

1. General description

Hyperfast power diode in a 2-lead IITO220 plastic package.

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

3. Applications

- Active PFC in air conditioner
- High frequency switched-mode power supplies
- Continuous Current Mode (CCM) Power Factor Correction (PFC)

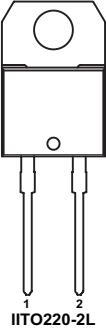
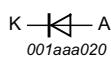
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 90$ °C; square-wave pulse Fig. 1 ; Fig. 2 ; Fig. 3	30			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ µs; $T_{mb} \leq 90$ °C; square-wave pulse	60			A
I_{FSM}	non-repetitive peak forward current	$t_b = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4	200			A
		$t_b = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	220			A
Symbol	Parameter	Conditions		Min	Typ	Max
Static characteristics						
V_F	forward voltage	$I_F = 30$ A; $T_j = 150$ °C; Fig. 6	-	1.38	1.8	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 50$ A/µs; $T_j = 25$ °C; Fig. 7	-	-	35	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
BYC30Y-600P	IITO220-2L	BYC30Y-600PQ	Tube	50	IITO220E-2L	03-Mar-2020

7. Marking

Table 4. Marking codes

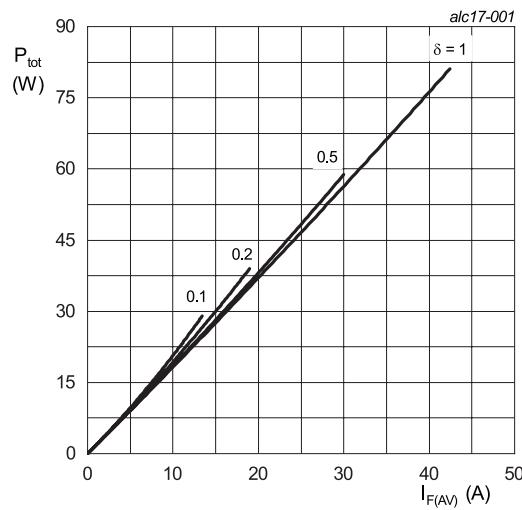
Type number	Marking codes
BYC30Y-600P	BYC30Y 600P

8. Limiting values

Table 5. Limiting values

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

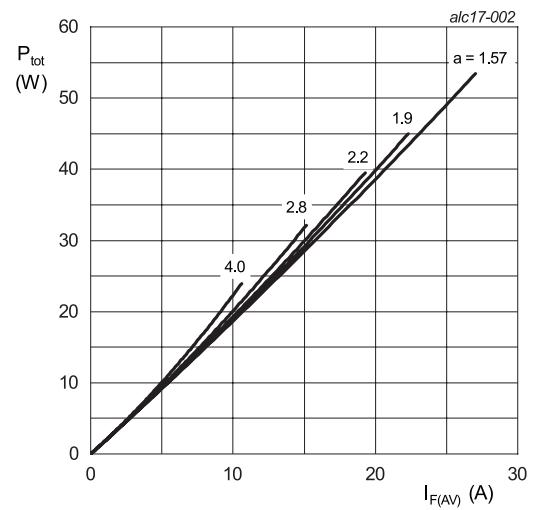
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 90$ °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	30	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ µs; $T_{mb} \leq 90$ °C; square-wave pulse	60	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4	200	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	220	A
T_{stg}	storage temperature		-65 to 175	°C
T_j	junction temperature		175	°C



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 1.797 \text{ V}; R_s = 0.0027 \Omega$$

Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$$V_o = 1.797 \text{ V}; R_s = 0.0027 \Omega$$

Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

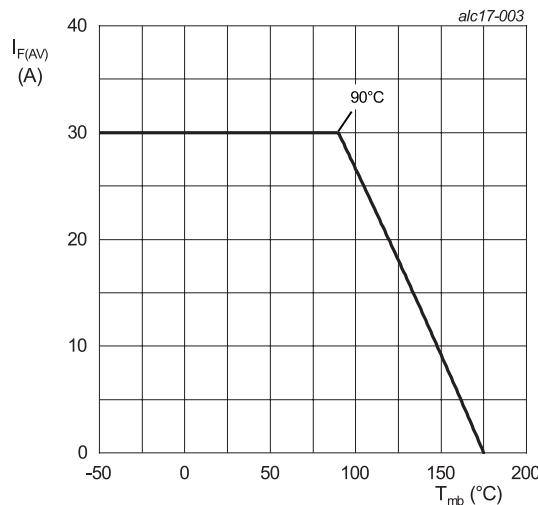


Fig. 3. Forward current as a function of mounting base temperature; maximum values

