

# Wespack Phase Control Thyristor

## Types N2191ML160 to N2191ML180

Development Type No.: NX313ML160-180

### Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
$V_{DRM}$	Repetitive peak off-state voltage, (note 1)	1600-1800	V
$V_{DSM}$	Non-repetitive peak off-state voltage, (note 1)	1600-1800	V
$V_{RRM}$	Repetitive peak reverse voltage, (note 1)	1600-1800	V
$V_{RSM}$	Non-repetitive peak reverse voltage, (note 1)	1500-1900	V

	OTHER RATINGS	MAXIMUM LIMITS	UNITS
$I_{T(AV)M}$	Maximum average on-state current, $T_{sink}=55^{\circ}C$ , (note 2)	2191	A
$I_{T(AV)M}$	Maximum average on-state current. $T_{sink}=85^{\circ}C$ , (note 2)	1476	A
$I_{T(AV)M}$	Maximum average on-state current. $T_{sink}=85^{\circ}C$ , (note 3)	743	A
$I_{T(RMS)M}$	Nominal RMS on-state current, $T_{sink}=25^{\circ}C$ , (note 2)	4366	A
$I_{T(d.c.)}$	D.C. on-state current, $T_{sink}=25^{\circ}C$ , (note 4)	3685	A
$I_{TSM}$	Peak non-repetitive surge $t_p=10ms$ , $V_{rm}=60\%V_{RRM}$ , (note 5)	34.5	kA
$I_{TSM2}$	Peak non-repetitive surge $t_p=10ms$ , $V_{rm}\leq 10V$ , (note 5)	38.0	kA
$I^2t$	$I^2t$ capacity for fusing $t_p=10ms$ , $V_{rm}=60\%V_{RRM}$ , (note 5)	$5.95\times 10^6$	$A^2s$
$I^2t$	$I^2t$ capacity for fusing $t_p=10ms$ , $V_{rm}\leq 10V$ , (note 5)	$7.22\times 10^6$	$A^2s$
$(di/dt)_{cr}$	Critical rate of rise of on-state current (note 6)	(continuous, 50Hz)	100
		(repetitive, 50Hz, 60s)	200
		(non-repetitive)	400
$V_{RGM}$	Peak reverse gate voltage	5	V
$P_{G(AV)}$	Mean forward gate power	4	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:-

- 1) De-rating factor of 0.13% per  $^{\circ}C$  is applicable for  $T_j$  below  $25^{\circ}C$ .
- 2) Double side cooled, single phase; 50Hz,  $180^{\circ}$  half-sinewave.
- 3) Cathode side cooled, single phase; 50Hz,  $180^{\circ}$  half-sinewave.
- 4) Double side cooled.
- 5) Half-sinewave,  $125^{\circ}C$   $T_j$  initial.
- 6)  $V_D=67\% V_{DRM}$ ,  $I_{TM}=2000A$ ,  $I_{FG}=2A$ ,  $t_r\leq 0.5\mu s$ ,  $T_{case}=125^{\circ}C$ .

## Characteristics

	PARAMETER	MIN.	TYP.	MAX.	TEST CONDITIONS (Note 1)	UNITS
$V_{TM}$	Maximum peak on-state voltage	-	-	1.40	$I_{TM}=3000A$	V
$V_{TM}$	Maximum peak on-state voltage	-	-	2.15	$I_{TM}=7800A$	V
$V_{T0}$	Threshold voltage	-	-	0.940		V
$r_T$	Slope resistance	-	-	0.154		m $\Omega$
$(dv/dt)_{cr}$	Critical rate of rise of off-state voltage	1000	-	-	$V_D=80\% V_{DRM}$ , linear ramp, gate o/c	V/ $\mu$ s
$I_{DRM}$	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	-	0.8	2.0	$V_D=67\% V_{DRM}$ , $I_T=2000A$ , $di/dt=10A/\mu s$ ,	$\mu$ s
$t_{gt}$	Turn-on time	-	1.4	3.0	$I_{FG}=2A$ , $t_r=0.5\mu s$ , $T_j=25^\circ C$	$\mu$ s
$Q_{rr}$	Recovered charge	-	3600	3900		$\mu$ C
$Q_{ra}$	Recovered charge, 50% Chord	-	2150	-	$I_{TM}=1000A$ , $t_p=1000\mu s$ , $di/dt=10A/\mu s$ ,	$\mu$ C
$I_{rr}$	Reverse recovery current	-	150	-	$V_r=50V$	A
$t_{rr}$	Reverse recovery time	-	29	-		$\mu$ s
$t_q$	Turn-off time	-	350	-	$I_{TM}=1000A$ , $t_p=1000\mu s$ , $di/dt=10A/\mu s$ ,	$\mu$ s
		-	600	-	$V_r=50V$ , $V_{dr}=80\%V_{DRM}$ , $dV_{dr}/dt=200V/\mu s$	
$R_{thJK}$	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
$W_t$	Weight	-	550	-		g

