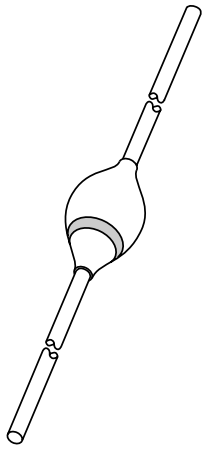
DATA SHEET



BYX90G
High-voltage soft-recovery controlled avalanche rectifier

Product specification
Supersedes data of June 1996

1996 Sep 26

Philips
Semiconductors

PHILIPS

High-voltage soft-recovery controlled avalanche rectifier

BYX90G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Soft-recovery switching characteristics
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

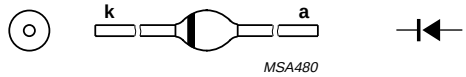
- High-voltage rectification at high frequencies
- Sub-component for very high voltage rectifiers, for example, in X-ray and radar equipment.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.



MSA480

The cathode is marked by a black band on the body.

Fig.1 Simplified outline (SOD83A) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	7.5	kV
V_{RWM}	crest working reverse voltage		–	6	kV
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{oil} = 45 °C; see Fig.2; see also Fig.3	–	550	mA
I_{FRM}	repetitive peak forward current		–	5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\ max}$ prior to surge; $V_R = V_{RWMmax}$; see Fig.4	–	20	A
P_{RSM}	non-repetitive peak reverse power dissipation	t = 10 μs; triangular pulse; $T_j = T_{j\ max}$ prior to surge	–	5	kW
T_{stg}	storage temperature		–65	+165	°C
T_j	junction temperature		–65	+165	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; see Fig.5	–	–	14.5	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	8	–	–	kV
I_R	reverse current	$V_R = V_{RWMmax}$; $T_j = T_{j\ max}$	–	–	50	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.7	–	–	350	ns

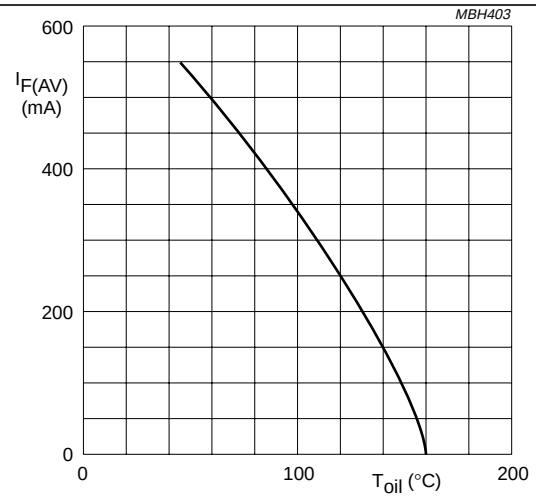
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}o}$	thermal resistance from junction to oil	note 1; see also Fig.6	20	K/W

Note

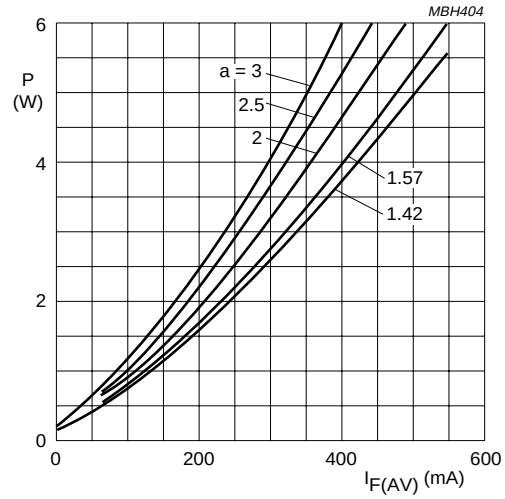
1. For more information please refer to the *"General Part of associated Handbook"*.

