

DATA SHEET

BYC10-600CT

Dual rectifier diode
ultrafast, low switching loss

Product specification

August 2018

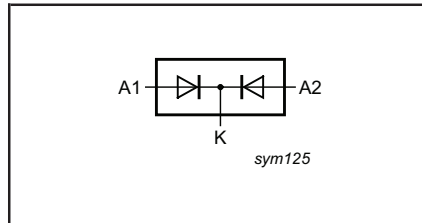
Rectifier diode ultrafast, low switching loss

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

$V_R = 600\text{ V}$
$V_F \leq 1.75\text{ V}$
$I_{O(AV)} = 10\text{ A}$
$t_{rr} = 19\text{ ns (typ)}$

APPLICATIONS

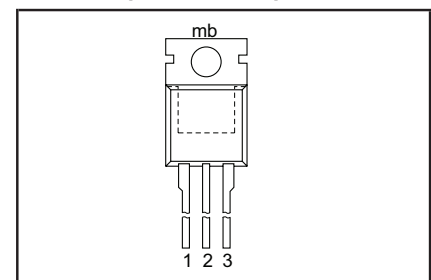
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

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

PINNING

PIN	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		-	500	V
$I_{O(AV)}$	Average output current (both diodes conducting)	$T_{mb} \leq 110\text{ °C}$ $\delta = 0.5$; with reappplied $V_{RRM(max)}$;	-	10	A
I_{FRM}	Repetitive peak forward current per diode	$T_{mb} \leq 50\text{ °C}^1$ $\delta = 0.5$; with reappplied $V_{RRM(max)}$;	-	10	A
I_{FSM}	Non-repetitive peak forward current per diode	$T_{mb} \leq 50\text{ °C}^1$ $t = 10\text{ ms}$	-	40	A
		$t = 8.3\text{ ms}$ sinusoidal; $T_j = 150\text{ °C}$ prior to surge	-	44	A
		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	per diode	-	-	2.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	both diodes in free air.	-	-	2.2	K/W
			-	60	-	K/W

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

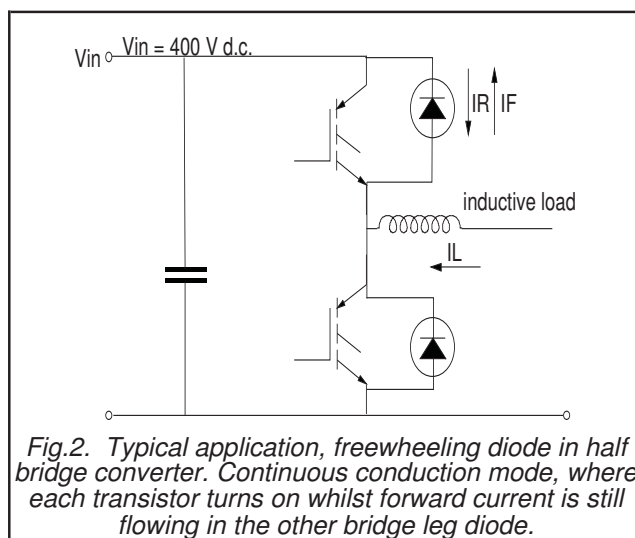
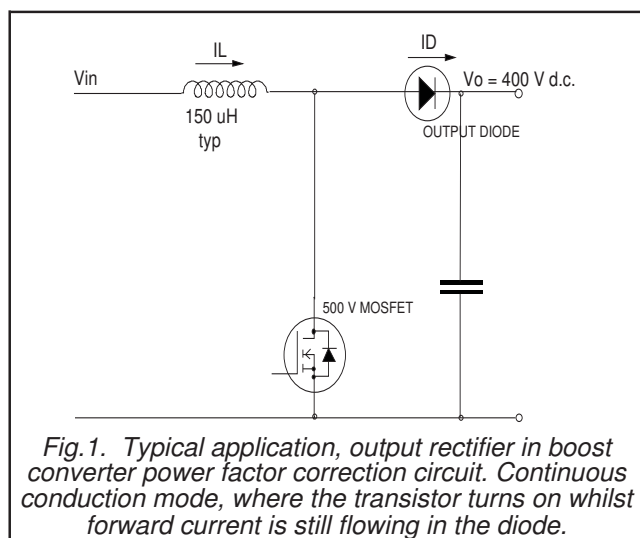
Rectifier diode ultrafast, low switching loss

