

**Features**

4600A, 5000V  
 270kA Pulse Current Capability  
 20kA/ $\mu$ S di/dt Pulse Capability  
 Low Power Gate Driver

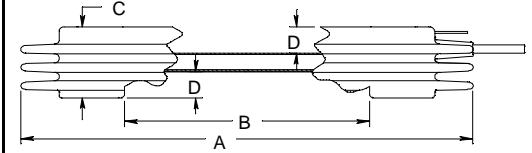
**Description**

The SPT411A thyristor is optimized for pulse power applications. It features a highly indented cathode / pilot gate combinations which enable extremely high pulse power di/dt driven with low gate power.

The design utilizes a revolutionary "Light Silicon Sandwich" or LSS technology, a new termination technique which eliminates heavy refractory metal as a substrate but still employs the alloyed anode interface necessary for high surge current duty. This light weight plastic package allows the insertion of liquid cooled chillers. Copper inserts can be supplied for adjoining commercially available flat surfaced heat dissipators.

**Package**

A=162.7mm, B=106.4mm, C=20.12mm, D=7.71mm  
 Notes - 1, 2 & 3



**MODEL RATING AVAILABILITY**

PART NUMBER	V <sub>DRM</sub>	V <sub>RRM</sub>
SPT411AHT	5000	5000
SPT411AHS	4900	4900
SPT411AHR	4800	4800
SPT411AHP	4700	4700
SPT411AHM	4600	4600

**Limiting Characteristics and Ratings**

At T<sub>J</sub> = 115°C, Unless Otherwise Specified

	SYMBOL		UNITS
Repetitive Peak Off State Voltage.....	V <sub>DRM</sub>	5000	V
Repetitive Peak Reverse Voltage.....	V <sub>RRM</sub>	5000	V
Average On-State Current (T <sub>C</sub> =70°C) .....	I <sub>T(AV)</sub>	4600	A
Peak Half-Cycle Non-Repetitive Surge Current ( 8.3ms / 1.5ms ).....	I <sub>TSM</sub>	77.5 / 143	kA
Critical Gate Trigger Voltage ( V <sub>D</sub> = 12V, T <sub>J</sub> = 25°C ).....	V <sub>GT</sub>	5	V
Critical Gate Trigger Current ( V <sub>D</sub> = 12V, T <sub>J</sub> = 25°C ) .....	I <sub>GT</sub>	150	mA
Non-Trigger Gate Current ( V <sub>D</sub> = 2000V ) .....	I <sub>GD</sub>	15	mA
Non-Trigger Gate Voltage ( V <sub>D</sub> = 2000V ) .....	V <sub>GD</sub>	0.8	V
Open Circuit Gate Voltage .....	V <sub>OC</sub>	100	V
Short Circuit Gate Current .....	I <sub>SS</sub>	20	A
Gate Pulse Duration and Rise Time .....		10 $\mu$ s duration / 0.1 $\mu$ s rise time	
Turn-Off Time (5A/ $\mu$ s, -100V, 20V/ $\mu$ s to 2000V) .....	T <sub>off</sub>	400	$\mu$ s
Turn-On Delay (V <sub>D</sub> = 50%V <sub>DRM</sub> , T <sub>J</sub> = 115°C) .....	t <sub>d</sub>	4	$\mu$ s
Rate of Change of Voltage ( V <sub>D</sub> =70% V <sub>DRM</sub> ) .....	dv/dt	1000	V/ $\mu$ s
Rate of Change of Current ( V <sub>D</sub> =50% V <sub>DRM</sub> , single shot capability ) .....	di/dt	20	kA/ $\mu$ s
Operating and Storage Temperature.....	T <sub>J</sub> , T <sub>STG</sub>	0 to +115	°C
Mounting Force.....	F	25000-30000	lbs

