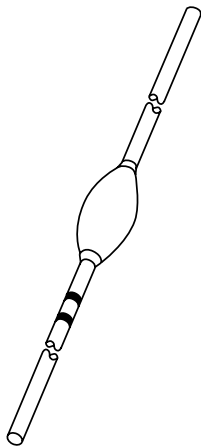


DATA SHEET



BY8400 series Fast high-voltage soft-recovery rectifiers

Product specification
Supersedes data of June 1994

1996 May 24

Fast high-voltage soft-recovery rectifiers

BY8400 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

- For colour television and monitors up to 25 kHz
- High-voltage applications for:
 - Multipliers
 - Slot-wound diode-split-transformers.

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.

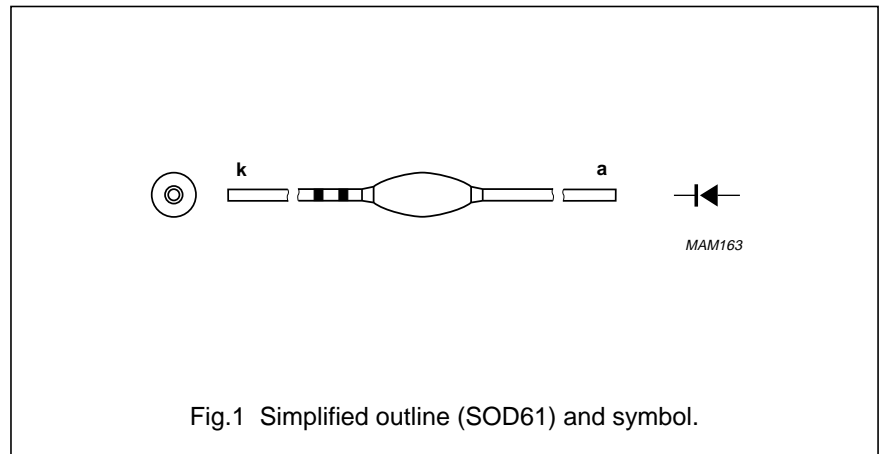


Fig.1 Simplified outline (SOD61) and symbol.

MARKING

Cathode band colour codes

| TYPE NUMBER | PACKAGE CODE | INNER BAND | OUTER BAND |
|-------------|--------------|------------|------------|
| BY8404 | SOD61AB | black | black |
| BY8406 | SOD61AC | black | green |
| BY8408 | SOD61AD | black | red |
| BY8410 | SOD61AE | black | violet |
| BY8412 | SOD61AF | black | orange |
| BY8414 | SOD61AG | black | lilac |
| BY8416 | SOD61AH | black | grey |
| BY8418 | SOD61AI | black | brown |
| BY8420 | SOD61AJ | black | dark blue |
| BY8424 | SOD61AK | black | no band |

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LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------------|------|------|------|
| V _{RSM} | non-repetitive peak reverse voltage | | | | |
| | BY8404 | | – | 5 | kV |
| | BY8406 | | – | 8 | kV |
| | BY8408 | | – | 10 | kV |
| | BY8410 | | – | 12 | kV |
| | BY8412 | | – | 14 | kV |
| | BY8414 | | – | 17 | kV |
| | BY8416 | | – | 19 | kV |
| | BY8418 | | – | 22 | kV |
| | BY8420 | | – | 24 | kV |
| | BY8424 | | – | 30 | kV |
| V _{RRM} | repetitive peak reverse voltage | | | | |
| | BY8404 | | – | 5 | kV |
| | BY8406 | | – | 8 | kV |
| | BY8408 | | – | 10 | kV |
| | BY8410 | | – | 12 | kV |
| | BY8412 | | – | 14 | kV |
| | BY8414 | | – | 17 | kV |
| | BY8416 | | – | 19 | kV |
| | BY8418 | | – | 22 | kV |
| | BY8420 | | – | 24 | kV |
| | BY8424 | | – | 30 | kV |
| V _{RW} | working reverse voltage | | | | |
| | BY8404 | | – | 4 | kV |
| | BY8406 | | – | 6 | kV |
| | BY8408 | | – | 8 | kV |
| | BY8410 | | – | 10 | kV |
| | BY8412 | | – | 12 | kV |
| | BY8414 | | – | 14 | kV |
| | BY8416 | | – | 16 | kV |
| | BY8418 | | – | 18 | kV |
| | BY8420 | | – | 20 | kV |
| | BY8424 | | – | 24 | kV |

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| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|---------------------------------|---|------|------|------|
| $I_{F(AV)}$ | average forward current | averaged over any 20 ms period; see Figs 2 to 11 | | | |
| | BY8404 | | – | 20 | mA |
| | BY8406 | | – | 10 | mA |
| | BY8408 | | – | 5 | mA |
| | BY8410 | | – | 5 | mA |
| | BY8412 | | – | 5 | mA |
| | BY8414 | | – | 5 | mA |
| | BY8416 | | – | 3 | mA |
| | BY8418 | | – | 3 | mA |
| | BY8420 | | – | 3 | mA |
| | BY8424 | – | 3 | mA | |
| I_{FRM} | repetitive peak forward current | note 1 | – | 500 | mA |
| T_{stg} | storage temperature | | –65 | +120 | °C |
| T_j | junction temperature | | –65 | +120 | °C |

