

1. General description

WeEn's 5th Generation Hyper Fast diode with softer recovery in a 2-lead ITO220 plastic package.

2. Features and benefits

- Isolated mounting base with 2500 V (RMS) isolation
- Low leakage current
- Low reverse recovery current
- Low thermal resistance
- Soft reverse recovery with low recovery current
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

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

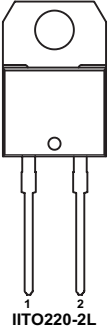
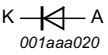
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V _{RRM}	repetitive peak reverse voltage			600			V
I _{F(AV)}	average forward current	δ = 0.5; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3		30			A
I _{FRM}	repetitive peak forward current	δ = 0.5; t _p = 25 μs; 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		260			A
		t _p = 8.3 ms; T _{j(init)} = 25 °C; sine-wave pulse		286			A
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 30 A; T _j = 25 °C; Fig. 6		-	2.00	2.75	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		-	-	45	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-600PS	IITO220-2L	BYC30Y-600PSQ	Tube	50	IITO220E-2L	03-Mar-2020

7. Marking

Table 4. Marking codes

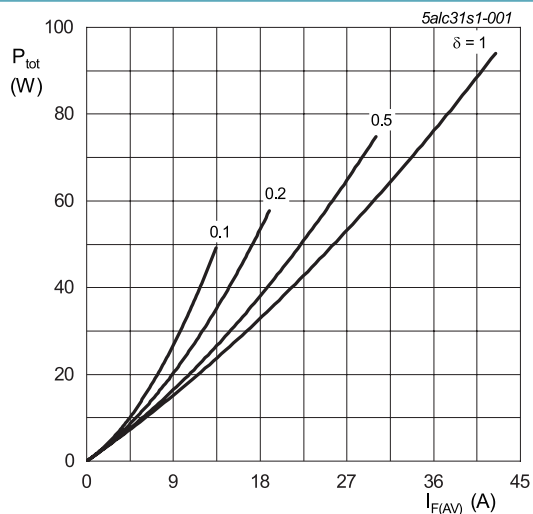
Type number	Marking codes
BYC30Y-600PS	BYC30Y 600PS

8. Limiting values

Table 5. Limiting values

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

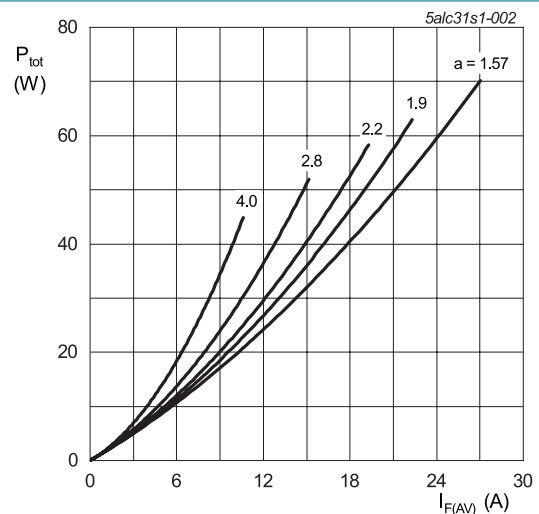
Symbol	Parameter	Conditions	Notes	Values	Unit
V_{RRM}	repetitive peak reverse voltage			600	V
V_{RWM}	crest working reverse voltage			600	V
V_R	reverse voltage	DC		600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3		30	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25 \mu s$; square-wave pulse		60	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10 \text{ ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse; Fig. 4		260	A
		$t_p = 8.3 \text{ ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse		286	A
T_{stg}	storage temperature			-65 to 175	$^\circ\text{C}$
T_j	junction temperature			-65 to 175	$^\circ\text{C}$



