mu$ s; $di_G/dt = 2$ A/ $\mu$ s
<b>THERMAL</b>				
$T_{stg}$	Storage temperature	$^{\circ}$ C	-60...+50	
$T_j$	Operating junction temperature	$^{\circ}$ C	-60...+125	
<b>MECHANICAL</b>				
F	Mounting force	kN	24.0...28.0	
a	Acceleration	m/s <sup>2</sup>	50	Device clamped

## CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
<b>ON-STATE</b>					
$V_{TM}$	Peak on-state voltage, max	V	2.50	$T_j = 25$ $^{\circ}$ C; $I_{TM} = 3140$ A	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.520	$T_j = T_{j\max}$ ;	
$r_T$	On-state slope resistance, max	m $\Omega$	0.312	$0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$	
$I_H$	Holding current, max	mA	500	$T_j = 25$ $^{\circ}$ C; $V_D = 12$ V; Gate open	
<b>BLOCKING</b>					
$I_{DRM}, I_{RRM}$	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	150	$T_j = T_{j\max}$ ; $V_D = V_{DRM}$ ; $V_R = V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage <sup>1)</sup> , min	V/ $\mu$ s	200, 320, 500, 1000, 1600, 2000, 2500	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; Gate open	
<b>TRIGGERING</b>					
$V_{GT}$	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	0.40	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ;	
$I_{GD}$	Gate non-trigger direct current, min	mA	60.00	Direct gate current	
<b>SWITCHING</b>					
$t_{gd}$	Delay time, max	$\mu$ s	0.90	$T_j = 25$ $^{\circ}$ C; $V_D = 600$ V; $I_{TM} = I_{TAV}$ ; $di/dt = 200$ A/ $\mu$ s;	
$t_{gt}$	Turn-on time <sup>2)</sup> , max	$\mu$ s	2.00, 2.50, 3.20, 4.00	Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ $\mu$ s; $di_G/dt = 2$ A/ $\mu$ s	
$t_q$	Turn-off time <sup>3)</sup> , max	$\mu$ s	10.0, 12.5, 16.0, 20.0	$dv_D/dt = 50$ V/ $\mu$ s;	
			12.5, 16.0, 20.0, 25.0	$dv_D/dt = 200$ V/ $\mu$ s;	
$Q_{rr}$	Total recovered charge, max	$\mu$ C	150	$T_j = T_{j\max}$ ; $I_{TM} = 1000$ A;	
$t_{rr}$	Reverse recovery time, typ	$\mu$ s	4.0	$di_R/dt = -50$ A/ $\mu$ s;	
$I_{rrM}$	Peak reverse recovery current, max	A	100	$V_R = 100$ V	

