IXYS UK WESTCODE

Date:- 21st June, 2016

Data Sheet Issue:- K2

Phase Control Thyristor

Types N0180SH120 to N0180SH160

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{DRM}	Repetitive peak off-state voltage, (note 1)	1200-1600	V
V_{DSM}	Non-repetitive peak off-state voltage, (note 1)	1200-1600	V
V_{RRM}	Repetitive peak reverse voltage, (note 1)	1200-1600	V
V_{RSM}	Non-repetitive peak reverse voltage, (note 1)	1300-1700	V

	OTHER RATINGS	MAXIMUM LIMITS	UNITS
$I_{T(AV)}$	Mean on-state current, T_{sink}=55°C, (note 2)	180	A
$I_{T(AV)}$	Mean on-state current. T_{sink}=85°C, (note 2)	110	A
$I_{T(RMS)}$	Nominal RMS on-state current, T_{sink}=25°C, (note 2)	175	A
$I_{T(d.c.)}$	D.C. on-state current, T_{sink}=25°C, (note 4)	175	A
I_{TSM}	Peak non-repetitive surge t_p=10ms, V_{RM}=0.6V_{RRM}, (note 5)	2450	A
I_{TSM2}	Peak non-repetitive surge t_p=10ms, V_{RM}≤10V, (note 5)	2695	A
I^2t	I^2t capacity for fusing t_p=10ms, V_{RM}=0.6V_{RRM}, (note 5)	30×10^3	A^2s
I^2t	I^2t capacity for fusing t_p=10ms, V_{RM}≤10V, (note 5)	36.3×10^3	A^2s
$(di/dt)_{cr}$	Maximum rate of rise of on-state current (repetitive), (Note 6)	500	A/µs
	Maximum rate of rise of on-state current (non-repetitive), (Note 6)	1000	A/µs
V_{FGM}	Peak forward gate voltage	12	V
I_{FGM}	Peak forward gate current	19	A
V_{RGM}	Peak reverse gate voltage	5	V
$P_{G(AV)}$	Mean forward gate power	2	W
P_{GM}	Peak forward gate power (100µs pulse width)	100	W
V_{GD}	Non-trigger gate voltage, (Note 7)	0.25	V
T_{HS}	Operating temperature range	-40 to +125	°C
T_{stg}	Storage temperature range	-40 to +150	°C

Notes:-
1) De-rating factor of 0.13% per °C is applicable for T_j below 25°C.
2) Double side cooled, single phase; 50Hz, 180° half-sinewave.
3) Single side cooled, single phase; 50Hz, 180° half-sinewave.
4) Double side cooled.
5) Half-sinewave, 125°C T_j initial.
6) V_D=80% V_{DRM}, I_{FG}=1A, t_r≤1µs, T_{case}=125°C.
7) Rated V_{DRM}.

Characteristics

	PARAMETER	MIN.	TYP.	MAX.	TEST CONDITIONS (Note 1)	UNITS
V_{TM}	Maximum peak on-state voltage	-	-	1.57	I_{TM}=715A	V
V_{T0}	Threshold voltage	-	-	0.9		V
r_T	Slope resistance	-	-	1.79		mΩ
$(dv/dt)_{cr}$	Critical rate of rise of off-state voltage	1000	-	-	V_D=80% V_{DRM}	V/µs
I_{DRM}	Peak off-state current	-	-	20	Rated V_{DRM}	mA
I_{RRM}	Peak reverse current	-	-	20	Rated V_{RRM}	mA
V_{GT}	Gate trigger voltage	-	-	3.0	T_j=25°C	V
I_{GT}	Gate trigger current	-	-	150	T_j=25°C V_D=6V, I_T=1A	mA
I_H	Holding current	-	-	600	T_j=25°C	mA
R_{thJC}	Thermal resistance, junction to case	-	-	0.23	Double side cooled	K/W
F	Mounting torque	-	-	14		Nm
W_t	Weight	-	130	-		g

Notes:-
1) Unless otherwise indicated T_j=125°C.

Notes on Ratings and Characteristics

1.0 Voltage Grade Table

Voltage Grade	V_{DRM} V_{DSM} V_{RRM} V	V_{RSM} V	V_D V_R DC V
12	1200	1300	810
14	1400	1500	930
16	1600	1700	1040

2.0 Extension of Voltage Grades

This report is applicable to other voltage grades when supply has been agreed by Sales/Production.

3.0 De-rating Factor

A blocking voltage de-rating factor of 0.13%/°C is applicable to this device for T_j below 25°C.

