

Fast Thyristor

AT599F

Key Parameters

$I_{TAV(M)}$	=	599	A
V_{DRM}/V_{RRM}	=	1200, 1300	V
I_{TSM}	=	10	kA
V_{TO}	=	1.15	V
r_T	=	0.42	mΩ

Properties

- International standard package
- Metal case with ceramic insulator
- Low on-state and switching losses
- High operation reliability
- Optimum power handling capability

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters			Maximum Limits			Unit
V_{DRM} V_{RRM}	Repetitive peak forward voltage Repetitive peak reverse voltage	t _{vj} = -40 °C ... t _{vj max}	1200	1300		V
V_{DSM}	Non-repetitive peak forward off-state voltage	t _{vj} = -40 °C ... t _{vj max}	1200	1300		V
V_{RSM}	Non-repetitive peak reverse voltage	t _{vj} = +25 °C ... t _{vj max}	1300	1400		V
I_{TAVM}	Average on-state current	t _C = 85 °C t _C = 47 °C	599 960			A A
I_{TRMSM}	RMSM on-state current		1500			A
I_{TSM}	Surge current	t _{vj} = 25 °C, t _p = 10 ms t _{vj} = t _{vj max} , t _p = 10 ms	11.3 10.0			kA kA
I²t	I ² t-value	t _{vj} = 25 °C, t _p = 10 ms t _{vj} = t _{vj max} , t _p = 10 ms	638 500			kA ² s kA ² s
(dv/dt)_{cr}	Critical rate of rise of off-state voltage	t _{vj} = t _{vj max} V _D = 0.67 V _{DRM}		1)	2)	V/μs V/μs V/μs V/μs
			B:	50	50	
			C:	500	500	
			L:	500	50	
			M:	1000	500	
(di/dt)_{cr}	Critical rate of rise of on-state current	DIN IEC 747-6 f = 50 Hz, I _{GM} = 1 A di _G /dt = 1 A/μs	200			A/μs

CHARACTERISTICS

Symbols and parameters			Value			Unit
			min	typ	max	
V_T	On-state voltage	$t_{vj} = t_{vj \max}, I_T = 1000 \text{ A}$			1.66	V
$V_{(TO)}$	Threshold voltage	$t_{vj} = t_{vj \max}$	1.15			V
r_T	Slope resistance	$t_{vj} = t_{vj \max}$	0.42			mΩ
I_{GT}	Gate trigger current	$t_{vj} = 25 \text{ °C}, V_D = 12 \text{ V}$			250	mA
V_{GT}	Gate trigger voltage	$t_{vj} = 25 \text{ °C}, V_D = 12 \text{ V}$			2.2	V
I_{GD}	Gate non-trigger current	$t_{vj} = t_{vj \max}, V_D = 12 \text{ V}$ $t_{vj} = t_{vj \max}, V_D = 0.5 V_{DRM}$			10 5	mA mA
V_{GD}	Gate non-trigger voltage	$t_{vj} = t_{vj \max}, V_D = 0.5 V_{DRM}$			0.25	V
I_H	Holding current	$t_{vj} = 25 \text{ °C}, V_D = 12 \text{ V}$ $R_A = 10 \text{ Ω}$			250	mA
I_L	Latching current	$t_{vj} = 25 \text{ °C}, V_D = 12 \text{ V}$ $R_{GK} \geq 10 \text{ Ω}, I_{GM} = 1 \text{ A}$ $di_G/dt = 1 \text{ A/μs}$ $t_g = 20 \text{ μs}$			1	A
i_D, i_R	Forward off-state and reverse current	$t_{vj} = t_{vj \max}$ $V_D = V_{DRM}, V_R = V_{RRM}$			100	mA
t_{gd}	Gate controlled delay time	DIN IEC 747-6 $t_{vj} = 25 \text{ °C}, I_{GM} = 1 \text{ A}$ $di_G/dt = 1 \text{ A/μs}$			1.5	μs
t_q	Turn-off time	$t_{vj} = t_{vj \max}, I_{TM} = I_{TAVM}$ $V_{RM} = 100 \text{ V}, V_{DM} = 0.67 V_{DRM}$ $-di_T/dt = 20 \text{ A/μs}$			K: 40 G: 30 F: 25 E: 20	μs μs μs μs

