

DATA SHEET

BYC10B-600

Rectifier diode

ultrafast, low switching loss

Product specification

March 2001



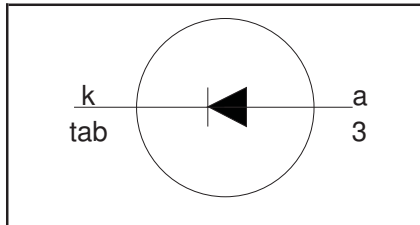
Rectifier diode ultrafast, low switching loss

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FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

$V_R = 600\text{ V}$
$V_F \leq 1.8\text{ V}$
$I_{F(AV)} = 10\text{ A}$
$t_{rr} = 19\text{ ns (typ)}$

APPLICATIONS

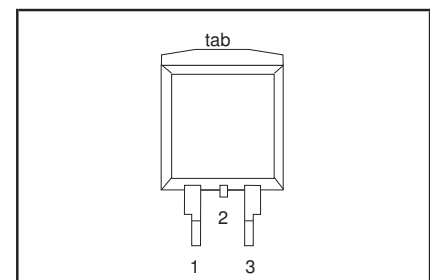
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC10B-600 is supplied in the SOT404 surface mounting package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode ¹
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	$T_{mb} \leq 114\text{ °C}$	-	500	V
$I_{F(AV)}$	Average forward current	$\delta = 0.5$; with reappplied $V_{RRM(max)}$; $T_{mb} \leq 78\text{ °C}$	-	10	A
I_{FRM}	Repetitive peak forward current	$\delta = 0.5$; with reappplied $V_{RRM(max)}$; $T_{mb} \leq 78\text{ °C}$	-	20	A
I_{FSM}	Non-repetitive peak forward current.	$t = 10\text{ ms}$	-	65	A
		$t = 8.3\text{ ms}$	-	71	A
		sinusoidal; $T_j = 150\text{ °C}$ prior to surge with reappplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	°C
T_j	Operating junction temperature		-	150	°C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	minimum footprint, FR4 board	-	50	-	K/W

¹ it is not possible to make connection to pin 2 of the SOT404 package

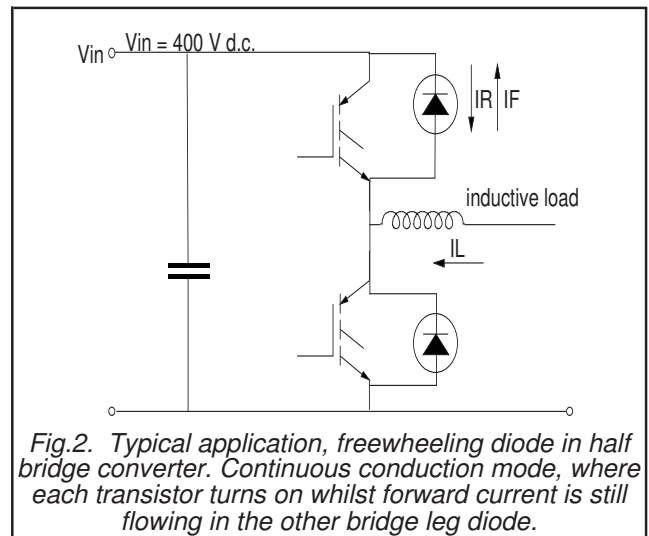
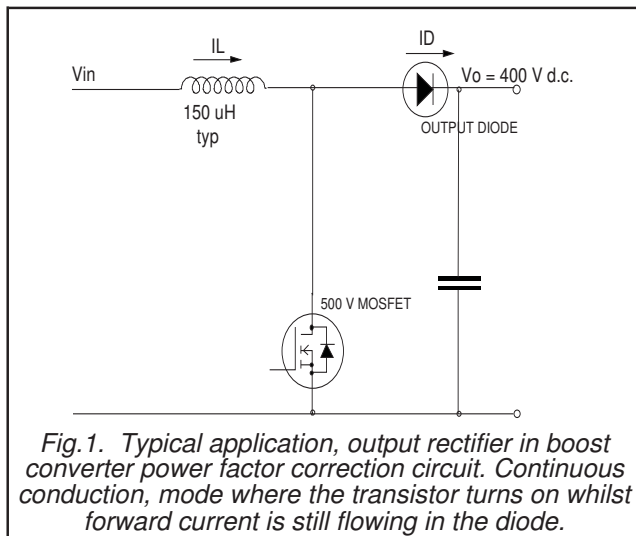
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ELECTRICAL CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 10\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	1.4	1.8	V
		$I_F = 20\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	1.7	2.3	V
I_R	Reverse current	$I_F = 10\text{ A}; V_R = 600\text{ V}$	-	2.0	2.9	V
		$V_R = 600\text{ V}$	-	9	200	μA
		$V_R = 500\text{ V}; T_j = 100\text{ }^\circ\text{C}$	-	1.1	3.0	mA
t_{rr}	Reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s}$	-	35	55	ns
t_{rr}	Reverse recovery time	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}$	-	19	-	ns
t_{rr}	Reverse recovery time	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 100\text{ }^\circ\text{C}$	-	32	40	ns
I_{rrm}	Peak reverse recovery current	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 125\text{ }^\circ\text{C}$	-	3	7.5	A
I_{rrm}	Peak reverse recovery current	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 125\text{ }^\circ\text{C}$	-	9.5	12	A
V_{fr}	Forward recovery voltage	$I_F = 10\text{ A}; dI_F/dt = 100\text{ A}/\mu\text{s}$	-	8	11	V



