

Prospective Data

Distributed Gate Thyristor

Type R1700MC18x to R1700MC21x

(Development Part Number: RX228MC18x-21x)

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{DRM}	Repetitive peak off-state voltage, (note 1)	1800-2100	V
V_{DSM}	Non-repetitive peak off-state voltage, (note 1)	1800-2100	V
V_{RRM}	Repetitive peak reverse voltage, (note 1)	1800	V
V_{RSM}	Non-repetitive peak reverse voltage, (note 1)	1900	V

	OTHER RATINGS	MAXIMUM LIMITS	UNITS
$I_{T(AV)M}$	Maximum average on-state current $T_{sink}=55^{\circ}C$, (note 2)	1700	A
$I_{T(AV)M}$	Maximum average on-state current $T_{sink}=85^{\circ}C$, (note 2)	1150	A
$I_{T(AV)M}$	Maximum average on-state current $T_{sink}=85^{\circ}C$, (note 3)	610	A
$I_{T(RMS)}$	Nominal RMS on-state current, $T_{sink}=25^{\circ}C$, (note 2)	3500	A
$I_{T(D.C.)}$	D.C. on-state current, $T_{sink}=25^{\circ}C$, (note 4)	2875	A
I_{TSM}	Peak non-repetitive surge $t_p=10ms$, $V_{rm}=60\%V_{RRM}$, (note 5)	20	kA
I_{TSM2}	Peak non-repetitive surge $t_p=10ms$, $V_{rm}\leq 10V$, (note 5)	22	kA
I^2t	I^2t capacity for fusing $t_p=10ms$, $V_{rm}=60\%V_{RRM}$, (note 5)	2.00×10^6	A^2s
I^2t	I^2t capacity for fusing $t_p=10ms$, $V_{rm}\leq 10V$, (note 5)	2.42×10^6	A^2s
$(di/dt)_{cr}$	Critical rate of rise of on-state current (note 6)	Non-repetitive Repetitive (50Hz, 60s) Continuous (50Hz)	1500 1000 500 A/ μs
V_{RGM}	Peak reverse gate voltage	5	V
$P_{G(AV)}$	Mean forward gate power	5	W
P_{GM}	Peak forward gate power	30	W
$T_{j,op}$	Operating temperature range	-40 to +125	$^{\circ}C$
T_{stg}	Storage temperature range	-40 to +150	$^{\circ}C$

Notes:-

- De-rating factor of 0.13% per $^{\circ}C$ is applicable for T_j below $25^{\circ}C$.
- Double side cooled, single phase; 50Hz, 180° half-sinewave.
- Single side cooled, single phase; 50Hz, 180° half-sinewave.
- Double side cooled.
- Half-sinewave, $125^{\circ}C$ T_j initial.
- $V_D=67\% V_{DRM}$, $I_{FG}=2A$, $t_r\leq 0.5\mu s$, $T_{case}=125^{\circ}C$.

