

## 1. General description

Hyperfast power diode in a TO263 (D2PAK) plastic package.

## 2. Features and benefits

- Fast switching
- Low leakage current
- Low reverse recovery current
- Reduces switching losses in associated MOSFET

## 3. Applications

- Server power supplies
- Telecom power supplies
- EV charger
- Air conditioner
- Continuous Current Mode (CCM) Power Factor Correction (PFC)

## 4. Quick reference data

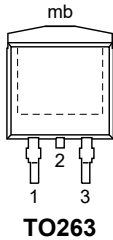
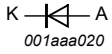
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_R$	reverse voltage	DC	-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 101$ °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	30	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 101$ °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; <a href="#">Fig. 4</a>	-	-	270	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	-	-	300	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 30$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>	-	2	2.75	V
		$I_F = 30$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>	-	1.38	-	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 50$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	26	35	ns
		$I_F = 30$ A; $V_R = 200$ V; $dI_F/dt = 200$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	35	-	ns

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 30\text{ A}$ ; $V_R = 200\text{ V}$ ; $di_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	70	-	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	nc	no connection	 <p style="text-align: center;">TO263</p>	
2	K	cathode <sup>[1]</sup>		
3	A	anode		
mb	mb	mounting base; connected to cathode		

[1] it is not possible to make connection to Pin 2 of the TO263 package

## 6. Ordering information

Table 3. Ordering information

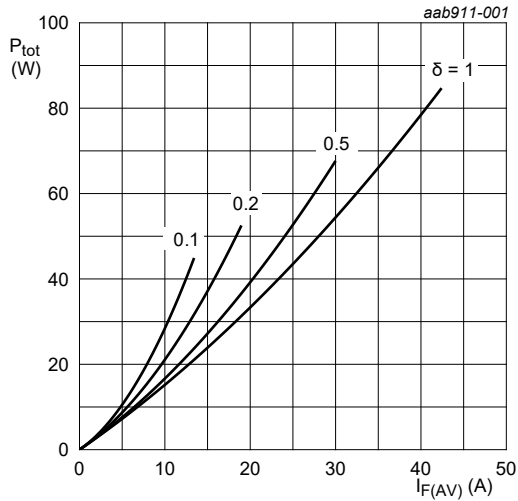
Type number	Package		Version
	Name	Description	
BYC30B-600P	-	Plastic single-ended surface-mounted packaged (D2PAK); 3 leads (one lead cropped) TO263	TO263

## 7. Limiting values

**Table 4. Limiting values**

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

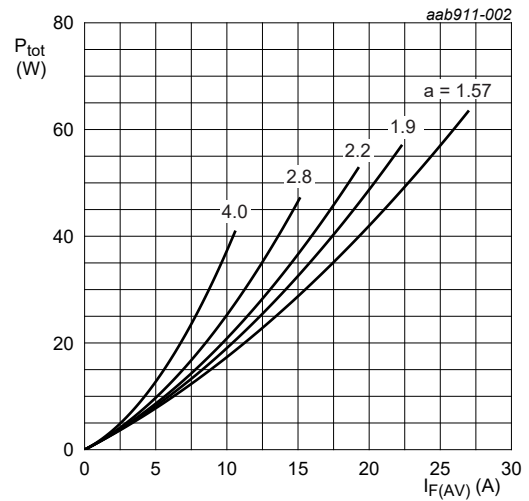
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$V_{RWM}$	crest working reverse voltage		-	600	V
$V_R$	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 101\text{ }^\circ\text{C}$ ; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	30	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 101\text{ }^\circ\text{C}$ ; square-wave pulse	-	60	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. 4</a>	-	270	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse	-	300	A
$T_{stg}$	storage temperature		-55	175	$^\circ\text{C}$
$T_j$	junction temperature		-	175	$^\circ\text{C}$



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

$$V_o = 1.371\text{ V}; R_s = 0.0147\text{ }\Omega$$

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



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

$$V_o = 1.371\text{ V}; R_s = 0.0147\text{ }\Omega$$

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

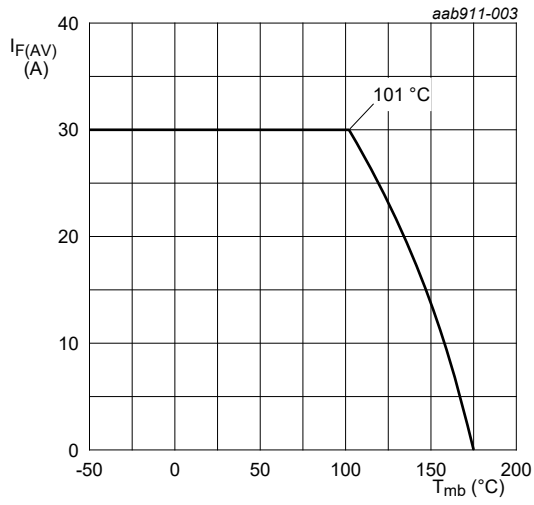


Fig. 3. Forward current as a function of mounting base temperature; maximum values

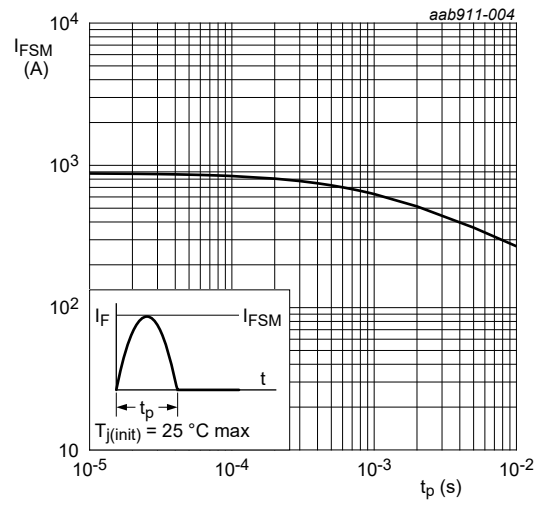


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

### 8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	<a href="#">Fig. 5</a>	-	-	1.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	50	-	K/W