Note

1. Withstands peak currents during flash-over in a picture tube.

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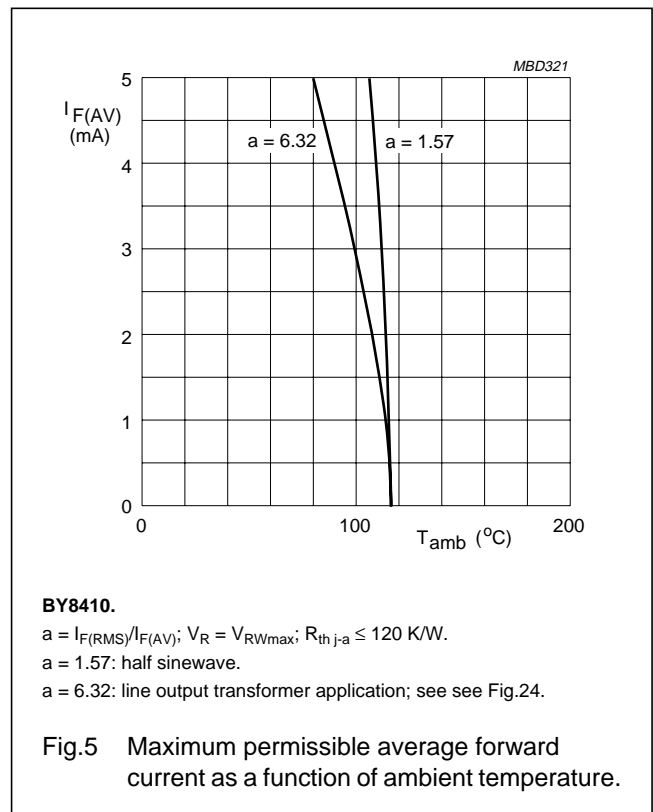
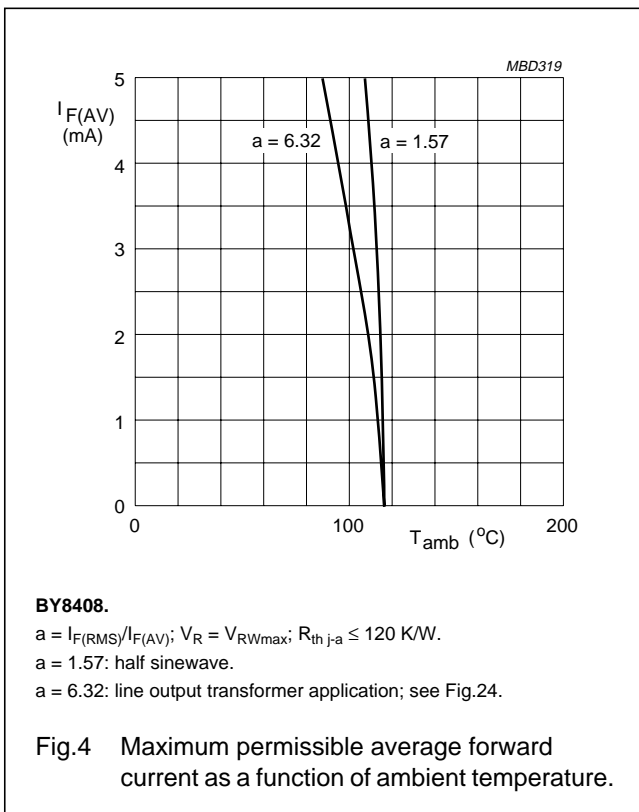
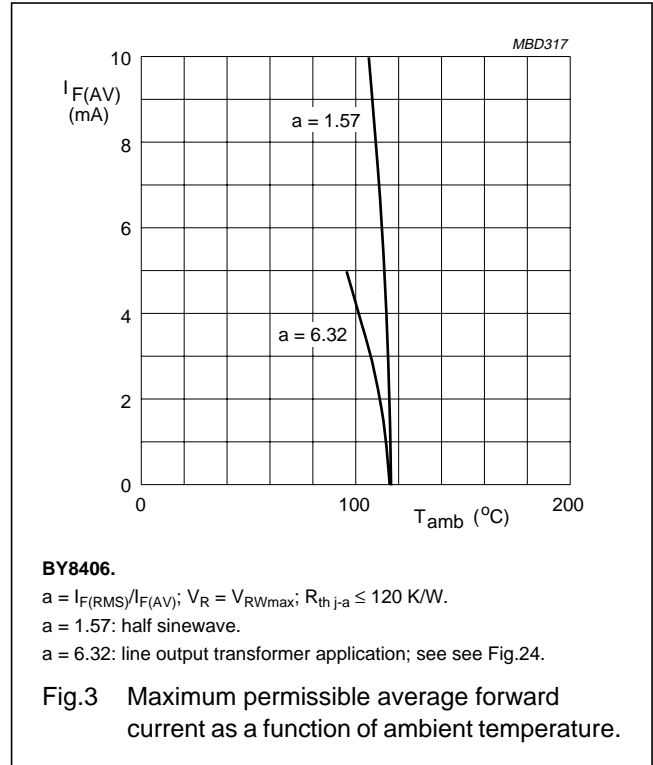
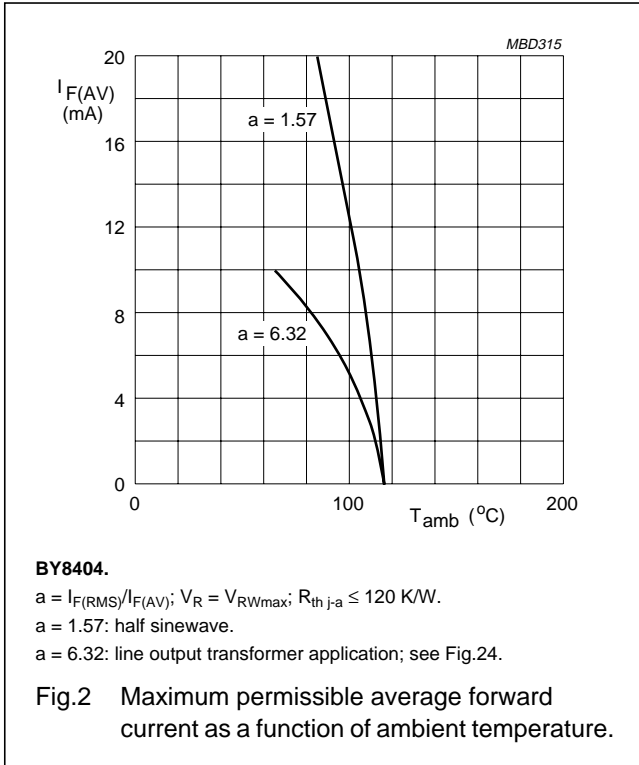
ELECTRICAL CHARACTERISTICS $T_j = 25\text{ }^\circ\text{C}$; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------|-----------------------|---|------|------|------|---------------|
| V_F | forward voltage | $I_F = 100\text{ mA}$; $T_j = T_{j\text{ max}}$; see Figs 12 to 21 | - | - | 20 | V |
| | BY8404 | | | | | |
| | BY8406 | | | | | |
| | BY8408 | | | | | |
| | BY8410 | | | | | |
| | BY8412 | | | | | |
| | BY8414 | | | | | |
| | BY8416 | | | | | |
| | BY8418 | | | | | |
| | BY8420 | | | | | |
| BY8424 | | | | | | |
| I_R | reverse current | $V_R = V_{RW\text{ max}}$; $T_j = 120\text{ }^\circ\text{C}$ | - | - | 3 | μA |
| Q_r | recovery charge | when switched from $I_F = 100\text{ mA}$ to $V_R \geq 100\text{ V}$ and $dI_F/dt = -200\text{ mA}/\mu\text{s}$; see Fig.22 | - | - | 1 | nC |
| t_f | fall time | when switched from $I_F = 100\text{ mA}$ to $V_R \geq 100\text{ V}$ and $dI_F/dt = -200\text{ mA}/\mu\text{s}$; see Fig.22 | 100 | - | - | ns |
| t_{rr} | reverse recovery time | when switched from $I_F = 2\text{ mA}$ to $I_R = 4\text{ mA}$; measured at $I_R = 1\text{ mA}$; see Fig.23 | - | - | 100 | ns |
| C_d | diode capacitance | $V_R = 0\text{ V}$; $f = 1\text{ MHz}$ | - | 1.20 | - | pF |
| | BY8404 | | | | | |
| | BY8406 | | | | | |
| | BY8408 | | | | | |
| | BY8410 | | | | | |
| | BY8412 | | | | | |
| | BY8414 | | | | | |
| | BY8416 | | | | | |
| | BY8418 | | | | | |
| | BY8420 | | | | | |
| BY8424 | | | | | | |

