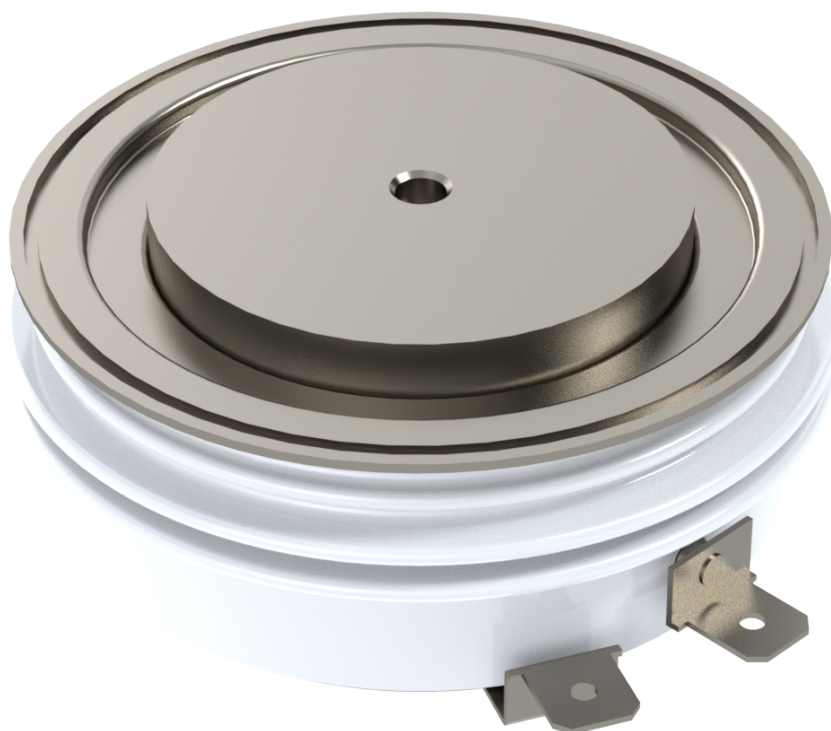


# Anode Shorted Gate Turn-Off Thyristor Type SA45AP1000TB

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Date: June, 2020  
Data Sheet Issue: 1



## ORDERING INFORMATION

(Please quote 12 to 15 digit code as below)

SA	45	AP	1000	T	B	
-	Voltage Code	Outline Code	Current code	Type code	Special code	Optional code

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## Absolute Maximum Ratings

VOLTAGE RATINGS		MAXIMUM LIMITS	UNITS
$V_{\text{DRM}}$	Repetitive peak off-state voltage, (note 1)	4500	V
$V_{\text{RSM}}$	Non-repetitive peak off-state voltage, (note 1)	4500	V
$V_{\text{DC-link}}$	Maximum continues DC-link voltage	2800	V
$V_{\text{RRM}}$	Repetitive peak reverse voltage	18	V
$V_{\text{RSM}}$	Non-repetitive peak reverse voltage	18	V
note 1)	$V_{\text{GK}} = -2\text{V}$		

