

# Wespack Phase Control Thyristor

## Types N3597ML020 to N3597ML060

Development Type No.: NX313ML020-060

### Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V <sub>DRM</sub>	Repetitive peak off-state voltage, (note 1)	200-600	V
V <sub>DSM</sub>	Non-repetitive peak off-state voltage, (note 1)	300-700	V
V <sub>RRM</sub>	Repetitive peak reverse voltage, (note 1)	200-600	V
V <sub>RSM</sub>	Non-repetitive peak reverse voltage, (note 1)	300-700	V

	OTHER RATINGS	MAXIMUM LIMITS	UNITS
I <sub>T(AV)M</sub>	Maximum average on-state current, T <sub>sink</sub> =55°C, (note 2)	3597	A
I <sub>T(AV)M</sub>	Maximum average on-state current. T <sub>sink</sub> =85°C, (note 2)	2588	A
I <sub>T(AV)M</sub>	Maximum average on-state current. T <sub>sink</sub> =85°C, (note 3)	1244	A
I <sub>T(RMS)M</sub>	Nominal RMS on-state current, T <sub>sink</sub> =25°C, (note 2)	7030	A
I <sub>T(d.c.)</sub>	D.C. on-state current, T <sub>sink</sub> =25°C, (note 4)	5616	A
I <sub>TSM</sub>	Peak non-repetitive surge t <sub>p</sub> =10ms, V <sub>rm</sub> =60%V <sub>RRM</sub> , (note 5)	45.4	kA
I <sub>TSM2</sub>	Peak non-repetitive surge t <sub>p</sub> =10ms, V <sub>rm</sub> ≤10V, (note 5)	50.0	kA
I <sup>2</sup> t	I <sup>2</sup> t capacity for fusing t <sub>p</sub> =10ms, V <sub>rm</sub> =60%V <sub>RRM</sub> , (note 5)	10.3×10 <sup>6</sup>	A <sup>2</sup> s
I <sup>2</sup> t	I <sup>2</sup> t capacity for fusing t <sub>p</sub> =10ms, V <sub>rm</sub> ≤10V, (note 5)	12.5×10 <sup>6</sup>	A <sup>2</sup> s
(di/dt) <sub>cr</sub>	Critical rate of rise of on-state current (note 6)	(continuous, 50Hz) (repetitive, 50Hz, 60s) (non-repetitive)	100 200 400 A/μs
V <sub>RGM</sub>	Peak reverse gate voltage	5	V
P <sub>G(AV)</sub>	Mean forward gate power	4	W
P <sub>GM</sub>	Peak forward gate power	30	W
T <sub>j op</sub>	Operating temperature range	-40 to +140	°C
T <sub>stg</sub>	Storage temperature range	-40 to +150	°C

**Notes:-**

- 1) De-rating factor of 0.13% per °C is applicable for T<sub>j</sub> below 25°C.
- 2) Double side cooled, single phase; 50Hz, 180° half-sinewave.
- 3) Cathode side cooled, single phase; 50Hz, 180° half-sinewave.
- 4) Double side cooled.
- 5) Half-sinewave, 140°C T<sub>j</sub> initial.
- 6) V<sub>D</sub>=67% V<sub>DRM</sub>, I<sub>TM</sub>=2000A, I<sub>FG</sub>=2A, t<sub>r</sub>≤0.5μs, T<sub>case</sub>=140°C.

