

WESTCODE SEMICONDUCTORS

Series
R600CH16-21

Capsule Thyristor

The R600C series thyristors feature low turn-on loss, regenerative and interdigitated gating mounted in a cold-weld capsule. High di/dt capability. Low on-state voltage.

Ratings Unless otherwise indicated $T_j = 125^\circ\text{C}$.		Maximum Limits				Units
	Voltage Codes	H16	H18	H20	H21	
V_{DRM}	Repetitive peak off-state voltage.	1600	1800	2000	2100	V
V_{DSM}	Non-repetitive peak off-state voltage.	1600	1800	2000	2100	V
V_{RRM}	Repetitive peak reverse voltage.	1600	1800	2000	2100	V
V_{RSM}	Non-repetitive peak reverse voltage.	1700	1900	2100	2200	V

$I_{\text{T(AV)}}$	Average on-state current	Half sine wave	$\left\{ \begin{array}{l} 55^\circ\text{C heatsink temperature} \\ \text{(double side cooled)} \\ 85^\circ\text{C heatsink temperature} \\ \text{(single side cooled)} \end{array} \right.$	2550	A
$I_{\text{T(RMS)}}$	R.M.S. on-state current			1720	A
I_{T}	Continuous on-state current		25°C heatsink temperature, double side cooled	5087	A
$I_{\text{TSM(1)}}$	Peak one-cycle surge		25°C heatsink temperature, double side cooled	4390	A
$I_{\text{TSM(2)}}$	(non-repetitive) on-state current		10ms duration, 60% V_{RRM} re-applied	33.80	KA
$I^2 t$	Maximum permissible surge energy		10ms duration, $V_{\text{R}} \leq 10$ volts	37.20	KA
			10ms duration, $V_{\text{R}} \leq 10$ volts	6.92×10^6	A^2s
			3 ms duration, $V_{\text{R}} \leq 10$ volts	4.57×10^6	A^2s
I_{FGM}	Peak forward gate current		Anode positive with respect to cathode	7.5	A
V_{FGM}	Peak forward gate voltage		Anode positive with respect to cathode	10	V
V_{RGM}	Peak reverse gate voltage			5	V
P_{G}	Average gate power			5	W
P_{GM}	Peak gate power		100μs pulse width	30	W
dv/dt	Rate of rise of off-state voltage		To 80% V_{DRM} gate open-circuit	*200	V/μs
di/dt (1)	Rate of rise of on-state current (repetitive)		Gate drive 20 volts, 20 ohms with $t_r \leq 1\mu\text{s}$.	1000	A/μs
di/dt (2)	Rate of rise of on-state current (non-repetitive)		Anode voltage $\leq 80\%$ V_{DRM}	1500	A/μs
T_j	Operating temperature range			-40 to +125	°C
T_{stg}	Storage temperature range			-40 to +150	°C

Characteristics Unless otherwise indicated $T_j = 125^\circ\text{C}$				
V_{TM}	Peak on-state voltage	At 4000A, I_{TM}	2.00	V
V_{O}	Forward conduction threshold voltage		1.30	V
r	Forward conduction slope resistance		0.175	mΩ
I_{DRM}	Repetitive peak off-state current	At V_{DRM}	300	mA
I_{RRM}	Repetitive peak reverse current	At V_{RRM}	300	mA
I_{GT}	Maximum gate current required to fire all devices		300	mA
V_{GT}	Maximum gate voltage required to fire all devices	At 25°C, $V_{\text{A}} = 10\text{V}$, $I_{\text{A}} = 3\text{A}$	3.0	V
I_{H}	Maximum holding current		1.0	A
V_{GD}	Maximum gate voltage which will not trigger any device		0.25	V
Q_{ra}	Stored charge	$I_{\text{TM}} = 4000\text{A}$, dir/dt 60A/μs $V_{\text{RM}} = 50\text{V}$, 50% chord value	1460	μC
tq	Circuit commutated turn-off time	$I_{\text{TM}} = 4000\text{A}$ dir/dt = 60 A/μs, $V_{\text{RM}} = 50\text{V}$ Double side cooled Single side cooled	*50-70	μs
tq typical	available down to		45-55	μs
$R_{\text{Th(j-hs)}}$	Thermal resistance, junction to heat sink, for a device with a maximum forward volt drop characteristic		0.011 0.022	°C/W °C/W

Ordering Information (Please quote device code as explained below - 11 digits)

R600C	• • •	•	•	0
Fixed type code	Voltage Code (see ratings)	dv/dt code to 67% V_{DRM} C = 20V/μs E = 100V/μs D = 50V/μs F = 200V/μs	Turn-off time F = 50μs 2H = 60μs Y = 55μs 2G = 70μs	For $V_{\text{RRM}} < V_{\text{DRM}}$ Refer to short form design guide for coding

Typical code: R600 CH18FY0 = 1800 V_{RRM} 1800 V_{DRM} 200 V/μs dv/dt to 67% V_{DRM} 55μs turn-off. *Other values of dv/dt up to 1000 V/μs, and turn-off times may be available.

