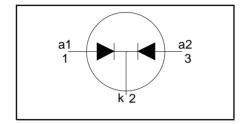
Rectifier diode ultrafast, low switching loss

BYC10-600CT

FEATURES

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

SYMBOL



QUICK REFERENCE DATA

$$V_{R} = 600 \text{ V}$$

$$V_{F} \le 1.75 \text{ V}$$

$$I_{O(AV)} = 10 \text{ A}$$

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

APPLICATIONS

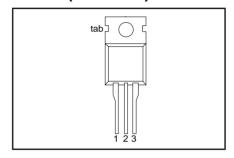
- Active power factor correction
- Half-bridge lighting ballastsHalf-bridge/ full-bridge switched mode power supplies.

The BYC10-600CT is supplied in the SOT78 (TO220AB) conventional leaded package.

PINNING

PIN	IN DESCRIPTION	
1	anode 1	
2	cathode	
3	anode 2	
tab	cathode	

SOT78 (TO220AB)



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 _{O(AV)}	Average output current (both diodes conducting)	$\delta = 0.5$; with reapplied $V_{RRM(max)}$; $T_{mb} \leq 50 ^{\circ}C^{1}$	-	10	Α
I _{FRM}	Repetitive peak forward current per diode	$\delta = 0.5$; with reapplied $V_{RRM(max)}$; $T_{mb} \leq 50 ^{\circ}C^{1}$	-	10	А
I _{FSM}	Non-repetitive peak forward	t = 10 ms	-	40	Α
10	current per diode	t = 8.3 ms sinusoidal; $T_j = 150^{\circ}\text{C}$ prior to surge with reapplied $V_{\text{RWM(max)}}$	-	44	A
T _{stg}	Storage temperature		-40	150	°C
T _j	Operating junction temperature		-	150	°C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{\text{th j-mb}}$ $R_{\text{th j-a}}$	mounting base	per diode both diodes in free air.		- - 60	2.5 2.2 -	K/W K/W K/W

¹ T_{mb(max)} limited by thermal runaway

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ELECTRICAL CHARACTERISTICS

T_i = 25 °C, per diode unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{F}	Forward voltage	I _F = 5 A; T _L = 150°C	1	1.4	1.75	V
		$I_{\rm F} = 10 {\rm A}; T_{\rm j} = 150 {\rm C}$	-	1.75	2.2	V
I _R	Reverse current	$I_F = 5 \text{ A};$ $V_R = 600 \text{ V}$ $V_R = 500 \text{ V}; T_i = 100 ^{\circ}\text{C}$	-	2.0 9 0.9	2.8 100 3.0	V μΑ mA
t _{rr}	Reverse recovery time Reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A/}\mu\text{s}$ $I_F = 5 \text{ A}; V_R = 400 \text{ V};$	-	30 19	50 -	ns ns
t _{rr}	Reverse recovery time	$ dI_F/dt = 500 \text{ A/}\mu\text{s}$ $ I_F = 5 \text{ A}; V_R = 400 \text{ V};$ $ dI_F/dt = 500 \text{ A/}\mu\text{s}; T_j = 125^{\circ}\text{C}$	-	25	30	ns
I _{rrm}	Peak reverse recovery current	$I_F = 5 \text{ A}; V_R = 400 \text{ V};$	-	0.7	3	Α
I _{rrm}	Peak reverse recovery current	dI _F /dt = 50 A/μs; T _i = 125 °C I _F = 5 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _j = 125 °C	-	8	11	Α
V_{fr}	Forward recovery voltage	$I_F = 10 \text{ A}; dI_F/dt = 100 \text{ A/}\mu\text{s}$	-	9	11	V

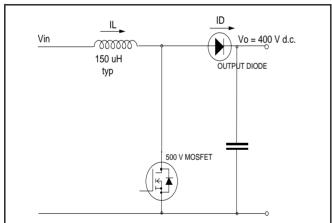


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction mode, where the transistor turns on whilst forward current is still flowing in the diode.

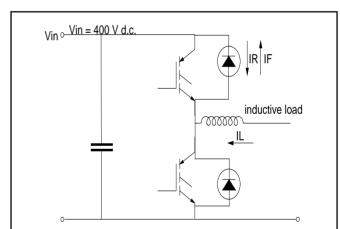


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

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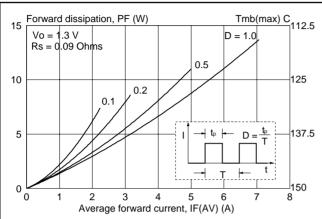


Fig.3. Maximum forward dissipation per diode as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

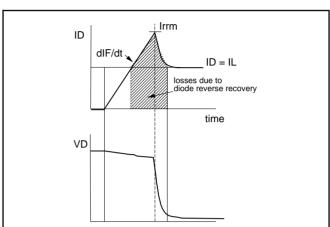


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

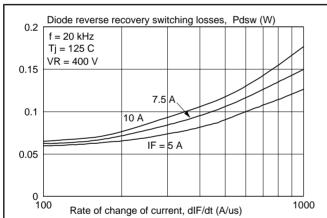


Fig.4. Typical reverse recovery switching losses per diode, as a function of rate of change of current dl_e/dt.

