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Fast Thyristor Type FDT32-250-36

Low switching losses / Low reverse recovery charge

Distributed amplified gate for high di_T/dt

Mean on-state current		I_{TAV}	250 A	
Repetitive peak off-state voltage		V_{DRM}	3200…3600 V	
Repetitive peak reverse voltage		V_{RRM}		
Turn-off time		t_q	63.0 µs	
V_{DRM}, V_{RRM}, V	3200	3400		3600
Voltage code	32	34		36
T_j, °C	−60…+125			

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{TAV}	Maximum allowable mean on-state current	A	250 260 370	T_c= 87 °C; Double side cooled; T_c= 85 °C; Double side cooled; T_c= 55 °C; Double side cooled; 180° half-sine wave; 50 Hz	
I_{TRMS}	RMS on-state current	A	393	T_c= 87 °C; Double side cooled; 180° half-sine wave; 50 Hz	
I_{TSM}	Surge on-state current	kA	4.0 4.5	$T_j=T_{j\,max}$ T_j=25 °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
			4.0 4.5	$T_j=T_{j\,max}$ T_j=25 °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	$A^2s·10^3$	80 100	$T_j=T_{j\,max}$ T_j=25 °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
			60 80	$T_j=T_{j\,max}$ T_j=25 °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	3200…3600	$T_{j\,min}< T_j <T_{j\,max}$; 180° half-sine wave; 50 Hz; Gate open	
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	3300…3700	$T_{j\,min}< T_j <T_{j\,max}$; 180° half-sine wave; single pulse; Gate open	
V_D, V_R	Direct off-state and Direct reverse voltages	V	$0.6·V_{DRM}$ $0.6·V_{RRM}$	$T_j=T_{j\,max}$; Gate open	

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TRIGGERING				
I_{FGM}	Peak forward gate current	A	6	$T_j=T_{j\,max}$
V_{RGM}	Peak reverse gate voltage	V	5	
P_G	Gate power dissipation	W	3	$T_j=T_{j\,max}$ for DC gate current
SWITCHING				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current non-repetitive (f=1 Hz)	A/µs	1600	$T_j=T_{j\,max}$; $V_D=0.67 \cdot V_{DRM}$; $I_{TM}=1600$ A; Gate pulse: $I_G=2$ A; $V_G=20$ V; $t_{GP}=50$ µs; $di_G/dt=2$ A/µs
THERMAL				
T_{stg}	Storage temperature	°C	−60...+50	
T_j	Operating junction temperature	°C	−60...+125	
MECHANICAL				
F	Mounting force	kN	9.0...11.0	
a	Acceleration	m/s²	50	Device clamped

CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{TM}	Peak on-state voltage, max	V	3.60	$T_j=25$ °C; $I_{TM}=785$ A	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.722	$T_j=T_{j\,max}$;	
r_T	On-state slope resistance, max	mΩ	3.303	$0.5\,\pi\,I_{TAV} < I_T < 1.5\,\pi\,I_{TAV}$	
I_H	Holding current, max	mA	500	$T_j=25$ °C; $V_D=12$ V; Gate open	
BLOCKING					
I_{DRM}, I_{RRM}	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	70	$T_j=T_{j\,max}$; $V_D=V_{DRM}$; $V_R=V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage[1), min	V/µs	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	$T_j=T_{j\,min}$ $T_j=25$ °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	$T_j=T_{j\,min}$ $T_j=25$ °C $T_j=T_{j\,max}$	
V_{GD}	Gate non-trigger direct voltage, min	V	0.30	$T_j=T_{j\,max}$; $V_D=0.67 \cdot V_{DRM}$; Direct gate current	
I_{GD}	Gate non-trigger direct current, min	mA	40.00		
SWITCHING					
t_{gd}	Delay time, max	µs	1.10	$T_j=25$ °C; $V_D=1500$ B; $I_{TM}=I_{TAV}$; di/dt=200 A/µs; Gate pulse: $I_G=I_{FGM}$; $V_G=20$ V; $t_{GP}=50$ µs; $di_G/dt=2$ A/µs	
t_{gt}	Turn-on time[2), max	µs	3.20, 4.00, 6.30, 8.00		
t_q	Turn-off time[3) max	µs	63.0	$dv_D/dt=50$ V/µs;	$T_j=T_{j\,max}$; $I_{TM}=I_{TAV}$; $di_R/dt=-10$ A/µs; $V_R=100$V; $V_D=0.67 \cdot V_{DRM}$
			80.0	$dv_D/dt=200$ V/µs;	
Q_{rr}	Recovered charge, max	µC	500	$T_j=T_{j\,max}$; $I_{TM}=I_{TAV}$; $di_R/dt=-50$ A/µs; $V_R=100$ V	
t_{rr}	Reverse recovery time, typ	µs	5.0		
I_{rr}	Reverse recovery current, max	A	200		

