

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

## Fast Thyristor Type **FDT56-1250-15**

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

Mean on-state current	$I_{TAV}$		1250 A			
Repetitive peak off-state voltage	$V_{DRM}$		1000...1500 V			
Repetitive peak reverse voltage	$V_{RRM}$					
Turn-off time	$t_q$		16.0, 20.0, 25.0, 32.0 $\mu s$			
$V_{DRM}, V_{RRM}, V$	1000	1100	1200	1300	1400	1500
Voltage code	10	11	12	13	14	15
$T_j, ^\circ C$	-60...+125					

### MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
<b>ON-STATE</b>					
$I_{TAV}$	Mean on-state current	A	1062 1250 1612	$T_c = 85^\circ C$ ; 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	1960	$T_c = 75^\circ C$ ; Double side cooled; 180° half-sine wave; 50 Hz	
$I_{TSM}$	Surge on-state current	kA	29.0 33.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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/ $\mu s$
			30.0 35.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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	$A^2s \cdot 10^3$	4200 5400	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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/ $\mu s$
			3700 5000	$T_j = T_{jmax}$ $T_j = 25^\circ C$	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...1500	$T_{jmin} < T_j < T_{jmax}$ ; 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...1600	$T_{jmin} < T_j < T_{jmax}$ ; 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	

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

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/ $\mu$ s	2000	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; $I_{TM} = 4900$ A; Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ $\mu$ s; $di_G/dt = 2$ A/ $\mu$ s
THERMAL				
$T_{stg}$	Storage temperature	$^{\circ}$ C	-60...+50	
$T_j$	Operating junction temperature	$^{\circ}$ C	-60...+125	
MECHANICAL				
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	
ON-STATE					
$V_{TM}$	Peak on-state voltage, max	V	2.10	$T_j = 25$ $^{\circ}$ C; $I_{TM} = 3925$ A	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.265	$T_j = T_{j\max}$ ;	
$r_T$	On-state slope resistance, max	m $\Omega$	0.203	$0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$	
$I_H$	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	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	
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	0.45	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ;	
$I_{GD}$	Gate non-trigger direct current, min	mA	85.00	Direct gate current	
SWITCHING					
$t_{gd}$	Delay time, max	$\mu$ s	0.95	$T_j = 25$ $^{\circ}$ C; $V_D = 600$ V; $I_{TM} = I_{TAV}$ ; Gate pulse: $I_G = 2$ A; $V_G = 20$ V; $t_{GP} = 50$ $\mu$ s; $di_G/dt = 2$ A/ $\mu$ s	
$t_{gt}$	Turn-on time <sup>2)</sup> , max	$\mu$ s	2.00, 2.50, 3.20, 4.00		
$t_q$	Turn-off time <sup>3)</sup> max	$\mu$ s	16.0, 20.0, 25.0, 32.0 20.0, 25.0, 32.0, 40.0	$dv_D/dt = 50$ V/ $\mu$ s; $dv_D/dt = 200$ V/ $\mu$ s;	$T_j = T_{j\max}$ ; $I_{TM} = I_{TAV}$ ; $di_R/dt = -10$ A/ $\mu$ s; $V_R = 100$ V; $V_D = 0.67 \cdot V_{DRM}$
$Q_{rr}$	Total recovered charge, max	$\mu$ C	350	$T_j = T_{j\max}$ ; $I_{TM} = 1250$ A;	
$t_{rr}$	Reverse recovery time, typ	$\mu$ s	5.0	$di_R/dt = -50$ A/ $\mu$ s;	
$I_{rrM}$	Peak reverse recovery current, max	A	155	$V_R = 100$ V	

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

<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>							
FDT	56	1250	15	7	5	4									
1	2	3	4	5	6	7		1) Critical rate of rise of off-state voltage							
1. FDT — Fast Inverter Disc Thyristor								Symbol of Group							
2. Design version								(dv <sub>D</sub> /dt) <sub>crit</sub> , V/μs							
3. Mean on-state current, A								200							
4. Voltage code								320							
5. Critical rate of rise of off-state voltage								500							
6. Group of turn-off time (dv <sub>D</sub> /dt=50 V/μs)								1000							
7. Group of turn-on time								1600							
								2000							
								2500							
								2) Turn-on time							
								Symbol of group							
								t <sub>gt</sub> , μs							
								5							
								4							
								3							
								2							
								2.00							
								2.50							
								3.20							
								4.00							
								3) Turn-off time (dv <sub>D</sub> /dt=50 V/μs)							
								Symbol of group							
								t <sub>qf</sub> , μs							
								7							
								6							
								5							
								4							
								16.0							
								20.0							
								25.0							
								32.0							



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