DISCRETE SEMICONDUCTORS

DATA SHEET

BYC8B-600 Rectifier diode ultrafast, low switching loss

Product specification

March 2001



Product specification WeEn Semiconductors

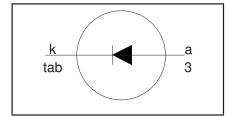
Rectifier diode ultrafast, low switching loss

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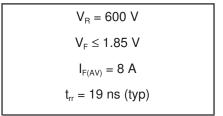
FEATURES

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

SYMBOL



QUICK REFERENCE DATA



APPLICATIONS

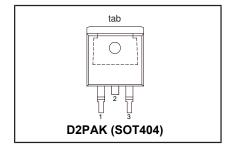
- Active power factor correction
- Half-bridge lighting ballastsHalf-bridge/ full-bridge switched mode power supplies.

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		-	600	V
V _{RWM}	Crest working reverse voltage		-	600	V
V _R	Continuous reverse voltage	T _{mb} ≤ 110 °C	-	500	V
I _{F(AV)}	Average forward current	$\delta = 0.5$; with reapplied $V_{BRM(max)}$;	-	8	A
` '		IT < 82 °C			
I _{FRM}	Repetitive peak forward current	$\delta = 0.5$; with reapplied $V_{RRM(max)}$;	-	16	A
		$T_{\rm mb} \leq 82 ^{\circ} \text{C}$			
I _{FSM}	Non-repetitive peak forward	t = 10 ms	-	55	A
	current.	t = 8.3 ms	-	60	A
		sinusoidal; $T_i = 150^{\circ}C$ prior to surge			
		with reapplied V _{RWM(max)}			
T _{stg}	Storage temperature		-40	150	C C
T _i	Operating junction temperature		-	150	l °C ∣

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
R _{th j-mb}	Thermal resistance junction to mounting base		-	-	2.2	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_i = 25 °C unless otherwise stated

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

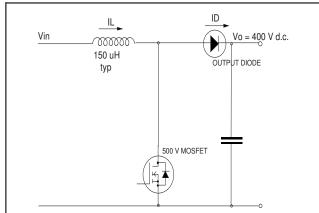


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction, mode where the transistor turns on whilst forward current is still flowing in the diode.

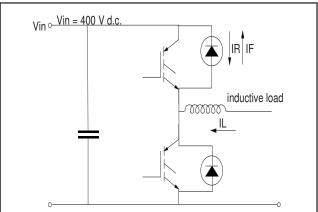


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

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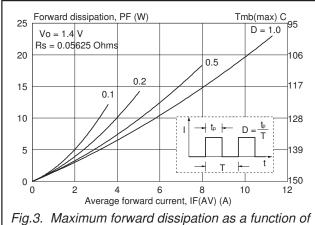


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(BMS)} x \sqrt{D}$.

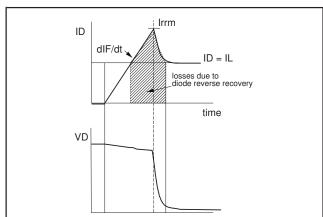


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

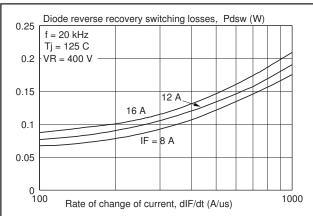


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dl_F/dt.

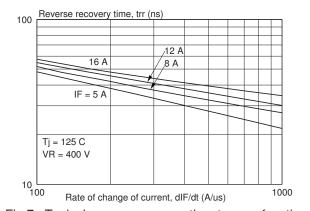


Fig.7. Typical reverse recovery time t_{rr} , as a function of rate of change of current dl_{r}/dt .

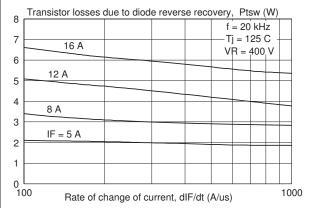


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dl_r/dt.

