

DATA SHEET

BYC8B-600

Rectifier diode

ultrafast, low switching loss

Product specification

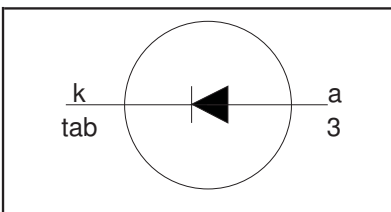
March 2001



Rectifier diode ultrafast, low switching loss

BYC8B-600**FEATURES**

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

SYMBOL**QUICK REFERENCE DATA**

$V_R = 600 \text{ V}$

$V_F \leq 1.85 \text{ V}$

$I_{F(AV)} = 8 \text{ A}$

$t_{rr} = 19 \text{ ns (typ)}$

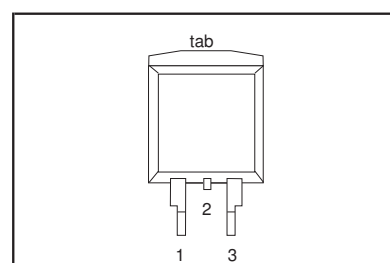
APPLICATIONS

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

The BYC8B-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	$T_{mb} \leq 110 \text{ }^{\circ}\text{C}$ $\delta = 0.5$; with reappplied $V_{RRM(max)}$; $T_{mb} \leq 82 \text{ }^{\circ}\text{C}$ $\delta = 0.5$; with reappplied $V_{RRM(max)}$; $T_{mb} \leq 82 \text{ }^{\circ}\text{C}$	-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage		-	500	V
$I_{F(AV)}$	Average forward current		-	8	A
I_{FRM}	Repetitive peak forward current	$T_{mb} \leq 82 \text{ }^{\circ}\text{C}$ $\delta = 0.5$; with reappplied $V_{RRM(max)}$;	-	16	A
I_{FSM}	Non-repetitive peak forward current.	$t = 10 \text{ ms}$	-	55	A
		$t = 8.3 \text{ ms}$ sinusoidal; $T_j = 150^{\circ}\text{C}$ prior to surge with reappplied $V_{RWM(max)}$	-	60	A
T_{stg}	Storage temperature		-40	150	$^{\circ}\text{C}$
T_j	Operating junction temperature		-	150	$^{\circ}\text{C}$

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th j-mb}$	Thermal resistance junction to mounting base	minimum footprint, FR4 board	-	-	2.2	K/W
$R_{th j-a}$	Thermal resistance junction to ambient		-	50	-	K/W

