

## 1. General description

Hyperfast power diode in a 2-lead TO220F plastic package



## 2. Features and benefits

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

## 3. Applications

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

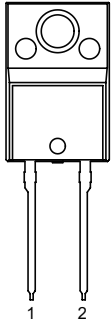
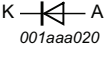
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
<b>Absolute maximum rating</b>							
$V_{RRM}$	repetitive peak reverse voltage			600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>		15			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25 \mu s$ ; square-wave pulse		30			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10 \text{ ms}$ ; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$ ; sine-wave pulse; <a href="#">Fig. 3</a>		200			A
		$t_p = 8.3 \text{ ms}$ ; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$ ; sine-wave pulse		220			A
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
$V_F$	forward voltage	$I_F = 15 \text{ A}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; <a href="#">Fig. 5</a>		-	1.92	2.35	V
		$I_F = 15 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$ ; <a href="#">Fig. 5</a>		-	1.27	1.70	V
<b>Dynamic characteristics</b>							
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $di_F/dt = 200 \text{ A}/\mu s$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; <a href="#">Fig. 6</a>		-	16	-	ns

## 5. 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		

## 6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYC15MX-600P	TO220F-2L	BYC15MX-600PQ	Tube	50	TO220Fd-2L	02-Aug-2022

## 7. Marking

Table 4. Marking codes

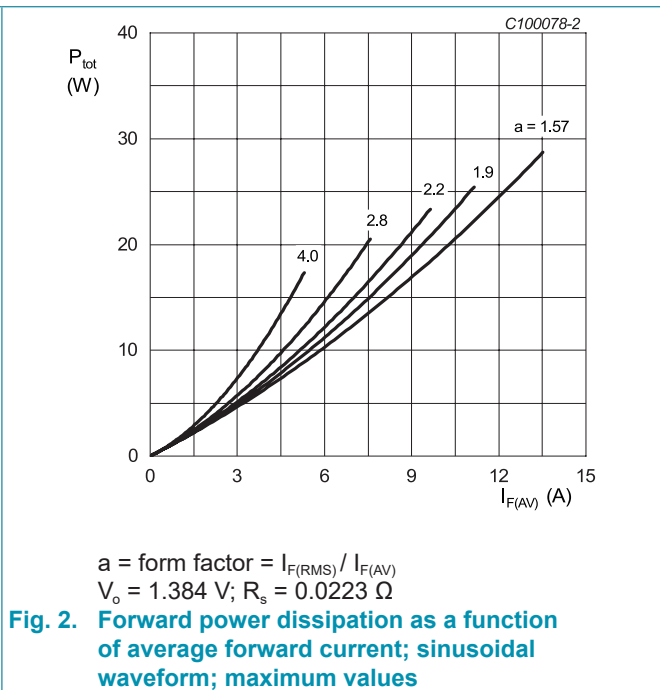
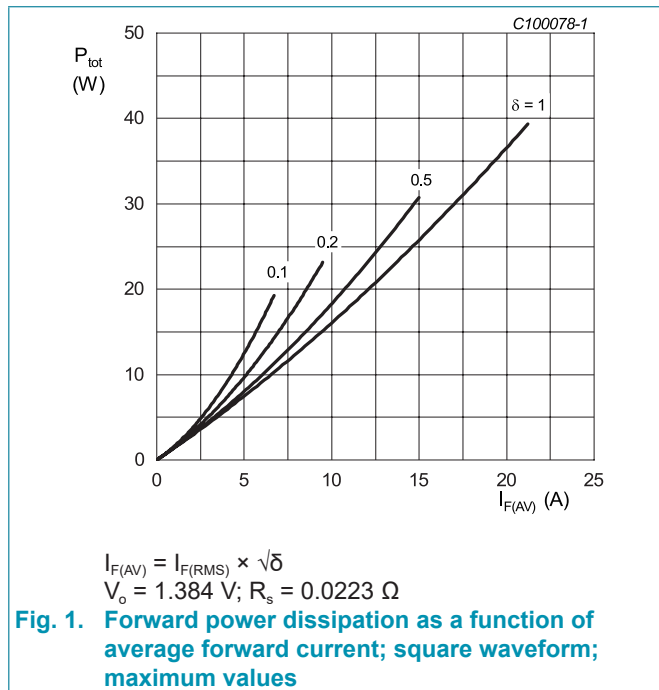
Type number	Marking codes
BYC15MX-600P	BYC15MX 600P

## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Notes	Values	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	$\delta = 0.5$ ; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>		15	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25 \mu s$ ; square-wave pulse		30	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10 ms$ ; $T_{j(initial)} = 25 \text{ }^\circ\text{C}$ ; sine-wave pulse; <a href="#">Fig. 3</a>		200	A
		$t_p = 8.3 ms$ ; $T_{j(initial)} = 25 \text{ }^\circ\text{C}$ ; sine-wave pulse		220	A
$T_{stg}$	storage temperature			-65 to 175	$^\circ\text{C}$
$T_j$	junction temperature			-65 to 175	$^\circ\text{C}$



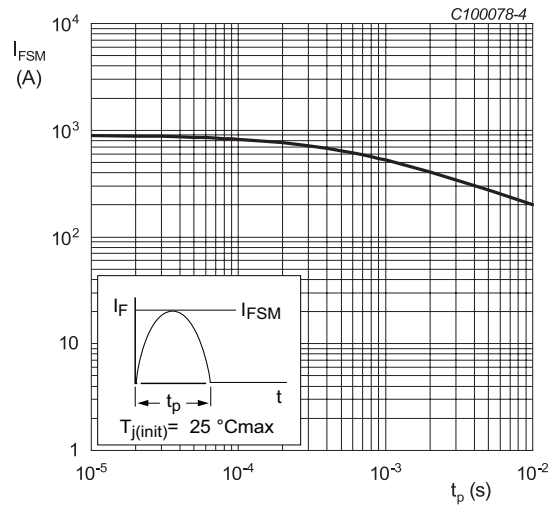


Fig. 3. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

### 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	<a href="#">Fig. 4</a>		-	-	6.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

