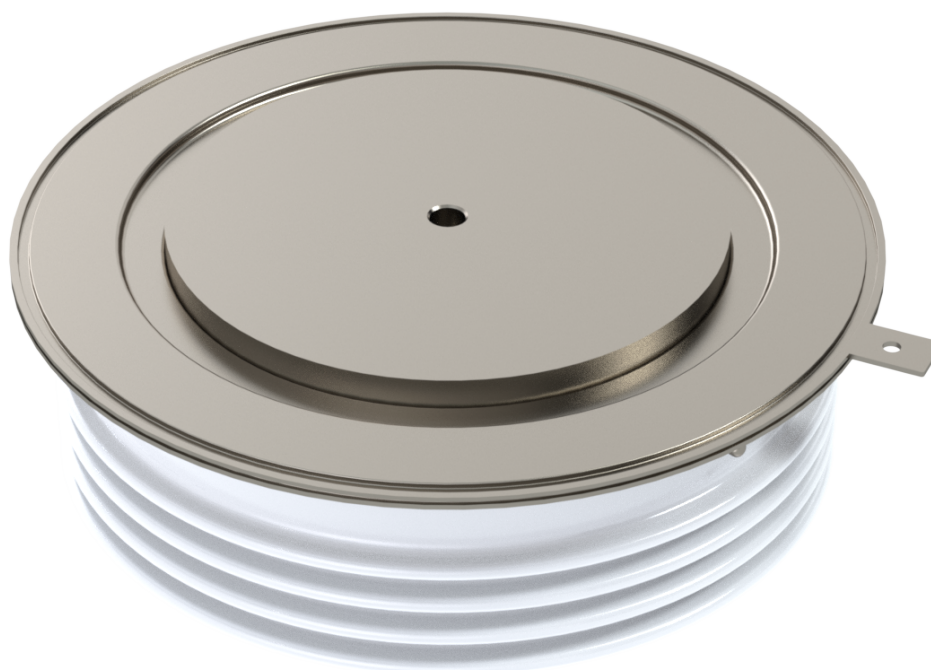


Distributed Gate Thyristor Type SA12AP1211EE

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Date: September, 2020
Data Sheet Issue: 1



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SA	12	AP	1211	E	E	
-	Voltage Code	Outline Code	Current code	Type code	t _q code	Optional code
t _q code: C = 15μs, D = 20μs, E = 25μs						

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Absolute Maximum Ratings

VOLTAGE RATINGS		MAXIMUM LIMITS	UNITS
V_{DRM}	Repetitive peak off-state voltage, (note 1)	1200	V
V_{DSM}	Non-repetitive peak off-state voltage, (note 1)	1200	V
V_{DDC}	Maximum DC of-state voltage, (note 1)	810	V
V_{RRM}	Repetitive peak reverse voltage, (note 1)	1200	V
V_{RSM}	Non-repetitive peak reverse voltage, (note 1)	1300	V
V_{RDC}	Maximum DC revrese voltage, (note 1)	810	V
note 1)	De-rating factor of 0.13%/°C is applicable for T_j below 25°C		