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

$$V_o = 1.544 \text{ V}; R_s = 0.0158 \Omega$$

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



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

$$V_o = 1.544 \text{ V}; R_s = 0.0158 \Omega$$

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

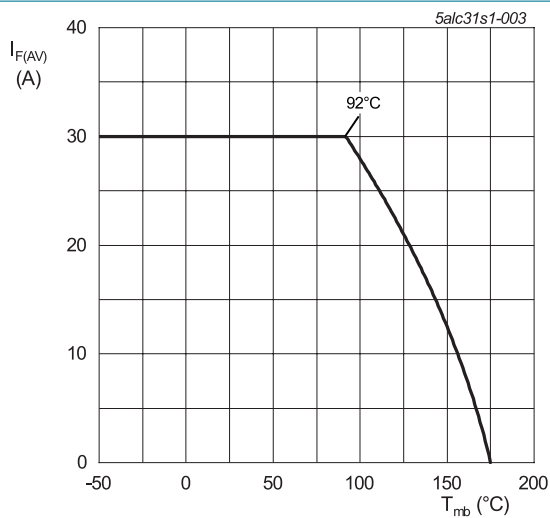


Fig. 3. Forward current as a function of mounting base temperature; typical values

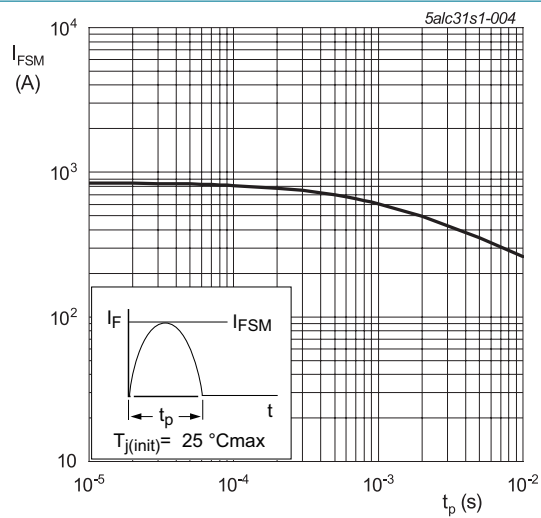


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

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

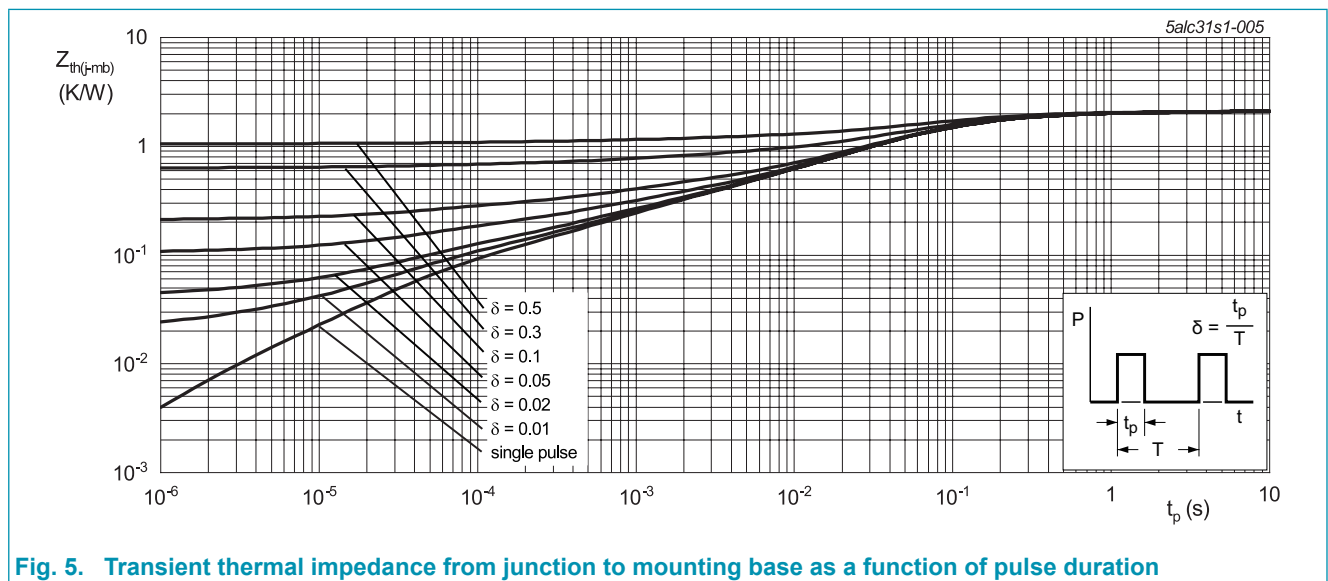


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Isolation characteristics

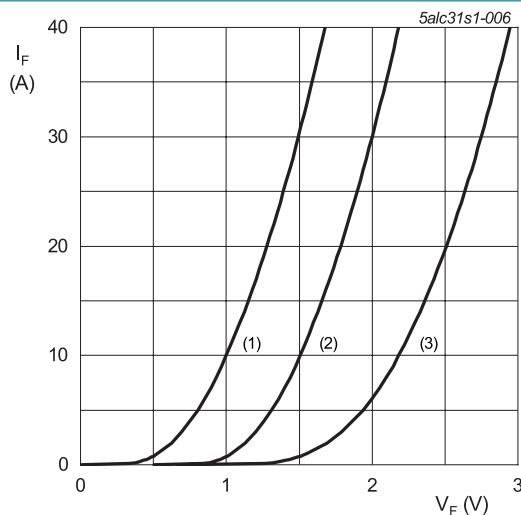
Table 7. Isolation characteristics

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

11. Characteristics

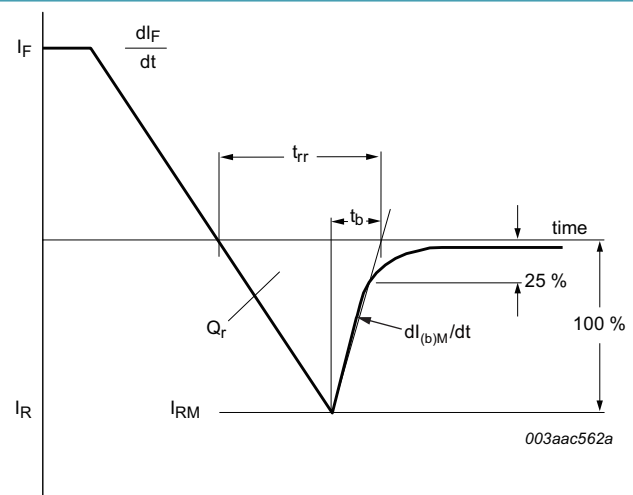
Table 8. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 30 A; T _j = 25 °C; Fig. 6		-	2.00	2.75	V
		I _F = 30 A; T _j = 150 °C; Fig. 6		-	1.50	2.00	V
I _R	reverse current	V _R = 600 V; T _j = 25 °C		-	-	10	μA
		V _R = 600 V; T _j = 150 °C		-	-	0.6	mA
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		-	-	45	ns
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	51	-	ns
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	105	-	ns
I _{RM}	peak reverse recovery current	I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	3.7	-	A
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	9.5	-	A
Q _r	recovered charge	I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	95	-	nC
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	498	-	nC
S _{factor}	softness factor	I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	0.55	-	



- (1) $T_J = 150\text{ °C}$; typical values
 (2) $T_J = 150\text{ °C}$; maximum values
 (3) $T_J = 25\text{ °C}$; maximum values
 $V_o = 1.544\text{ V}$; $R_s = 0.0158\text{ }\Omega$