OTHER RATINGS		MAXIMUM LIMITS	UNITS
$I_{\text{TGQ}}$	Peak turn-off current (note 1)	1000	A
$L_{\text{S}}$	Snubber loop impedance, $I_{\text{TM}} = I_{\text{TGQ}}$ (note 1)	300	nH
$I_{\text{T(AV)M}}$	Mean on-state current, $T_{\text{sink}} = 55^{\circ}\text{C}$ , (note 2)	443	A
$I_{\text{T(RMS)}}$	Nominal RMS on-state current, $T_{\text{sink}} = 25^{\circ}\text{C}$ (note 2)	867	A
$I_{\text{TSM}}$	Peak non-repetitive surge current $t_{\text{p}} = 10\text{ms}$ (note 3)	6.5	kA
$I_{\text{TSM2}}$	Peak non-repetitive surge current $t_{\text{p}} = 2\text{ms}$ (note 3)	11.45	kA
$I^2t$	$I^2t$ capacity for fusing $t_{\text{p}} = 10\text{ms}$	$211.25 \cdot 10^3$	$\text{A}^2\text{s}$
$(di/dt)_{\text{cr}}$	Critical rate of rise of on-state current, (note 4)	300	$\text{A}/\mu\text{s}$
$P_{\text{FGM}}$	Peak forward gate power	185	W
$P_{\text{RGM}}$	Peak reverse gate power	7	kW
$I_{\text{FGM}}$	Peak forward gate current	100	A
$V_{\text{RGM}}$	Peak reverse gate voltage (note 5)	18	V
$t_{\text{off}}$	Minimum permissible off-time (note 1)	80	$\mu\text{s}$
$t_{\text{on}}$	Maximum permissible on-time	20	$\mu\text{s}$
$T_{\text{jop}}$	Operating temperature range	-40 to +125	$^{\circ}\text{C}$
$T_{\text{stg}}$	Storage temperature range	-40 to +125	$^{\circ}\text{C}$
note 1)	$T_{\text{j}} = 125^{\circ}\text{C}$ , $V_{\text{D}} = 2800\text{V}$ , $V_{\text{DM}} \leq 4500\text{V}$ , $di_{\text{GQ}}/dt = 25\text{A}/\mu\text{s}$ , $I_{\text{TGQ}} = 1000\text{A}$ and $C_{\text{S}} = 1\mu\text{F}$		
note 2)	Double-side cooled, single phase, 50Hz, 180° half-sinewave.		
note 3)	$T_{\text{j(initial)}} = 125^{\circ}\text{C}$ , single phase, 50Hz, 180° sinewave, re-applied voltage $V_{\text{D}} = V_{\text{R}} \leq 10\text{V}$		
note 4)	For $di/dt > 300\text{A}/\mu\text{s}$ please consult factory.		
note 5)	May exceed this value during turn-off avalanche period.		