OTHER RATINGS		MAXIMUM LIMITS	UNITS
$I_{T(AV)M}$	Maximum average on-state current, $T_{sink} = 55^{\circ}C$, (note 1)	1211	A
$I_{T(AV)M}$	Maximum average on-state current, $T_{sink} = 85^{\circ}C$, (note 1)	771	A
$I_{T(AV)M}$	Maximum average on-state current, $T_{sink} = 85^{\circ}C$, (note 2)	424	A
$I_{T(RMS)}$	Nominal RMS on-state current, $T_{sink} = 25^{\circ}C$ (note 1)	2497	A
$I_{T(d.c.)}$	D.C. on-state current, $T_{sink} = 25^{\circ}C$, (note 3)	1927	A
I_{TSM}	Peak non-repetitive surge current $t_p = 10ms$, $V_{RM} = 60\%V_{RRM}$, (note4)	17.6	kA
I_{TSM2}	Peak non-repetitive surge current $t_p = 10ms$, $V_{RM} \leq 10V$, (note 4)	19.4	kA
I^2t	I^2t capacity for fusing $t_p = 10ms$, $V_{RM} = 60\%V_{RRM}$, (note 4)	$1.548 \cdot 10^6$	A ² s
I^2t	I^2t capacity for fusing $t_p = 10ms$, $V_{RM} \leq 10V$, (note 4)	$1.882 \cdot 10^6$	A ² s
$(di/dt)_{cr}$	Critical rate of rise of on-state current (repetitive), (note 5)	1000	A/ μs
	Critical rate of rise of on-state current (non repetitive), (note 5)	1500	A/ μs
V_{RGM}	Peak reverse gate voltage	5	V
$P_{G(AV)}$	Mean forward gate power	2	W
P_{GM}	Peak forward gate power	30	W
V_{GD}	Non-trigger gate voltage, (note 6)	0.25	V
T_{jop}	Operating temperature range	-40 to +125	°C
T_{stg}	Storage temperature range	-40 to +150	°C
note 1)	Double-side cooled, single phase, 50Hz, 180° half-sinewave.		
note 2)	Single-side cooled, single phase, 50Hz, 180° half-sinewave.		
note 3)	Double-side cooled		
note 4)	Half-sinewave, 125°C T_j initial		
note 5)	$V_D = 67\%V_{DRM}$, $I_{FG} = 2A$, $t_R \leq 0.5\mu s$, $T_{case} = 125^{\circ}C$		
note 6)	Rated V_{DRM}		