THERMAL PARAMETERS

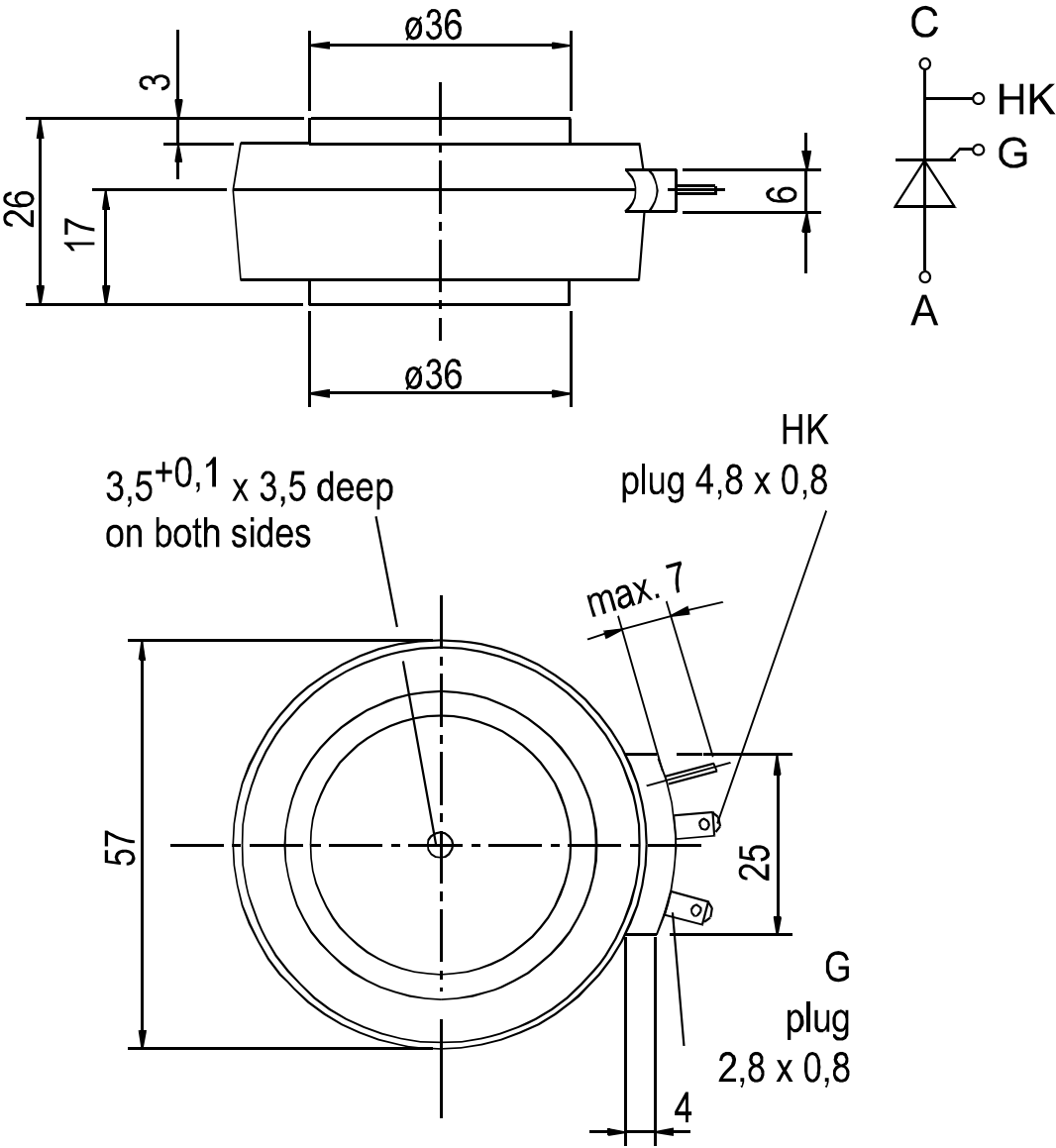
Symbols and parameters			Value	Unit
$R_{th(j-c)}$	Thermal resistance, junction to case	Two-sided cooling, $\theta = 180^\circ \text{ el, sin}$ Two-sided cooling, DC Anode-sided cooling, $\theta = 180^\circ \text{ el, sin}$ Anode-sided cooling, DC Cathode-sided cooling, $\theta = 180^\circ \text{ el, sin}$ Cathode-sided cooling, DC	0.038 0.036 0.0675 0.065 0.082 0.080	$^\circ\text{C/W}$
$R_{th(c-h)}$	Thermal resistance, case to heatsink	Two-sided Single-sided	0.005 0.010	$^\circ\text{C/W}$
$t_{vj \max}$	Maximum junction temperature		+125	$^\circ\text{C}$
$t_{c \text{ op}}$	Operating temperature range		-40 ... +125	$^\circ\text{C}$
t_{stg}	Storage temperature range		-40 ... +150	$^\circ\text{C}$