Figure 1. Limit On-State Characteristic at 125°C

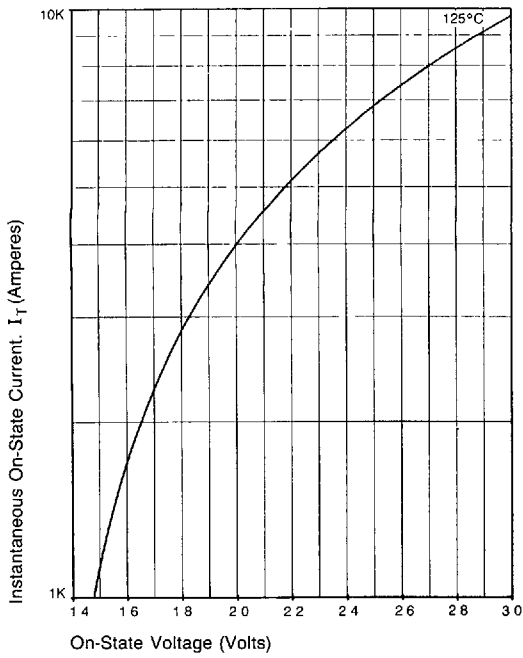


Figure 2. Gate Characteristics at 25°C Junction Temperature

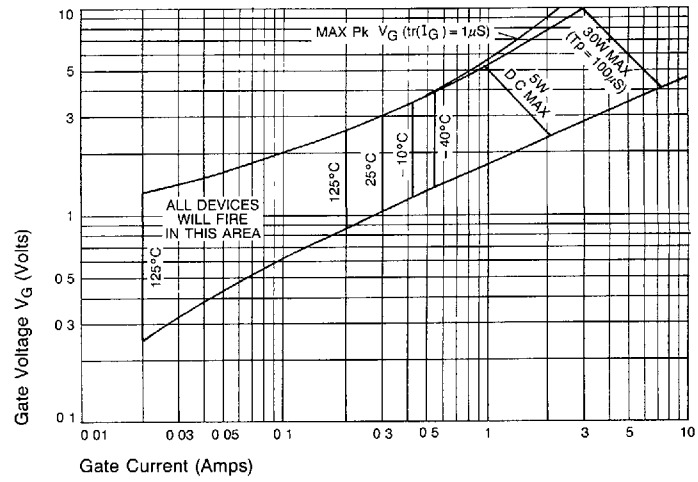


Figure 3. Junction to Sink Transient Thermal Impedance

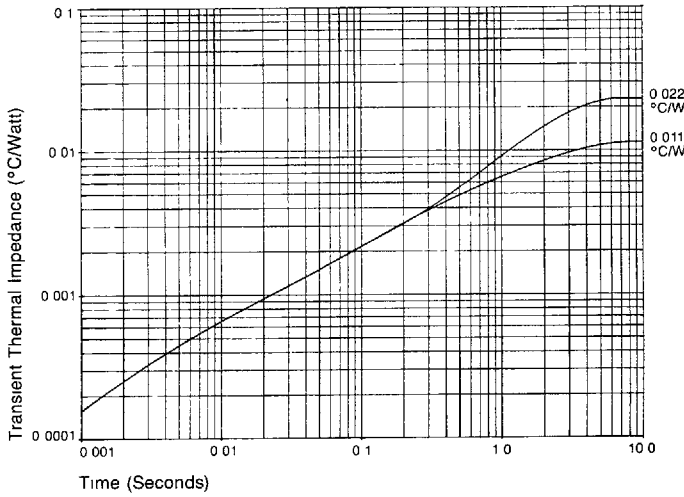


Figure 4. Maximum Non-Repetitive Surge Current at initial Junction Temperature 125°C (Gate may temporarily lose control of conduction angle)