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ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 5\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	1.4	1.75	V
		$I_F = 10\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	1.75	2.2	V
I_R	Reverse current	$I_F = 5\text{ A}$; $V_R = 600\text{ V}$	-	2.0	2.9	V
		$V_R = 500\text{ V}$; $T_j = 100\text{ }^{\circ}\text{C}$	-	9	100	μA
			-	0.9	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	50	ns
t_{rr}	Reverse recovery time	$I_F = 5\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 500\text{ A}/\mu\text{s}$	-	19	-	ns
t_{rr}	Reverse recovery time	$I_F = 5\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $T_j = 100\text{ }^{\circ}\text{C}$	-	25	30	ns
I_{rrm}	Peak reverse recovery current	$I_F = 5\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 50\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^{\circ}\text{C}$	-	0.7	3	A
I_{rrm}	Peak reverse recovery current	$I_F = 5\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^{\circ}\text{C}$	-	8	11	A
V_{fr}	Forward recovery voltage	$I_F = 10\text{ A}$; $di_F/dt = 100\text{ A}/\mu\text{s}$	-	9	11	V



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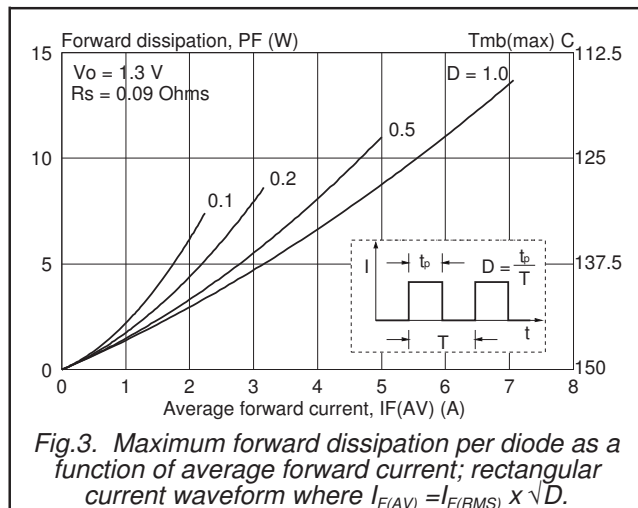


Fig.3. Maximum forward dissipation per diode as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

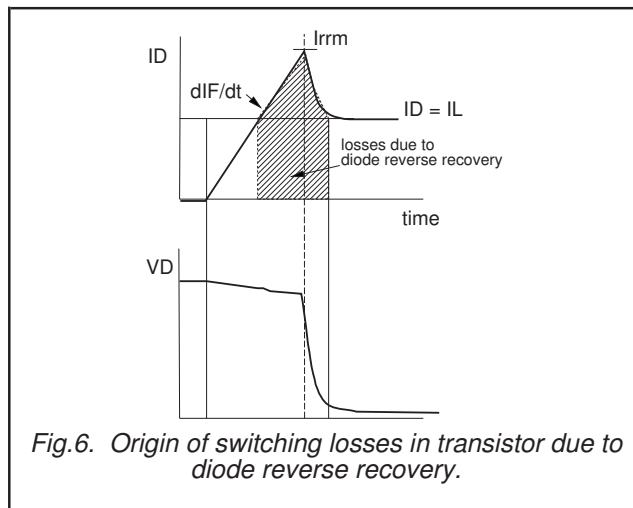


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

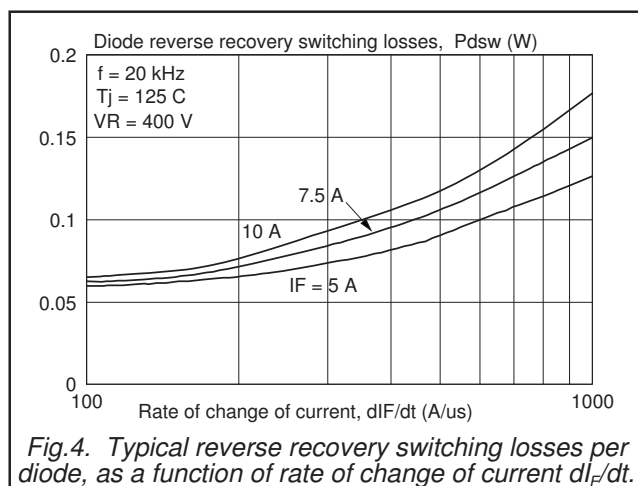


Fig.4. Typical reverse recovery switching losses per diode, as a function of rate of change of current dI_F/dt .

