

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

Phase Control Disc Thyristor Type DT90-2000-52

High power cycling capability / Low on-state and switching losses
Designed for traction and industrial applications

Mean on-state current	I_{TAV}	2000 A		
Repetitive peak off-state voltage	V_{DRM}	4600 ÷ 5200 V		
Repetitive peak reverse voltage	V_{RRM}			
Turn-off time	t_q	800 μ s		
V_{DRM}, V_{RRM}, V	4600	4800	5000	5200
Voltage code	46	48	50	52
$T_j, ^\circ C$	- 60 ÷ 125			

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions
ON-STATE				
I_{TAV}	Mean on-state current	A	2000 2322 2818	$T_c = 93^\circ C$, Double side cooled $T_c = 85^\circ C$, Double side cooled $T_c = 70^\circ C$, Double side cooled 180° half-sine wave; 50 Hz
I_{TRMS}	RMS on-state current	A	3140	$T_c = 93^\circ C$, Double side cooled 180° half-sine wave; 50 Hz
I_{TSM}	Surge on-state current	kA	42.0 48.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 50 Hz ($t_p = 10$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s
			45.0 52.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 60 Hz ($t_p = 8.3$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s
I^2t	Safety factor	$A^2s \cdot 10^3$	8820 11520	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 50 Hz ($t_p = 10$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s
			8400 11220	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; 60 Hz ($t_p = 8.3$ ms); single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s
BLOCKING				
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	4600÷5200	$T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; 50 Hz; Gate open
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	4700÷5300	$T_{jmin} < T_j < T_{jmax}$; 180° half-sine wave; 50 Hz; single pulse; Gate open
V_D, V_R	Direct off-state and Direct reverse voltages	V	0.75· V_{DRM} 0.75· V_{RRM}	$T_j = T_{jmax}$; Gate open

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TRIGGERING				
I_{FGM}	Peak forward gate current	A	10	$T_j = T_{j\max}$
V_{RGM}	Peak reverse gate voltage	V	5	
P_G	Gate power dissipation	W	5	$T_j = T_{j\max}$ 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	800	$T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; $I_{TM} = 2 I_{TAV}$; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s
THERMAL				
T_{stg}	Storage temperature	$^{\circ}$ C	-60 ÷ 125	
T_j	Operating junction temperature	$^{\circ}$ C	-60 ÷ 125	
MECHANICAL				
F	Mounting force	kN	60.0 ÷ 70.0	
a	Acceleration	m/s ²	50 100	Device unclamped Device clamped

CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{TM}	Peak on-state voltage, max	V	2.50	$T_j = 25 \text{ }^{\circ}\text{C}$; $I_{TM} = 6300$ A	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.00	$T_j = T_{j\max}$;	
r_T	On-state slope resistance, max	m Ω	0.290	$0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$	
I_L	Latching current, max	mA	1500	$T_j = 25 \text{ }^{\circ}\text{C}$; $V_D = 12$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s	
I_H	Holding current, max	mA	300	$T_j = 25 \text{ }^{\circ}\text{C}$; $V_D = 12$ V; Gate open	
BLOCKING					
I_{DRM} , I_{RRM}	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	200	$T_j = T_{j\max}$; $V_D = V_{DRM}$; $V_R = V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage ¹⁾ , min	V/ μ s	1000	$T_j = T_{j\max}$; $V_D = 0.67 \cdot V_{DRM}$; Gate open	
TRIGGERING					
V_{GT}	Gate trigger direct voltage, max	V	5.00	$T_j = T_{j\min}$ $T_j = 25 \text{ }^{\circ}\text{C}$ $T_j = T_{j\max}$	$V_D = 12$ V; $I_D = 3$ A; Direct gate current
			3.00		
I_{GT}	Gate trigger direct current, max	mA	500	$T_j = T_{j\min}$ $T_j = 25 \text{ }^{\circ}\text{C}$ $T_j = T_{j\max}$	
			300 200		
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	15.00	Direct gate current	
SWITCHING					
t_{gd}	Delay time	μ s	4.00	$T_j = 25 \text{ }^{\circ}\text{C}$; $V_D = 0.4 \cdot V_{DRM}$; $I_{TM} = 2000$ A; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ μ s	
t_q	Turn-off time ²⁾ , max	μ s	800	$dv_D/dt = 50$ V/ μ s; $T_j = T_{j\max}$; $I_{TM} = 2000$ A; $di_R/dt = -10$ A/ μ s; $V_R = 100$ V; $V_D = 0.67 V_{DRM}$;	
Q_{rr}	Total recovered charge, max	μ C	8000	$T_j = T_{j\max}$; $I_{TM} = 2000$ A;	
t_{rr}	Reverse recovery time, typ	μ s	84	$di_R/dt = -5$ A/ μ s;	
I_{rrM}	Peak reverse recovery current, max	A	190	$V_R = 100$ V	