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

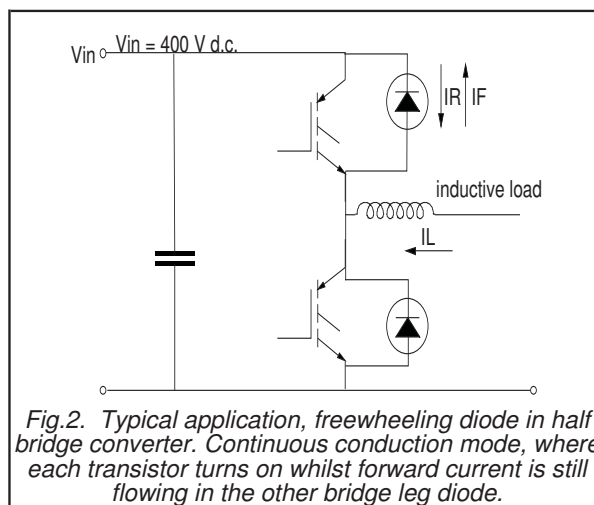
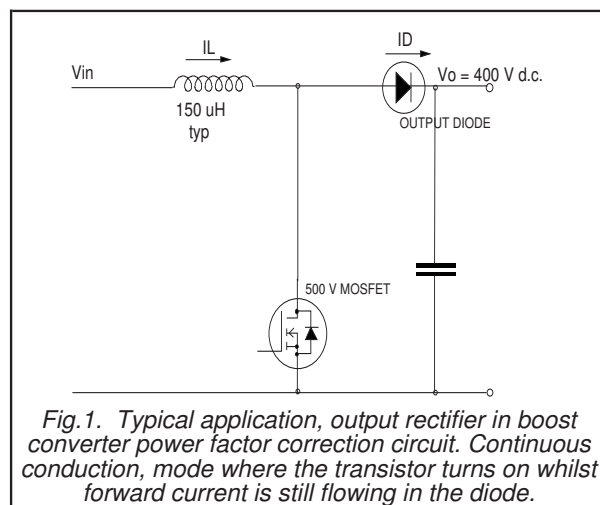
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ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 8\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	1.4	1.85	V
		$I_F = 16\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	1.7	2.3	V
I_R	Reverse current	$I_F = 8\text{ A}$; $V_R = 600\text{ V}$	-	2.0	2.9	V
		$V_R = 500\text{ V}$; $T_j = 100\text{ }^{\circ}\text{C}$	-	9	150	μA
			-	1.1	3.0	mA
t_{rr}	Reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $dI_F/dt = 50\text{ A}/\mu\text{s}$	-	30	52	ns
t_{rr}	Reverse recovery time	$I_F = 8\text{ A}$; $V_R = 400\text{ V}$; $dI_F/dt = 500\text{ A}/\mu\text{s}$	-	19	-	ns
t_{rr}	Reverse recovery time	$I_F = 8\text{ A}$; $V_R = 400\text{ V}$; $dI_F/dt = 500\text{ A}/\mu\text{s}$; $T_j = 100\text{ }^{\circ}\text{C}$	-	32	40	ns
I_{rrm}	Peak reverse recovery current	$I_F = 8\text{ A}$; $V_R = 400\text{ V}$; $dI_F/dt = 50\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^{\circ}\text{C}$	-	1.5	5.5	A
I_{rrm}	Peak reverse recovery current	$I_F = 8\text{ A}$; $V_R = 400\text{ V}$; $dI_F/dt = 500\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^{\circ}\text{C}$	-	9.5	12	A
V_{fr}	Forward recovery voltage	$I_F = 10\text{ A}$; $dI_F/dt = 100\text{ A}/\mu\text{s}$	-	8	10	V



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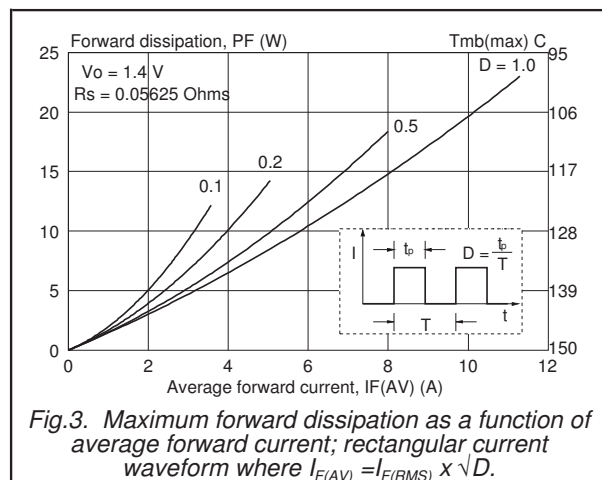