GRAPHICAL DATA



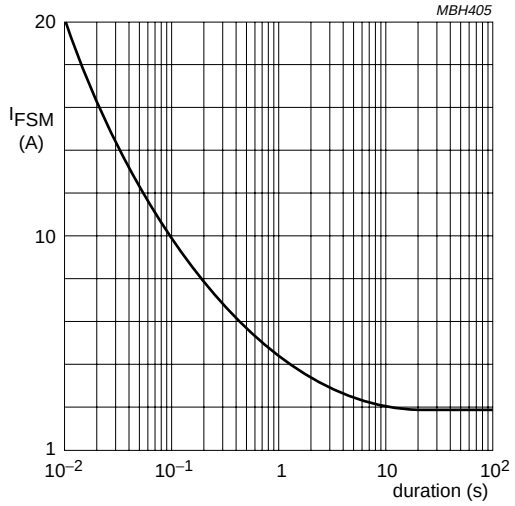
a = 1.57; δ = 0.5; $V_R = V_{RWMmax}$.

Fig.2 Maximum permissible average forward current as a function of oil temperature (including losses due to reverse leakage).



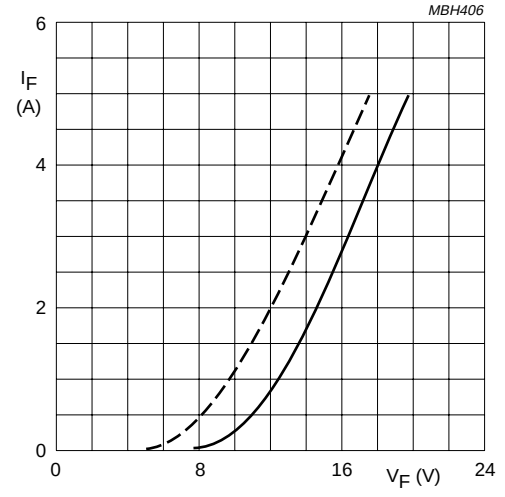
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RWMmax}$.

Fig.3 Maximum steady state power dissipation (forward plus leakage losses) as a function of average forward current.



50 Hz half sinewave current burst.
T_j = 165 °C prior to surge.
$V_R = V_{RWMmax}$.

Fig.4 Maximum non-repetitive peak forward current as a function of burst duration.



Dotted lines: T_j = 165 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of maximum forward voltage.

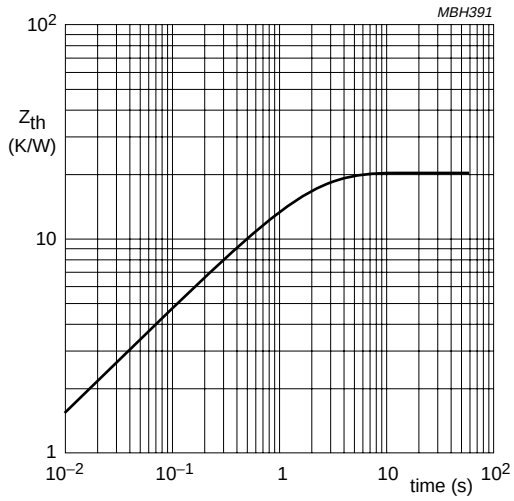
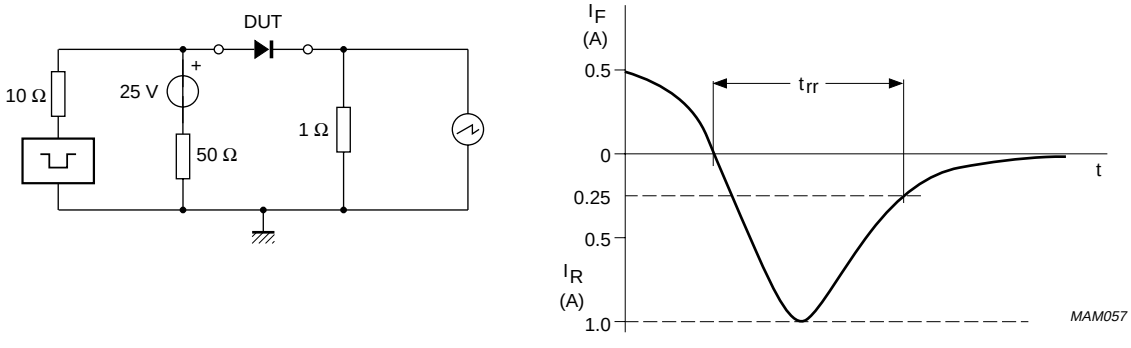


Fig.6 Thermal impedance in oil as a function of time.