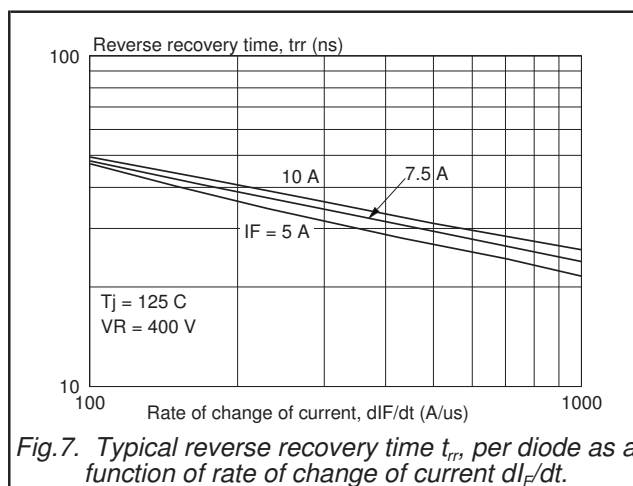


Fig.7. Typical reverse recovery time t_{rr} per diode as a function of rate of change of current dI_F/dt .

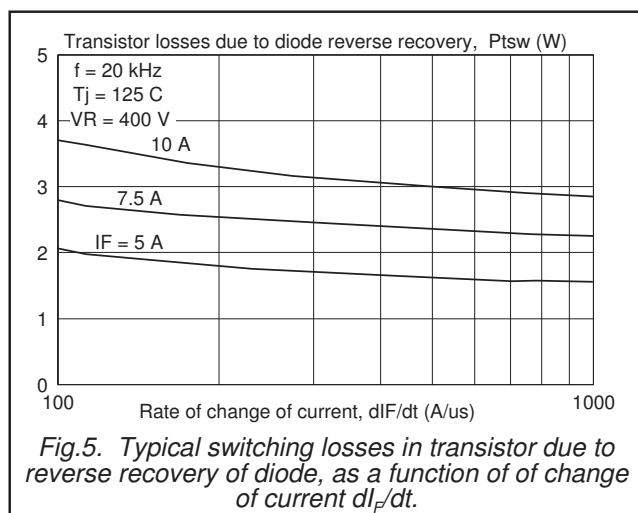


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of rate of change of current dI_F/dt .