**Notes**

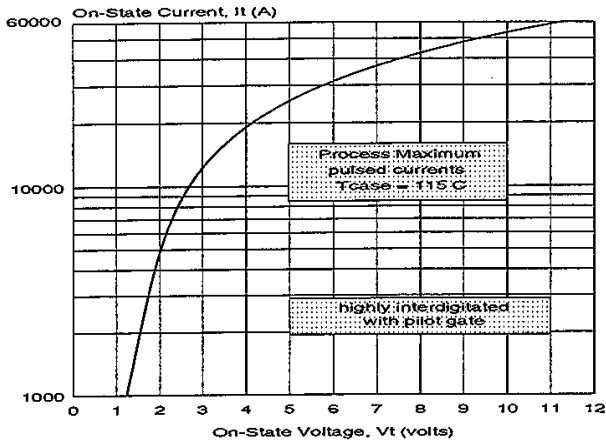
- Optional external posts dwg. # 0215B8315; Ni plated copper, 0.35" thick each.
- Compressed thickness including external post is 0.88" - 0.89" (22.35mm - 22.61mm).
- Weigh 18 oz., 3.6 lbs with posts.

**Electrical Specifications**

At T<sub>J</sub> = 115°C, Unless Otherwise Specified

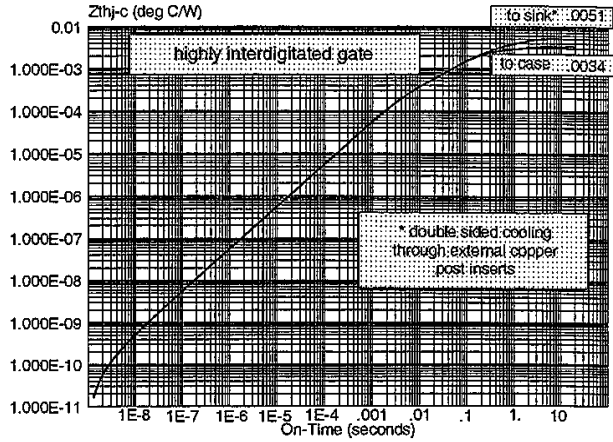
PARAMETERS	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Peak Off State Blocking	I <sub>DRM</sub>	V <sub>D</sub> = 80%V <sub>DRM</sub>			450	mA
Forward & Reverse Current	I <sub>RRM</sub>				100	mA
On State Voltage	V <sub>TM</sub>	I <sub>T</sub> = 10kA Pulse	T <sub>C</sub> = +30°C	2		V
			T <sub>C</sub> = +115°C	2.46		V
Max. Peak Recovery Current	I <sub>RM</sub>	di/dt = 2A/ $\mu$ s Snap. S = .5-.33			110	A
		di/dt = 2000A/ $\mu$ s Snap. S = .5-.33			10000	A
Thermal Resistance	R <sub>θJC</sub>	Double Side Cooling		0.0034		°C/W

# Typical Performance Curves



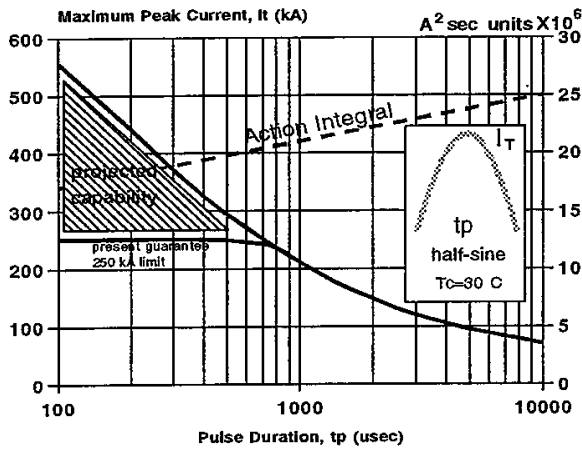
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FIGURE 1. ON-STATE CURRENT vs ON STATE VOLTAGE