### Characteristics

	PARAMETER	MIN.	TYP.	MAX.	TEST CONDITIONS (Note 1)	UNITS
V <sub>TM</sub>	Maximum peak on-state voltage	-	-	1.05	I <sub>TM</sub> =4000A	V
V <sub>TM</sub>	Maximum peak on-state voltage	-	-	1.53	I <sub>TM</sub> =13000A	V
V <sub>T0</sub>	Threshold voltage	-	-	0.840		V
r <sub>T</sub>	Slope resistance	-	-	0.053		mΩ
(dv/dt) <sub>cr</sub>	Critical rate of rise of off-state voltage	1000	-	-	V <sub>D</sub> =80% V <sub>DRM</sub> , linear ramp, gate o/c	V/μs
I <sub>DRM</sub>	Peak off-state current	-	-	100	Rated V <sub>DRM</sub>	mA
I <sub>RRM</sub>	Peak reverse current	-	-	100	Rated V <sub>RRM</sub>	mA
V <sub>GT</sub>	Gate trigger voltage	-	-	3.0	T <sub>j</sub> =25°C      V <sub>D</sub> =10V, I <sub>T</sub> =3A	V
I <sub>GT</sub>	Gate trigger current	-	-	300		mA
V <sub>GD</sub>	Gate non-trigger voltage	-	-	0.25		Rated V <sub>DRM</sub>
I <sub>H</sub>	Holding current	-	-	1000	T <sub>j</sub> =25°C	mA
t <sub>gd</sub>	Gate-controlled turn-on delay time	-	0.7	2.0	V <sub>D</sub> =67% V <sub>DRM</sub> , I <sub>T</sub> =2000A, di/dt=10A/μs, I <sub>FG</sub> =2A, t <sub>r</sub> =0.5μs, T <sub>j</sub> =25°C	μs
t <sub>gt</sub>	Turn-on time	-	1.3	3.0		μs
Q <sub>rr</sub>	Recovered charge	-	1300	-	I <sub>TM</sub> =1000A, t <sub>p</sub> =1000μs, di/dt=10A/μs, V <sub>r</sub> =50V	μC
Q <sub>ra</sub>	Recovered charge, 50% Chord	-	750	850		μC
I <sub>rr</sub>	Reverse recovery current	-	95	-		A
t <sub>rr</sub>	Reverse recovery time	-	16	-		μs
t <sub>q</sub>	Turn-off time	-	200	-	I <sub>TM</sub> =1000A, t <sub>p</sub> =1000μs, di/dt=10A/μs, V <sub>r</sub> =50V, V <sub>dr</sub> =80%V <sub>DRM</sub> , dV <sub>dr</sub> /dt=20V/μs	μs
		-	260	-	I <sub>TM</sub> =1000A, t <sub>p</sub> =1000μs, di/dt=10A/μs, V <sub>r</sub> =50V, V <sub>dr</sub> =80%V <sub>DRM</sub> , dV <sub>dr</sub> /dt=200V/μs	
R <sub>thJK</sub>	Thermal resistance, junction to heatsink	-	-	0.018	Double side cooled	K/W
		-	-	0.033	Anode side cooled	K/W
		-	-	0.044	Cathode side cooled	K/W
F	Mounting force	25	-	31	Note 2.	kN
W <sub>t</sub>	Weight	-	550	-		g

Notes:-

- 1) Unless otherwise indicated T<sub>j</sub>=140°C.
- 2) For other clamp forces, please consult factory.

