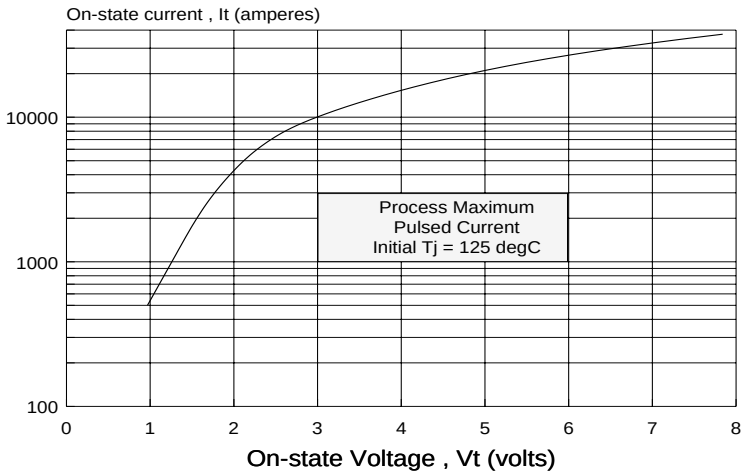
Southern States

Powers the Future

INVERTER THYRISTOR
C770 & C770A
77mm / 1800V / 60-80us

Type C770 reverse blocking thyristor is suitable for inverter applications.The silicon junction is manufactured by the proven multi-diffusion process and utilizes the exclusive involute gate structure.It is supplied in an industry accepted disc-type package , ready to mount using commercially available heat dissipators and mechanical clamping hardware.

C770
ON-STATE CHARACTERISTIC



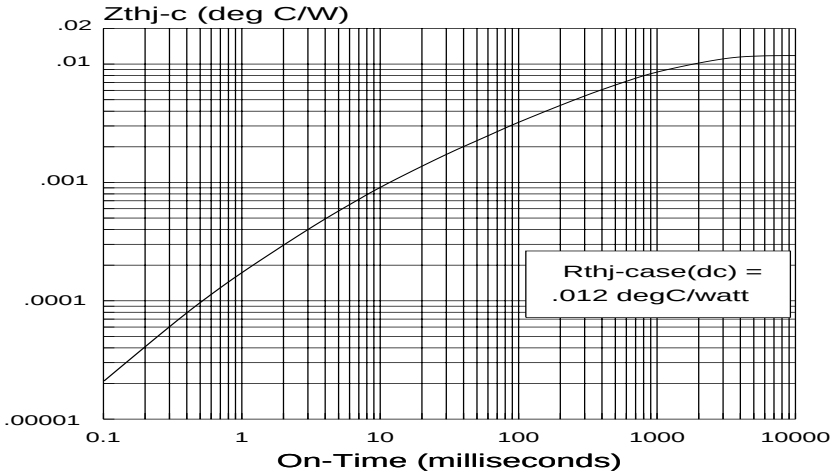
Blocking Voltage Code

C770__ MODEL	C770A__ V_{DRM}/V_{RRM}
	-40 to +125 °C
C770 PN	1800 Volts
C770 PS	1700
C770 PM	1600
C770 PE	1500
C770 PD	1400

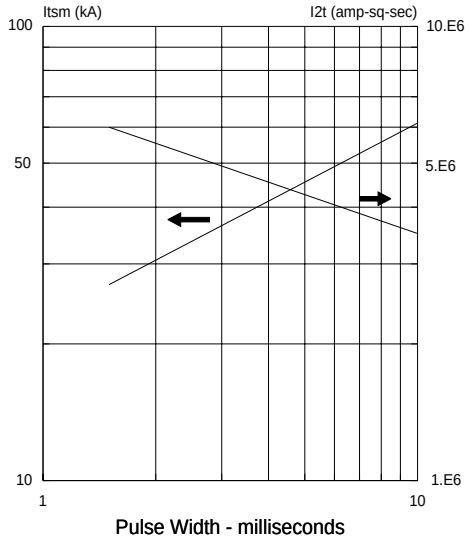
Gate Drive Requirements:

open circuit voltage	30-40 V
internal impedance	10 Ω
rise time of s.s. current	0.5 - 1 µs
minimum duration	10 µs