Notes:-

- 1) Unless otherwise indicated  $T_j=125^\circ C$ .
- 2) For other clamp forces, please consult factory.

**Curves**

Figure 1 – On-state characteristics of Limit device

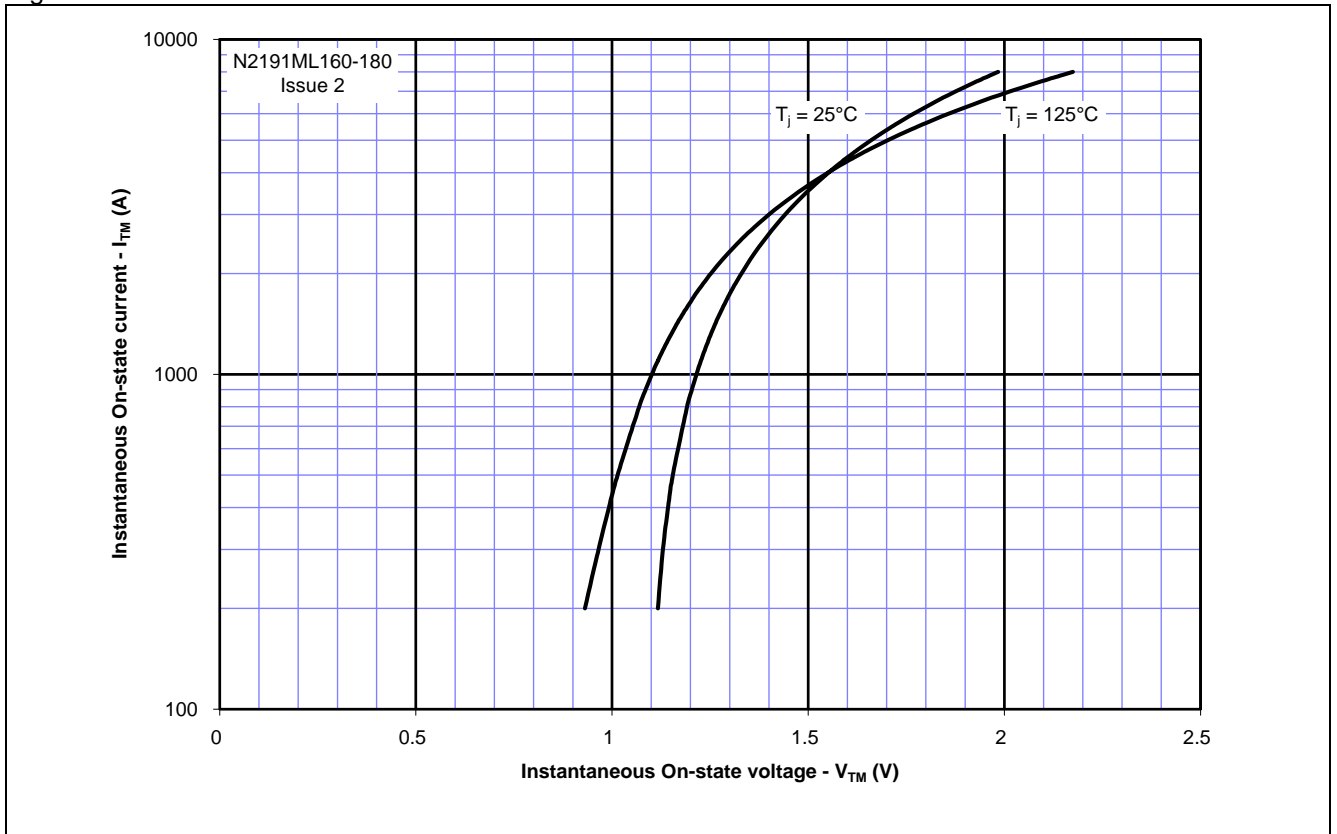


Figure 2 – Transient thermal impedance

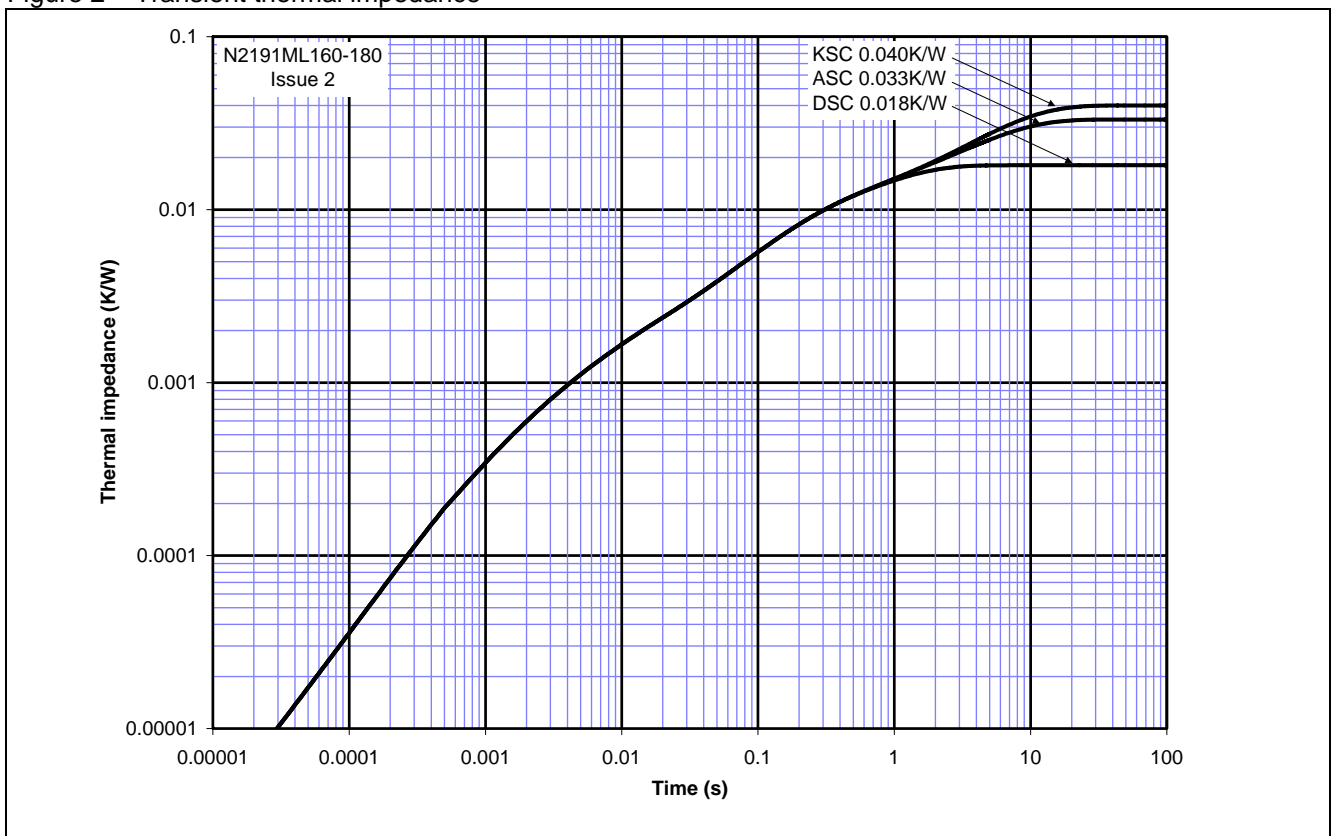
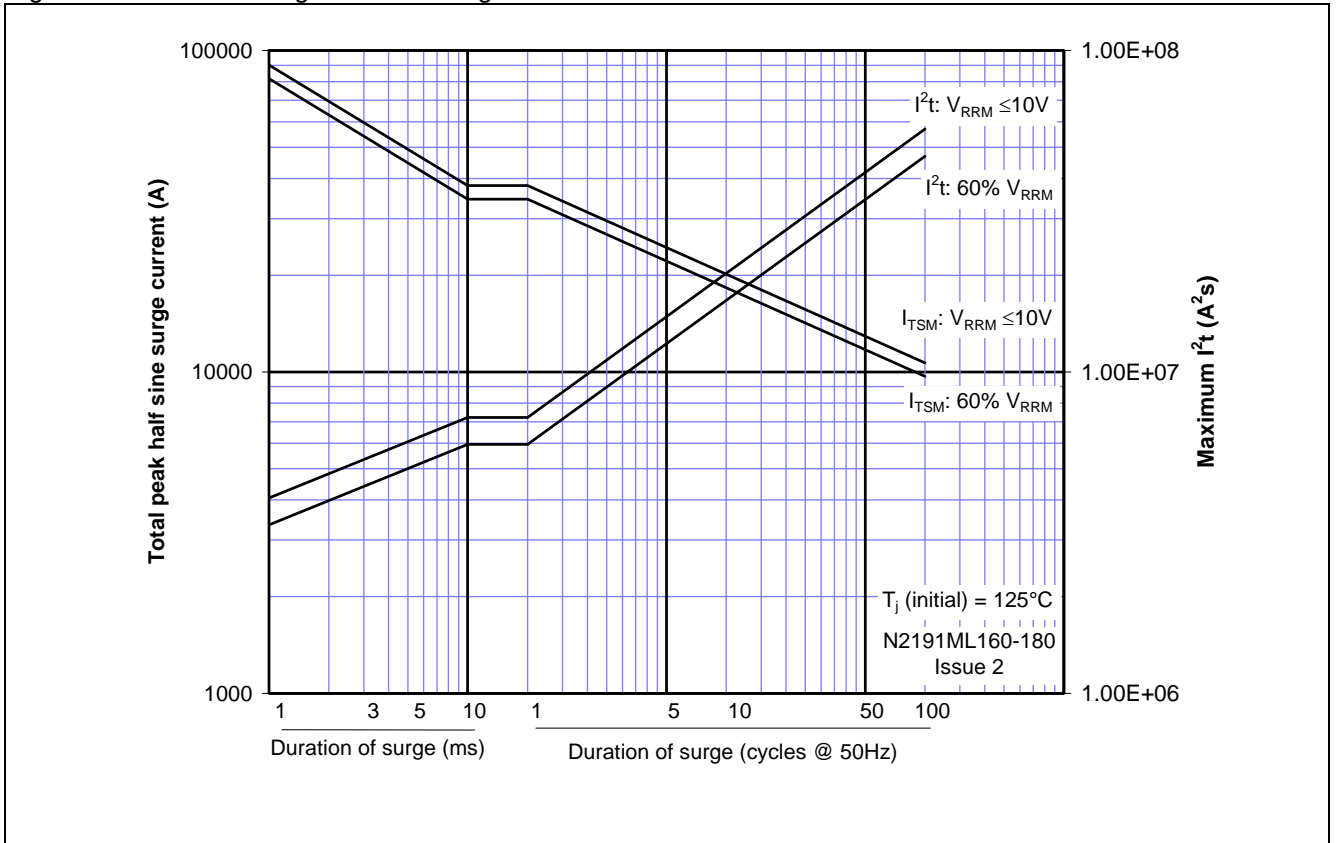