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

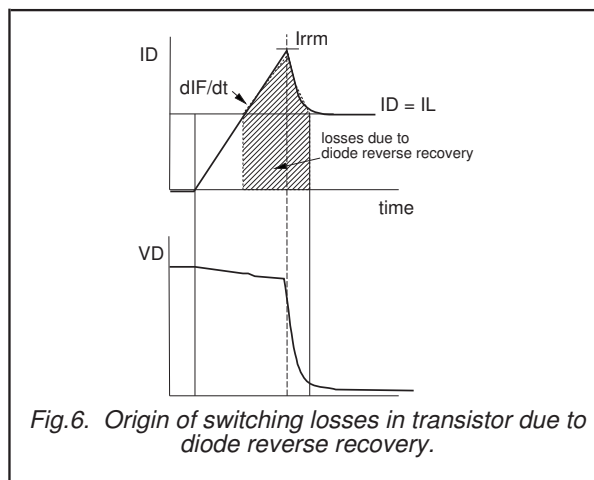


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

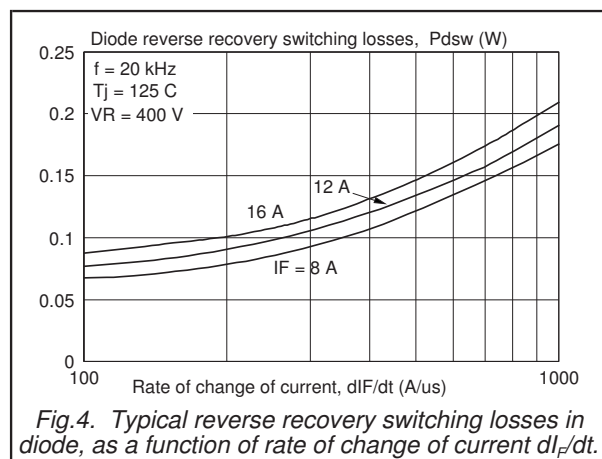


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt .

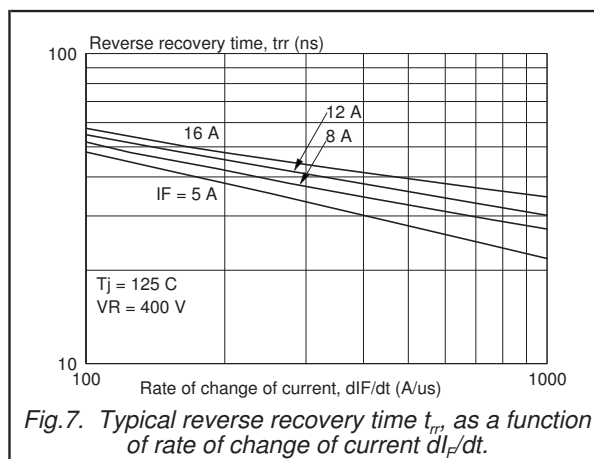


Fig.7. Typical reverse recovery time t_{rr} as a function of rate of change of current dI_F/dt .

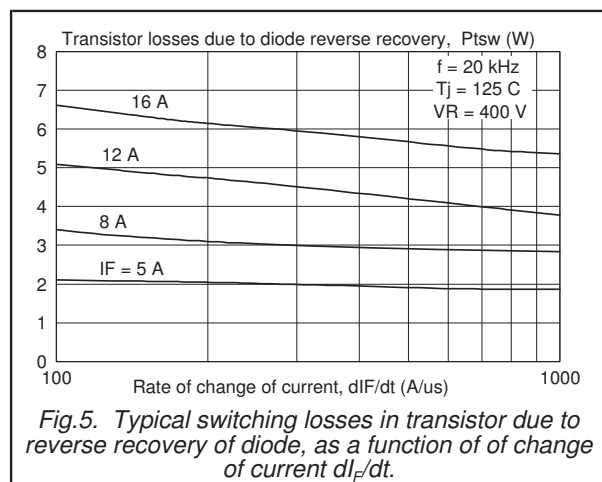


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of rate of change of current dI_F/dt .