4.0 Repetitive dv/dt

Standard dv/dt is 1000V/µs.

5.0 Snubber Components

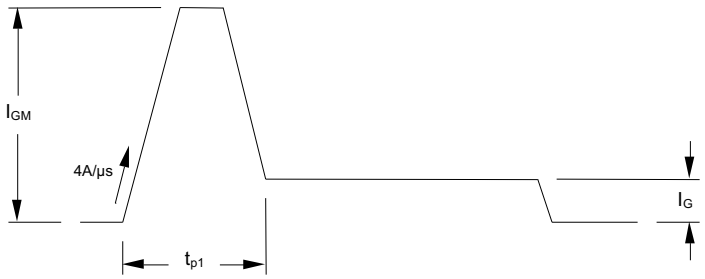
When selecting snubber components, care must be taken not to use excessively large values of snubber capacitor or excessively small values of snubber resistor. Such excessive component values may lead to device damage due to the large resultant values of snubber discharge current. If required, please consult the factory for assistance.

6.0 Rate of rise of on-state current

The maximum un-primed rate of rise of on-state current must not exceed 1000A/µs at any time during turn-on on a non-repetitive basis. For repetitive performance, the on-state rate of rise of current must not exceed 500A/µs at any time during turn-on. Note that these values of rate of rise of current apply to the total device current including that from any local snubber network.

7.0 Gate Drive

The nominal requirement for a typical gate drive is illustrated below. An open circuit voltage of at least 30V is assumed. This gate drive must be applied when using the full di/dt capability of the device.



The magnitude of I_{GM} should be between five and ten times I_{GT}, which is shown on page 2. Its duration (t_{p1}) should be 20µs or sufficient to allow the anode current to reach ten times I_L, whichever is greater. Otherwise, an increase in pulse current could be needed to supply the necessary charge to trigger. The 'back-porch' current I_G should remain flowing for the same duration as the anode current and have a magnitude in the order of 1.5 times I_{GT}.