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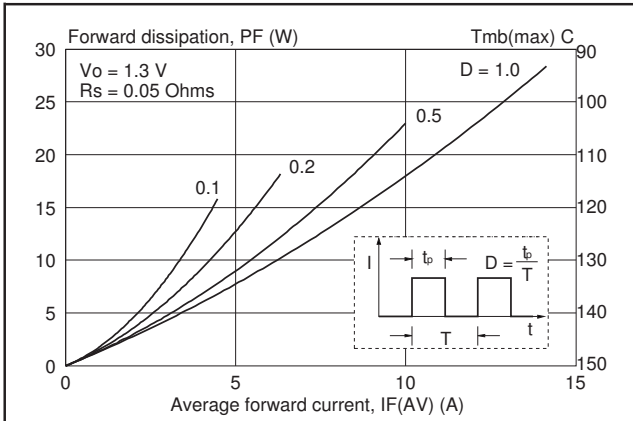


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

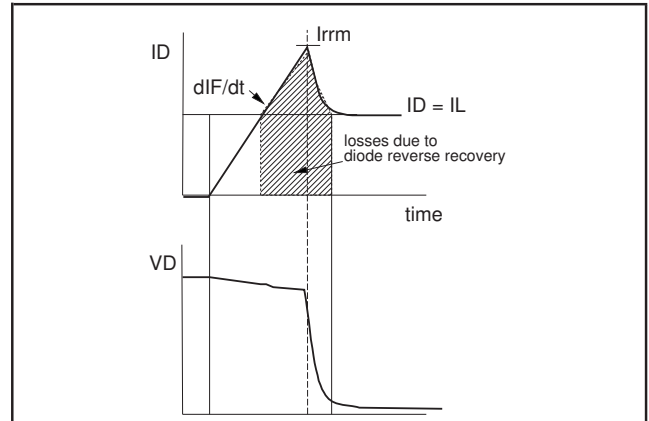


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

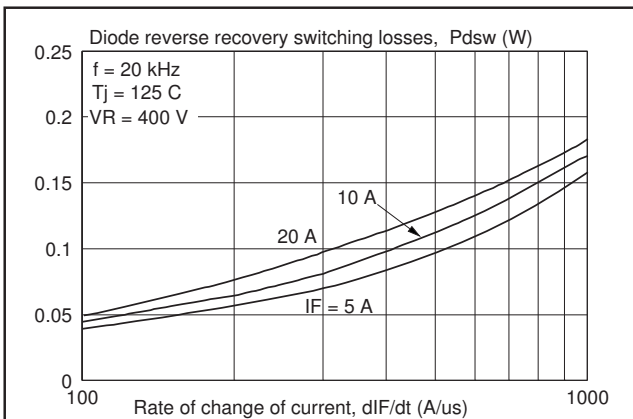


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt .

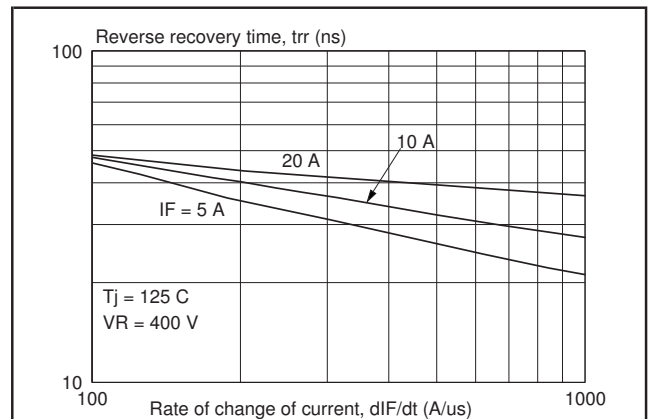


Fig.7. Typical reverse recovery time t_{rr} as a function of rate of change of current dI_F/dt .