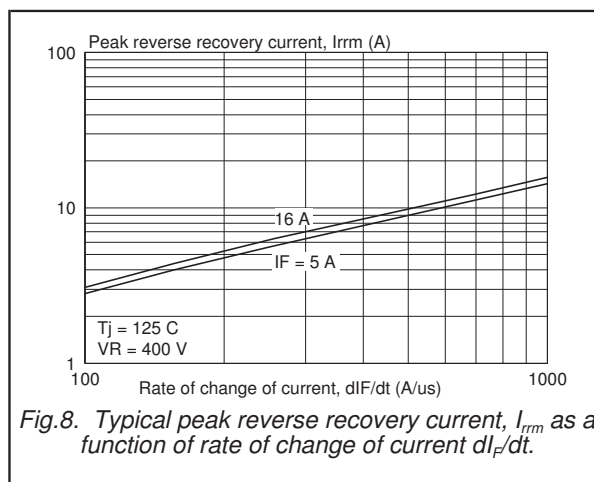
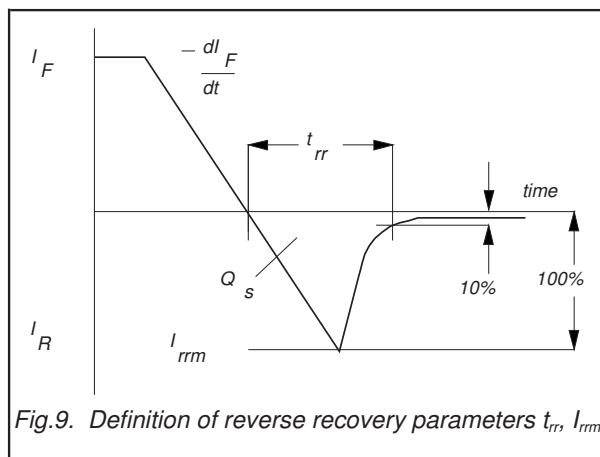
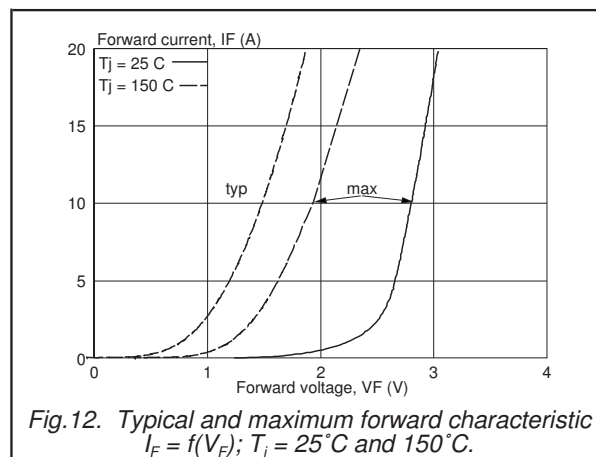
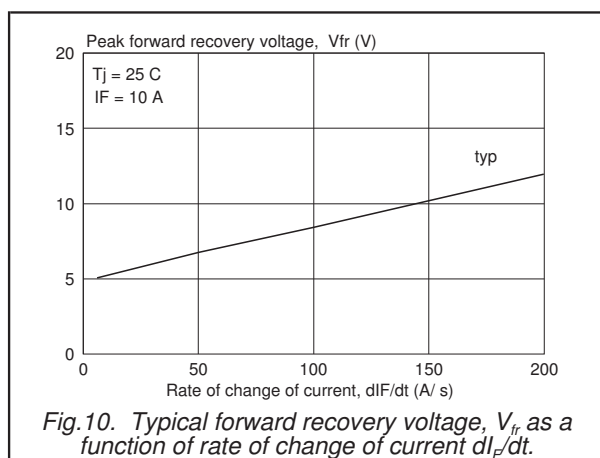
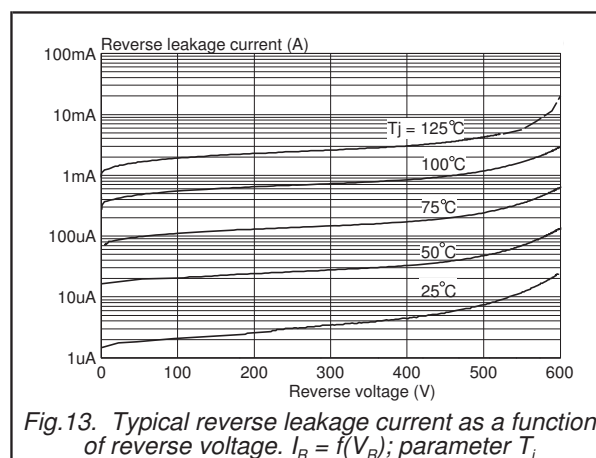
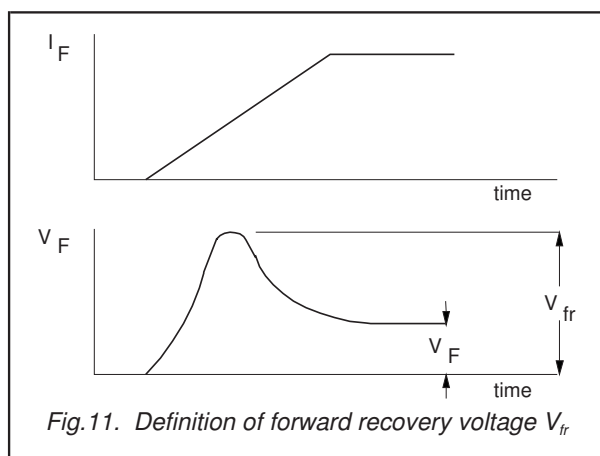
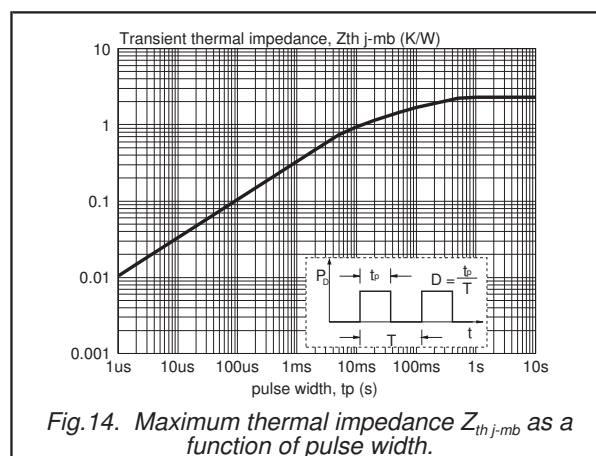