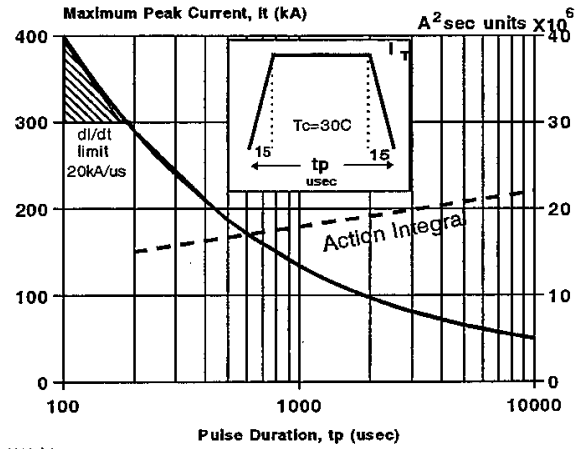
SPT411ther

FIGURE 2. THERMAL IMPEDANCE vs ON TIME



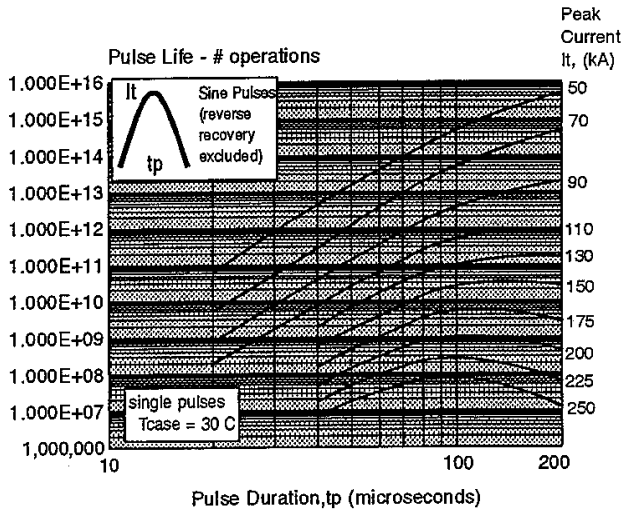
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FIGURE 3. SINUSOIDAL, SINGLE SHOT CAPABILITY



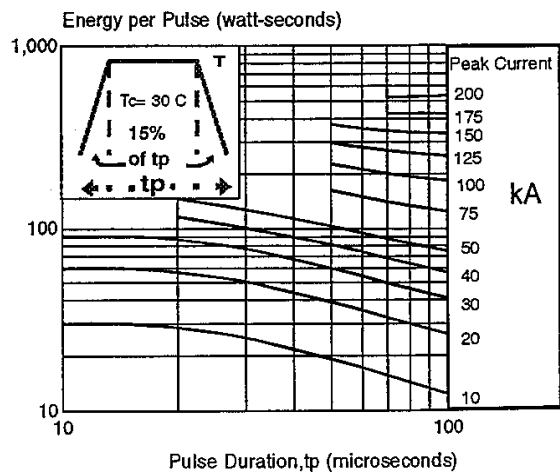
t411pk1a

FIGURE 4. TRAPEZOIDAL, SINGLE SHOT CAPABILITY



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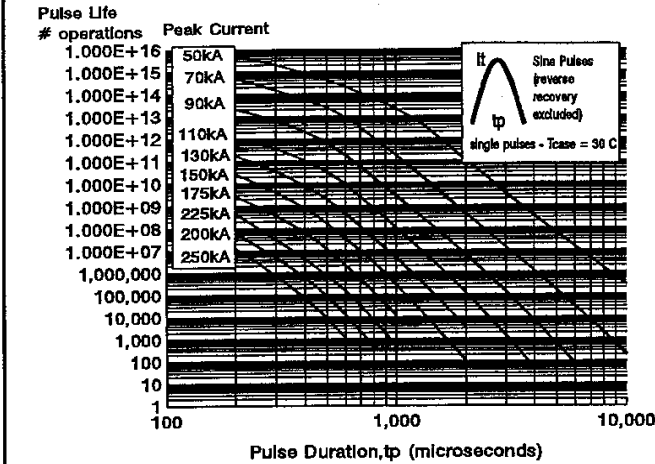
FIGURE 5. SINUSOIDAL, NUMBER OF OPERATIONS