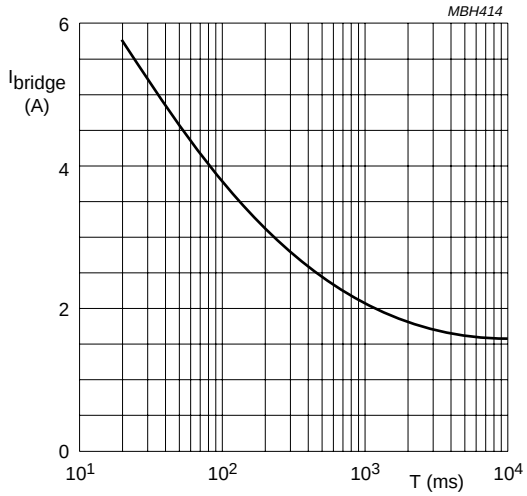


Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.7 Test circuit and reverse recovery time waveform and definition.

APPLICATION INFORMATION

Typical 3-phase bridge application information



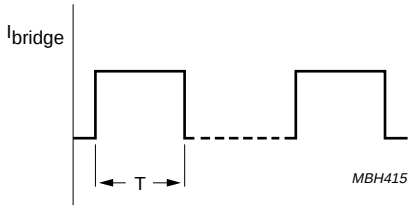
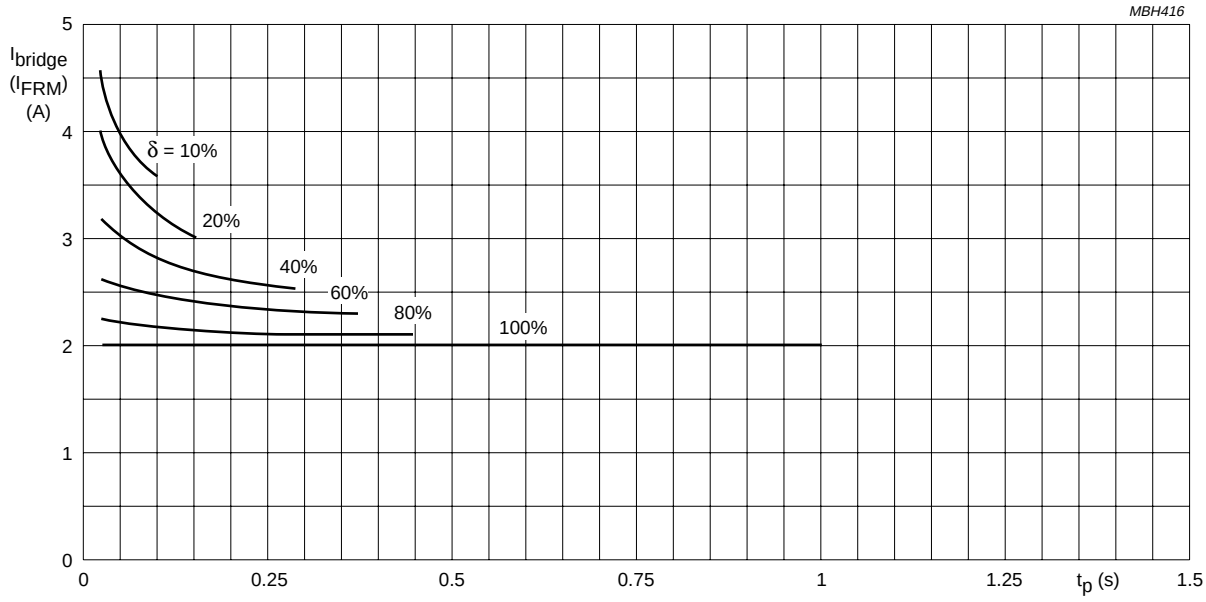


Fig.8 Maximum permissible output current in a 3-phase rectifier bridge with a minimum time between exposures of 20 s; T_{oil} = 50 °C.