THERMAL IMPEDANCE vs. ON-TIME



C770
Non-Repetitive Half-Cycle
Peak Surge Current & I2t



LIMITING CHARCTERISTICS
C770

PARAMETER	SYMBOL	TEST CONDITIONS	LIMIT	UNITS
Rep. peak rev. & off-state volts	V_{RRM} V_{DRM}	Tj = -40 to +125°C	up to 1800	V
Reverse & off-state current	I_{RRM} I_{DRM}	Tj = 125°C	100	ma
Average on-state current	$I_{T(AV)}$	T_{CASE} = 70°C	2100	A
Non-rep. half cycle surge current	I_{TSM}	60 Hz (8.3ms) 50 Hz (10 ms)	38 35	kA
On-state voltage	V_{TM}	I_T = 2000A *special C770A* T_{CASE} = 125°C	1.55 *1.60*	V
Critical rate of rise of on-state current	$di/dt_{(rep)}$	Tj=125°C 60Hz	300	A/us
Critical rate of rise of off-state voltage	dv/dt linear	Tj=125°C 60Hz V_{DCRIT}=67%V_{DRM}	500	V/us
Recovery current	I_{RM}	Tj=125°C @ 25 A/us	200	A
Turn-on delay	td	V_D=67%V_{DRM}	2	us
Thermal resistance	R_{thJ-C}		.012	°C/watt

SELECTED RECOVERY TESTS
Turn-off Time
@ Tj = 125°C

- LEM Thyristometre — Type C770
  conditions for **Tq <= 80us**
  di_R/dt = 25 A/us
  V_R = - 5V
  400V/us to 67%V_{DRM}

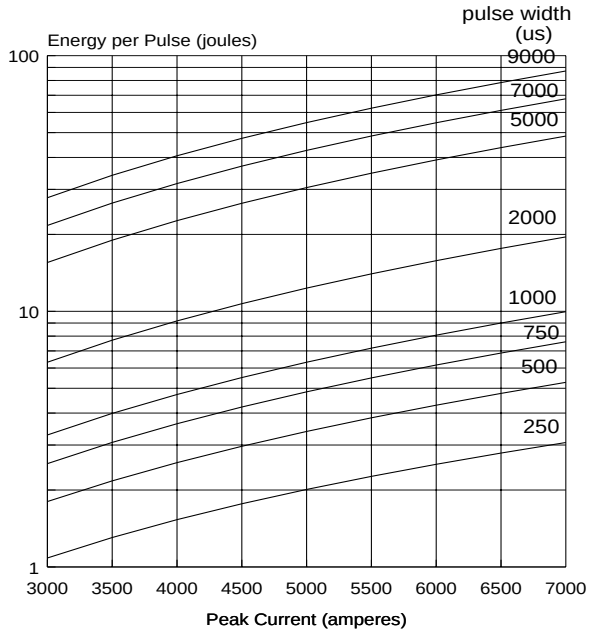
- Naturally Commutating Circuit
  type C770A only
  *conditions for **Tq <= 60us***
  It = 3000 A
  di_R/dt = 60 A/us
  80 - 100V/us initial
  Vd = 1000V

- Naturally Commutating Circuit
  type C770A only
  conditions : di_R/dt = 60 A/us
  $V_{R\text{-}appl'd}$=350V
  snubber R=60Ω C= 1μF

I_{RM} <= 400A Q_{RR} <= 2000μC
$S = t_b/t_a$ >= 0.33

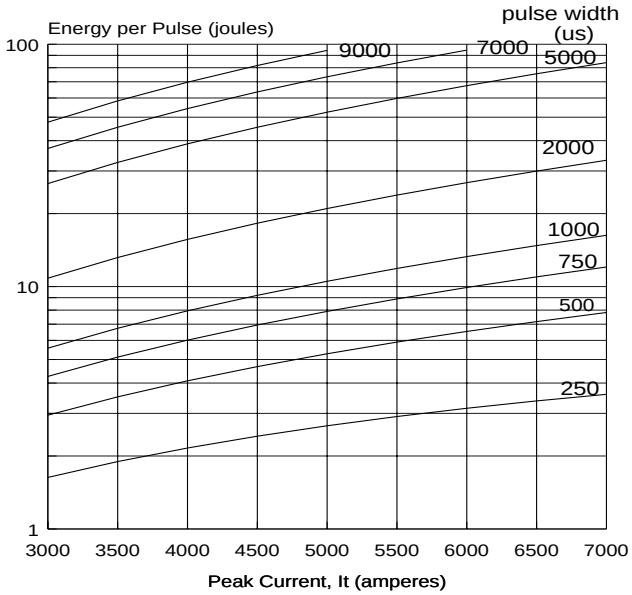
C770 only

ENERGY LOSS PULSE / C770 THYRISTOR
Half sine pulses / No reverse loss



C770 only

ENERGY PER PULSE
Trapezoidal Wave - no reverse voltage
di/dt = 100 A/us



SIGC770A/89C

C770TR1/91a 2/7/91

MOUNTING PRESSPAKS TO HEAT DISSIPATORS

The following instruction is essential for maintaining low, stable thermal and electrical resistances associated with the PRESSPAK to heat dissipator surfaces.