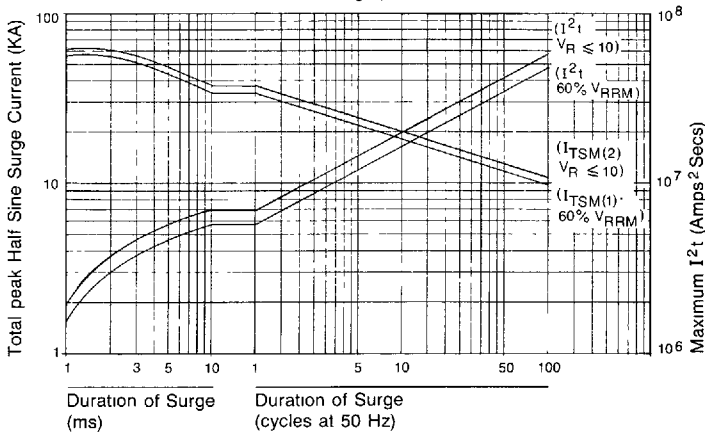
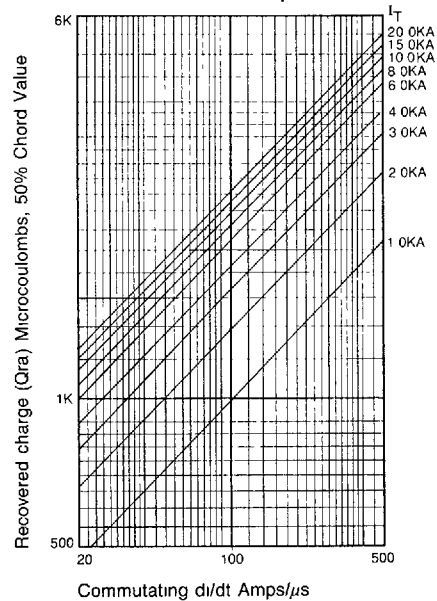


Figure 5. Maximum Recovered Charge at 125°C Junction Temperature



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Figure 6. Maximum Reverse Recovery Energy Loss per Pulse. 125°C

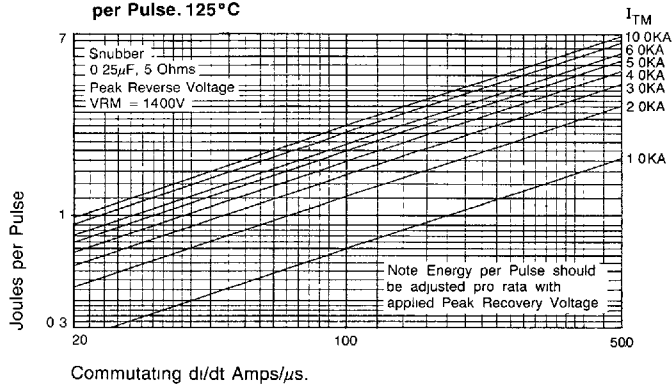


Figure 7. Square Wave Frequency Rating at T Sink 85°C. di/dt 500 A/μs.

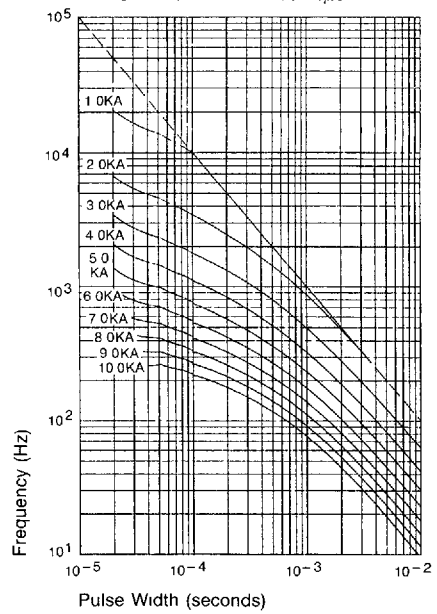


Figure 8. Square Wave Frequency Rating at T Sink 55°C. di/dt 500 A/μs.

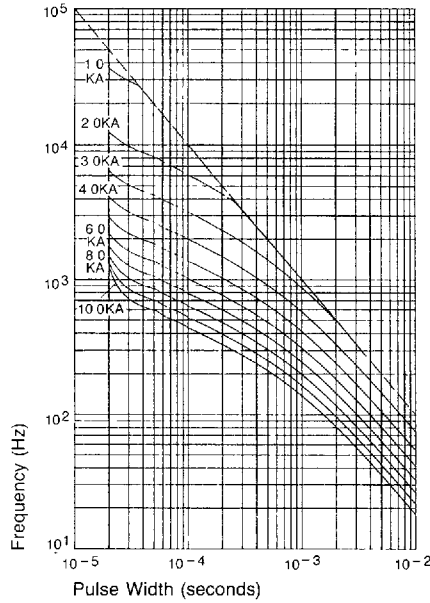


Figure 9. Square Wave Frequency Rating at T Sink 85°C. di/dt 100 A/μs.