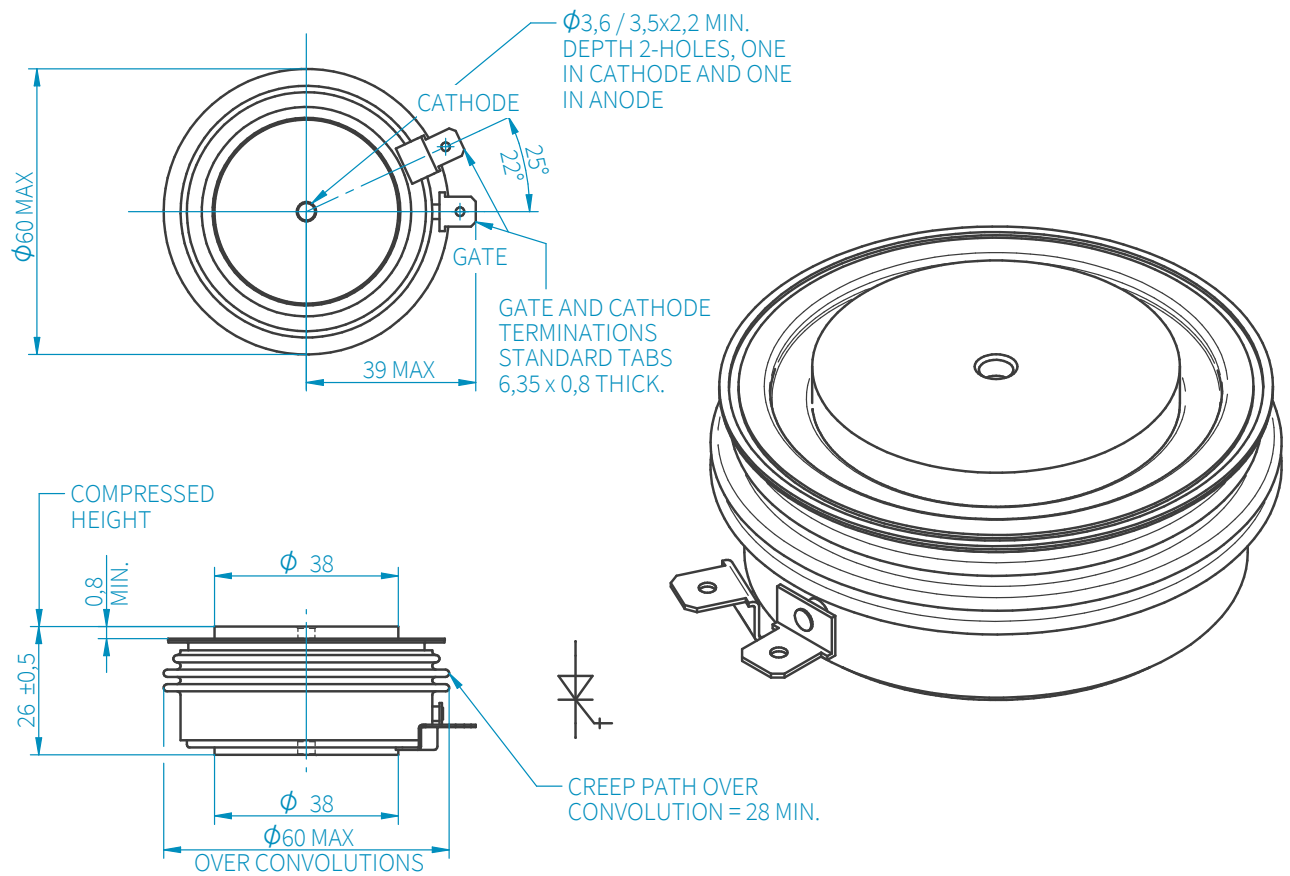
## Characteristics

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$V_{TM}$	Maximum peak on-state voltage	$I_G = 2A, I_T = 1000A$	-	3.65	4.0	V
$I_L$	Latching current	$T_J = 25^\circ C$	-	10	-	A
$I_H$	Holding current	$T_J = 25^\circ C$	-	10	-	A
$(dv/dt)_{cr}$	Critical rate of rise of off-state voltage	$V_D = 2800V_{DRM}, V_{GR} = -2V$	1000	-	-	V/ $\mu s$
$I_{DRM}$	Peak off-state current	Rated $V_{DRM}, V_{GR} = -2V$	-	-	50	mA
$I_{RRM}$	Peak reverse current	$V_{RR} = 16V$	-	-	60	mA
$I_{GKM}$	Peak negative gate leakage current	$V_{GR} = -16V$	-	-	60	mA
$V_{GT}$	Gate trigger voltage	$T_J = -40^\circ C, V_D = 25V, R_L = 25m\Omega$	-	1.0	-	V
		$T_J = 25^\circ C, V_D = 25V, R_L = 25m\Omega$	-	0.8	1.0	V
		$T_J = 125^\circ C, V_D = 25V, R_L = 25m\Omega$	-	0.6	-	V
$I_{GT}$	Gate trigger current	$T_J = -40^\circ C, V_D = 25V, R_L = 25m\Omega$	-	1.8	3.5	A
		$T_J = 25^\circ C, V_D = 25V, R_L = 25m\Omega$	-	0.75	1.5	A
		$T_J = 125^\circ C, V_D = 25V, R_L = 25m\Omega$	-	0.2	0.4	A
$t_d$	Delay time	$V_D = 2800V, I_{TGQ} = 1000A,$ $di_T/dt = 300A/\mu s, I_{GM} = 20A,$	-	0.9	-	$\mu s$
$t_{gt}$	Turn-on time	$di_G/dt = 20A/\mu s$	-	3.4	6.0	$\mu s$
$t_f$	Fall time		-	1.25	-	$\mu s$
$t_{gq}$	Turn-off time		-	14	16	$\mu s$
$I_{CQM}$	Peak turn-off gate current	$V_D = 2800V, V_{TGQ} = 1000V,$ $di_{GQ}/dt = 25A/\mu s, V_{GR} = -16V, C_S = 1\mu F$	-	300	-	A
$Q_{GQ}$	Turn-off gate charge		-	2.2	3.0	mC
$t_{tail}$	Tail time		-	13	20	$\mu s$
$t_{gw}$	Gate off-time (note 3)		100	-	-	$\mu s$
$R_{thJK}$	Thermal resistance, junction to sink	Double side cooled	-	-	38	K/kW
		Cathode side cooled	-	-	61	K/kW
		Anode side cooled	-	-	101	K/kW
F	Mounting force	(note 2)	13	-	17	kN
$W_t$	Weight		-	325	-	g
note 1)	Unless otherwise indicated $T_J = 125^\circ C$					
note 2)	For other clamping forces, consult factory.					
note 3)	$t_{gw}$ is the period during which the gate circuit is required to remain at low impedance to allow for the passage of $t_{tail}$ .					

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## Outline Drawing



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