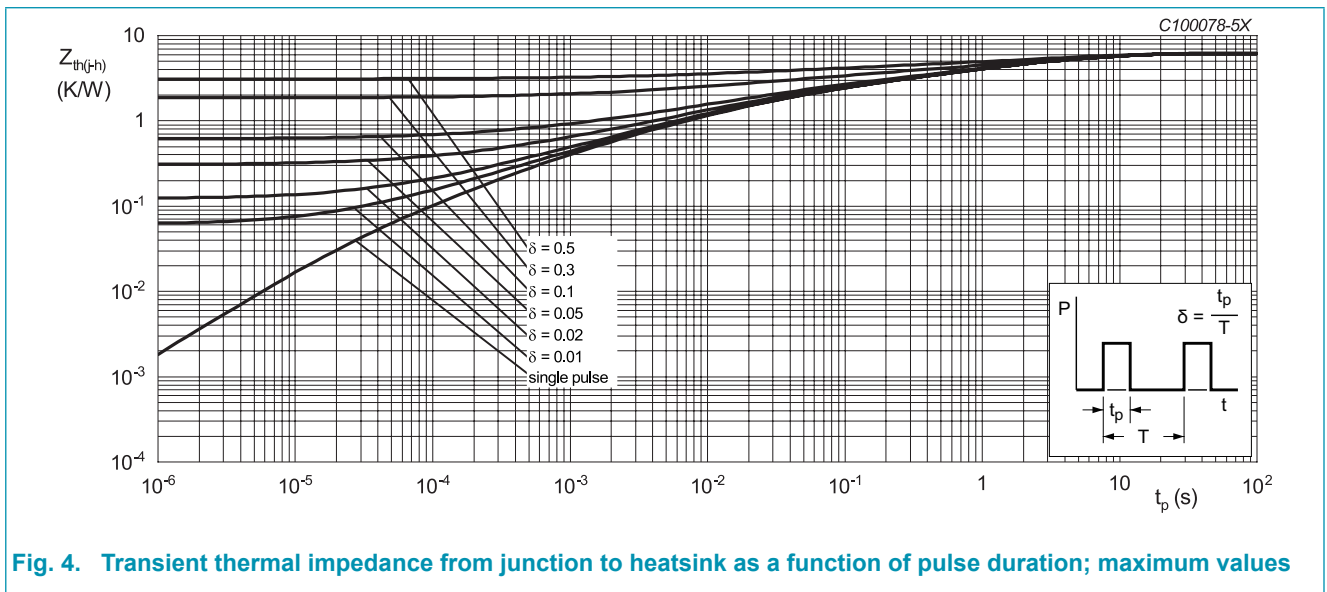


Fig. 4. Transient thermal impedance from junction to heatsink as a function of pulse duration; maximum values

### 10. Isolation characteristics

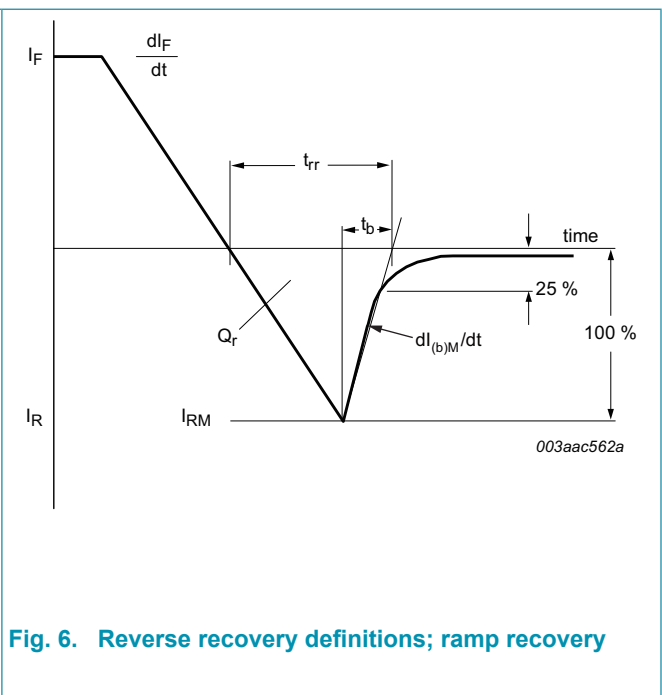
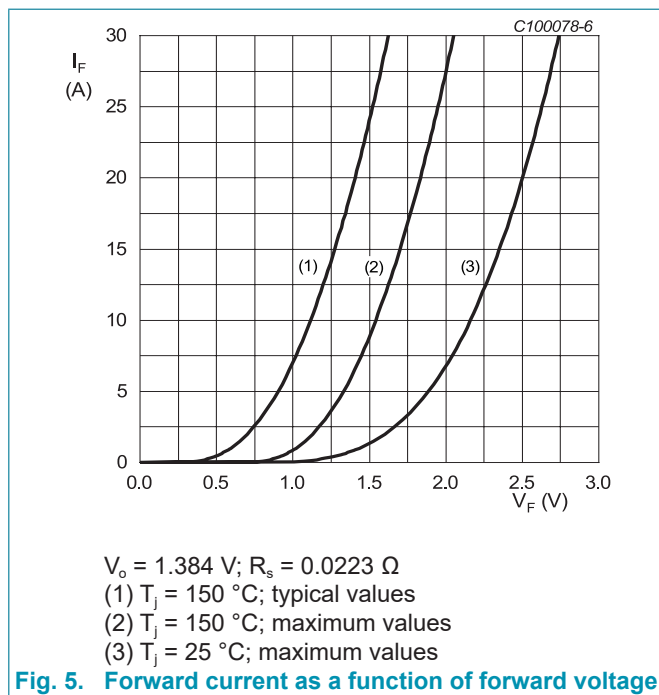
Table 7. Isolation characteristics