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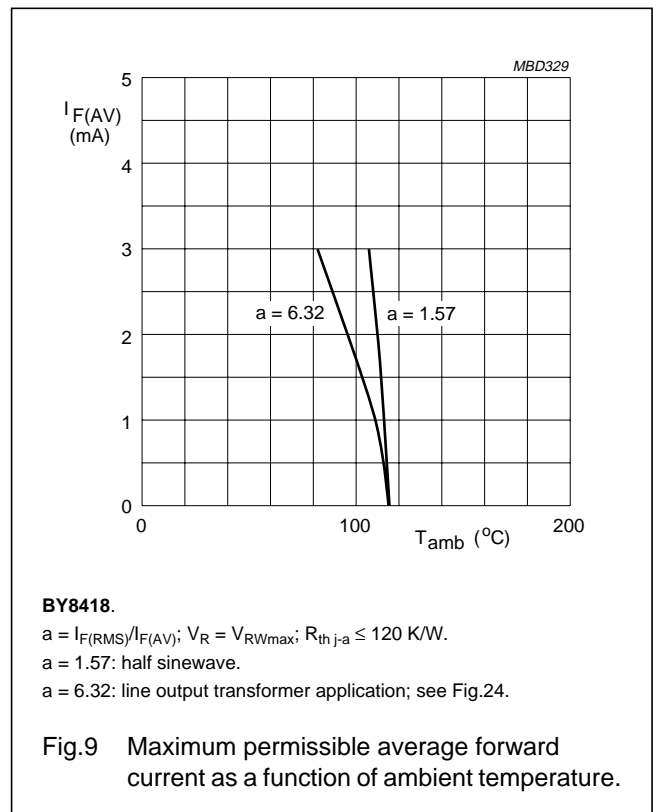
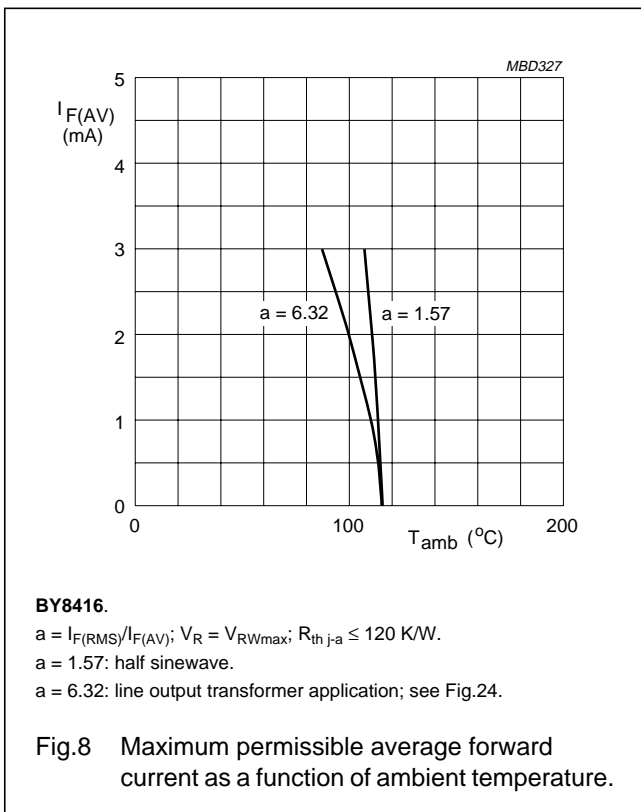
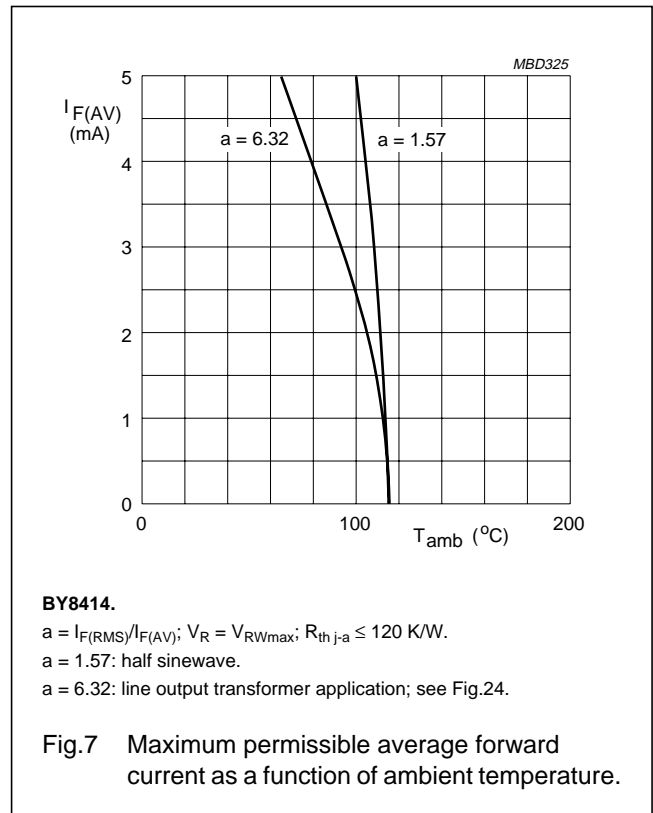
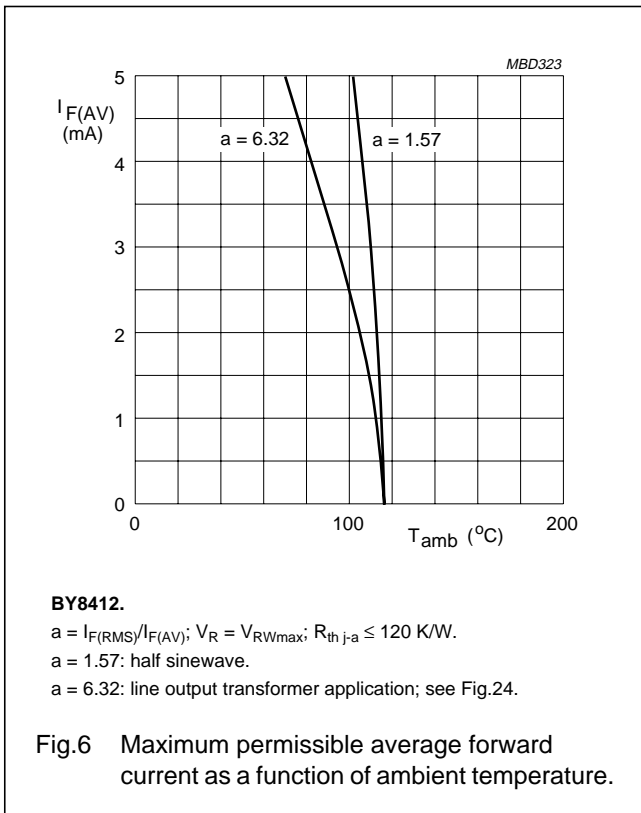
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GRAPHICAL DATA