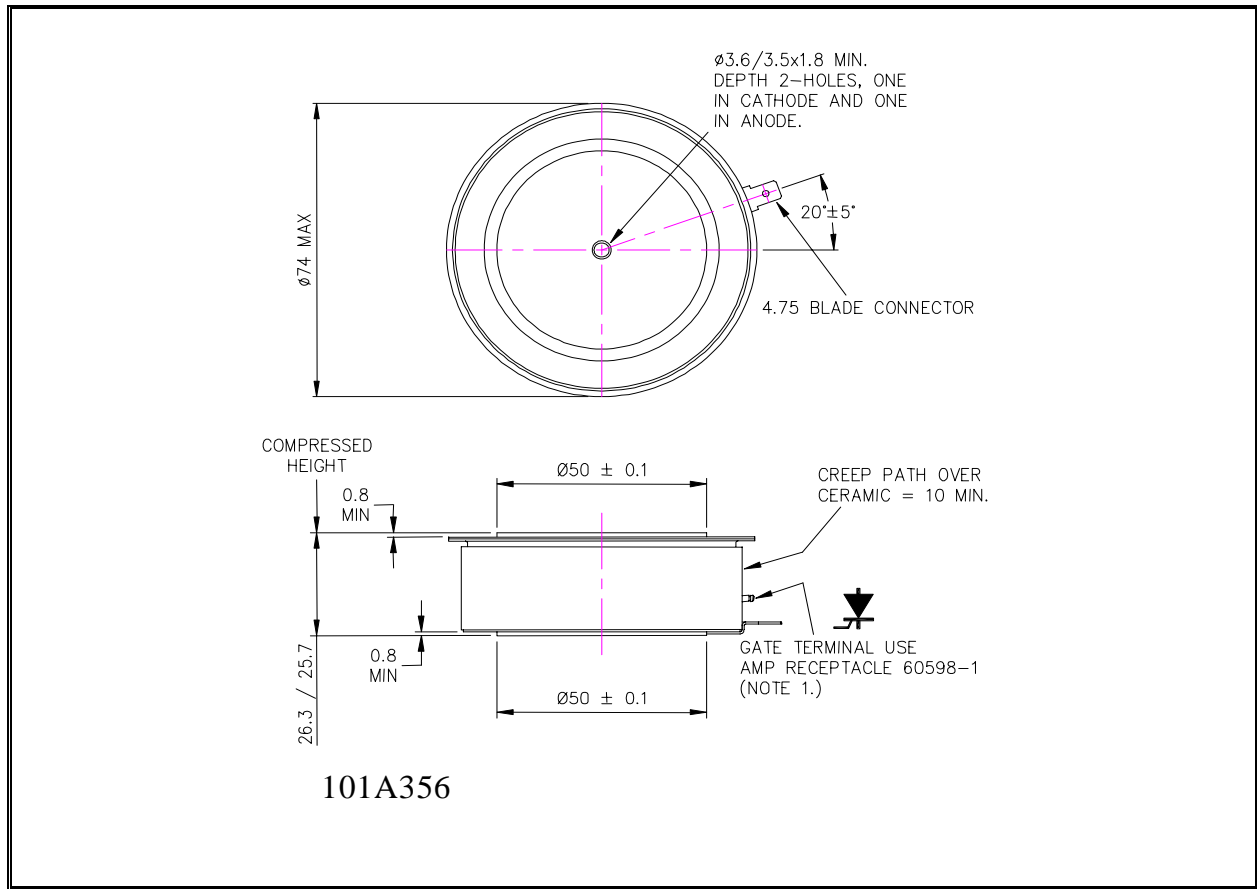


Figure 3 – Maximum surge and  $I^2t$  Ratings



**Outline Drawing & Ordering Information**



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

<b>N2191</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: N2191ML160 – 1600V  $V_{DRM}$ ,  $V_{RRM}$ , 26mm clamp height capsule.

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