



BYC30X-600P

Hyperfast power diode

Rev. 1 — 3 July 2012

Objective data sheet

1. Product profile

1.1 General description

Hyperfast power diode in a SOD113 (2-lead TO-220F) plastic package.

1.2 Features and benefits

- Isolated plastic package
- Low leakage current
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET or IGBT

1.3 Applications

- Active PFC in air conditioner
- Continuous Current Mode (CCM) Power Factor Correction (PFC)
- Half-bridge/full-bridge switched-mode power supplies

1.4 Quick reference data

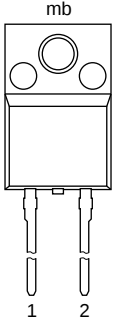
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$; $T_h \leq 51^\circ\text{C}$	-	-	30	A
Static characteristics						
V_F	forward voltage	$I_F = 30\text{ A}$; $T_j = 150^\circ\text{C}$	-	1.4	1.8	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $dI_F/dt = 50\text{ A/s}$; $T_j = 25^\circ\text{C}$	-	-	35	ns



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	n.c.	mounting base; isolated		

SOD113 (TO-220F)

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC30X-600P	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	600	V
V_{RWM}	crest working reverse voltage		-	600	V
V_R	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$; $T_h \leq 51^\circ\text{C}$	-	30	A
I_{FRM}	repetitive peak forward current	square-wave pulse; $\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_h \leq 51^\circ\text{C}$	-	60	A
I_{FSM}	non-repetitive peak forward current	sine-wave pulse; $t_p = 10\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$	-	200	A
		sine-wave pulse; $t_p = 8.3\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$	-	220	A
T_{stg}	storage temperature		-65	175	$^\circ\text{C}$
T_j	junction temperature		-	175	$^\circ\text{C}$

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound	-	-	2.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	55	-	K/W

6. Isolation characteristics

Table 6. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 Hz $\leq f \leq$ 60 Hz; RH $\leq$ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free	-	-	2500	V
C_{isol}	isolation capacitance	f = 1 MHz ; from cathode to external heatsink	-	10	-	pF

7. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 30\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$	-	2	2.65	V
		$I_F = 30\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$	-	1.4	1.8	V
I_R	reverse current	$V_R = 600\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$	-	-	30	μA
		$V_R = 600\text{ V}$; $T_j = 150\text{ }^\circ\text{C}$	-	-	300	μA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $di_F/dt = 200\text{ A/s}$; $T_j = 25\text{ }^\circ\text{C}$	-	50	-	nC
		$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $di_F/dt = 200\text{ A/s}$; $T_j = 125\text{ }^\circ\text{C}$	-	280	-	nC
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $di_F/dt = 50\text{ A/s}$; $T_j = 25\text{ }^\circ\text{C}$	-	-	35	ns
		$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $di_F/dt = 200\text{ A/s}$; $T_j = 25\text{ }^\circ\text{C}$	-	-	35	ns
		$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $di_F/dt = 200\text{ A/s}$; $T_j = 125\text{ }^\circ\text{C}$	-	70	-	ns
I_{RM}	peak reverse recovery current	$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $di_F/dt = 200\text{ A/s}$; $T_j = 25\text{ }^\circ\text{C}$	-	3.5	-	A
		$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $di_F/dt = 200\text{ A/s}$; $T_j = 125\text{ }^\circ\text{C}$	-	7.6	-	A

8. Package outline

Plastic single-ended package; isolated heatsink mounted;
1 mounting hole; 2-lead TO-220 'full pack'

SOD113

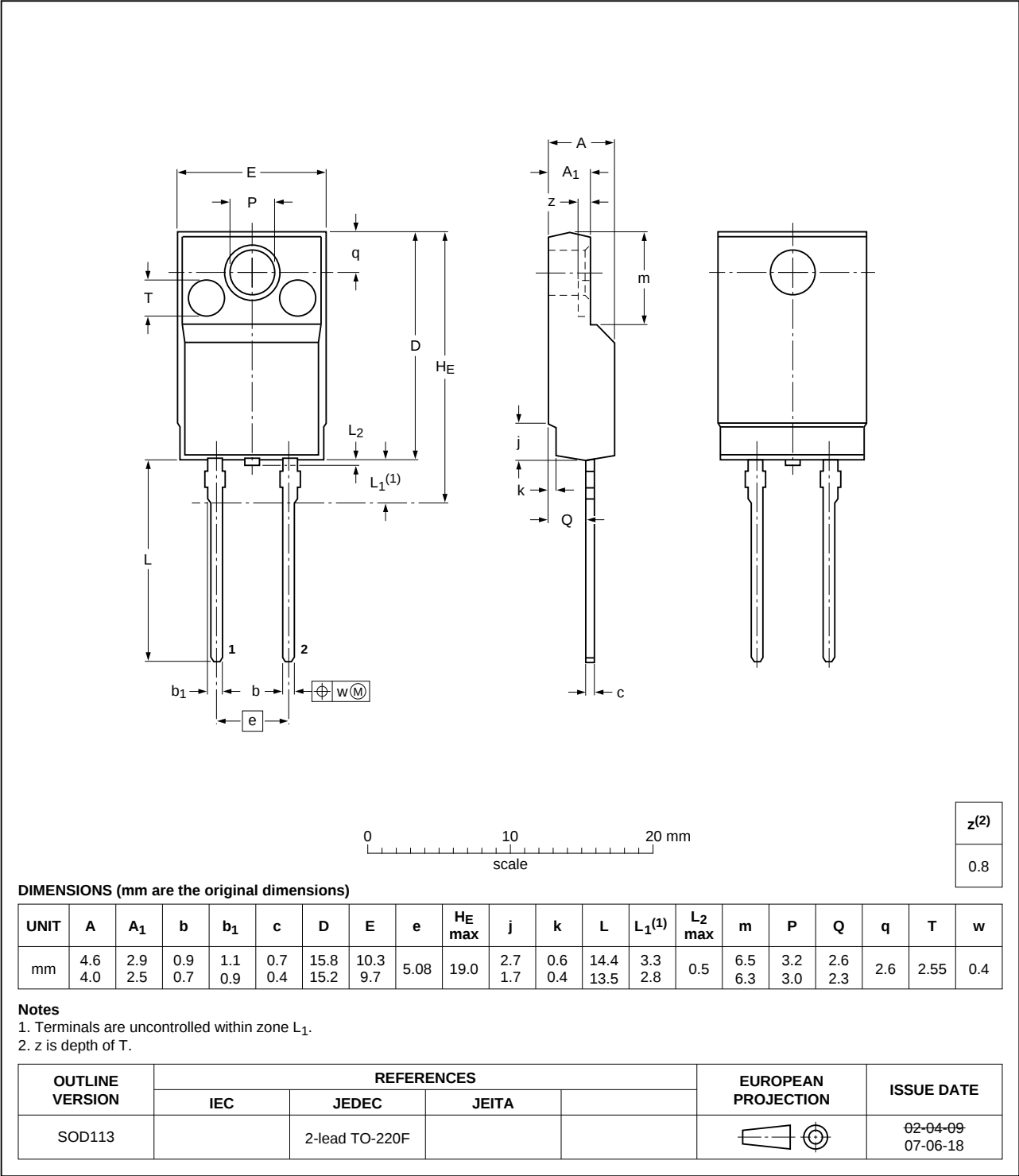


Fig 1. Package outline SOD113 (TO-220F)

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYC30X-600P v.1	20120703	Objective data sheet	-	-

10. Legal information

10.1 Data sheet status

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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