

Symmetrical Gate Turn-Off Thyristor Type SA20AP1200FK

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SA	20	AP	1200	F	K	
-	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_{DRM}	Repetitive peak off-state voltage, (note 1)	2000	V
V_{RSM}	Non-repetitive peak off-state voltage, (note 1)	2100	V
V_{RRM}	Repetitive peak reverse voltage	1000	V
V_{RSM}	Non-repetitive peak reverse voltage	1000	V
note 1)	$V_{GK} = -2V$		

OTHER RATINGS		MAXIMUM LIMITS	UNITS
I_{TGQ}	Peak turn-off current (note 1)	1200	A
L_S	Snubber loop impedance, $I_{TM} = I_{TGQ}$ (note 1)	0.3	μH
$I_{T(AV)M}$	Mean on-state current, $T_{sink} = 55^{\circ}C$, (note 2)	790	A
$I_{T(RMS)}$	Nominal RMS on-state current, $T_{sink} = 25^{\circ}C$ (note 2)	1600	A
I_{TSM}	Peak non-repetitive surge current $t_p = 10ms$	13.0	kA
I_{TSM2}	Peak non-repetitive surge current (note 3)	23.0	kA
I^2t	I^2t capacity for fusing $t_p = 10ms$	$840 \cdot 10^3$	A^2s
$(di/dt)_{cr}$	Critical rate of rise of on-state current, (note 4)	1000	$A/\mu s$
P_{FGM}	Peak forward gate power	200	W
P_{RGM}	Peak reverse gate power	8	kW
I_{FGM}	Peak forward gate current	140	A
V_{RGM}	Peak reverse gate voltage (note 5)	18	V
t_{off}	Minimum permissible off-time, $I_{TM} = I_{TGQ}$ (note 1)	80	μs
t_{on}	Minimum permissible on-time	20	μs
T_{jop}	Operating temperature range	-40 to +125	$^{\circ}C$
T_{stg}	Storage temperature range	-40 to +150	$^{\circ}C$
note 1)	$T_j = 125^{\circ}C$, $V_D = 80\%V_{DM}$, $V_{DM} \leq V_{DRM}$, $di_{GQ}/dt = 20A/\mu s$, $I_{TM} = I_{TGQ}$ and $C_S = 3\mu F$		
note 2)	Double-side cooled, single phase, 50Hz, 180° half-sinewave.		
note 3)	Half-sinewave, $t_p = 2ms$		
note 4)	For $di/dt > 1000A/\mu s$ 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	$I_G = 2A, I_T = 1200A$	-	2.4	2.7	V
I_L	Latching current	$T_j = 25^\circ C$	-	10	-	A
I_H	Holding current		-	10	-	A
$(dv/dt)_{cr}$	Critical rate of rise of off-state voltage	$V_D = 80\%V_{DRM}, V_{GR} = -2V$	1000	-	-	V/ μs
I_{DRM}	Peak off-state current	Rated $V_{DRM}, V_{GR} = -2V$	-	-	50	mA
I_{RRM}	Peak reverse current	Rated V_{RRM}	-	-	100	mA
I_{GKM}	Peak negative gate leakage current	$V_{GR} = -16V$	-	-	200	mA
V_{GT}	Gate trigger voltage	$T_j = -40^\circ C, V_D = 25V, R_L = 25m\Omega$	-	1.0	-	V
		$T_j = 25^\circ C, V_D = 25V, R_L = 25m\Omega$	-	0.9	-	V
		$T_j = 125^\circ C, V_D = 25V, R_L = 25m\Omega$	-	0.8	-	V
I_{GT}	Gate trigger current	$T_j = -40^\circ C, V_D = 25V, R_L = 25m\Omega$	-	2	7	A
		$T_j = 25^\circ C, V_D = 25V, R_L = 25m\Omega$	-	0.5	2	A
		$T_j = 125^\circ C, V_D = 25V, R_L = 25m\Omega$	-	50	300	mA
t_d	Delay time	(note 2)	-	1.5	-	μs
t_{gt}	Turn-on time	Conditions as for t_d , ($10\%I_{GM}$ to $10\%V_D$)	-	4.5	8.0	μs
t_f	Fall time	(note 3)	-	1	-	μs
t_{gq}	Turn-off time	Conditions as for t_f , ($10\%I_{GQ}$ to $10\%I_{TGQ}$)	-	19	22	μs
I_{GQ}	Turn-off gate current	Conditions as for t_f	-	300	-	A
Q_{GQ}	Turn-off gate charge		-	4000	5000	mC
t_{tail}	Tail time	Conditions as for t_f , ($10\%I_{TGQ}$ to $I_{TGQ} < 1A$)	-	50	75	μs
t_{gw}	Gate off-time (note 4)	Conditions as for t_f	150	-	-	μs
R_{thJK}	Thermal resistance, junction to sink	Double side cooled	-	-	0.027	K/W
		Cathode side cooled	-	-	0.070	K/W
		Anode side cooled	-	-	0.045	K/W
F	Mounting force	(note 5)	15	-	25	kN
W_t	Weight		-	480	-	g
note 1)	Unless otherwise indicated $T_j = 125^\circ C$					
note 2)	$V_D = 50\%V_{DRM}, I_{TGQ} = 1200A, I_{GM} = 20A, di_G/dt = 10A/\mu s, T_j = 25^\circ C, di/dt = 300A/\mu s, (10\%I_{GM} \text{ to } 90\%V_D)$					
note 3)	$V_D = 80\%V_{DRM}, I_{TGQ} = 1200A, C_S = 3\mu F, di_G/dt = 20A/\mu s, V_{GR} = -16V, (90\%I_{TGQ} \text{ to } 10\%I_{TGQ})$					
note 4)	The gate off-time is the period during which the gate circuit is required to remain low impedance to allow for the passage of tail current.					
note 5)	For other clamping forces, consult factory.					

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