Distributed Gate Thyristor
Type SA20SQ3968EN

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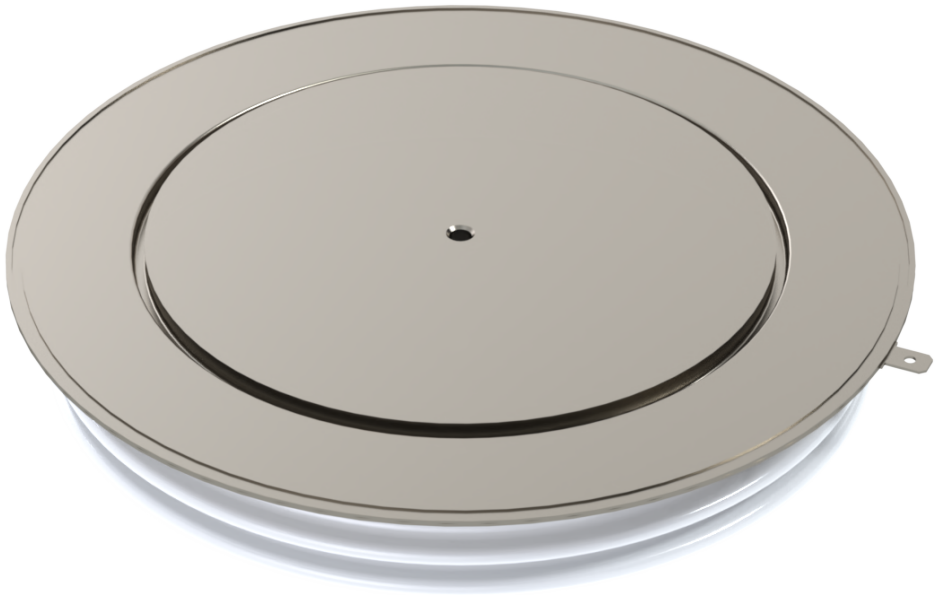
Date: September, 2020
Data Sheet Issue: 1



ORDERING INFORMATION						(Please quote 12 to 15 digit code as below)
SA	20	SQ	3968	E	N	
-	Voltage Code	Outline Code	Current code	Type code	t_q code	Optional code
t_q code: K = 60µs, L = 65µs, M = 70µs, N = 100µs						

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Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{DRM}	Repetitive peak off-state voltage, (note 1)	2000	V
V_{DSM}	Non-repetitive peak off-state voltage, (note 1)	2000	V
V_{DDC}	Maximum DC of-state voltage, (note 1)	1250	V
V_{RRM}	Repetitive peak reverse voltage, (note 1)	2000	V
V_{RSM}	Non-repetitive peak reverse voltage, (note 1)	2100	V
V_{RDC}	Maximum DC revrese voltage, (note 1)	1250	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°C, (note 1)	4001	A
$I_{T(AV)M}$	Maximum average on-state current, T_{sink} = 85°C, (note 1)	2691	A
$I_{T(AV)M}$	Maximum average on-state current, T_{sink} = 85°C, (note 2)	1582	A
$I_{T(RMS)}$	Nominal RMS on-state current, T_{sink} = 25°C (note 1)	7988	A
$I_{T(d.c.)}$	D.C. on-state current, T_{sink} = 25°C, (note 3)	6712	A
I_{TSM}	Peak non-repetitive surge current t_p = 10ms, V_{RM} = 60%V_{RRM}, (note4)	66.0	kA
I_{TSM2}	Peak non-repetitive surge current t_p = 10ms, $V_{RM} \leq$ 10V, (note 4)	72.5	kA
I^2t	I^2t capacity for fusing t_p = 10ms, V_{RM} = 60%V_{RRM}, (note 4)	$21.78 \cdot 10^6$	A^2s
I^2t	I^2t capacity for fusing t_p = 10ms, $V_{RM} \leq$ 10V, (note 4)	$26.28 \cdot 10^6$	A^2s
$(di/dt)_{cr}$	Critical rate of rise of on-state current (Non-repetitive)	1000	A/µs
	Critical rate of rise of on-state current (repetitive 50Hz, 60s), (note 5)	500	A/µs
	Critical rate of rise of on-state current (continuous 50Hz), (note 5)	250	A/µs
V_{RGM}	Peak reverse gate voltage	5	V
$P_{G(AV)}$	Mean forward gate power	4	W
P_{GM}	Peak forward gate power	50	W
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, $t_R \leq$ 0.5µs, T_{case} = 125°C		