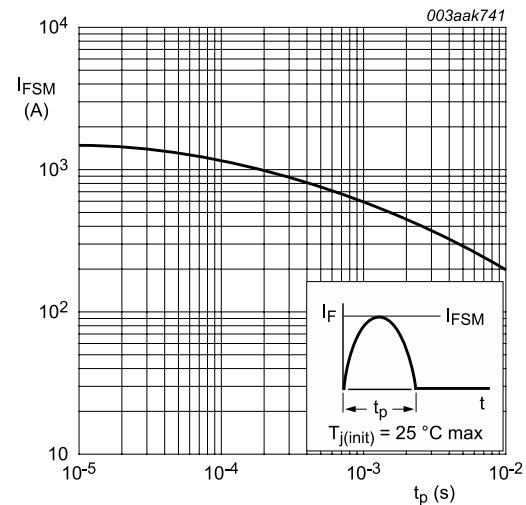


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j\text{-mb})}$	thermal resistance from junction to mounting base	with heatsink compound; Fig. 5		-	-	2.1	K/W
$R_{th(j\text{-a})}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W

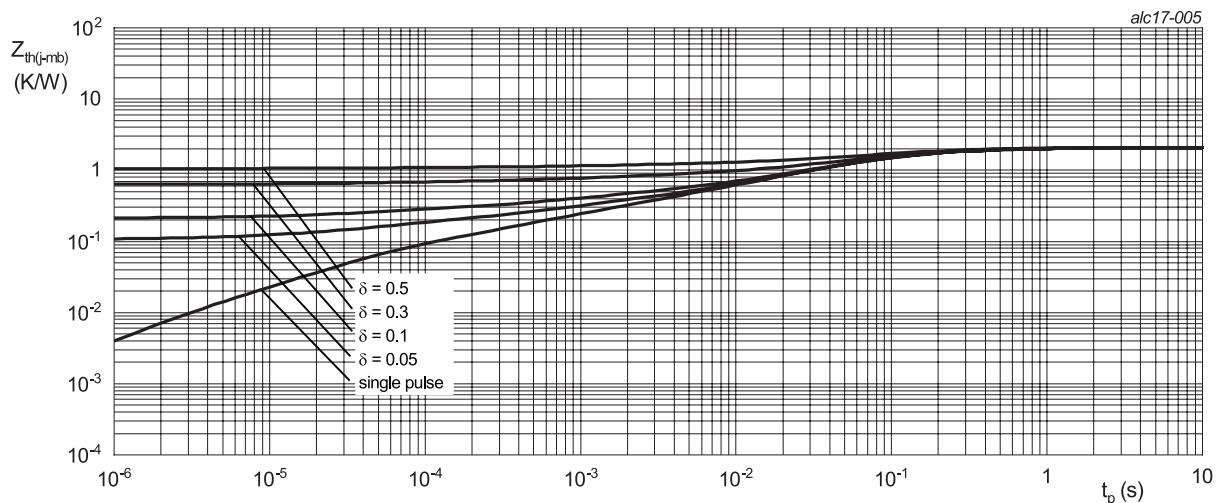


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Isolation characteristics

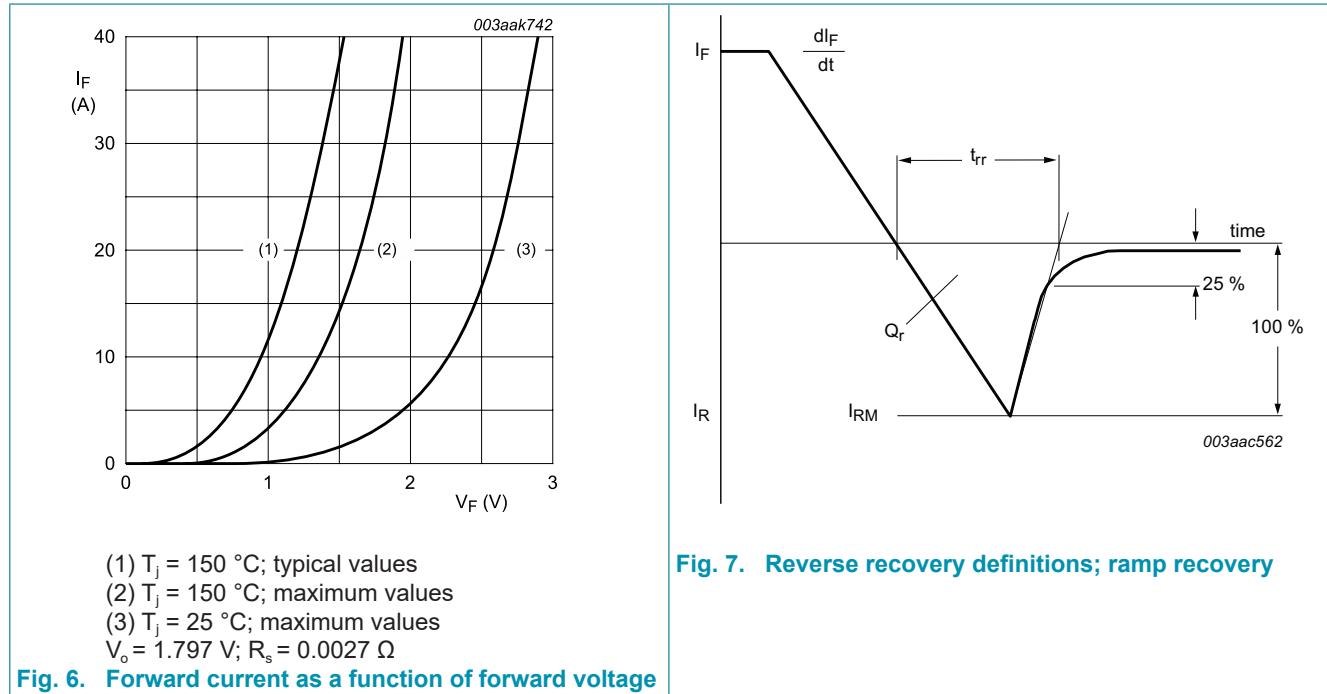
Table 7. Isolation characteristics

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

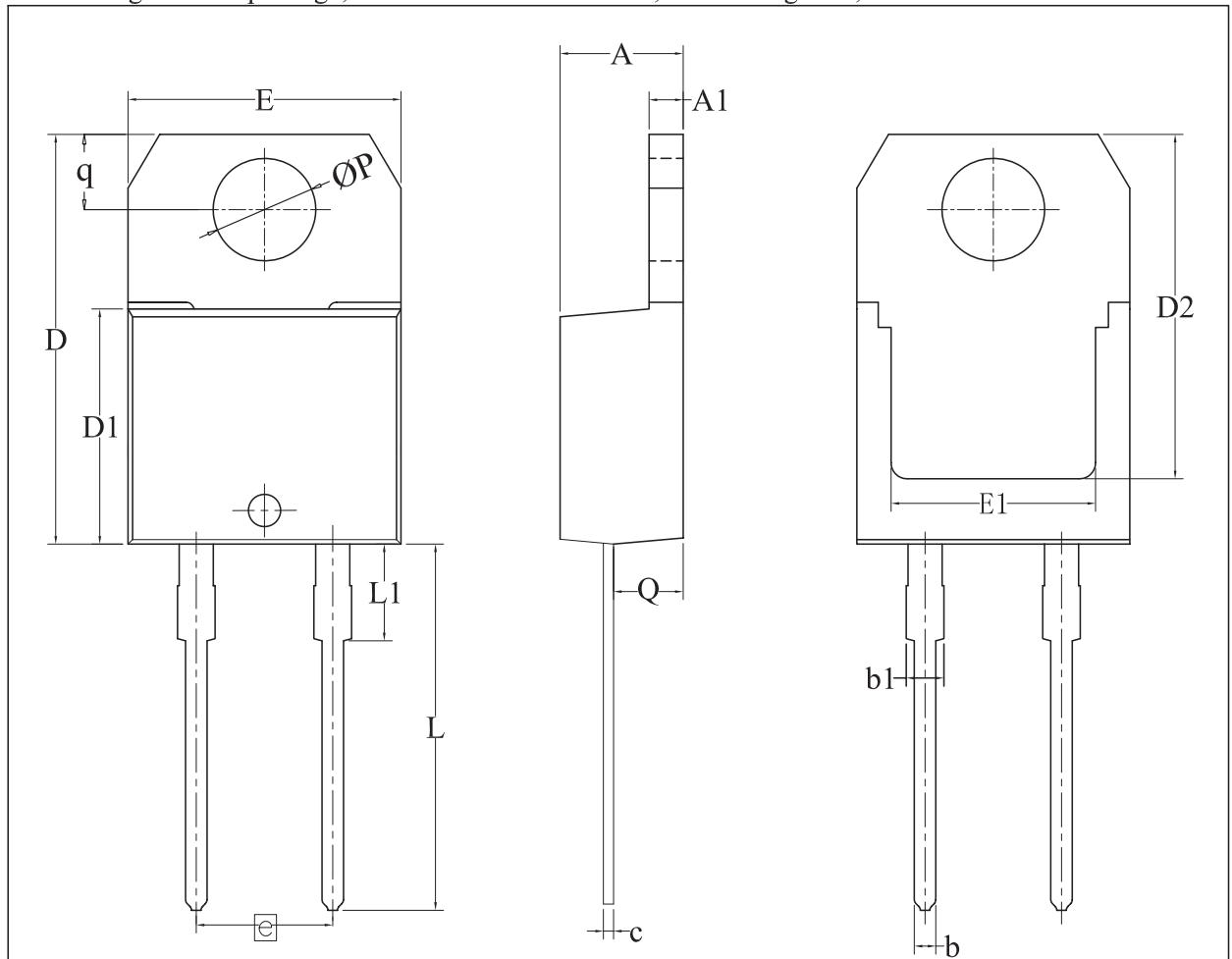
Table 8. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 30A; T_j = 25^\circ C$; Fig. 6		-	2	2.75	V