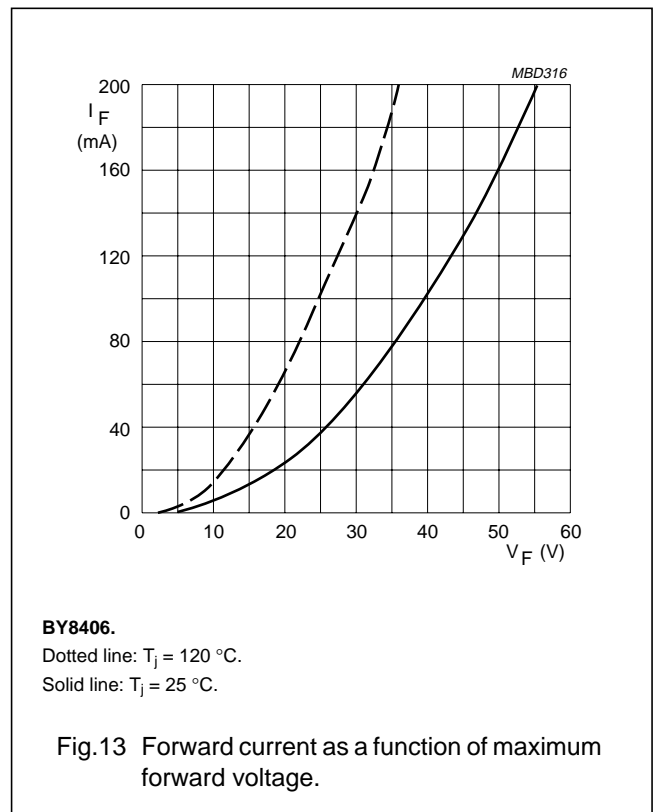
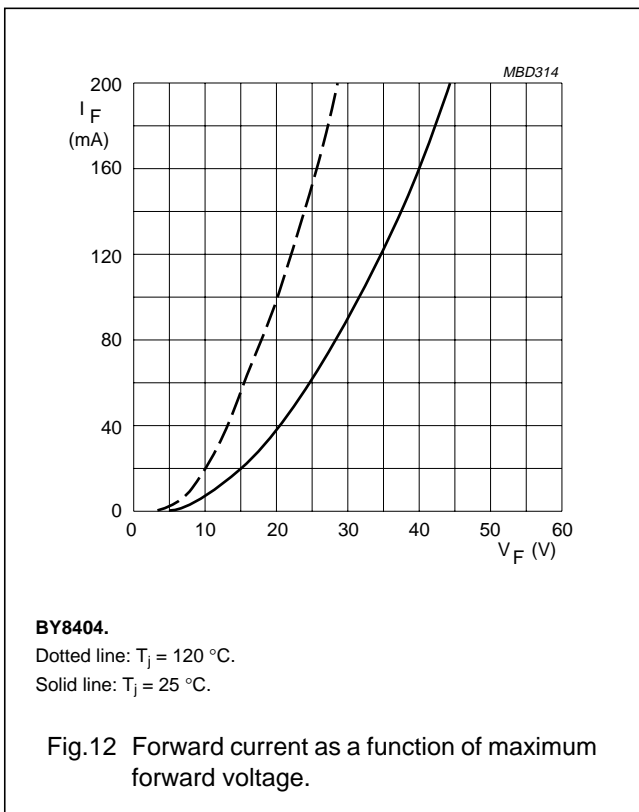
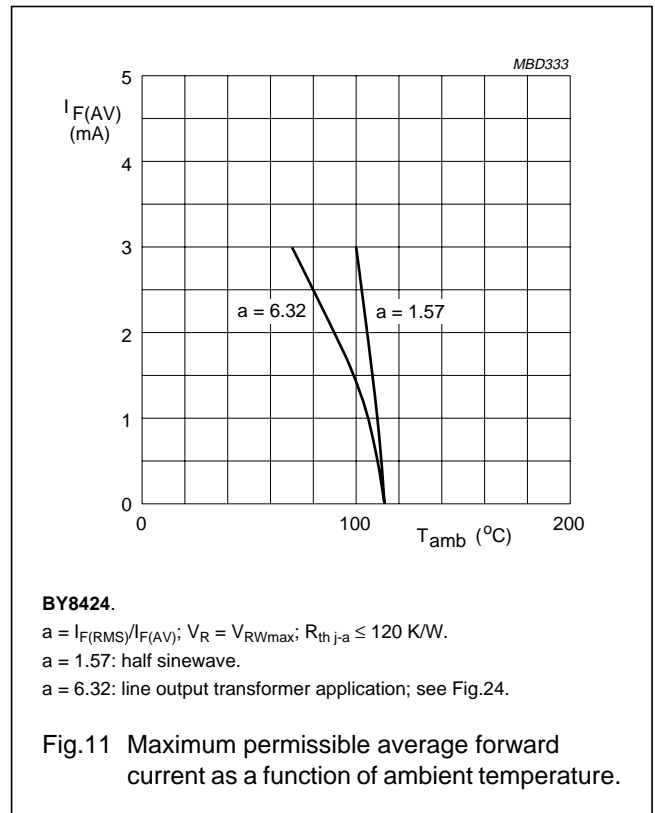
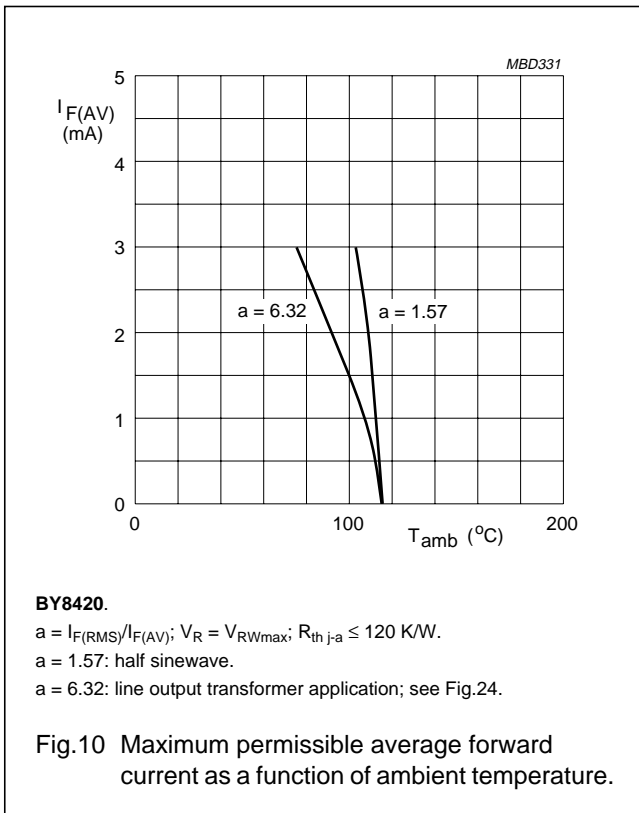
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