

Fast Thyristor

AT481S

Key Parameters

$I_{TAV(M)}$	=	480	A
V_{DRM}/V_{RRM}	=	1600 - 2000	V
I_{TSM}	=	8.3	kA
V_{TO}	=	1.44	V
r_T	=	0.66	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}	Repetitive peak forward voltage	$t_{vj} = -40\text{ °C} \dots t_{vj\text{ max}}$	1600	V
V_{RRM}	Repetitive peak reverse voltage		1800	V
			2000	V
V_{DSM}	Non-repetitive peak forward off-state voltage	$t_{vj} = -40\text{ °C} \dots t_{vj\text{ max}}$	1600	V
			1800	V
			2000	V
V_{RSM}	Non-repetitive peak reverse voltage	$t_{vj} = +25\text{ °C} \dots t_{vj\text{ max}}$	1700	V
			1900	V
			2100	V
I_{TAVM}	Average on-state current	$t_c = 85\text{ °C}$	480	A
		$t_c = 39\text{ °C}$	830	A
I_{TRMSM}	RMS on-state current		1300	A
I_{TSM}	Surge current	$t_{vj} = 25\text{ °C}, t_p = 10\text{ ms}$	9.5	kA
		$t_{vj} = t_{vj\text{ max}}, t_p = 10\text{ ms}$	8.3	kA
I^2t	I^2t -value	$t_{vj} = 25\text{ °C}, t_p = 10\text{ ms}$	450	kA ² s
		$t_{vj} = t_{vj\text{ max}}, t_p = 10\text{ ms}$	345	kA ² s
$(dv/dt)_{cr}$	Critical rate of rise of off-state voltage	$t_{vj} = t_{vj\text{ max}}$		
		$V_D = 0.67 V_{DRM}$	N*:	
			1000	50
$(di/dt)_{cr}$	Critical rate of rise of on-state current	$f = 50\text{ Hz}, I_{GM} = 1.5\text{ A}$	300	V/μs
		$di_G/dt = 2\text{ A/μs}$		
		$V_D \leq 0.67 V_{DRM}$		A/μs

CHARACTERISTICS

Symbols and parameters			Value			Unit
			min	typ	max	
V_T	On-state voltage	$t_{vj} = t_{vj \max}, I_T = 2400 \text{ A}$			3.1	V
$V_{(TO)}$	Threshold voltage	$t_{vj} = t_{vj \max}$	1.44			V
r_T	Slope resistance	$t_{vj} = t_{vj \max}$	0.66			mΩ
I_{GT}	Gate trigger current	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}$			300	mA
V_{GT}	Gate trigger voltage	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}$			2	V
I_{GD}	Gate non-trigger current	$t_{vj} = t_{vj \max}, v_D = 6 \text{ V}$			40	mA
V_{GD}	Gate non-trigger voltage	$t_{vj} = t_{vj \max}, v_D = 0.5 V_{DRM}$			0.3	V
I_H	Holding current	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}$ $R_A = 5 \Omega$			400	mA
I_L	Latching current	$t_{vj} = 25^\circ\text{C}, v_D = 6 \text{ V}$ $R_{GK} \geq 10 \Omega, I_{GM} = 1 \text{ A}$ $di_G/dt = 1 \text{ A}/\mu\text{s}$ $t_g = 20 \mu\text{s}$			2	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	$t_{vj} = 25^\circ\text{C}, I_{GM} = 1 \text{ A}$ $di_G/dt = 1 \text{ A}/\mu\text{s}$			1.5	μs
t_q	Turn-off time	See Techn. Inf.			1 ³⁾ : 40 2 ³⁾ : 50	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	0.0373 0.0350 0.0708 0.0685 0.0738 0.0715	$^\circ\text{C}/\text{W}$
$R_{th(c-h)}$	Thermal resistance, case to heatsink	Two-sided Single-sided	0.006 0.012	$^\circ\text{C}/\text{W}$
$t_{vj \max}$	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 – 13	kN
W	Weight		250	g
D	Creepage distance		25	mm
a	Vibration resistance	f = 50 Hz	50	m/s ²

* - Delivery for larger quantities on request
1) - Values to DIN IEC 747-6 (without prior commutation)
2) - Immediately after circuit commutated turn-off time, see Parameters t_q
3) - -di_T/dt = 100 A/μs; dv_D/dt = 50 V/μs

DIMENSIONS