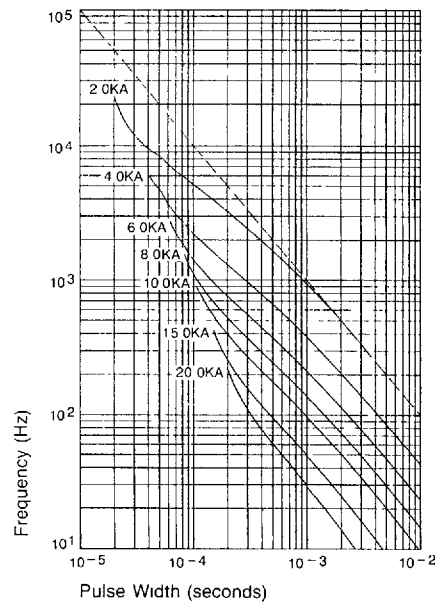


Figure 10. Square Wave Frequency Rating at T Sink 55°C. di/dt 100 A/μs.

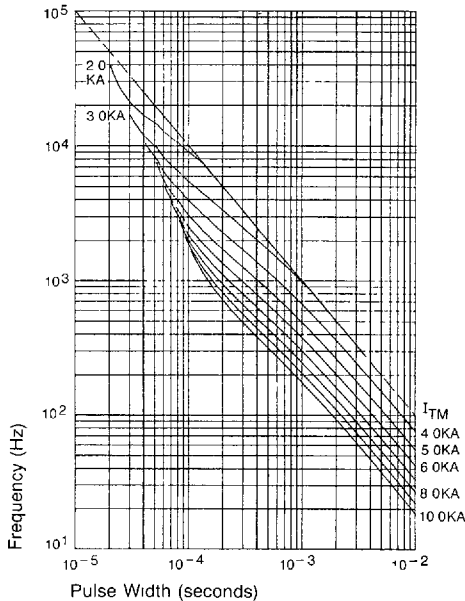


Figure 11. Energy per Pulse Tj 125°C. di/dt 500 A/μs. Square Wave

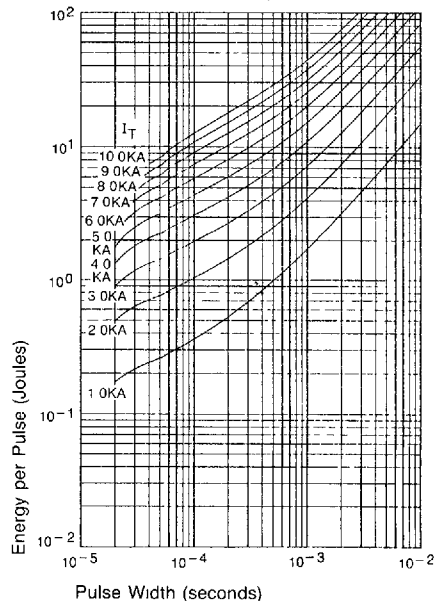


Figure 12. Energy per Pulse T_j 125°C.
di/dt 100 A/ μ s. Square Wave

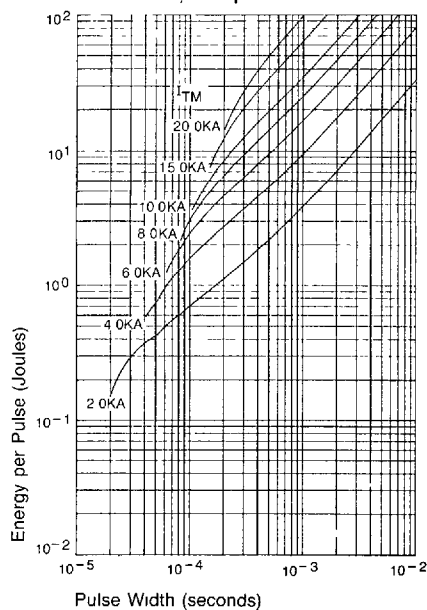


Figure 13. Sine Wave Frequency Rating at
T Sink 85°C.