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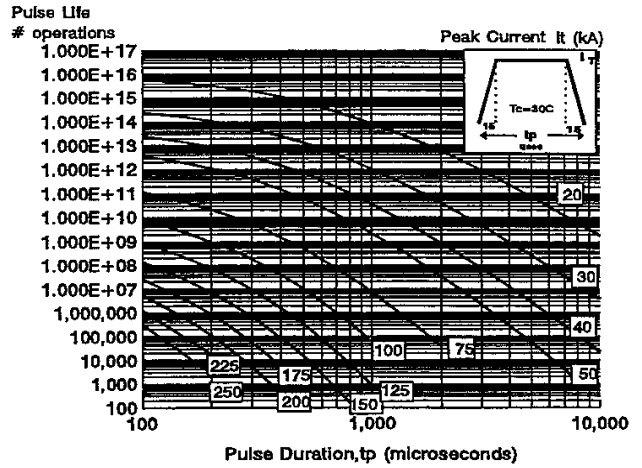
FIGURE 6. TRAPEZOIDAL, NUMBER OF OPERATIONS

# Typical Performance Curves



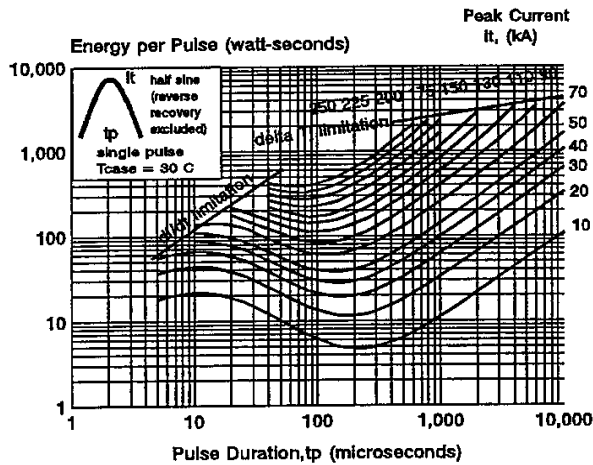
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FIGURE 7. SINUSOIDAL, NUMBER OF OPERATIONS



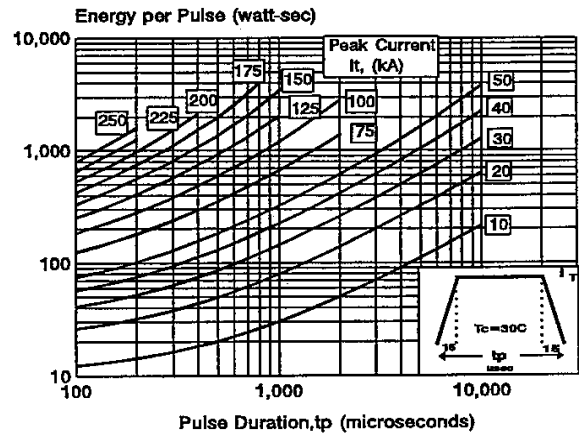
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FIGURE 8. TRAPEZOIDAL, NUMBER OF OPERATIONS



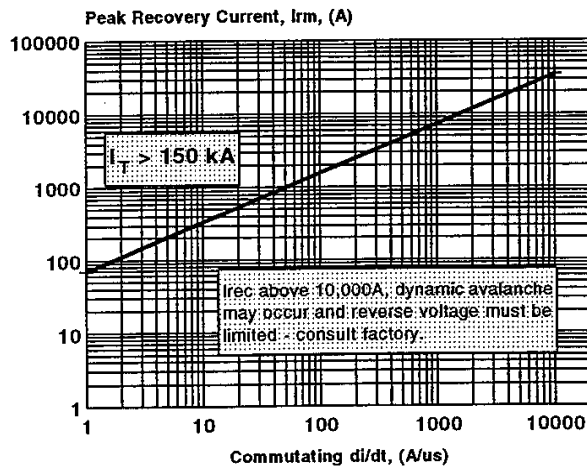
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FIGURE 9. SINUSOIDAL, ENERGY PER PULSE



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FIGURE 10. TRAPEZOIDAL, ENERGY PER PULSE



1411rec1

FIGURE 11. PEAK  $I_{REC}$  vs COMMUTATING  $di/dt$