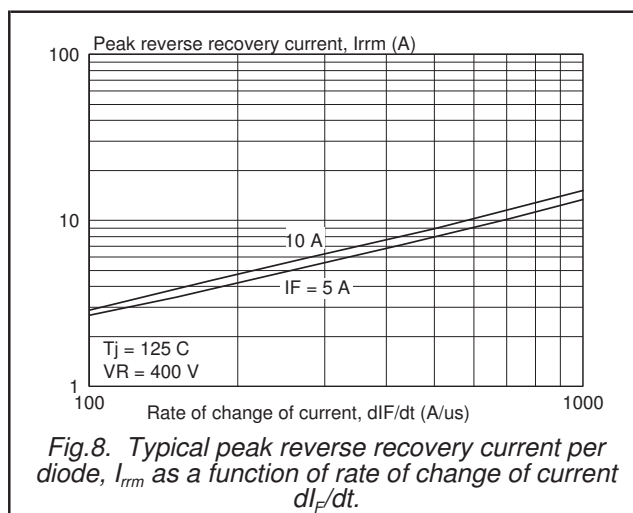
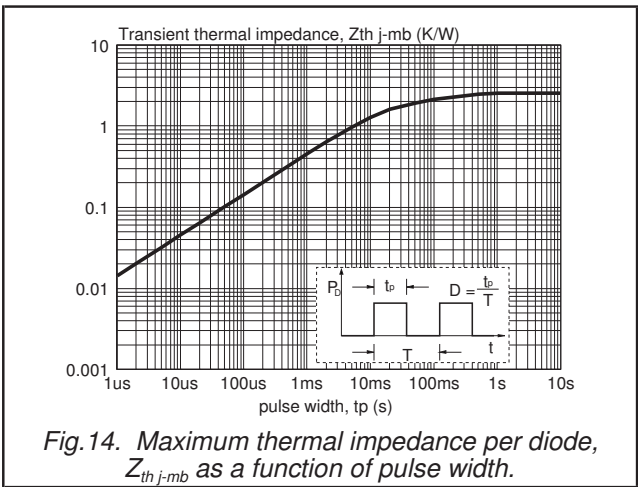
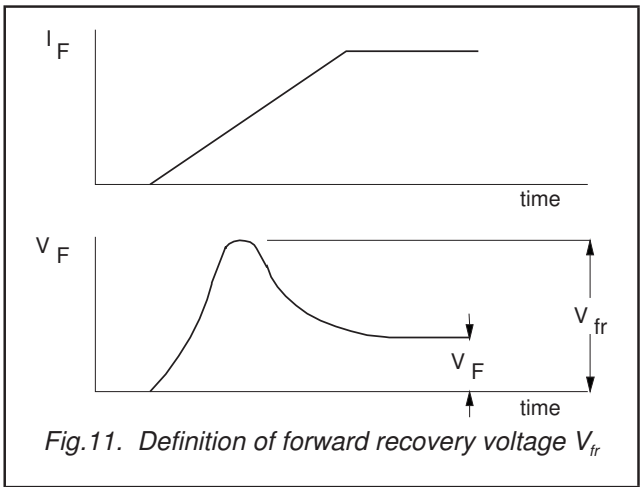
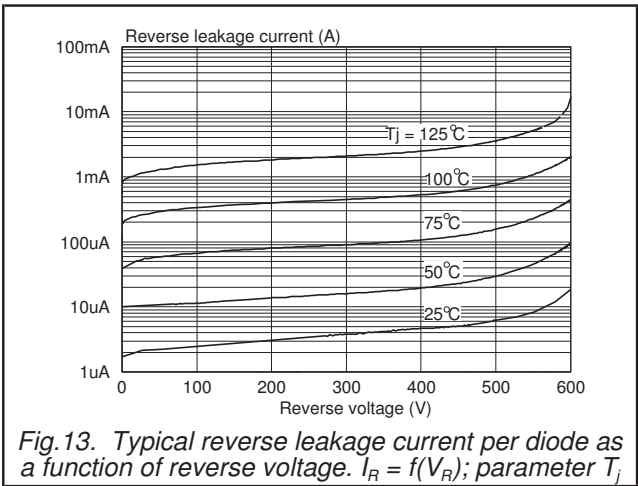
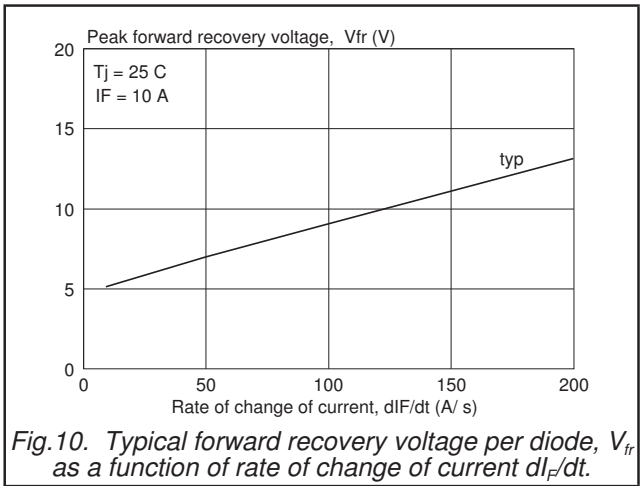
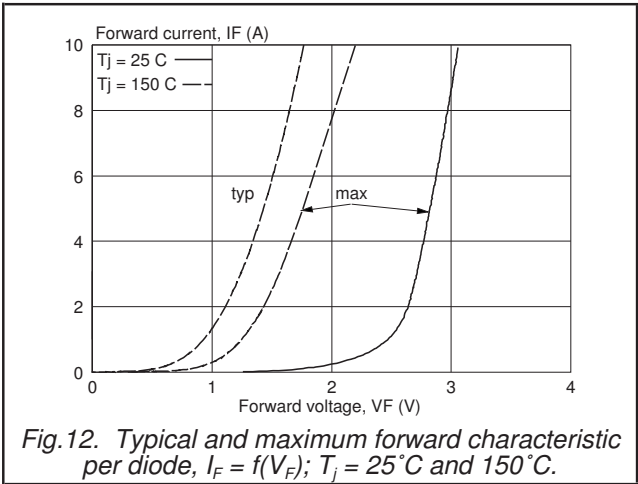
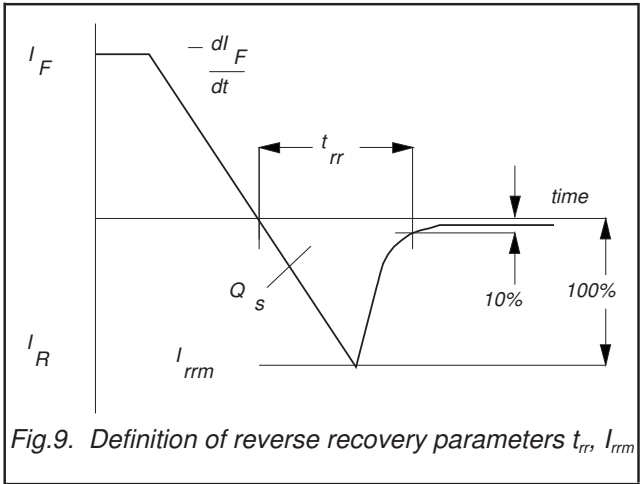