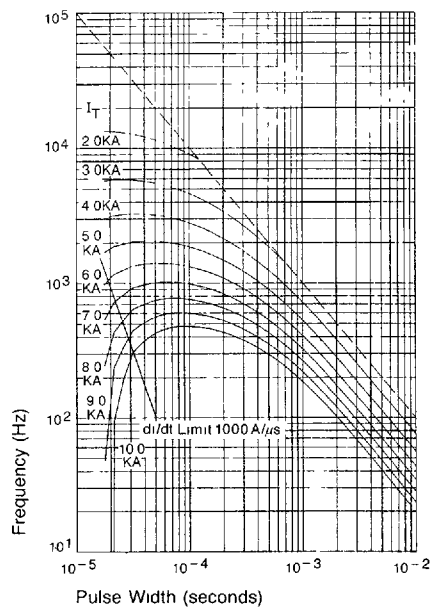


Figure 14. Sine Wave Frequency Rating at
T Sink 55°C.

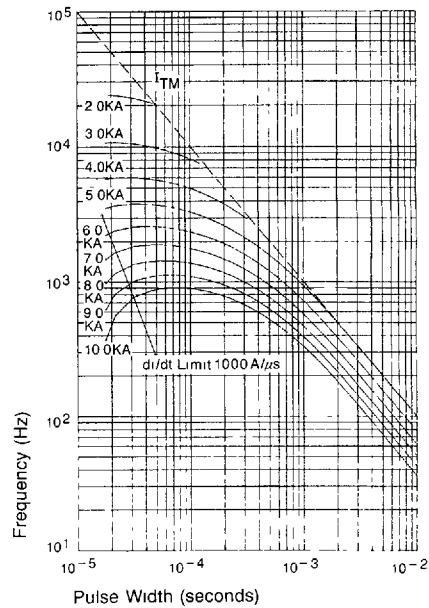
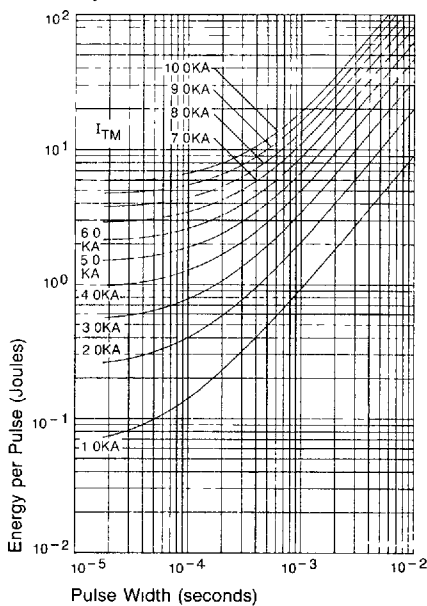
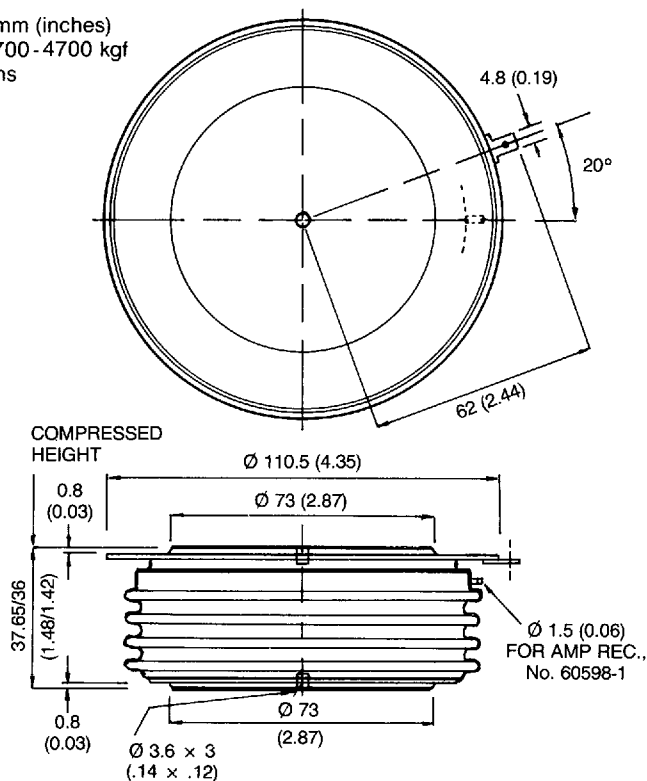


Figure 15. Sine Wave Energy per Pulse
 T_j 125°C.



All dimensions in mm (inches)
Mounting force: 2700-4700 kgf
Weight: 1700 grams



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