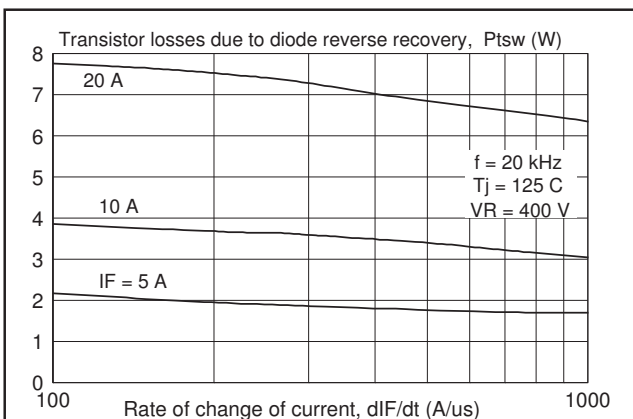


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt .

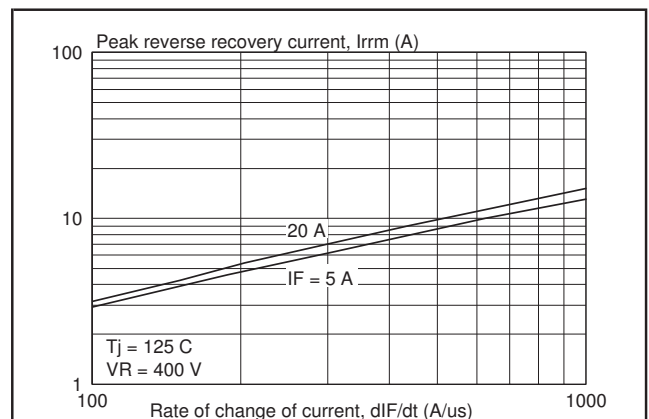
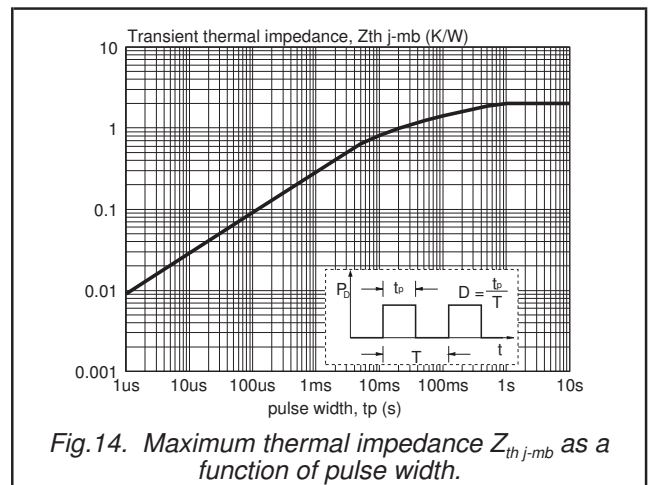
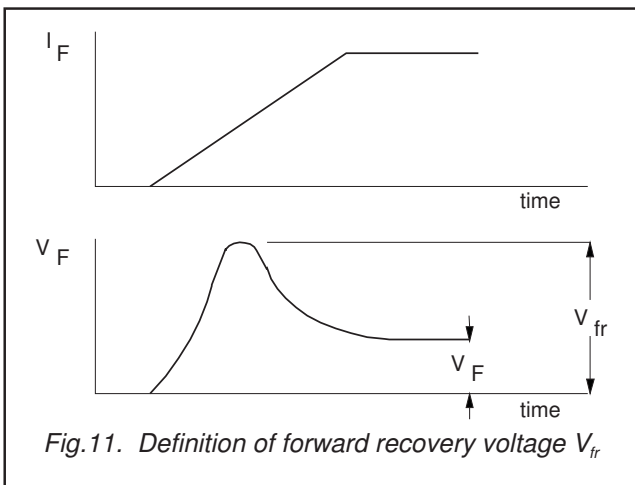
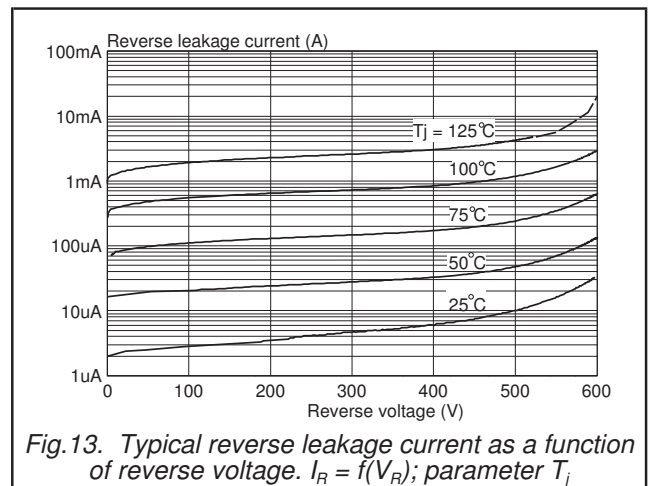
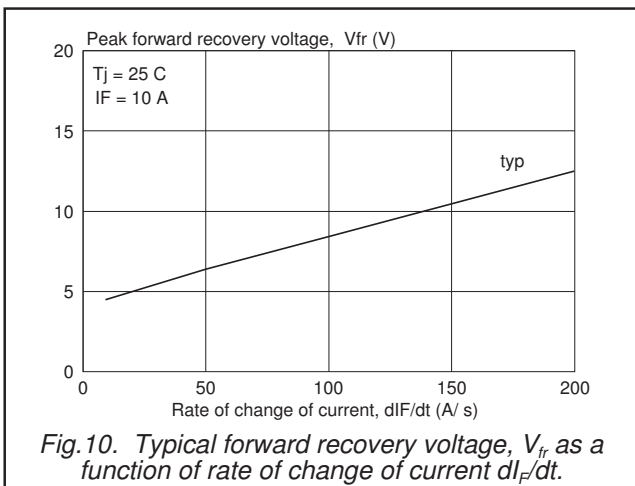
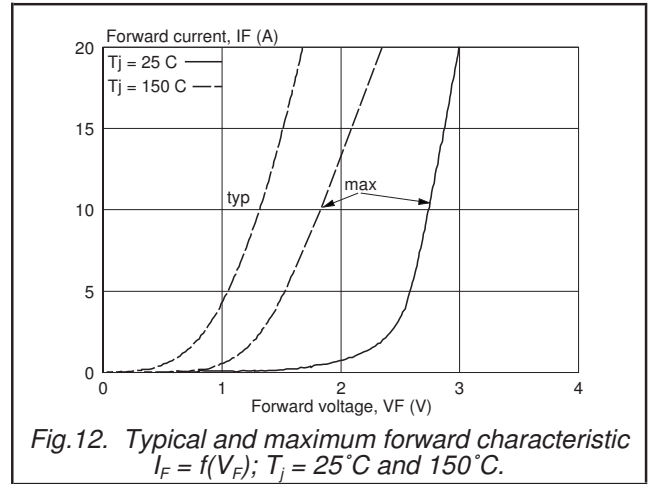