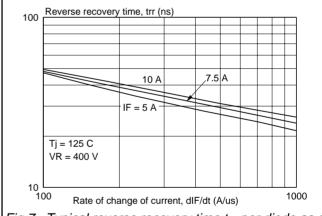


Fig.7. Typical reverse recovery time t_{rr}, per diode as a function of rate of change of current dl_r/dt.

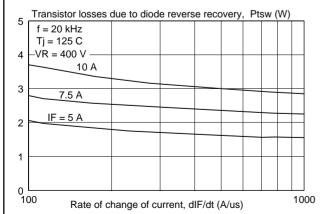


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dl_r/dt.

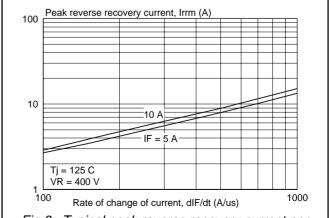
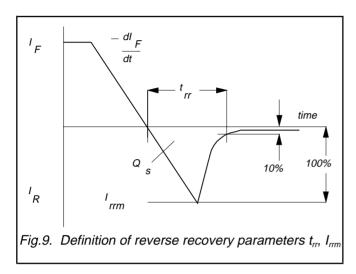


Fig.8. Typical peak reverse recovery current per diode, I_{rrm} as a function of rate of change of current dI_{r}/dt .

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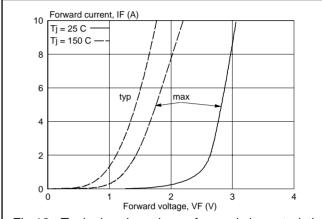


Fig.12. Typical and maximum forward characteristic per diode, $I_F = f(V_F)$; $T_i = 25^{\circ}C$ and $150^{\circ}C$.

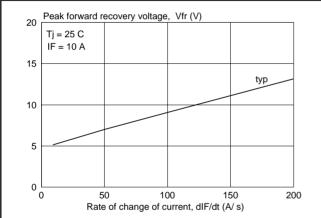


Fig.10. Typical forward recovery voltage per diode, V_{ti} as a function of rate of change of current dI_{F}/dt .

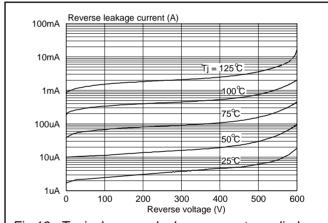
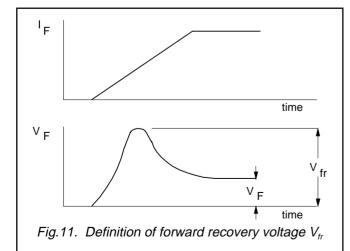


Fig.13. Typical reverse leakage current per diode as a function of reverse voltage. $I_R = f(V_R)$; parameter T_i



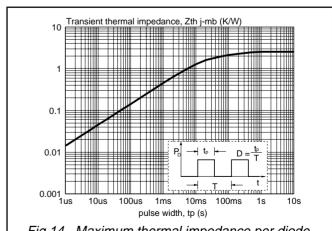
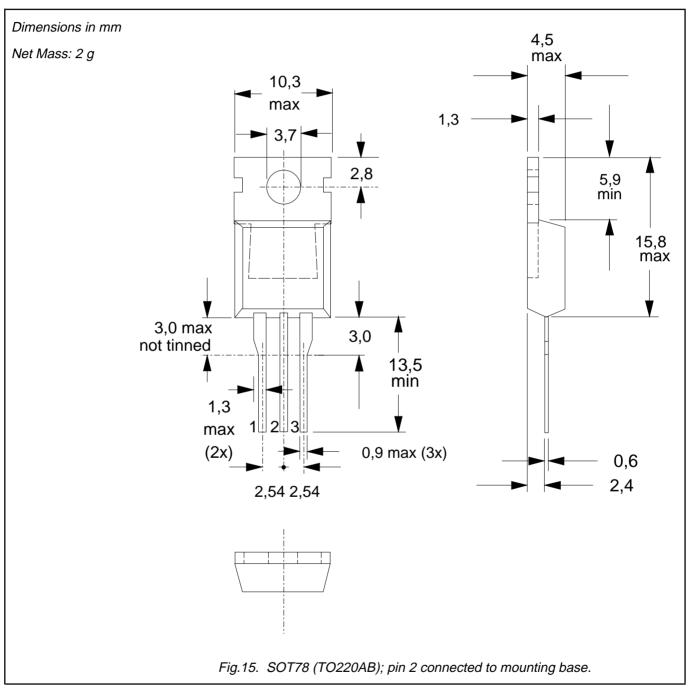


Fig.14. Maximum thermal impedance per diode, $Z_{th i-mb}$ as a function of pulse width.

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MECHANICAL DATA



- Notes
 1. Refer to mounting instructions for SOT78 (TO220) envelopes.
 2. Epoxy meets UL94 V0 at 1/8".

Philips Semiconductors Product specification

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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 are given 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 this 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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