1. INSPECTION OF MATING SURFACES
   Check each mating surface for nicks,scratches and surface finish.The PRESSPAK surface has a total indicator reading TIR < .0005 inch and surface finish 32 prior to factory electrical test in pressure fixtures. The dissipator surface should be equally as good.The TIR of a fully tested PRESSPAK may run higher but not exceed 0.001 inch (**) not including some minor nicks and scratches associated with the test fixtures. Any bow created by clamp system at assembly must keep flatness within 0.001 inch.(**) (**) .002 inch for 77mm PRESSPAKS
2. SURFACE DEOXIDATION AND CLEANING
   Although plated surfaces are recommended for aluminum and copper heat dissipators, bare surfaces may be used if careful attention to cleaning and treating is assured. Plated surfaces and PRESSPAKS should be lightly sanded with 600 grit paper, then oil or compound applied as recommended. Unplated aluminum surfaces should be vigorously abraided with a fine wire brush or 3M "Scotchbrite" coated with Alcoa EJC #2 compound. The EJC # 2 should be removed and the recommended compound applied.
3. FINAL SURFACE TREATMENT
   Apply silicone oil or a very thin layer of grease or compound as indicated below. Rotate the PRESSPAK to properly distribute the applied agent.
   - . bare copper - use G322L or LS2037
   - . bare aluminum - use EJC #2 or G322L
   - . tin plated copper or aluminum
     - preferably reapply DC550 or SF1154
     - alternatively use G623 or G322L
   - . nickel plated aluminum - use DC550,G623 or G322L
   - . silver plating - not recommended

   Recommended silicone oils are SF1154 or DC550 (200 centistoke)

4. MOUNTING
   Assemble with specified mounting force applied through a self-leveling swivel connection. The diameter of the swivel should be preferably equal but not smaller than the poleface diameter of the PRESSPAK. Center holes on the top and bottom of the PRESSPAK are for locating and positioning it to identical holes anticipated at the heat dissipator surfaces using 1/8"dia 3/16" roll pins.

   NOTES:

   Silicone oil DC550 (200 centistoke) is a product of DOW CORNING; clear silicone grease G623, yellow G322L and SF1154(200 centistoke) GE Silicones Waterford NY; EJC# 2 from ALCOA and black LS2037 from ARCO , 7301 Bessemer Ave. Cleveland OH.

   Limit maximum joint temperature to:
   - 95 C using EJC #2
   - 150 C using SF1154,DC550 or G322L

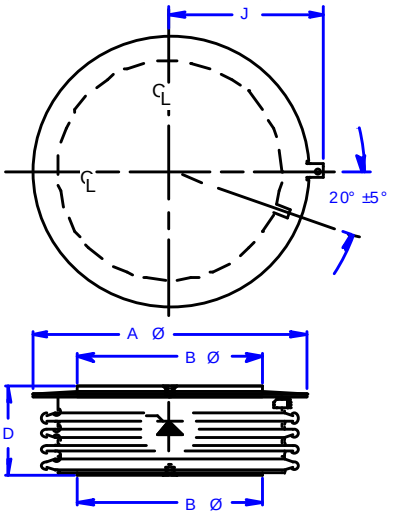
5. APPLIED MOUNTING FORCE
   The selection of an appropriate commercially available spring clamping hardware* should consider eatablishing and maintaining the specified mounting force over the operating temperature range and operating life of the PRESSPAK.Thus essential ratings such as thermal resistance ,di/dt,surge current and thermal cycling will not be impaired.

   Specified forces for this product are as follows:

   7000-9000 lbs.
   31.1 -40.0 kN

   * Consult factory for recommendations or more detailed instructions.

MECHANICAL OUTLINE



AΦ= 4.35 in (110.5 mm)
BΦ= 2.88 in (73.2 mm)
D= 1.45 in (36.8 mm)

External Clamping Force
8000 - 9000 lbs.
35.6 - 40 kN