Fig. 6. Forward current as a function of forward voltage



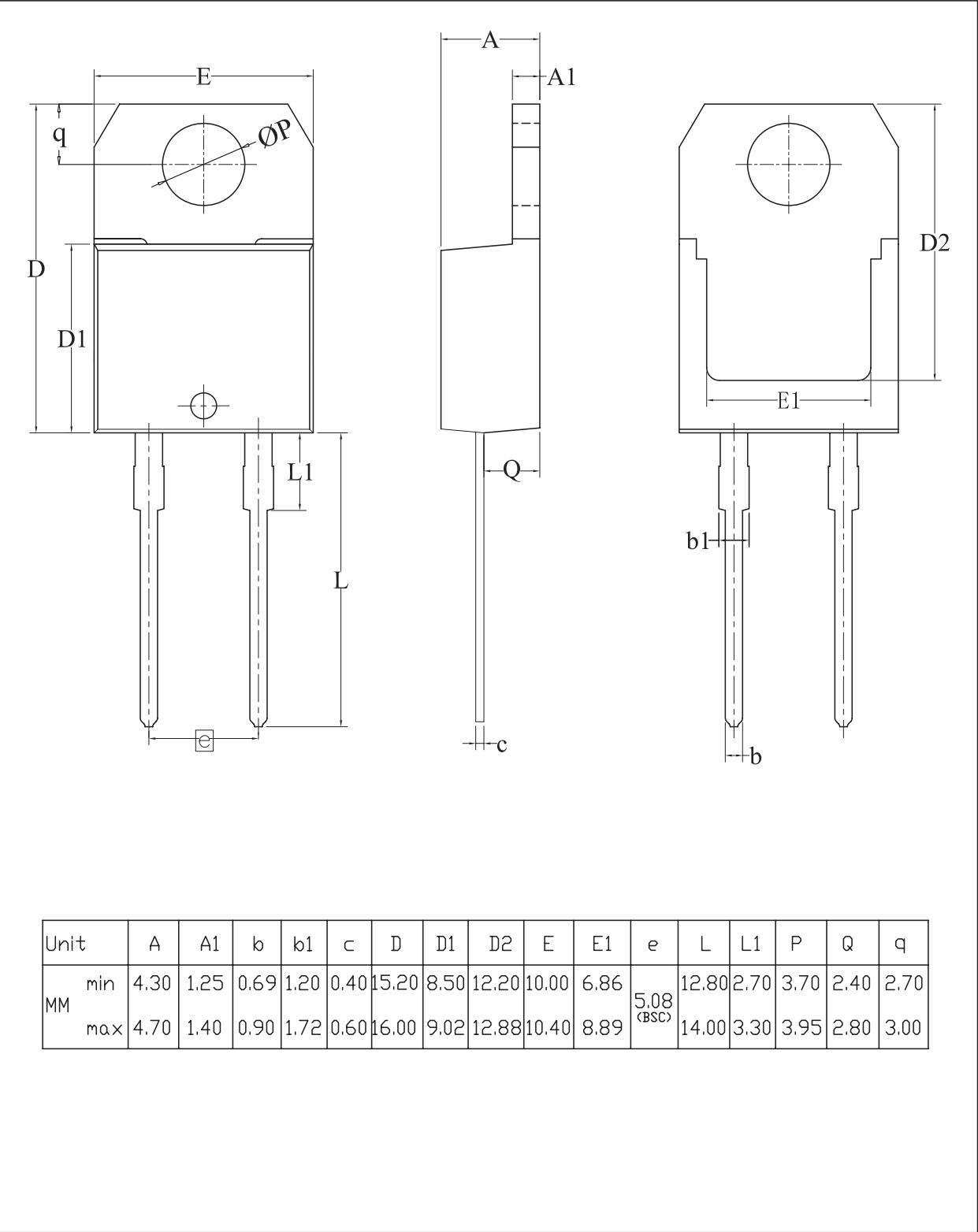
$$S_{\text{factor}} = [dl_F/dt] / [dl_{(b)M}/dt]$$

$dl_{(b)M}/dt$ = peak rate of change of current during t_b portion of t_{rr}

Fig. 7. Reverse recovery definitions; ramp recovery

12. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2 leads TO-220 ITO220-2L



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.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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