Characteristics

	PARAMETER	MIN.	TYP.	MAX.	TEST CONDITIONS (Note 1)	UNITS
V_{TM}	Maximum peak on-state voltage	-	-	2.10	$I_{TM}=1700A$	V
V_{T0}	Threshold voltage	-	-	1.60		V
r_T	Slope resistance	-	-	0.25		mΩ
$(dv/dt)_{cr}$	Critical rate of rise of off-state voltage	200	-	-	$V_D=80\% V_{DRM}$, Linear ramp, Gate o/c	V/μs
I_{DRM}	Peak off-state current	-	-	100	Rated V_{DRM}	mA
I_{RRM}	Peak reverse current	-	-	100	Rated V_{RRM}	mA
V_{GT}	Gate trigger voltage	-	-	3.0	$T_J=25^\circ C$, $V_D=10V$, $I_T=3A$	V
I_{GT}	Gate trigger current	-	-	300		mA
V_{GD}	Gate non-trigger voltage	-	-	0.25	Rated V_{DRM}	V
I_H	Holding current	-	-	1000	$T_J=25^\circ C$	mA
t_{gd}	Gate controlled turn-on delay time	-	0.5	1.0	$V_D=67\% V_{DRM}$, $I_{TM}=2000A$, $di/dt=60A/\mu s$, $I_{FG}=2A$, $t_r=0.5\mu s$, $T_J=25^\circ C$	μs
t_{gt}	Turn-on time	-	1.0	2.0		
Q_{rr}	Recovered charge	-	1400	1500		μC
Q_{ra}	Recovered charge, 50% Chord	-	750	-	$I_{TM}=1000A$, $t_p=1000\mu s$, $di/dt=60A/\mu s$, $V_r=100V$	μC
I_{rm}	Reverse recovery current	-	230	-		A
t_{rr}	Reverse recovery time	-	6.5	-		μs
t_q	Turn-off time (note 2)	-	30	-	$I_{TM}=1000A$, $t_p=1000\mu s$, $di/dt=60A/\mu s$, $V_r=100V$, $V_{dr}=33\%V_{DRM}$, $dV_{dr}/dt=20V/\mu s$	μs
		-	40	-	$I_{TM}=1000A$, $t_p=1000\mu s$, $di/dt=60A/\mu s$, $V_r=100V$, $V_{dr}=33\%V_{DRM}$, $dV_{dr}/dt=200V/\mu s$	
R_{thJK}	Thermal resistance, junction to heatsink (note 3)	-	-	0.015	Double side cooled	K/W
		-	-	0.028	Anode side cooled	
		-	-	0.033	Cathode side cooled	K/W
F	Mounting force	27	-	34		kN
Wt	Weight	-	550	-		g

Notes:-

2) Unless otherwise indicated $T_J=125^\circ C$.3) The required t_q (specified with $dV_{dr}/dt=200V/\mu s$) is represented by 'x' in the device part number. See ordering information for details of t_q codes.