Curves

Figure 1 - On-state characteristics of Limit device

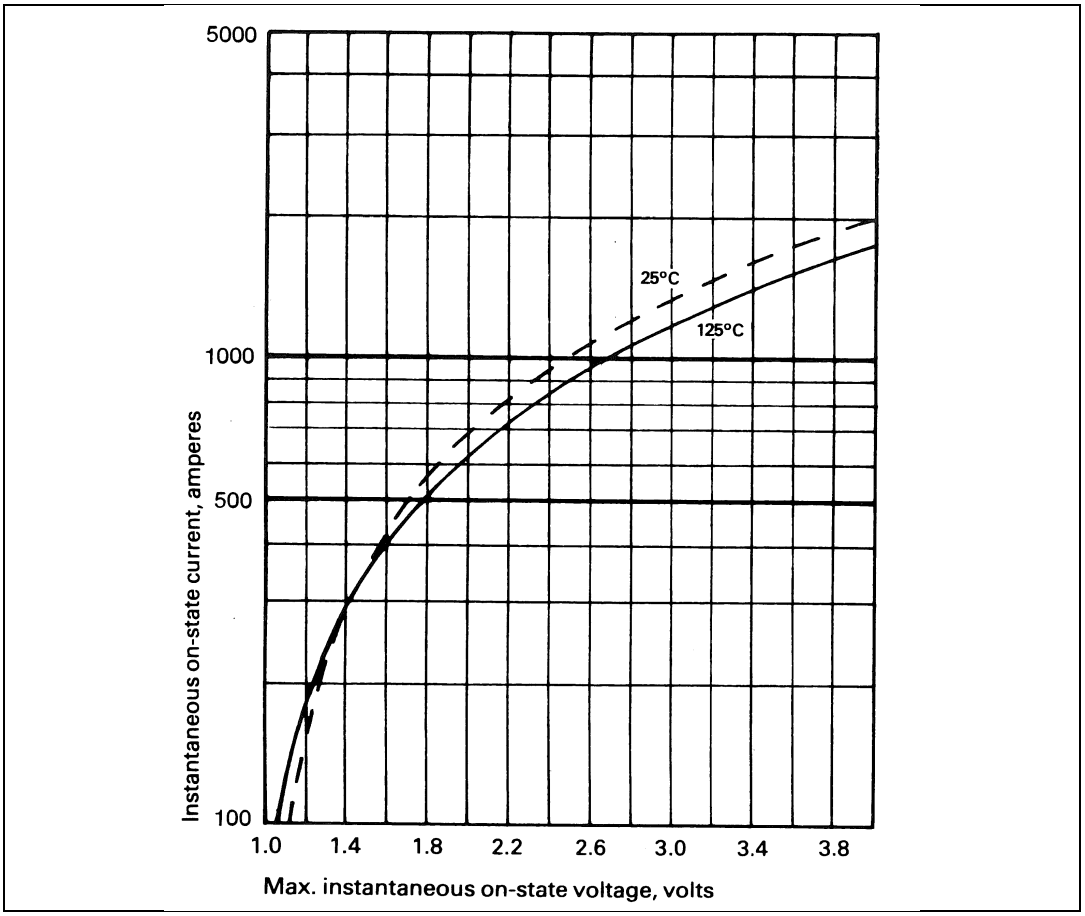


Figure 2 - Transient thermal impedance

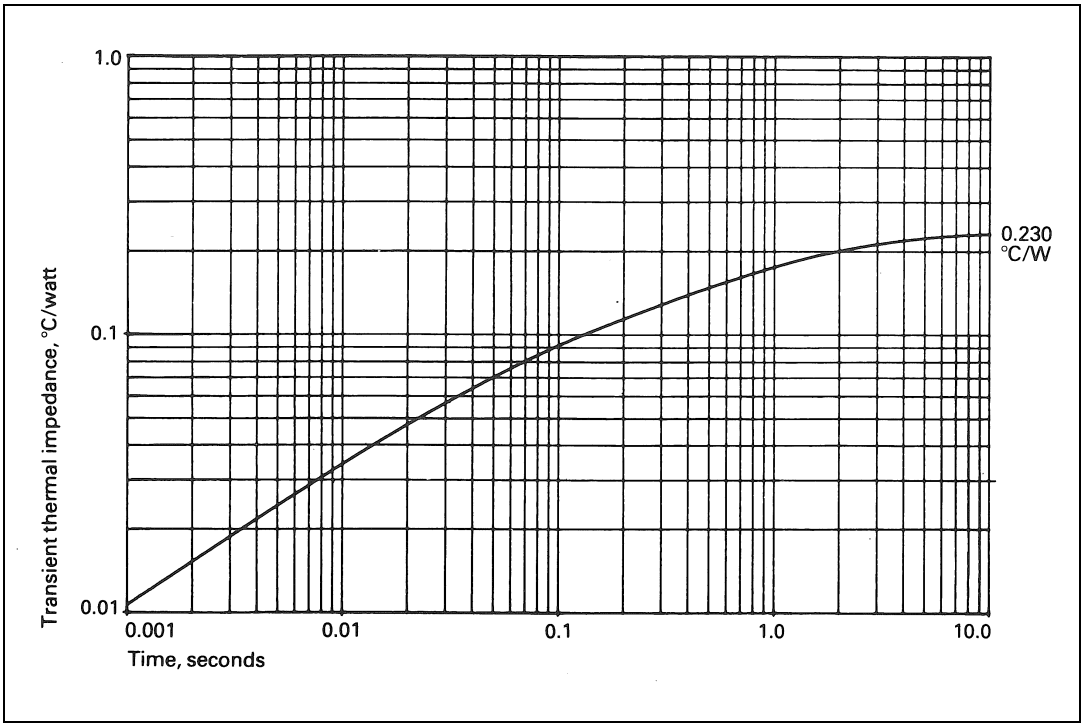


Figure 3 - Gate characteristics at 25°C junction temperature

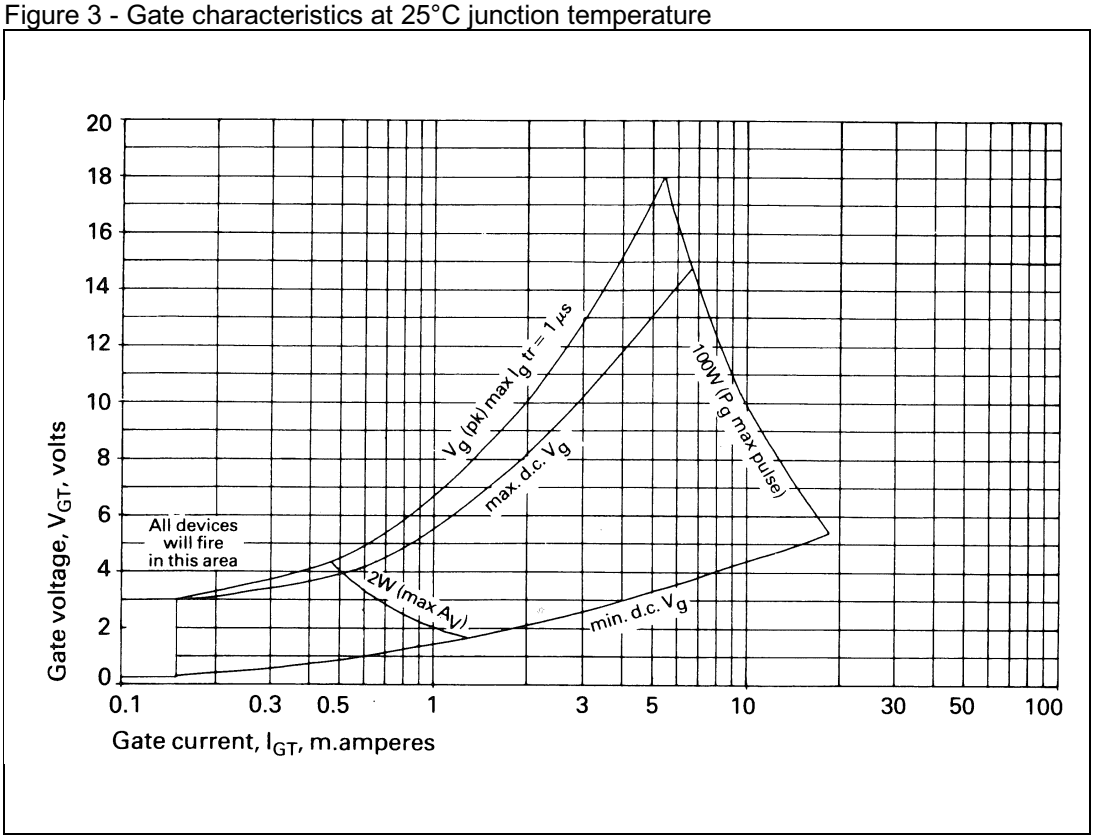