**Curves**

Figure 1 – On-state characteristics of Limit device

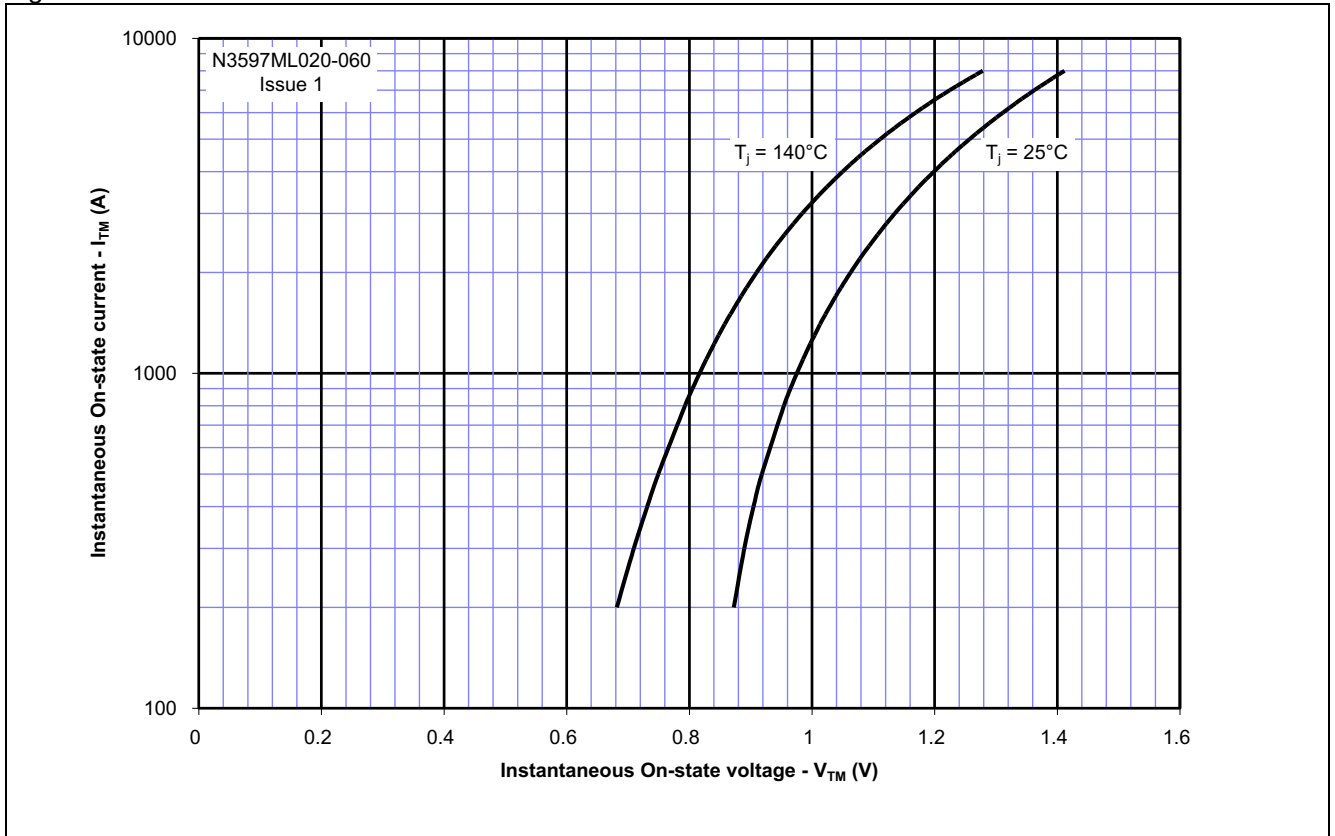