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THERMAL					
R_{thjc}	Thermal resistance, junction to case, max	°C/W	0.0400	Direct current	Double side cooled
R_{thjc-A}			0.0880		Anode side cooled
R_{thjc-K}			0.0720		Cathode side cooled
R_{thck}	Thermal resistance, case to heatsink, max	°C/W	0.0060	Direct current	

MECHANICAL				
m	Weight, max	g	176	
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

FDT	32	250	36	7	1	2	
1	2	3	4	5	6	7	

1. FDT — Fast Inverter Disc Thyristor
2. Design version
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

NOTES

[1] Critical rate of rise of off-state voltage

Symbol of Group	4	5	6	7	8	8,5	9
$(dv_D/dt)_{crit}$, V/µs	200	320	500	1000	1600	2000	2500

[2] Turn-on time

Symbol of group	3	2		
t_{gt}, µs	3.20	4.00	6.30	8.00

[3] Turn-off time ($dv_D/dt=50$ V/µs)

Symbol of group	1
t_q, µs	63.0

OVERALL DIMENSIONS

Package type: T.B3
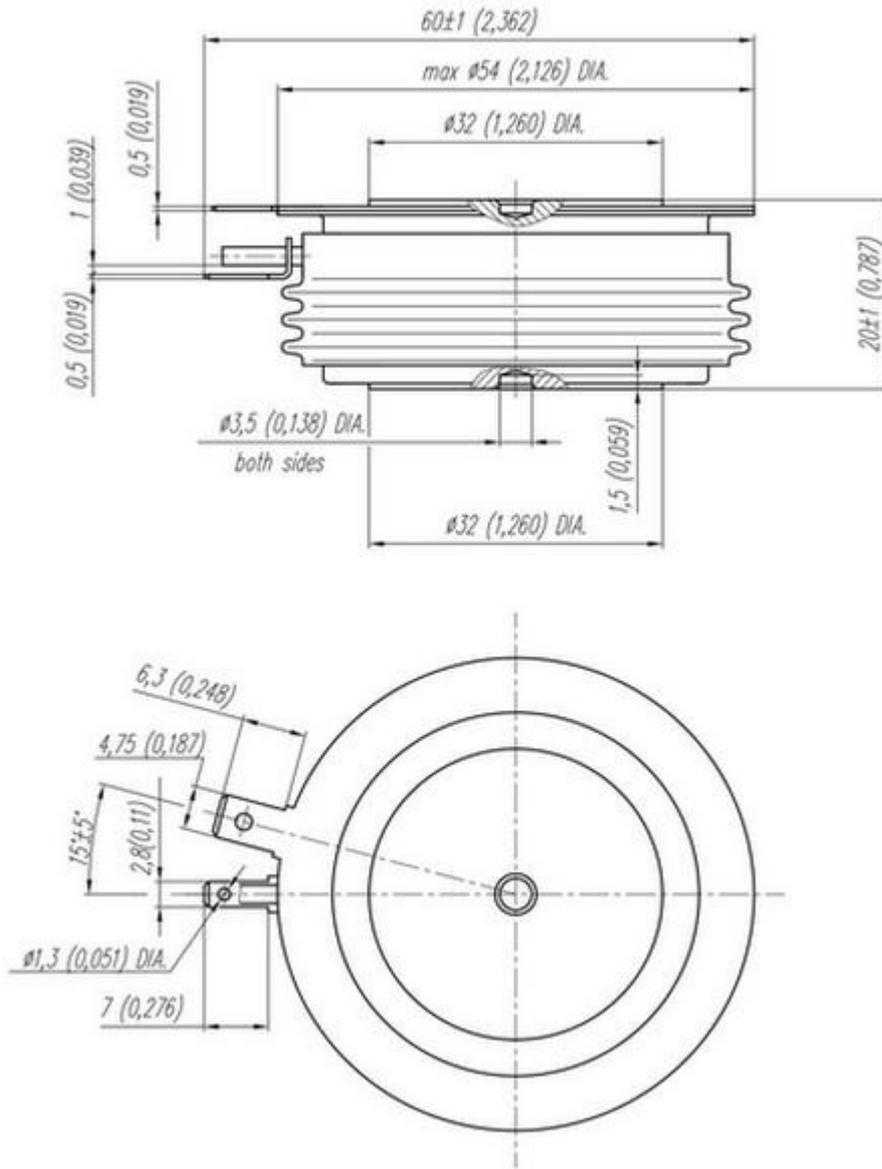
All dimensions in millimeters (inches)