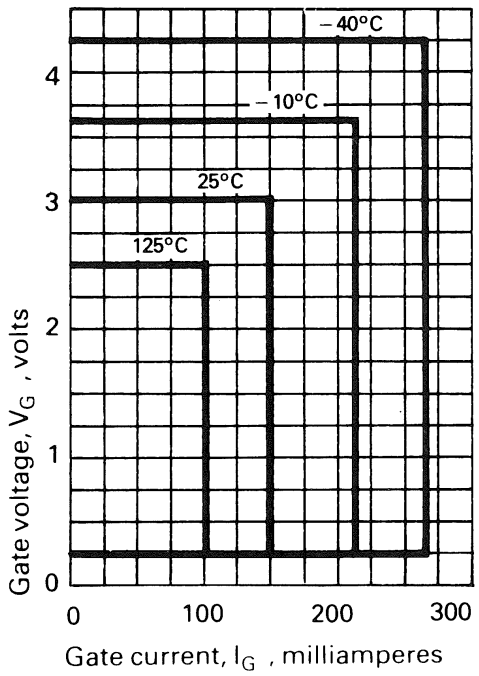


Figure 4 - Gate trigger characteristic



Trigger point of all thyristors lie within the areas shown.
Gate drive load line must lie outside appropriate I_G/V_G rectangle

Figure 5 – On-state current vs. case temperature - (Sine wave)