4) For other clamp forces, please consult factory

Curves

Figure 1 - On-state characteristics of Limit device

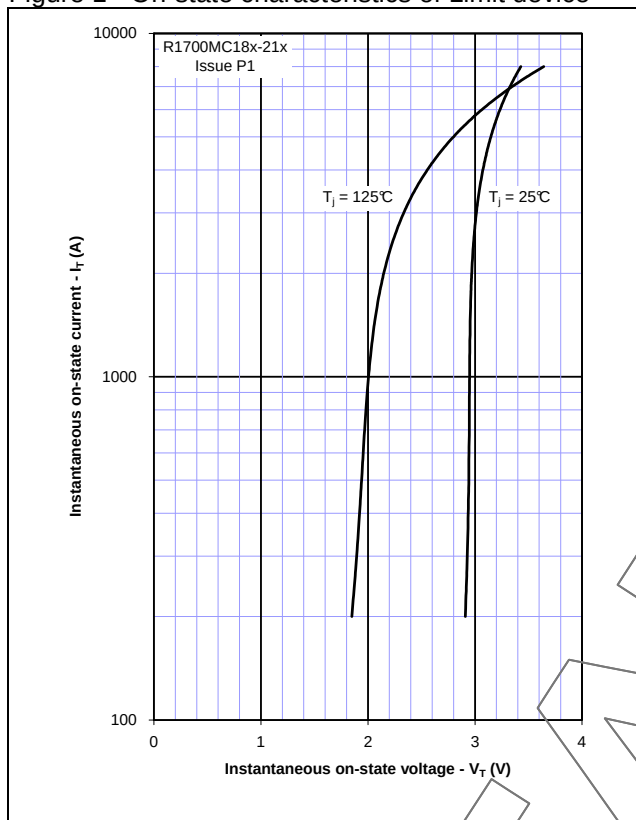
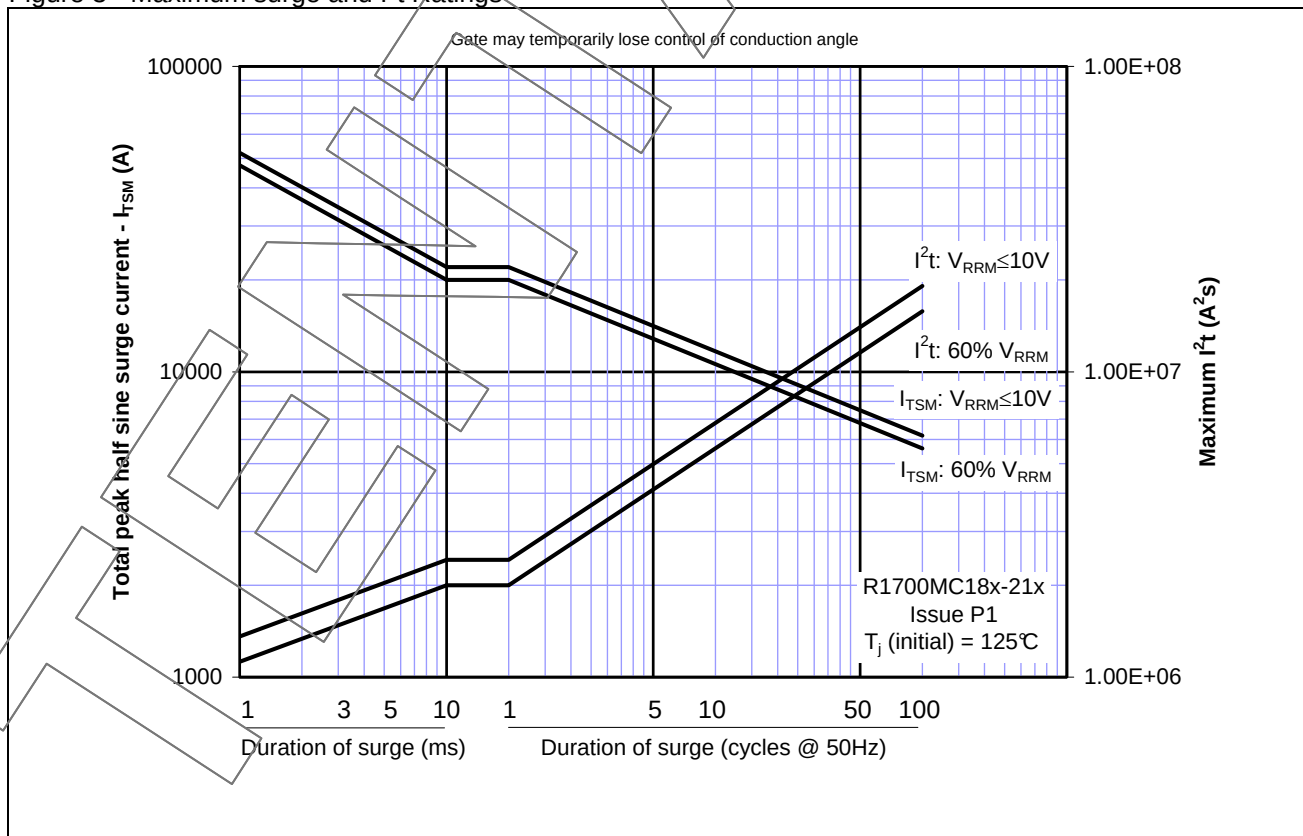