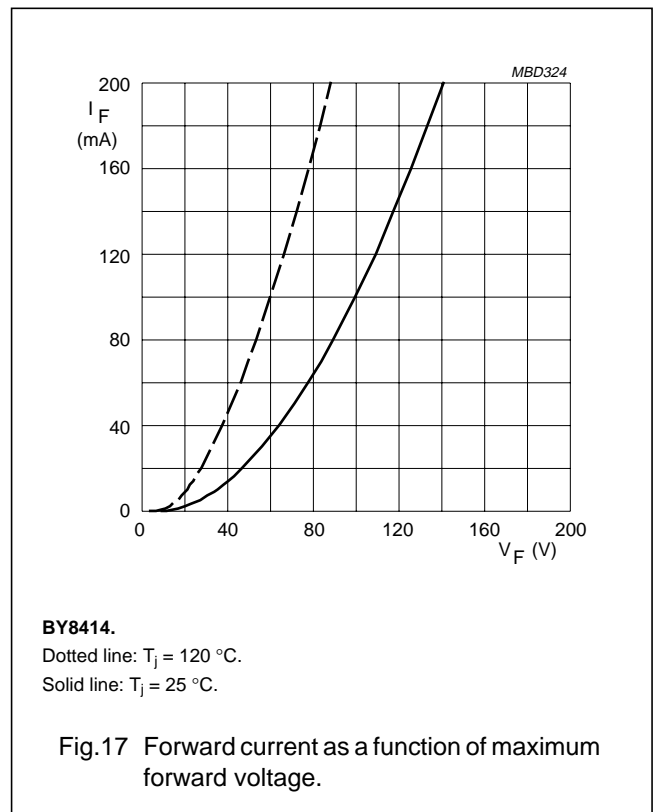
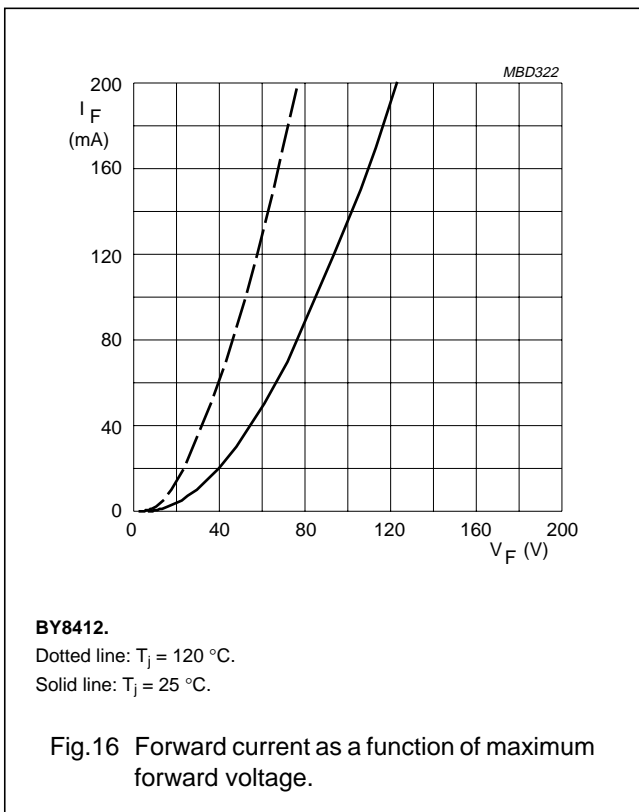
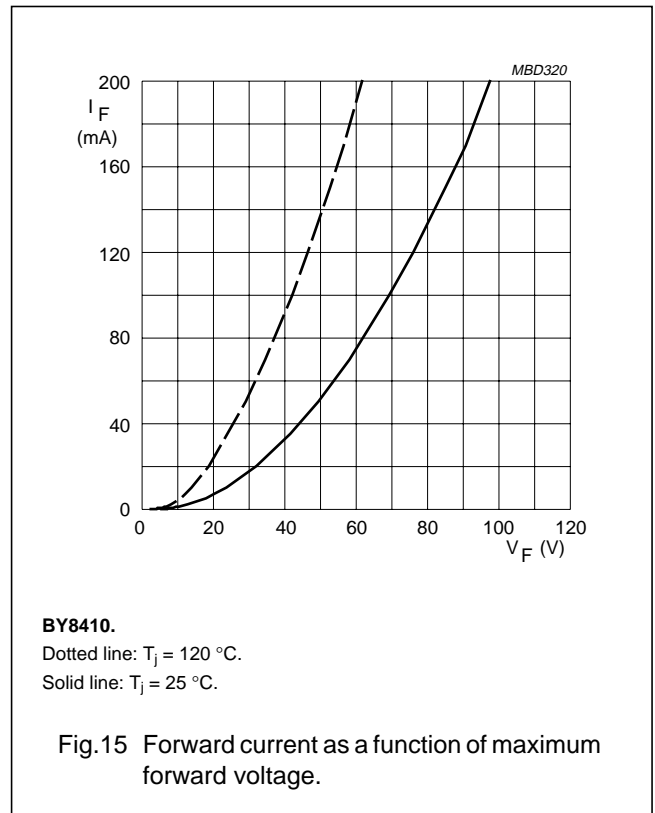
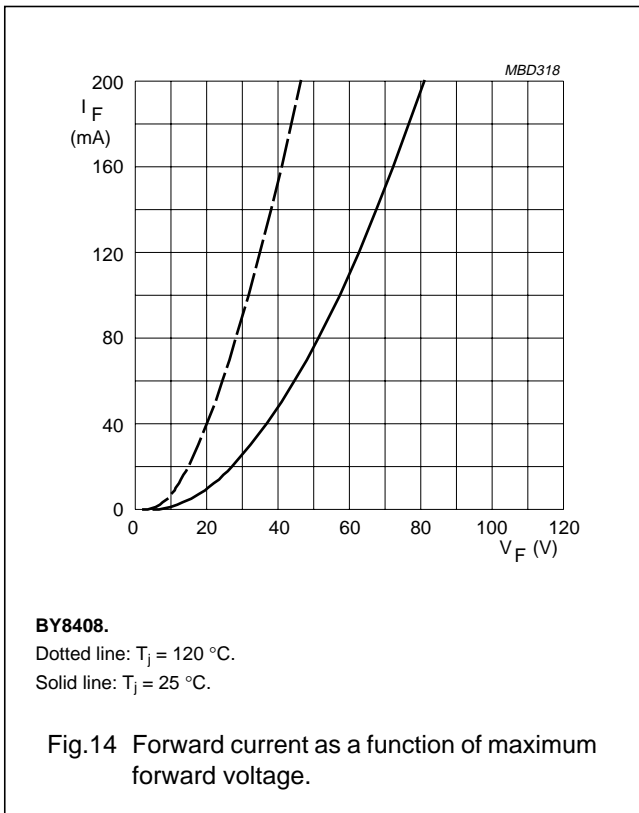
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