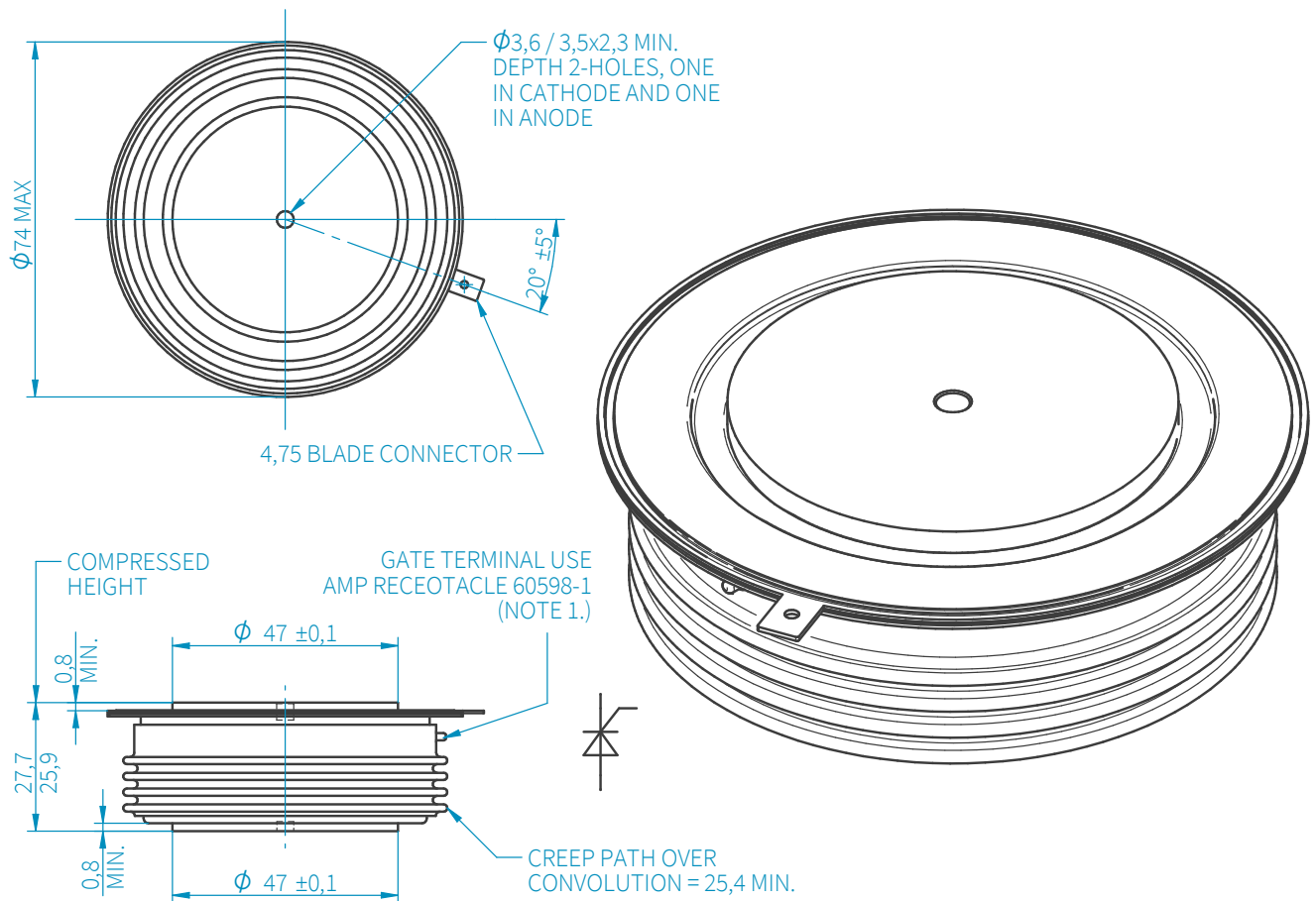
Characteristics

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_{TM}	Maximum peak on-state voltage	$I_{TM} = 2000A$	-	-	2.18	V
V_{T0}	Threshold voltage		-	-	1.7	V
r_T	Slope resistance		-	-	0.2	mΩ
$(dv/dt)_{CR}$	Critical rate of rise of off-state voltage	$V_D = 80\%V_{DRM}$, linear ramp	200	-	-	V/μs
I_{DRM}	Peak off-state current	Rated V_{DRM}	-	-	150	mA
I_{RRM}	Peak reverse current	Rated V_{RRM}	-	-	150	mA
V_{GT}	Gate trigger voltage	$T_j = 25^\circ C$, $V_D = 10V$, $I_T = 3A$	-	-	3.0	V
I_{GT}	Gate trigger current		-	-	300	mA
I_H	Holding current	$T_j = 25^\circ C$	-	-	1000	mA
t_{GD}	Gate controlled turn-on delay time	$V_D = 67\%V_{DRM}$, $I_{TM} = 2000A$, $di/dt = 60A/\mu s$,	-	0.5	1.0	μs
t_{GT}	Turn-on time	$I_{FG} = 2A$, $t_r \leq 0.5\mu s$, $T_j = 25^\circ C$	-	1.0	2.0	μs
Q_{RR}	Recovered charge		-	230	-	μC
Q_{RA}	Recovered charge, 50% Chord	$I_{TM} = 1000A$, $t_p = 1000\mu s$, $di/dt = 60A/\mu s$, $V_R = 50V$	-	100	130	μC
I_{RM}	Reverse recovery current		-	80	-	A
t_{RR}	Reverse recovery time		-	2.4	-	μs
t_{GQ}	Turn-off time (note 2)	$I_{TM} = 1000A$, $t_p = 1000\mu s$, $di/dt = 60A/\mu s$, $V_R = 50V$, $V_{DR} = 80\%V_{DRM}$, $dV_{DR}/dt = 20V/\mu s$	-	-	23	μs
		$I_{TM} = 1000A$, $t_p = 1000\mu s$, $di/dt = 60A/\mu s$, $V_R = 50V$, $V_{DR} = 80\%V_{DRM}$, $dV_{DR}/dt = 200V/\mu s$	15	-	25	μs
R_{thJK}	Thermal resistance, junction to sink (note 3)	Double-side cooled	-	-	0.024	K/W
		Single-side cooled	-	-	0.048	K/W
F	Mounting force	(note 3)	19	-	26	kN
W_t	Weight		-	510	-	g
note 1)	Unless otherwise indicated $T_j = 125^\circ C$					
note 2)	The required t_Q (specified with $dV_{DR}/dt = 200V/\mu s$) is 25μs					
note 3)	For other clamp forces, please consult factory					

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