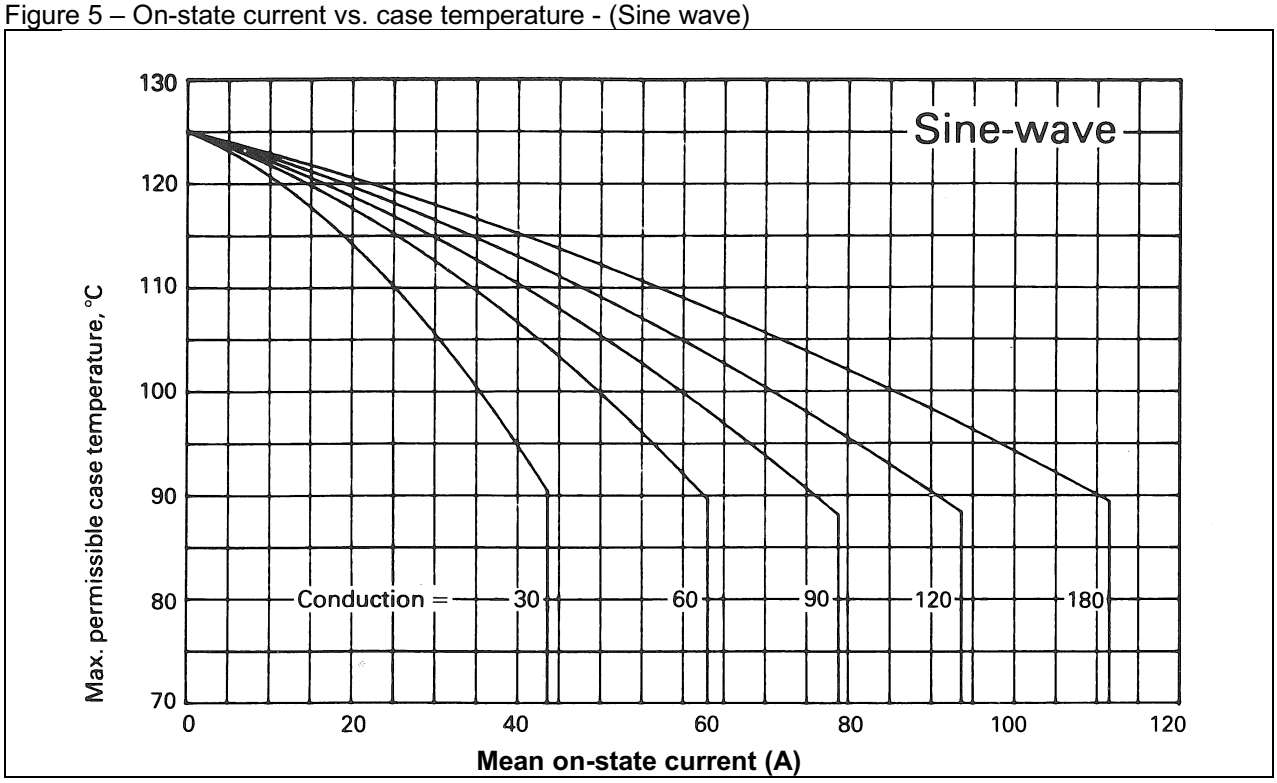


Figure 6 - On-state current vs. Power dissipation - (Sine wave)