		$I_F = 30 A; T_j = 150^\circ C$; Fig. 6		-	1.38	1.8	V
I_R	reverse current	$V_R = 600 V; T_j = 25^\circ C$		-	-	10	μA
		$V_R = 600 V; T_j = 150^\circ C$		-	-	1	mA
Dynamic characteristics							
Q_r	recovered charge	$I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/\mu s; T_j = 25^\circ C$; Fig. 7		-	50	-	nC
		$I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/\mu s; T_j = 125^\circ C$; Fig. 7		-	280	-	nC
t_{rr}	reverse recovery time	$I_F = 1 A; V_R = 30 V; dI_F/dt = 50 A/\mu s; T_j = 25^\circ C$; Fig. 7		-	-	35	ns
		$I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/\mu s; T_j = 25^\circ C$; Fig. 7		-	-	35	ns
		$I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/\mu s; T_j = 125^\circ C$; Fig. 7		-	70	-	ns
I_{RM}	peak reverse recovery current	$I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/\mu s; T_j = 25^\circ C$; Fig. 7		-	3.5	-	A
		$I_F = 30 A; V_R = 200 V; dI_F/dt = 200 A/\mu s; T_j = 125^\circ C$; Fig. 7		-	7.6	-	A



12. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2 leads TO-220 IITO220-2L



Unit	A	A1	b	b1	c	D	D1	D2	E	E1	e	L	L1	P	Q	q
min	4.30	1.25	0.69	1.20	0.40	15.20	8.50	12.20	10.00	6.86	5.08 (BSC)	12.80	2.70	3.70	2.40	2.70
max	4.70	1.40	0.90	1.72	0.60	16.00	9.02	12.88	10.40	8.89		14.00	3.30	3.95	2.80	3.00

13. Legal information

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.
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