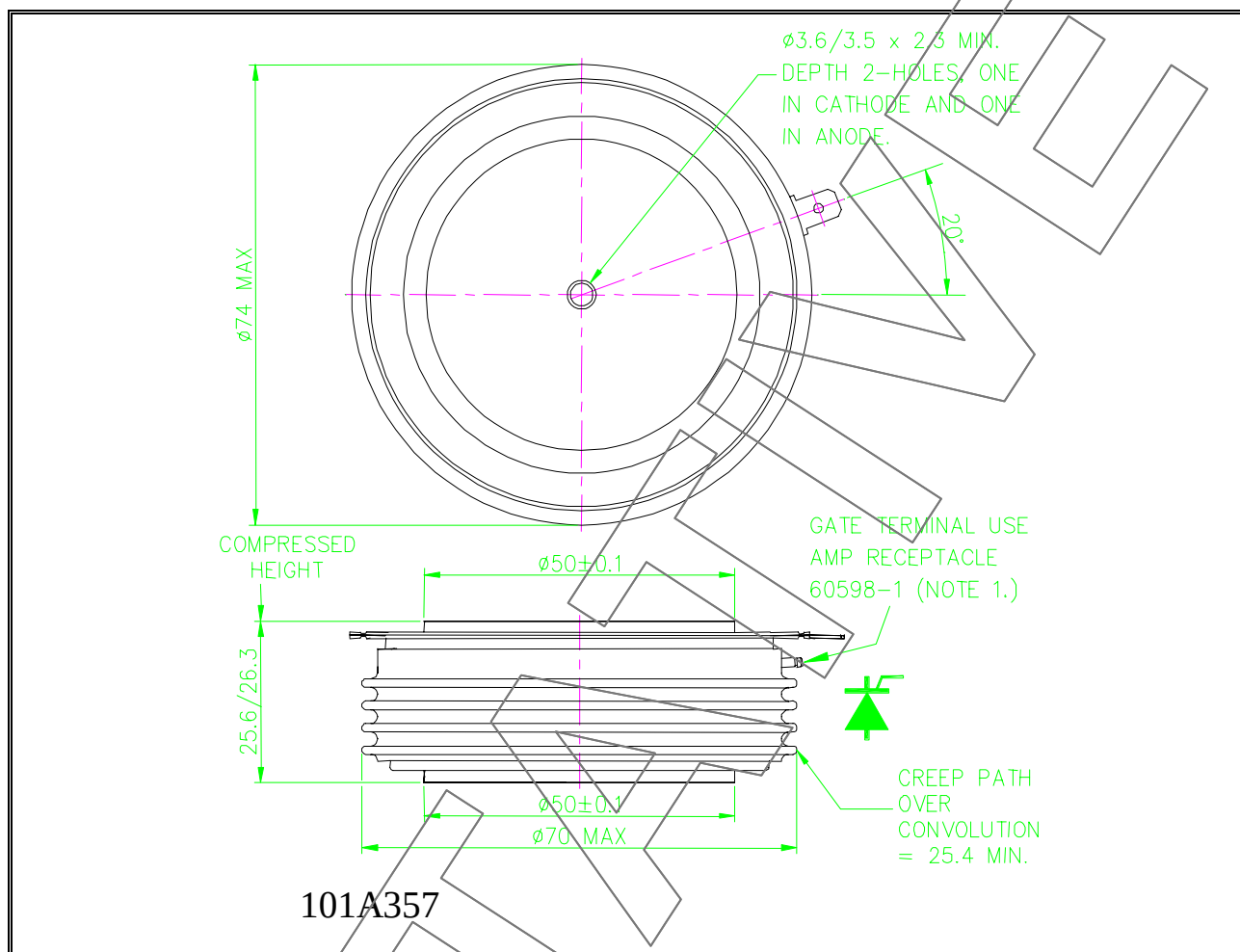
Figure 2 - Transient thermal impedance



Figure 3 - Maximum surge and I^2t Ratings



Outline Drawing & Ordering Information



ORDERING INFORMATION

(Please quote 10 digit code as below)

R1700	MC	♦ ♦	♦
Fixed Type Code	Outline Code MC=27mm height,	Fixed Voltage Code $V_{DRM}/100$ 18-21	t_q Code E=25 μ s, F=30 μ s, G=35 μ s, H=40 μ s, J=50 μ s, K=60 μ s

Typical order code: R1700MC21E – 2100V V_{DRM} , 1800V V_{RRM} 25 μ s t_q , 26.3mm clamp height capsule.

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