Figure 2 – Transient thermal impedance

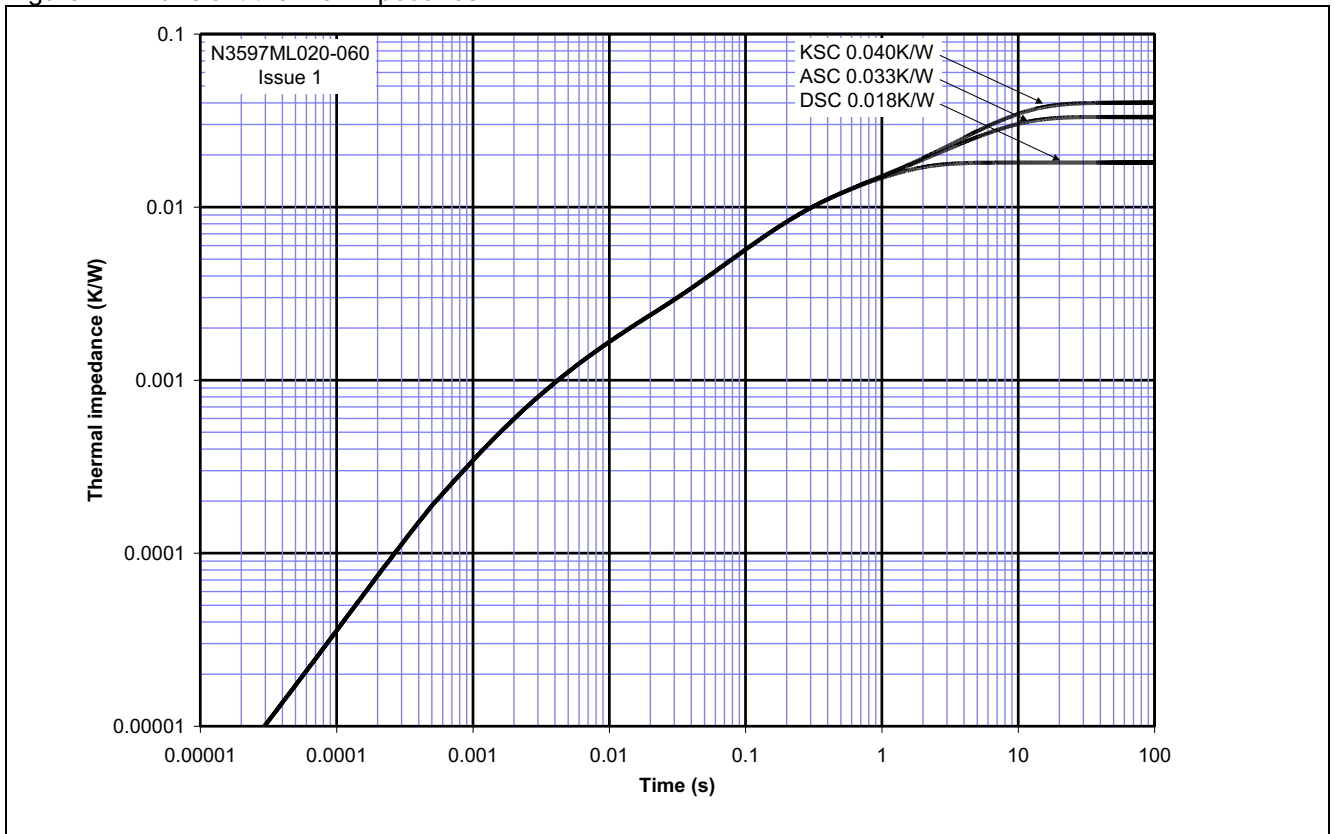