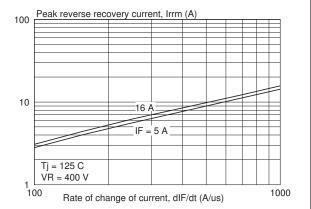
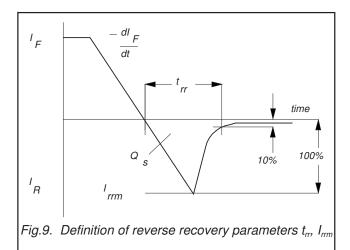


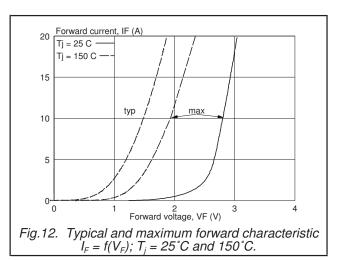
Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_r/dt.

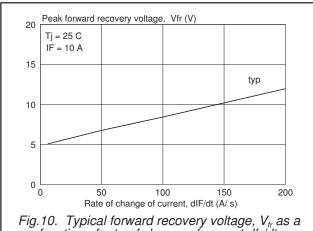
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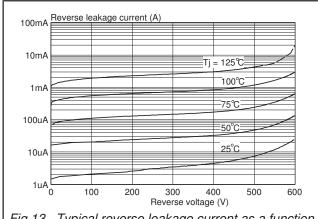
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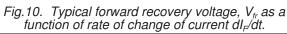
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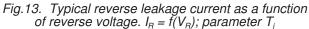


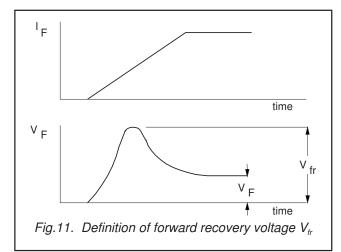


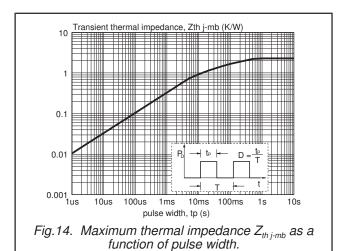








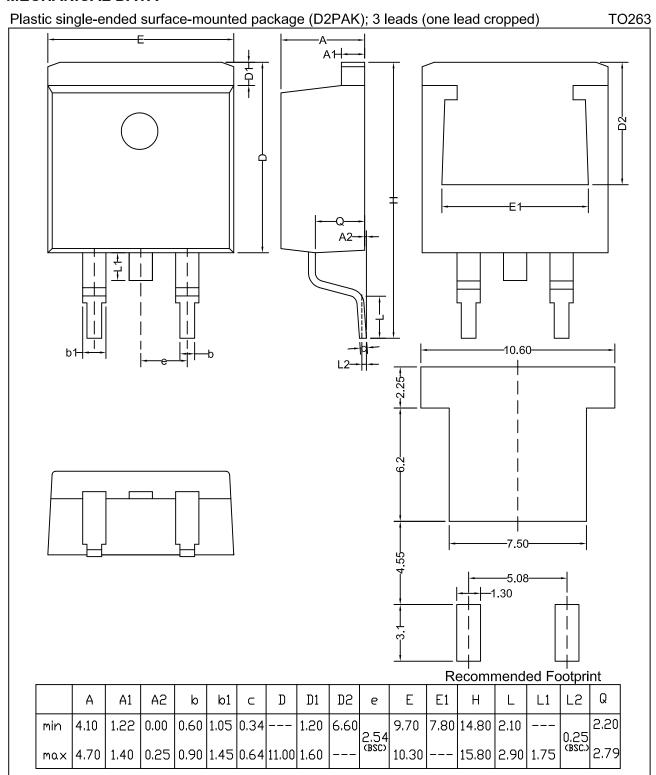




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MECHANICAL DATA



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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

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