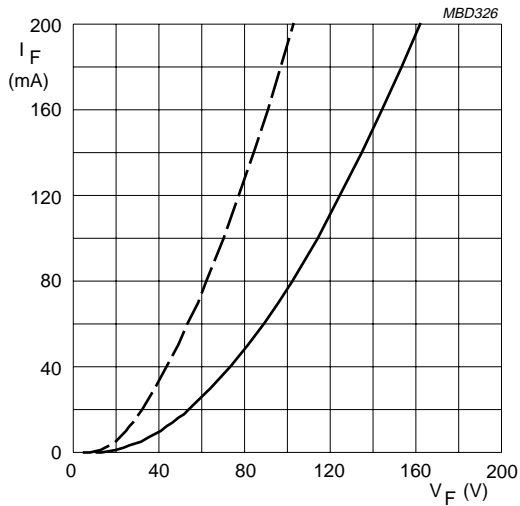
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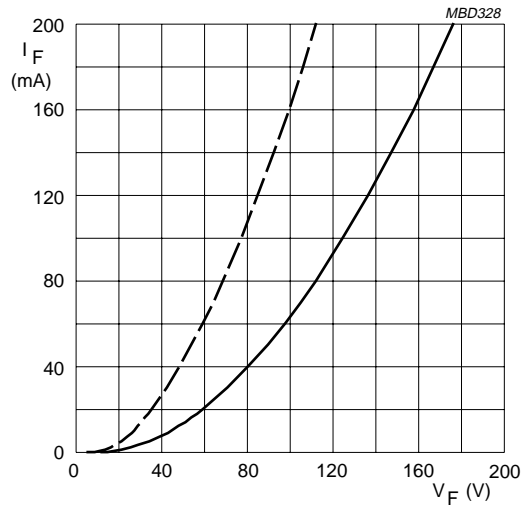
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BY8400 series