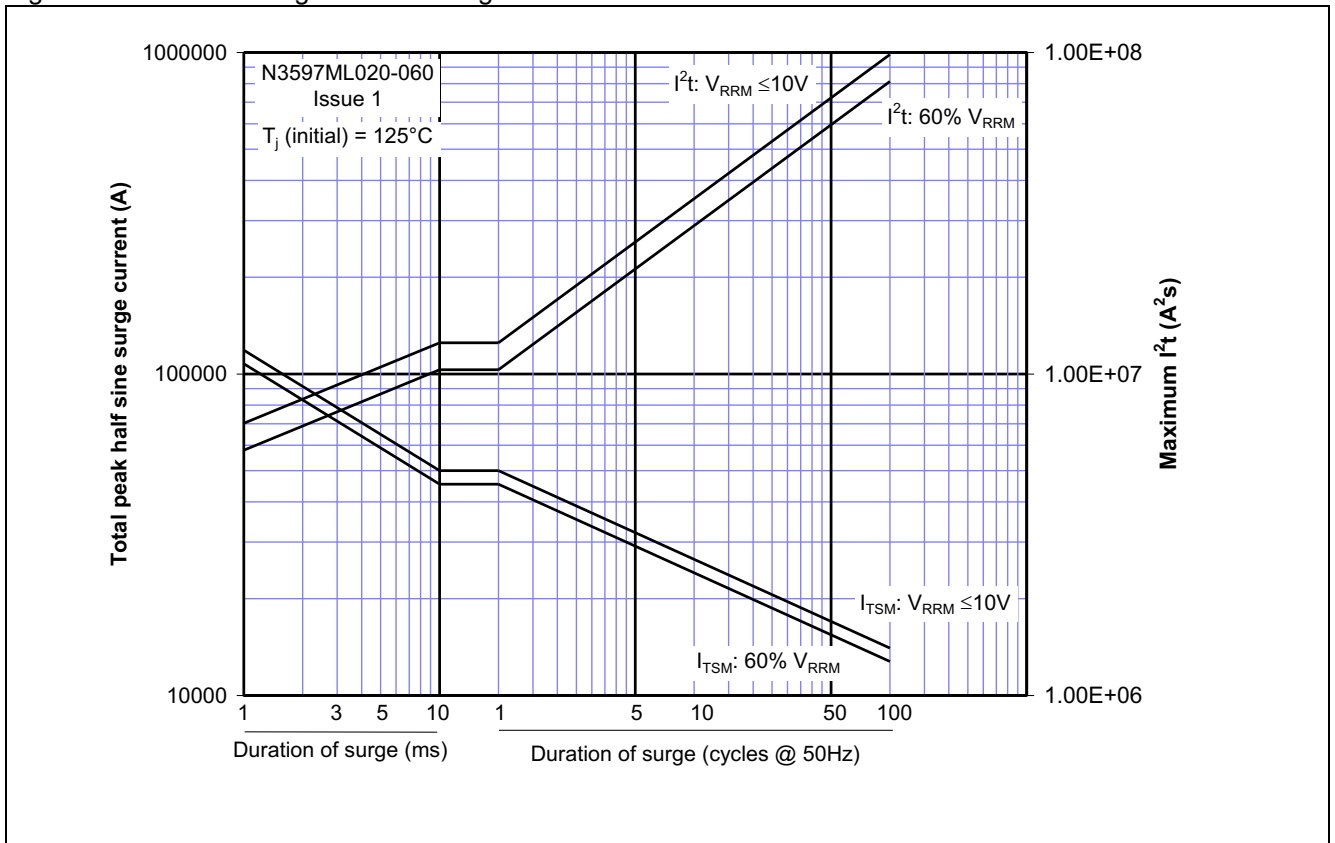
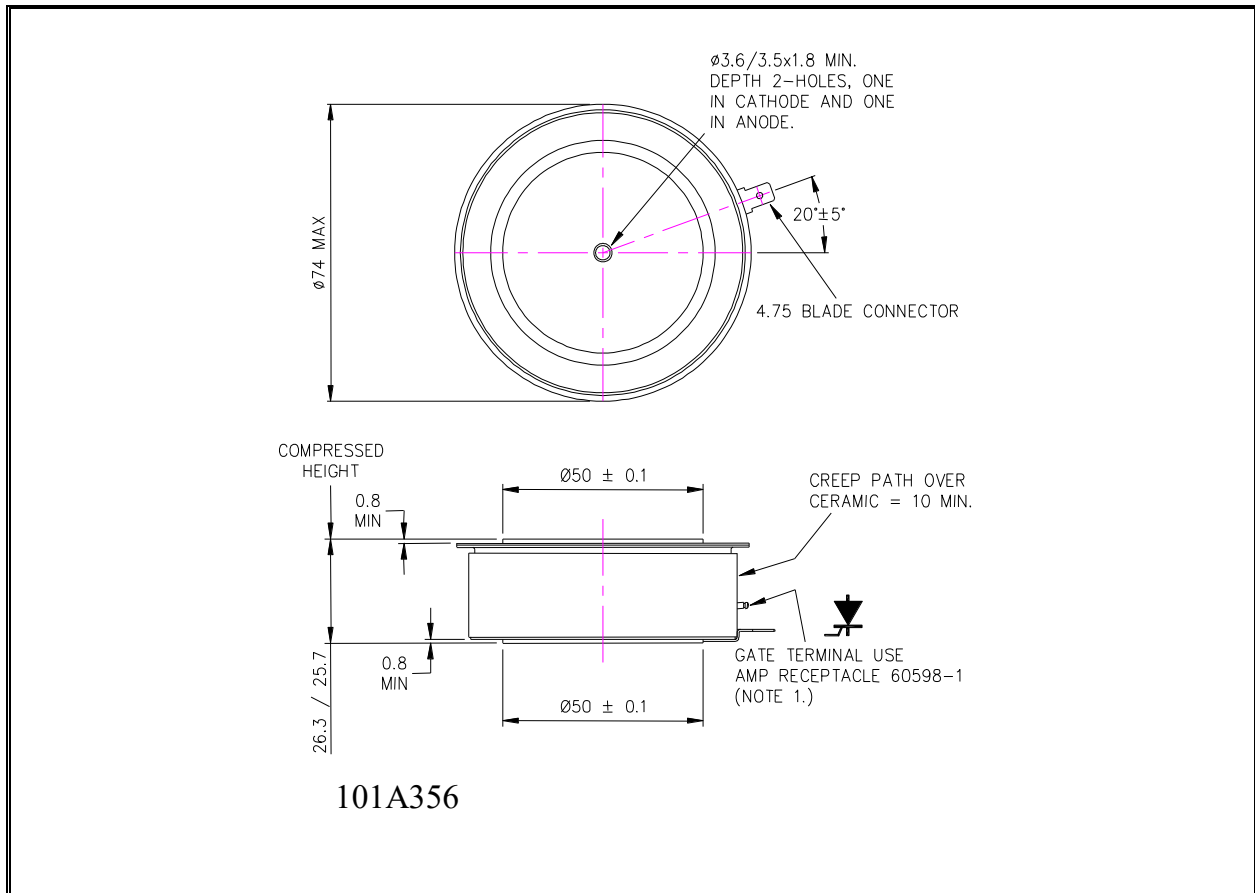