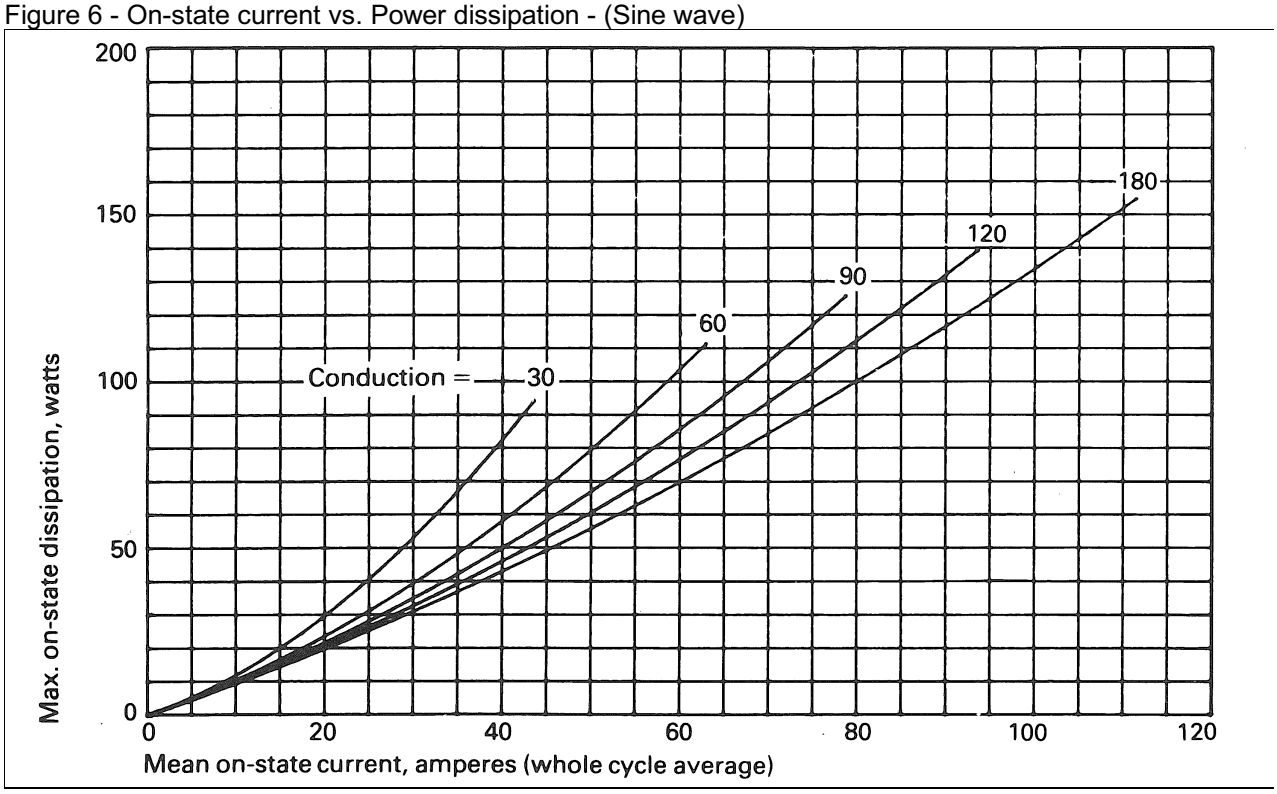


Figure 7 – On-state current vs. case temperature - (Square wave)

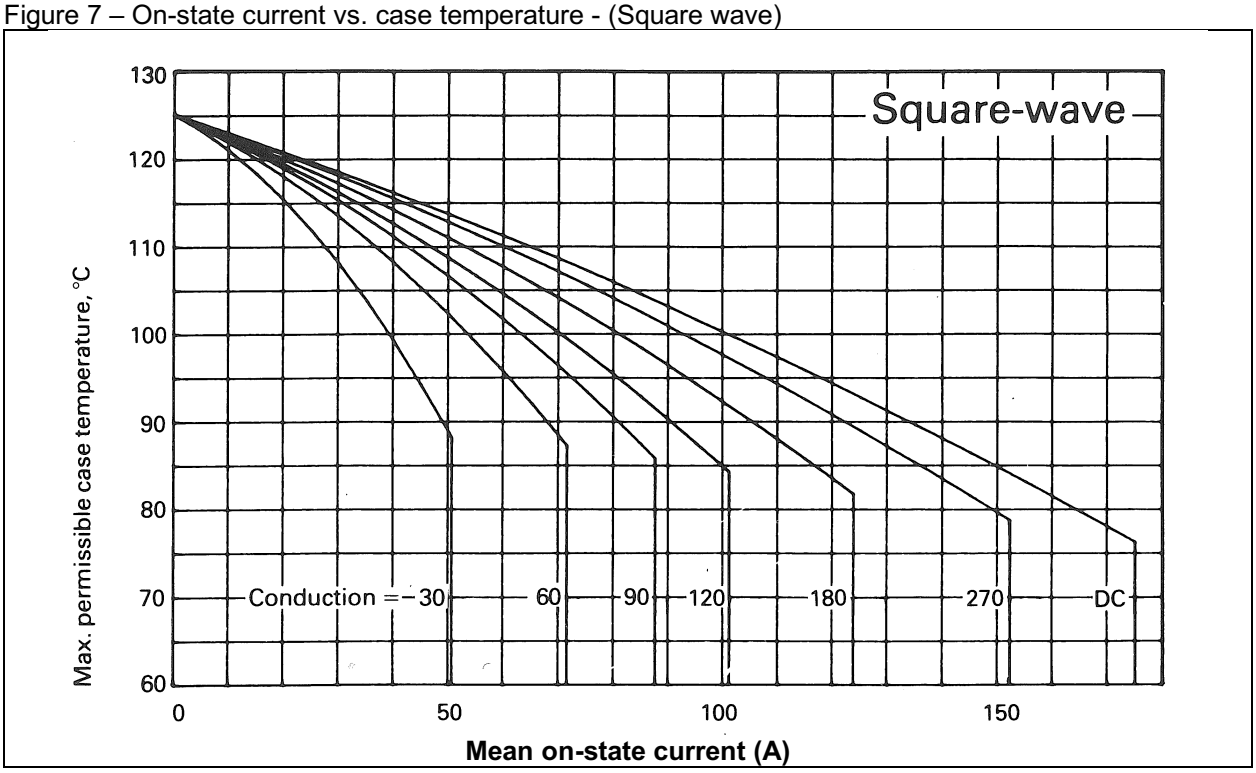


Figure 8 – On-state current vs. Power dissipation - (Square wave)