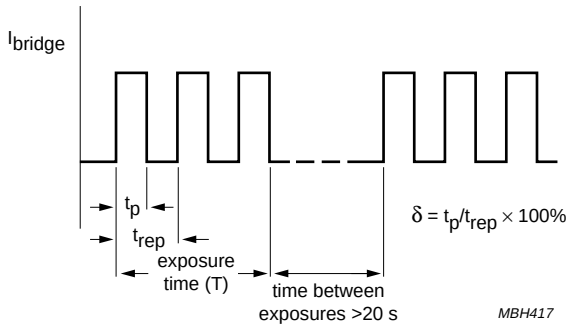
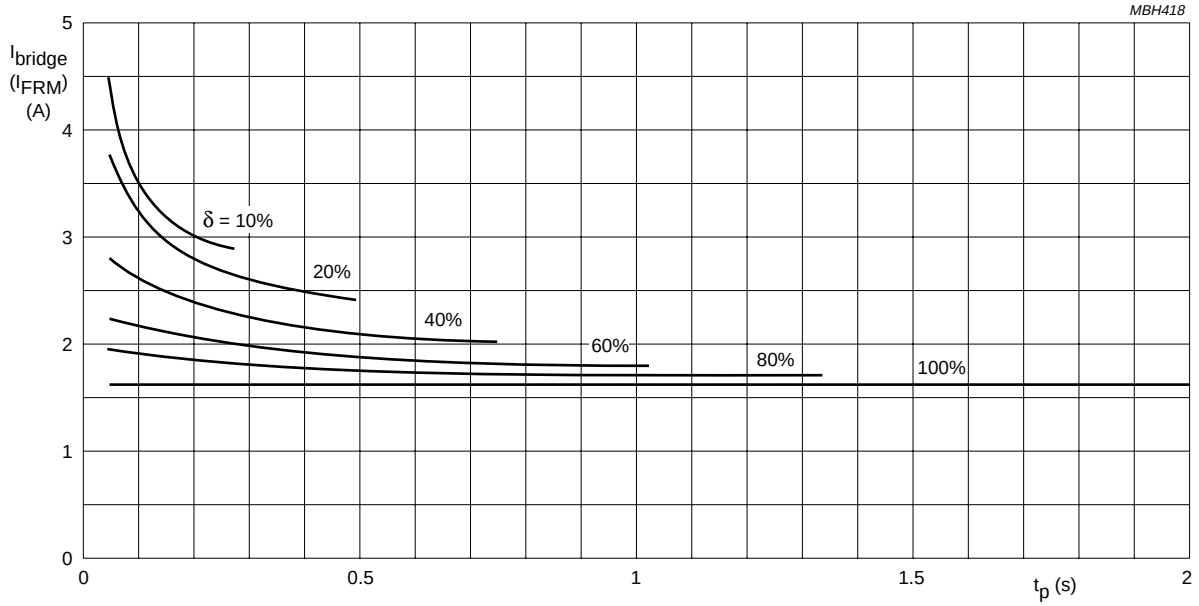


Fig.9 Maximum current through a 3-phase bridge rectifier versus pulse duration; exposure time T = 1 s; T_{oil} = 50 °C.



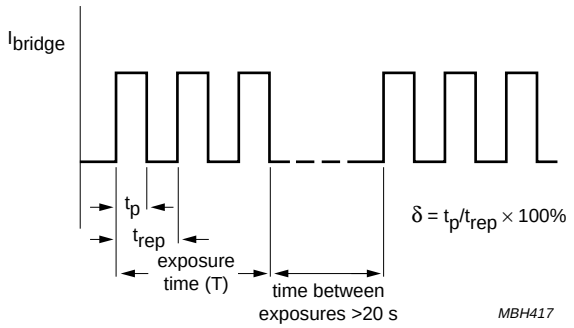
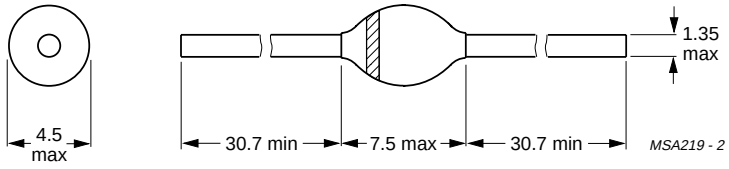


Fig.10 Maximum current through a 3-phase bridge rectifier versus pulse duration; exposure time T = 3 s; T_{oil} = 50 °C.

PACKAGE OUTLINE



Dimensions in mm.

The marking band indicates the cathode.

Fig.11 SOD83A.

DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

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