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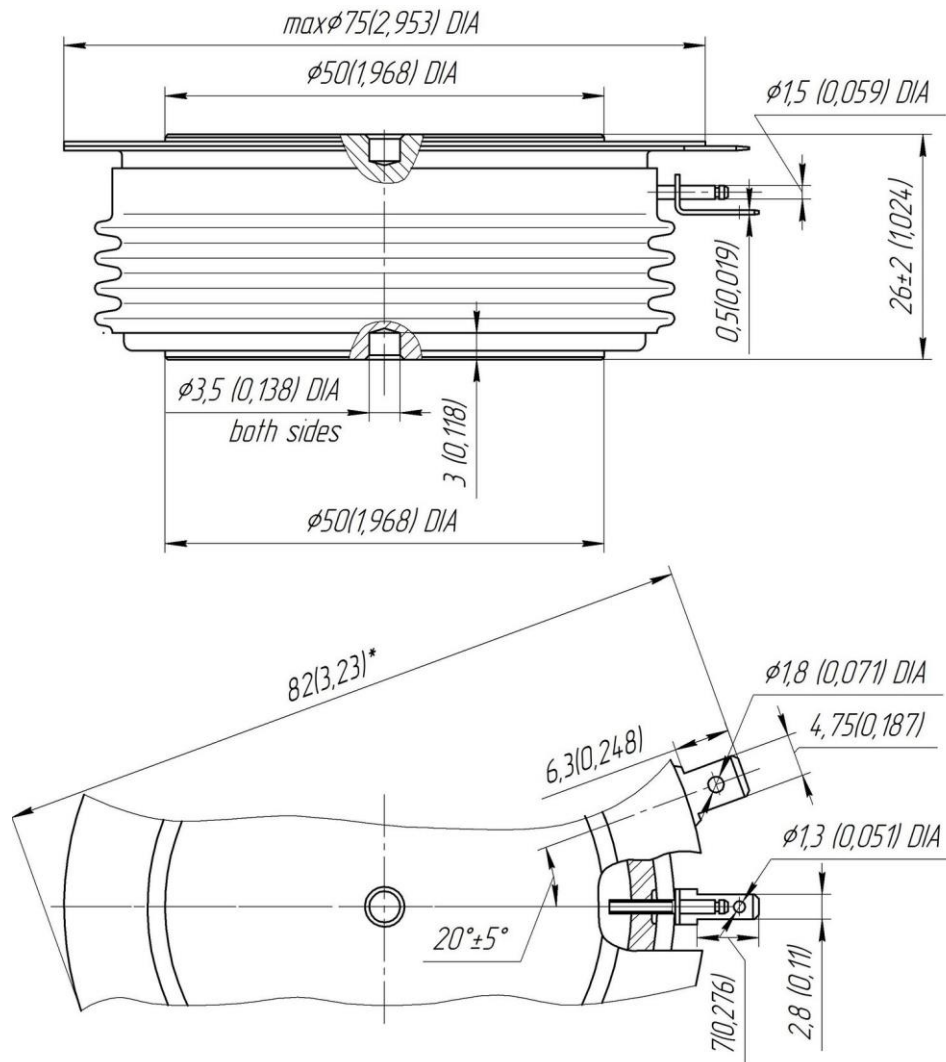
<b>THERMAL</b>					
$R_{thjc}$	Thermal resistance, junction to case, max	°C/W	0.0210	Direct current	Double side cooled
$R_{thjc-A}$			0.0462		Anode side cooled
$R_{thjc-K}$			0.0378		Cathode side cooled
$R_{thck}$	Thermal resistance, case to heatsink, max	°C/W	0.0040	Direct current	
<b>MECHANICAL</b>					
w	Weight, max	g	510		
$D_s$	Surface creepage distance	mm (inch)	31.60 (1.244)		
$D_a$	Air strike distance	mm (inch)	16.50 (0.649)		

<b>PART NUMBERING GUIDE</b>								<b>NOTES</b>																																									
FIDT	56	1000	14	7	8	3		<sup>1)</sup> 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;">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><math>(dv_D/dt)_{crit}</math>, V/μs</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> <sup>2)</sup> Turn-on time <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;">5</th> <th style="background-color: #cccccc;">4</th> <th style="background-color: #cccccc;">3</th> <th style="background-color: #cccccc;">2</th> </tr> </thead> <tbody> <tr> <td><math>t_{gt}</math>, μs</td> <td>2.00</td> <td>2.50</td> <td>3.20</td> <td>4.00</td> </tr> </tbody> </table> <sup>3)</sup> Turn-off time ( $dv_D/dt=50$ V/μs) <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;">8</th> <th style="background-color: #cccccc;">7</th> <th style="background-color: #cccccc;">6</th> </tr> </thead> <tbody> <tr> <td><math>t_d</math>, μs</td> <td>10.0</td> <td>12.5</td> <td>20.0</td> </tr> </tbody> </table>								Symbol of Group	4	5	6	7	8	8,5	9	$(dv_D/dt)_{crit}$ , V/μs	200	320	500	1000	1600	2000	2500	Symbol of group	5	4	3	2	$t_{gt}$ , μs	2.00	2.50	3.20	4.00	Symbol of group	8	7	6	$t_d$ , μs	10.0	12.5	20.0
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1. FIDT — Fast Inverter Disc Thyristor with Distributed Amplified Gate 2. Element Diameter 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																																																	

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## OVERALL DIMENSIONS

Package type: T.D5



All dimensions in millimeters (inches)

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