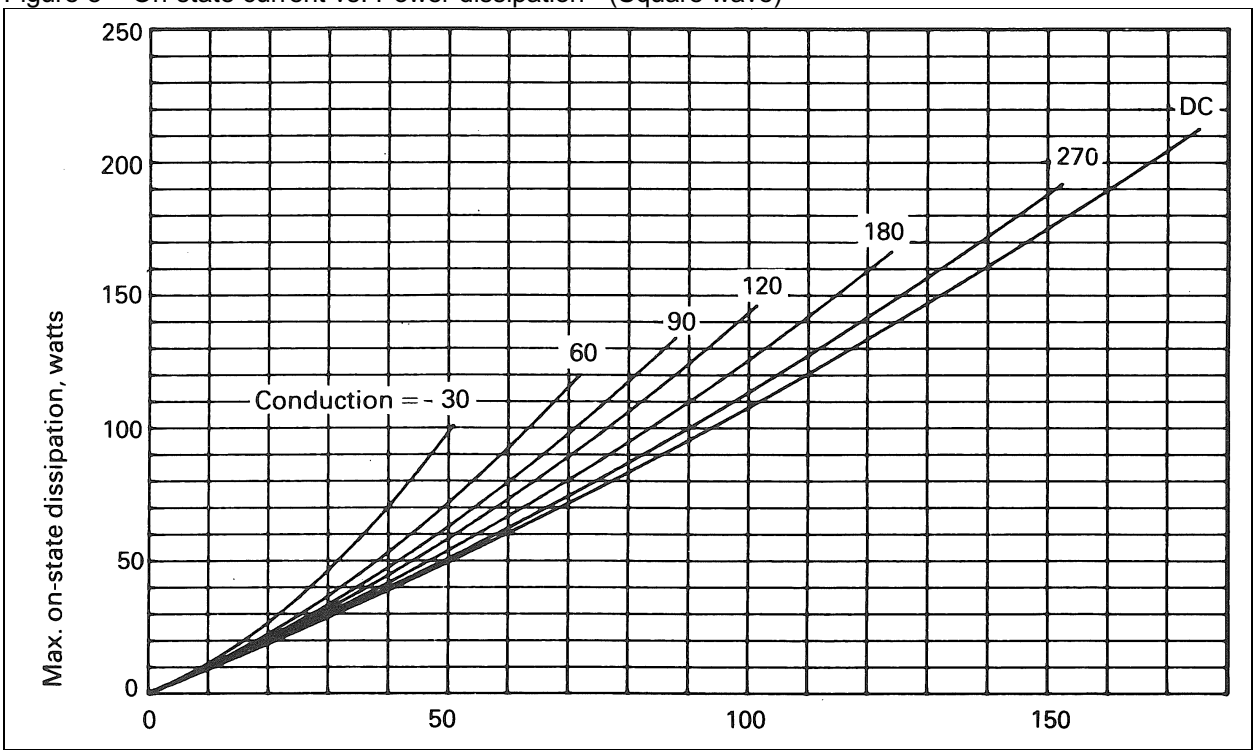
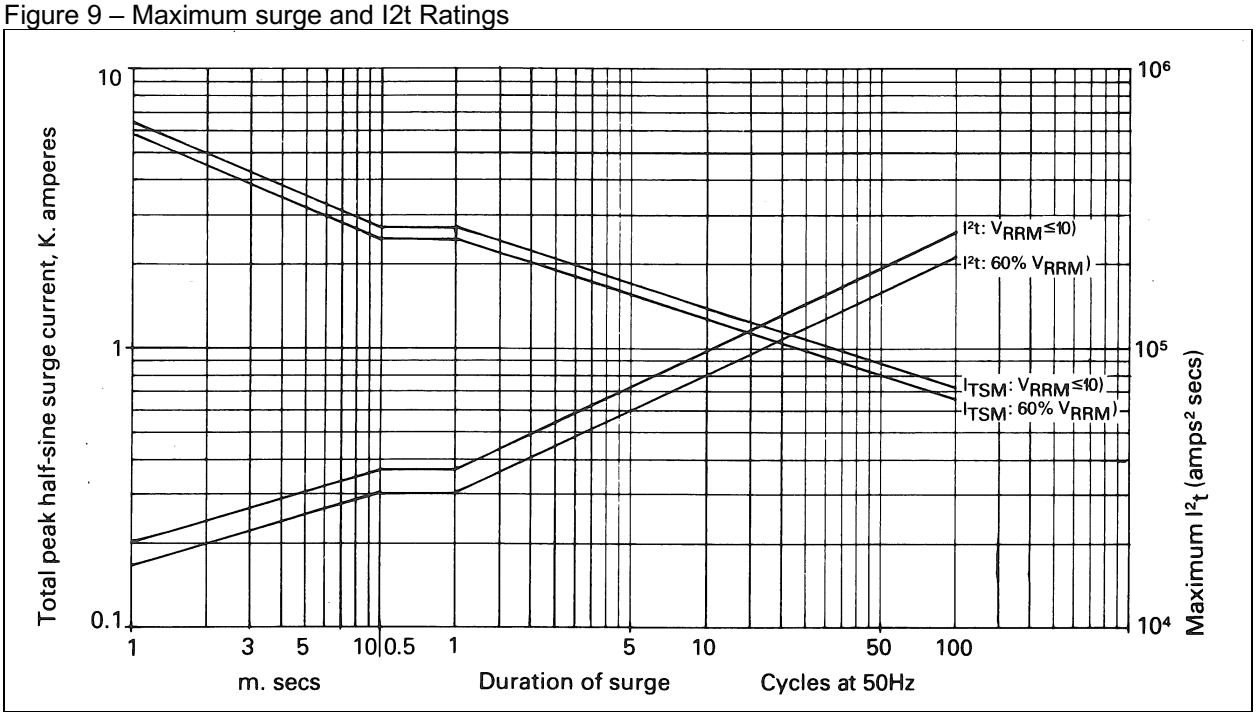
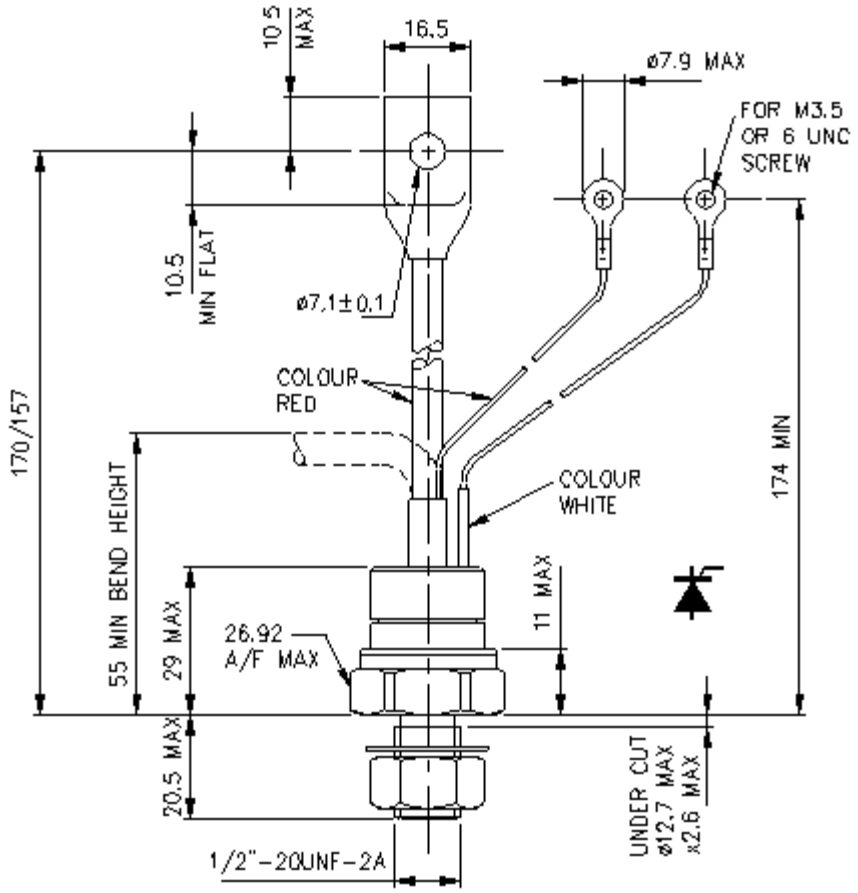


Figure 9 – Maximum surge and I2t Ratings



Outline Drawing & Ordering Information



101A231

ORDERING INFORMATION (Please quote 10 digit code as below)

N0180	SH	♦ ♦	0
Fixed Type Code	Fixed Outline Code	Off-state Voltage Code $V_{DRM}/100$ 12-16	Fixed Code

Typical order code: N0180SH140 – 1400V V_{RRM}/V_{DRM}

IXYS Semiconductor GmbH
Edisonstraße 15
D-68623 Lampertheim
Tel: +49 6206 503-0
Fax: +49 6206 503-627
E-mail: 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

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

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

www.ixysuk.com

www.ixys.com