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt .

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MECHANICAL DATA

Dimensions in mm

Net Mass: 1.4 g

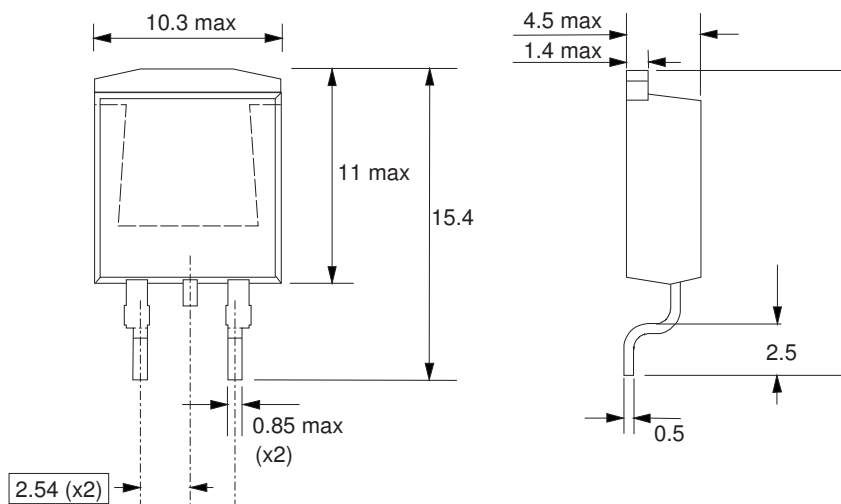


Fig. 15. SOT404 : centre pin connected to mounting base.

MOUNTING INSTRUCTIONS

Dimensions in mm

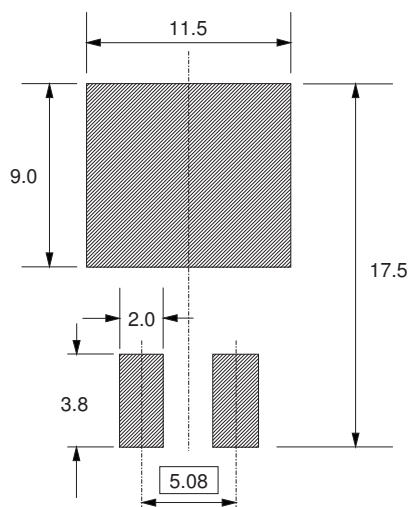


Fig. 16. SOT404 : minimum pad sizes for surface mounting.

Notes

- 1. Plastic meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
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Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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