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THERMAL					
R_{thjc}	Thermal resistance, junction to case, max	°C/W	0.0065	Direct current	Double side cooled
R_{thjc-A}			0.0143		Anode side cooled
R_{thjc-K}			0.0117		Cathode side cooled
R_{thck}	Thermal resistance, case to heatsink, max	°C/W	0.0015	Direct current	
MECHANICAL					
w	Weight, typ	g	1900		
D_s	Surface creepage distance	mm (inch)	36.50 (1.437)		
D_a	Air strike distance	mm (inch)	16.5 (0.650)		

PART NUMBERING GUIDE

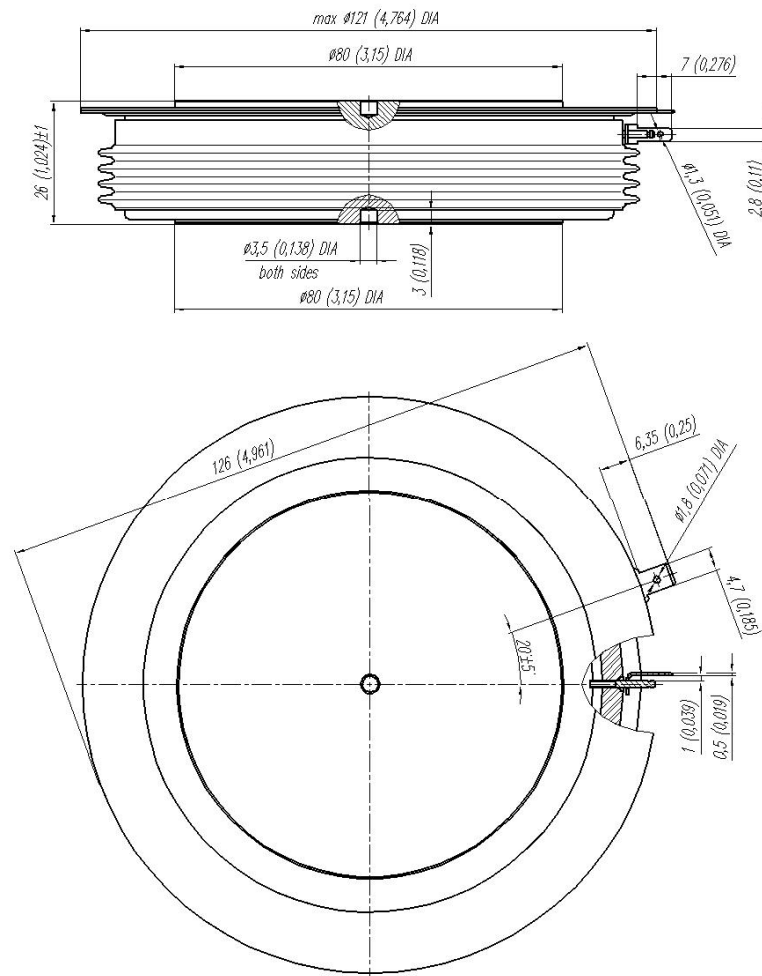
DT	90	2000	52
1	2	3	4

1. DT - Phase Control Disc Thyristor
2. Element Diameter
3. Mean on-state current, A
4. Voltage code

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OVERALL DIMENSIONS

Package type: T.H1



All dimensions in millimeters (inches)