Characteristics

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_{TM}	Maximum peak on-state voltage	I_{TM} = 6000A	-	-	2.20	V
V_{T0}	Threshold voltage		-	-	1.453	V
r_T	Slope resistance		-	-	0.125	mΩ
$(dv/dt)_{CR}$	Critical rate of rise of off-state voltage	V_D = 80%V_{DRM}, Linear ramp, Gate o/c	200	-	-	V/µs
I_{DRM}	Peak off-state current	Rated V_{DRM}	-	-	150	mA
I_{RRM}	Peak reverse current	Rated V_{RRM}	-	-	300	mA
V_{GT}	Gate trigger voltage	T_j = 25°C, V_D = 10V, I_T = 3A	-	-	3.0	V
I_{GT}	Gate trigger current		-	-	600	mA
V_{GD}	Gate non-trigger voltage	Rated V_{DRM}	-	-	0.25	V
I_H	Holding current	T_j = 25°C	-	-	1000	mA
t_{GD}	Gate controlled turn-on delay time	V_D = 67%V_{DRM}, I_{TM} = 4000A, di/dt = 60A/µs, I_{FG} = 2A, t_r = 0.5µs, T_j = 25°C	-	0.8	2.0	µs
t_{GT}	Turn-on time		-	2.0	3.0	µs
Q_{RR}	Recovered charge	I_{TM} = 4000A, t_p = 2000µs,di/dt = 60A/µs, V_R = 100V	-	2600	3200	µC
Q_{RA}	Recovered charge, 50% Chord		-	1700	-	µC
I_{RM}	Reverse recovery current		-	360	-	A
t_{RR}	Reverse recovery time		-	9.5	-	µs
t_{GQ}	Turn-off time (note 2)	I_{TM} = 4000A, t_p = 2000µs, di/dt = 60A/µs, V_R = 100V, V_{DR} = 67%V_{DRM}, dV_{DR}/dt = 20V/µs	50	-	70	µs
		I_{TM} = 4000A, t_p = 2000µs, di/dt = 60A/µs, V_R = 100V, V_{DR} = 67%V_{DRM}, dV_{DR}/dt = 200V/µs	60	-	100	µs
R_{thJK}	Thermal resistance, junction to sink (note 3)	Double-side cooled	-	-	6.5	K/kW
		Single-side cooled	-	-	13.0	K/kW
F	Mounting force	(note 3)	81	-	99	kN
W_t	Weight		-	2800	-	g

note 1) Unless otherwise indicated T_j = 125°C

note 2) The required t_Q (specified with dV_{DR}/dt = 200V/µs) is 100µs

note 3) For other clamp forces, please consult factory

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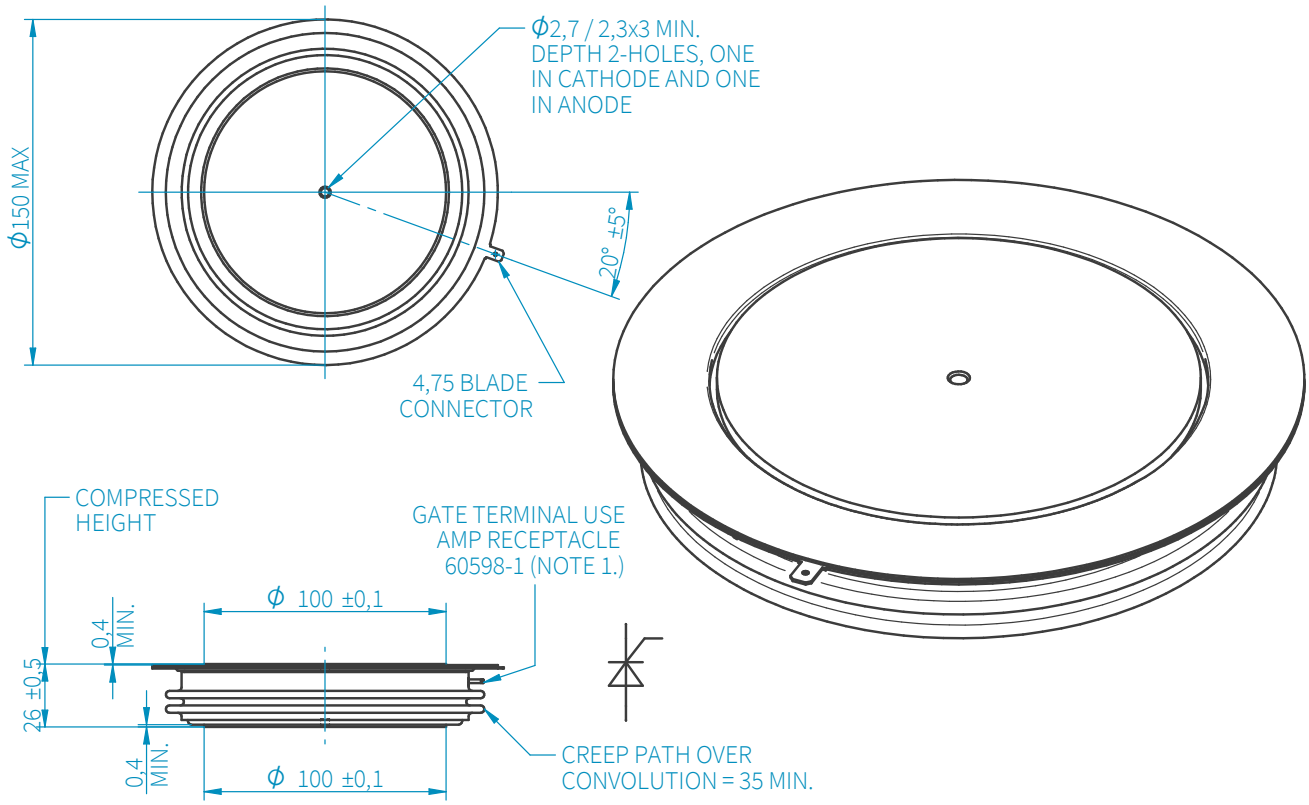
Outline Drawing



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