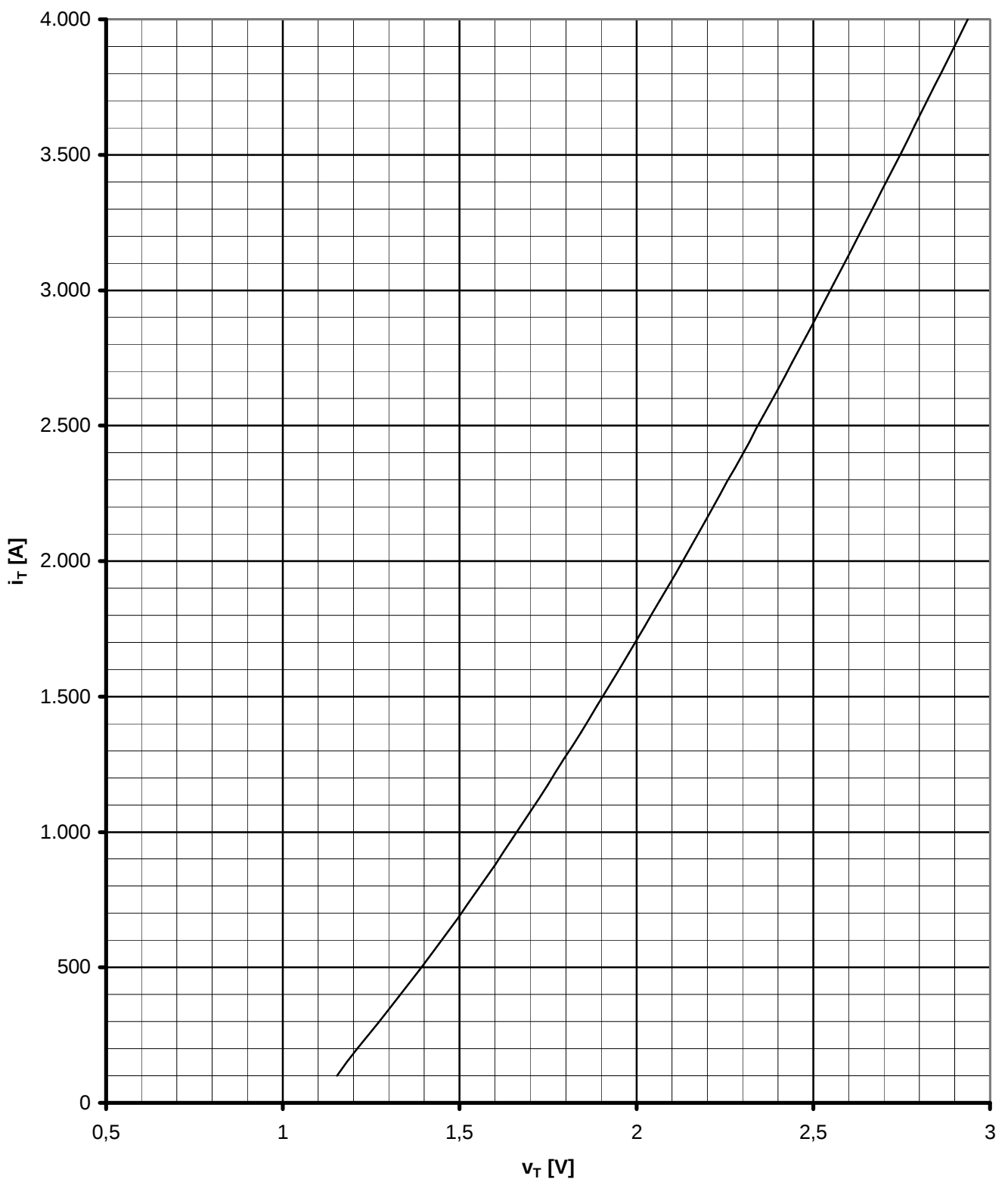
MECHANICAL PARAMETERS

Symbols and parameters			Value	Unit
F	Clamping force		9 – 18	kN
W	Weight		280	g
D	Creepage distance		25	mm
a	Vibration resistance	f = 50 Hz	50	m/s ²

1) - Values to DIN IEC 747-6 (without prior commutation)
2) - Immediately after circuit commutated turn-off time, see parameters t_q

DIMENSIONS





Limiting On-state characteristic $i_T = f(v_T)$ $T_{vj} = T_{vj\ max}$