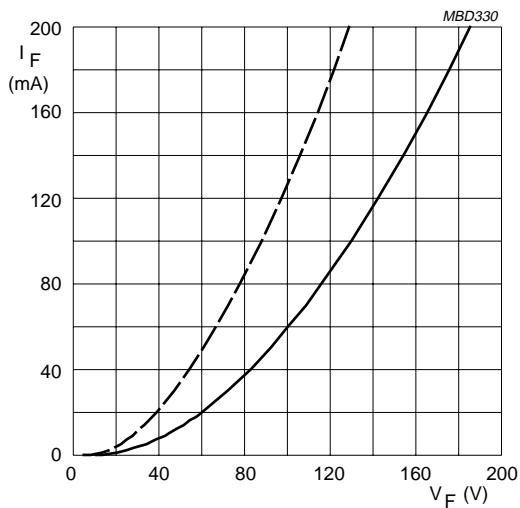
BY8416.
Dotted line: $T_j = 120\text{ }^\circ\text{C}$.
Solid line: $T_j = 25\text{ }^\circ\text{C}$.

Fig.18 Forward current as a function of maximum forward voltage.



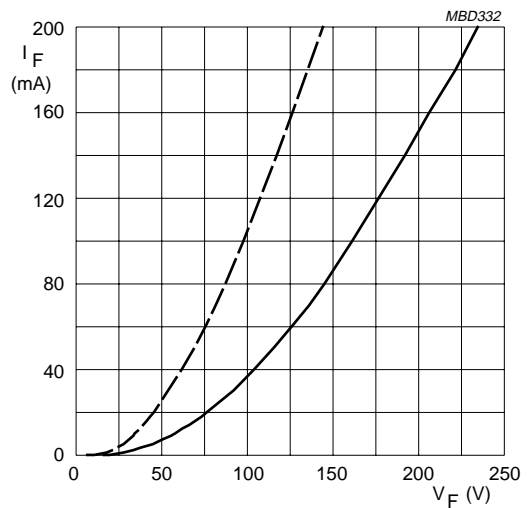
BY8418.
Dotted line: $T_j = 120\text{ }^\circ\text{C}$.
Solid line: $T_j = 25\text{ }^\circ\text{C}$.

Fig.19 Forward current as a function of maximum forward voltage.



BY8420.
Dotted line: $T_j = 120\text{ }^\circ\text{C}$.
Solid line: $T_j = 25\text{ }^\circ\text{C}$.

Fig.20 Forward current as a function of maximum forward voltage.



BY8424.
Dotted line: $T_j = 120\text{ }^\circ\text{C}$.
Solid line: $T_j = 25\text{ }^\circ\text{C}$.

Fig.21 Forward current as a function of maximum forward voltage.

Fast high-voltage soft-recovery rectifiers

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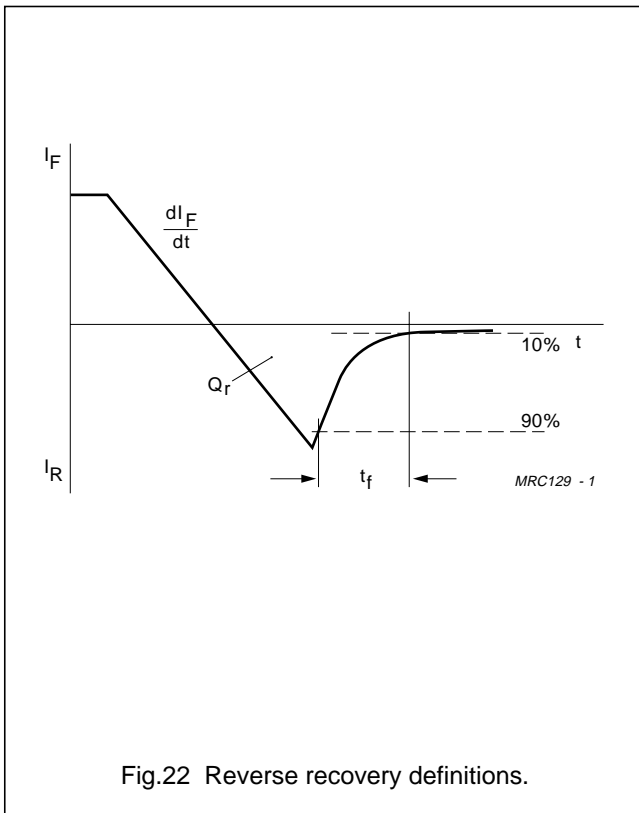
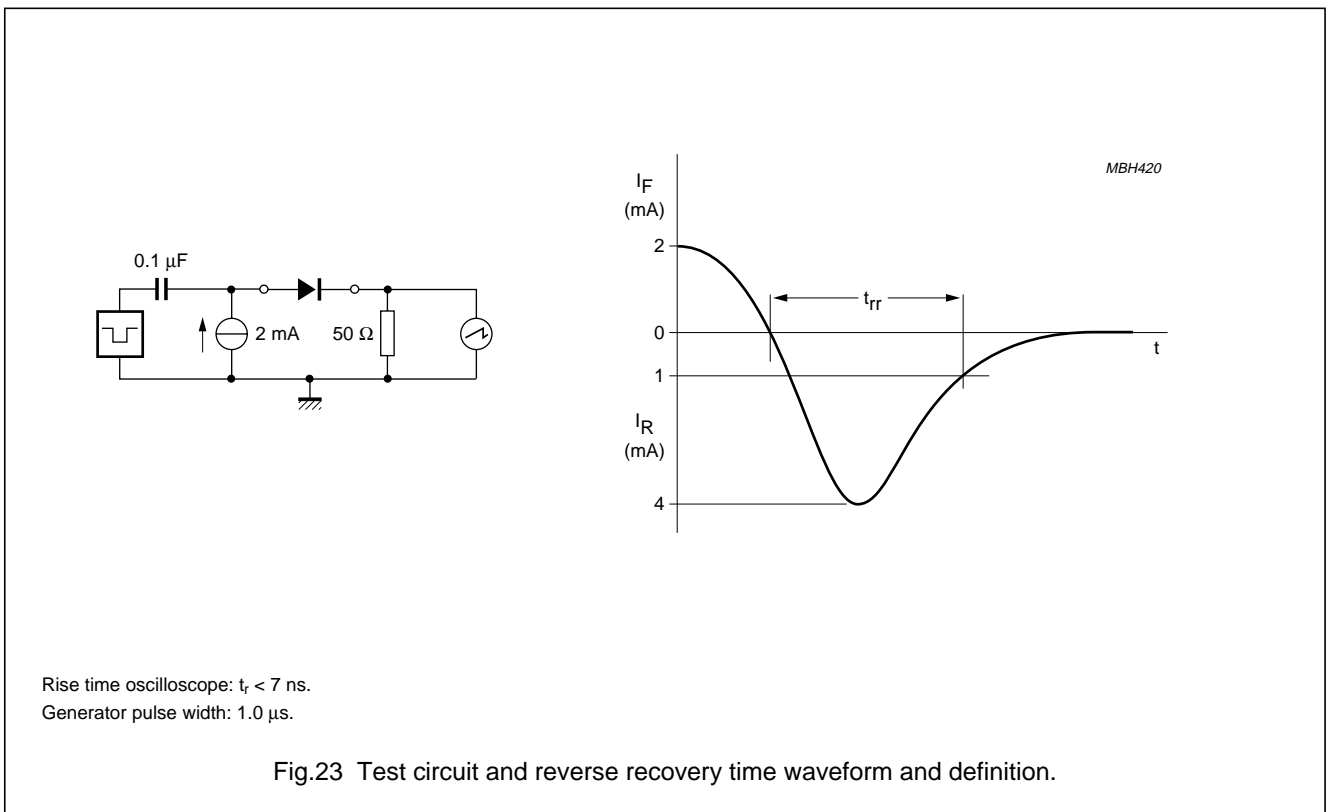