Figure 3 – Maximum surge and I<sup>2</sup>t Ratings



**Outline Drawing & Ordering Information**



**ORDERING INFORMATION** (Please quote 10 digit code as below)

<b>N3597</b>	<b>ML</b>	<b>◆◆</b>	<b>0</b>
Fixed Type Code	Fixed outline code	Voltage code $V_{DRM}/100$ 16-18	Fixed turn-off time code

Order code: N3597ML060 – 600V  $V_{DRM}$ ,  $V_{RRM}$ , 26mm clamp height capsule.

**IXYS Semiconductor GmbH**  
Edisonstraße 15  
D-68623 Lampertheim  
Tel: +49 6206 503-0  
Fax: +49 6206 503-627  
E-mail: [marcom@ixys.de](mailto:marcom@ixys.de)



**IXYS UK Westcode Ltd**  
Langley Park Way, Langley Park,  
Chippenham, Wiltshire, SN15 1GE.  
Tel: +44 (0)1249 444524  
Fax: +44 (0)1249 659448  
E-mail: [sales@ixysuk.com](mailto:sales@ixysuk.com)

**IXYS Corporation**  
1590 Buckeye Drive  
Milpitas CA 95035-7418  
Tel: +1 (408) 457 9000  
Fax: +1 (408) 496 0670  
E-mail: [sales@ixys.net](mailto:sales@ixys.net)

[www.ixysuk.com](http://www.ixysuk.com)

[www.ixys.com](http://www.ixys.com)

**IXYS Long Beach**  
IXYS Long Beach, Inc  
2500 Mira Mar Ave, Long Beach  
CA 90815  
Tel: +1 (562) 296 6584  
Fax: +1 (562) 296 6585  
E-mail: [service@ixyslongbeach.com](mailto:service@ixyslongbeach.com)

The information contained herein is confidential and is protected by Copyright. The information may not be used or disclosed except with the written permission of and in the manner permitted by the proprietors IXYS UK Westcode Ltd.

© IXYS UK Westcode Ltd.

In the interest of product improvement, IXYS UK Westcode reserves the right to change specifications at any time without prior notice.

Devices with a suffix code (2-letter, 3-letter or letter/digit/letter combination) added to their generic code are not necessarily subject to the conditions and limits contained in this report.



---

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).