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt .

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Fig. 9. Definition of reverse recovery parameters t_{rr} , I_{rrm} Fig. 12. Typical and maximum forward characteristic $I_F = f(V_F)$; $T_j = 25^\circ\text{C}$ and 150°C .Fig. 10. Typical forward recovery voltage, V_{fr} , as a function of rate of change of current dI_F/dt .Fig. 13. Typical reverse leakage current as a function of reverse voltage. $I_R = f(V_R)$; parameter T_j Fig. 11. Definition of forward recovery voltage V_{fr} Fig. 14. Maximum thermal impedance $Z_{th j-mb}$ as a function of pulse width.

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MECHANICAL DATA

Dimensions in mm

Net Mass: 1.4 g

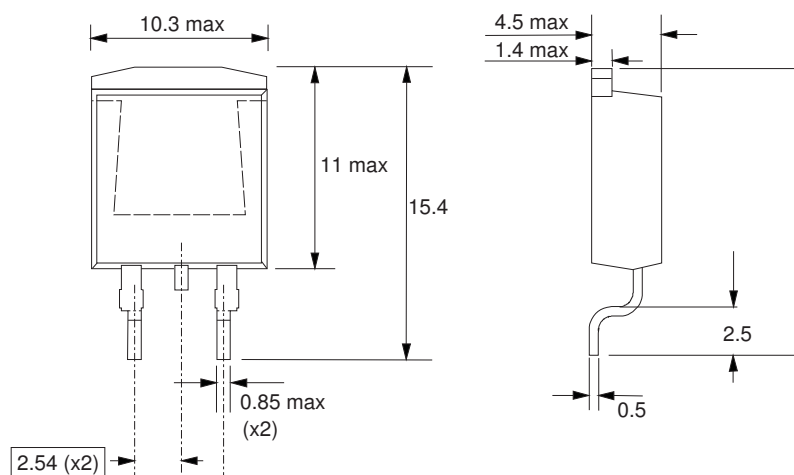


Fig. 15. SOT404 : centre pin connected to mounting base.

MOUNTING INSTRUCTIONS

Dimensions in mm

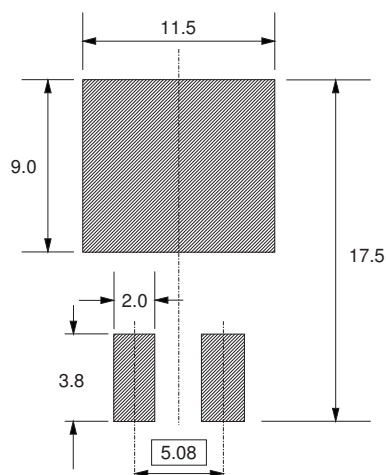


Fig. 16. SOT404 : soldering pattern for surface mounting.

Notes

1. Epoxy meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
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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