Fig.22 Reverse recovery definitions.



Rise time oscilloscope: $t_r < 7 \text{ ns}$.
 Generator pulse width: $1.0 \mu s$.

Fig.23 Test circuit and reverse recovery time waveform and definition.

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APPLICATION INFORMATION

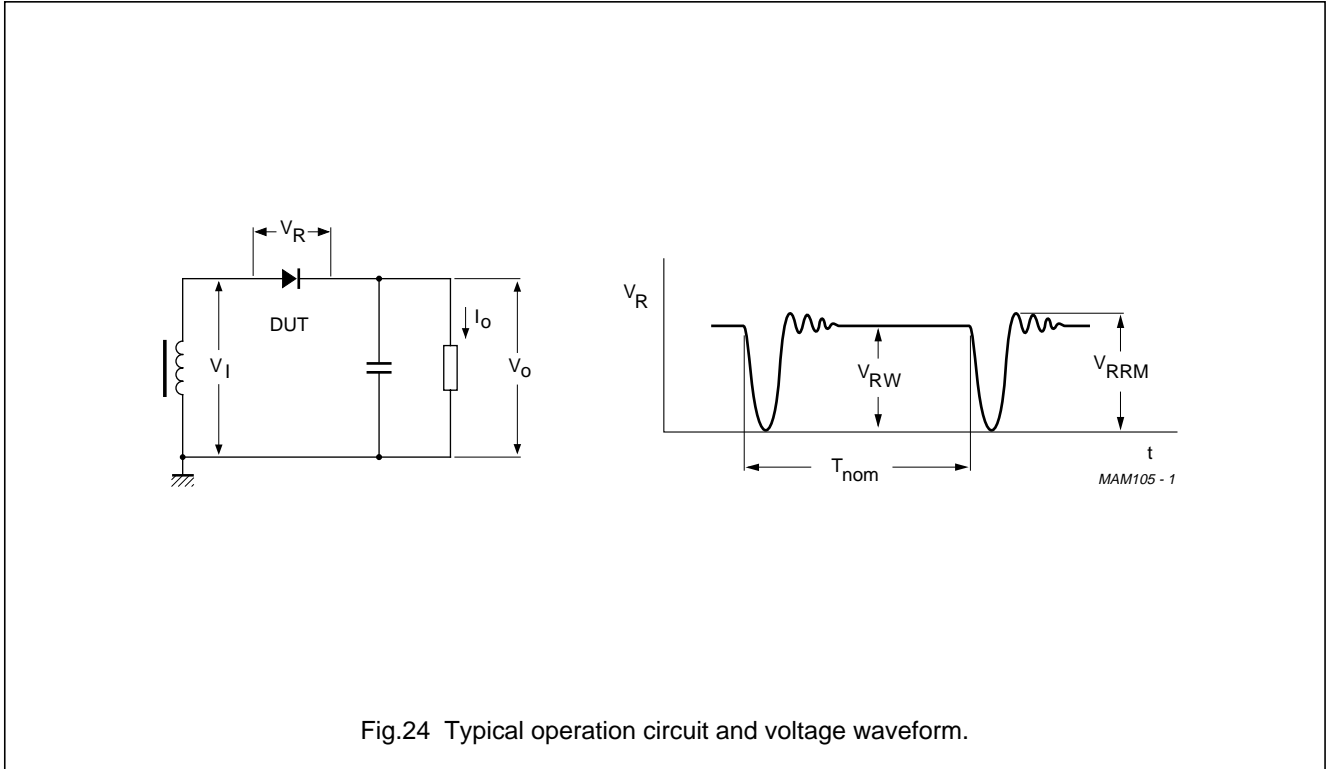
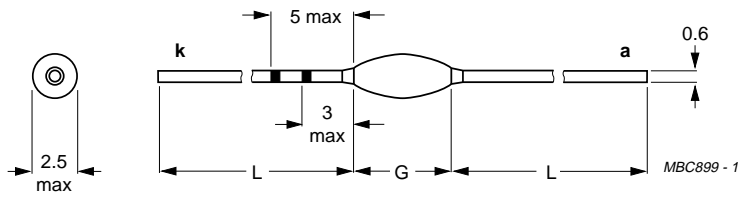


Fig.24 Typical operation circuit and voltage waveform.

Fast high-voltage soft-recovery rectifiers

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PACKAGE OUTLINE



Dimensions in mm.

Fig.25 SOD61.

SOD61 package specification

| TYPE NUMBER | PACKAGE CODE | L _{min} (mm) | G _{max} (mm) |
|-------------|--------------|-----------------------|-----------------------|
| BY8404 | SOD61AB | 31.8 | 5.5 |
| BY8406 | SOD61AC | 30.4 | 8.3 |
| BY8408 | SOD61AD | 30.2 | 8.7 |
| BY8410 | SOD61AE | 30.0 | 9.1 |
| BY8412 | SOD61AF | 29.8 | 9.5 |
| BY8414 | SOD61AG | 29.6 | 9.9 |
| BY8416 | SOD61AH | 29.3 | 10.5 |
| BY8418 | SOD61AI | 28.8 | 11.5 |
| BY8420 | SOD61AJ | 28.3 | 12.5 |
| BY8424 | SOD61AK | 27.8 | 13.5 |

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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. | |

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