Fig.8. Typical peak reverse recovery current per diode, I_{rrm} as a function of rate of change of current dI_F/dt .

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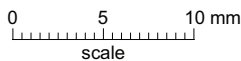
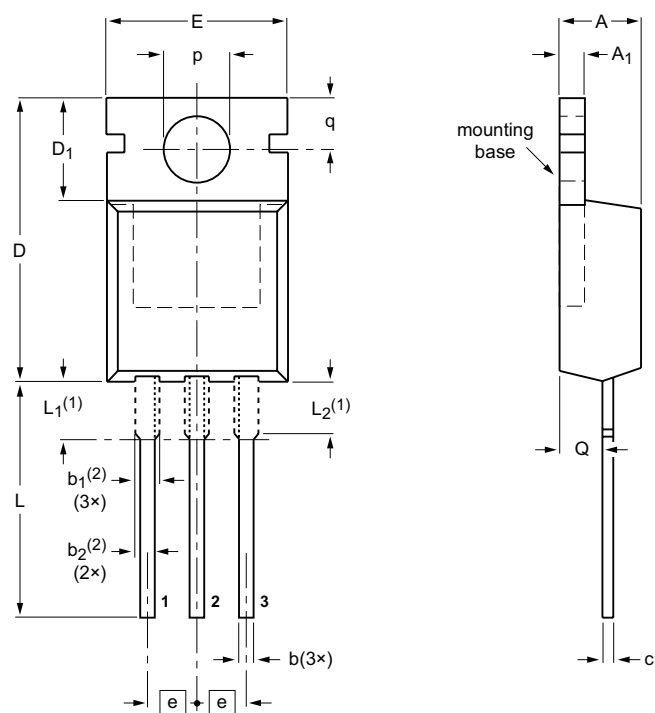


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MECHANICAL DATA

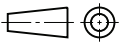
Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB SOT78



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	b ₁ (2)	b ₂ (2)	c	D	D ₁	E	e	L	L ₁ (1)	L ₂ (1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

- Notes
- Lead shoulder designs may vary.
 - Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT78		3-lead TO-220AB	SC-46			08-04-23 08-06-13

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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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- [2] The term 'short data sheet' is explained in section "Definitions".
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