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

### 11. Characteristics

Table 8. Characteristics

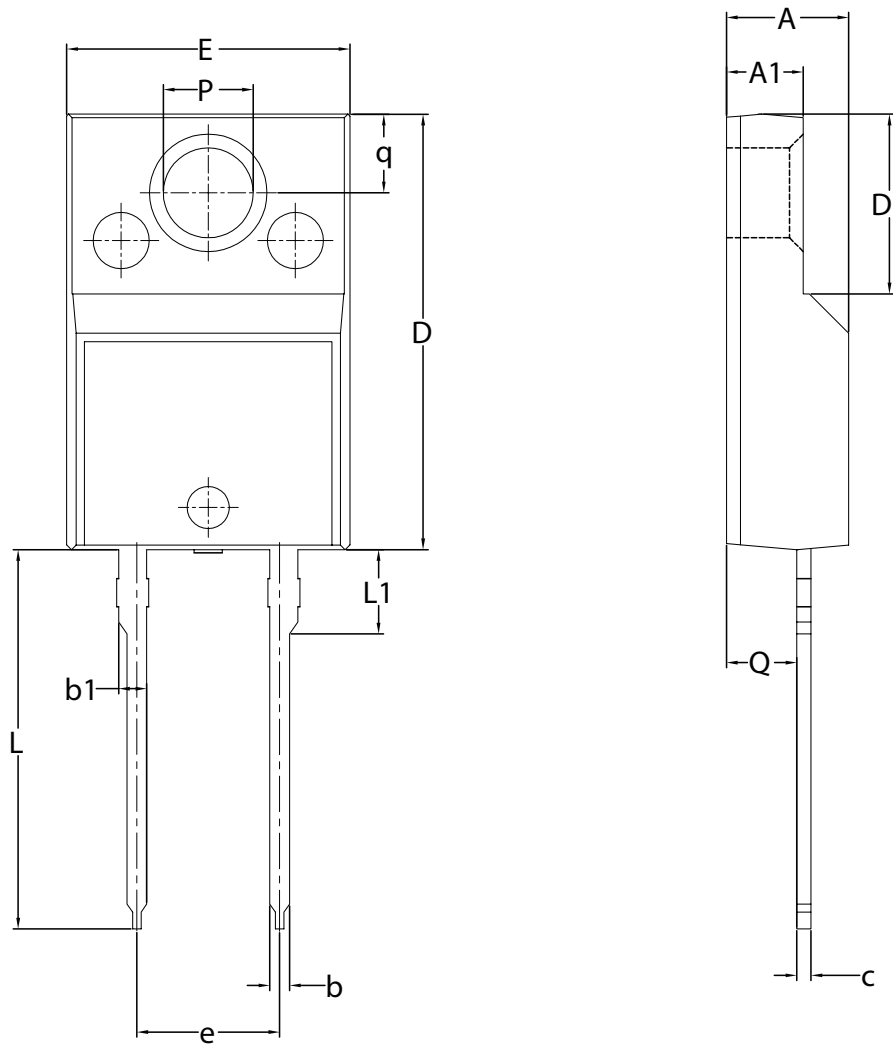
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 5</a>		-	1.92	2.35	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 5</a>		-	1.27	1.70	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C		-	0.71	10	µA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 150 °C		-	-	0.5	mA
<b>Dynamic characteristics</b>							
Q <sub>r</sub>	reverse charge	I <sub>F</sub> = 15 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/µs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	75	-	nC
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/µs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 6</a>		-	204	-	nC
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 0.5 A; I <sub>R</sub> = 1 A; I <sub>rr</sub> = 0.25 A; T <sub>j</sub> = 25 °C		-	20	-	ns
		I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 200 A/µs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	16	-	ns
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/µs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	26	-	ns
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/µs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 6</a>		-	38	-	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 15 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/µs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	5.7	-	A
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/µs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 6</a>		-	10.8	-	A



## 12. Package outline

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

TO220F-2L



Unit	A	A1	b	b1	c	D	D1	E	e	L	L1	P	Q	q	
MM	min	4.00	2.50	0.70	0.90	0.40	15.20	6.30	9.80	5.08 (BSC)	13.50	2.80	3.00	2.30	2.60
	max	4.60	3.10	0.90	1.10	0.70	15.80	6.50	10.30		14.40	3.30	3.40	2.80	3.00

Note:

1. All dimensions don't include mold flash and metal protrusion.

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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.
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