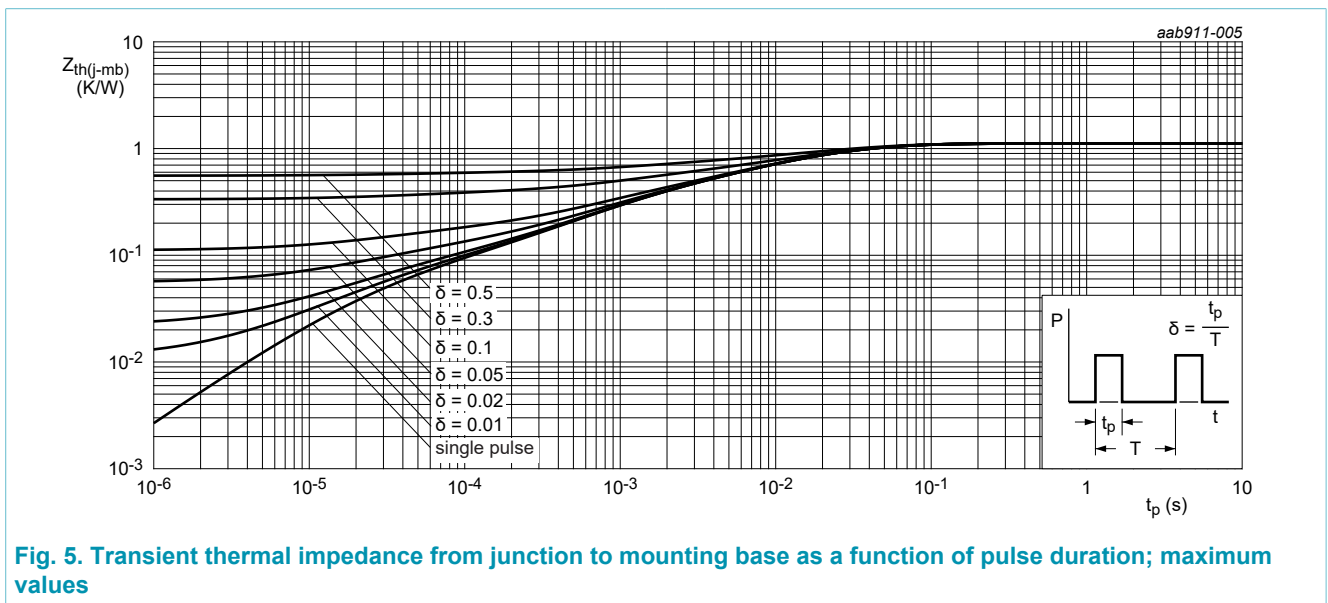
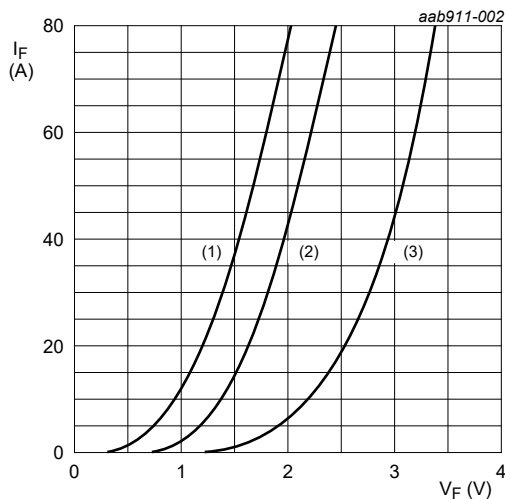


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration; maximum values

### 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 30\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$	-	2	2.75	V
		$I_F = 30\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$	-	1.38	-	V
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ °C}$	-	-	10	$\mu\text{A}$
		$V_R = 600\text{ V}; T_j = 125\text{ °C}$	-	-	500	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	26	35	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	35	-	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	70	-	ns
$I_{RM}$	peak reverse recovery current	$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}$	-	3.5	-	A
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}$	-	7.6	-	A
$Q_r$	recovered charge	$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	50	-	nC
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	280	-	nC



$V_o = 1.371\text{ V}; R_s = 0.0147\ \Omega$   
 (1)  $T_j = 150\text{ °C};$  typical values  
 (2)  $T_j = 150\text{ °C};$  maximum values  
 (3)  $T_j = 25\text{ °C};$  maximum values

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

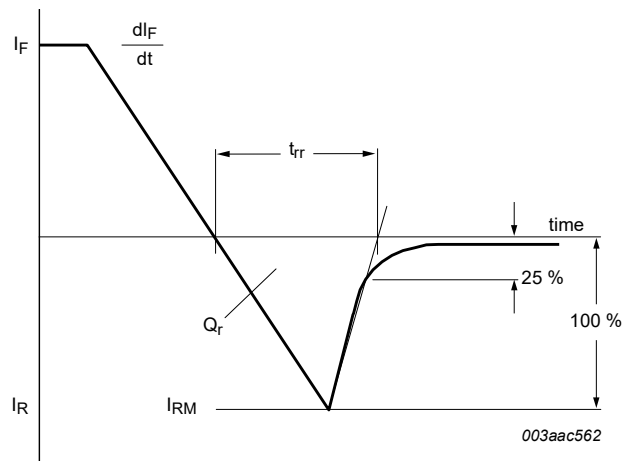


Fig. 7. Reverse recovery definitions; ramp recovery

10. Package outline

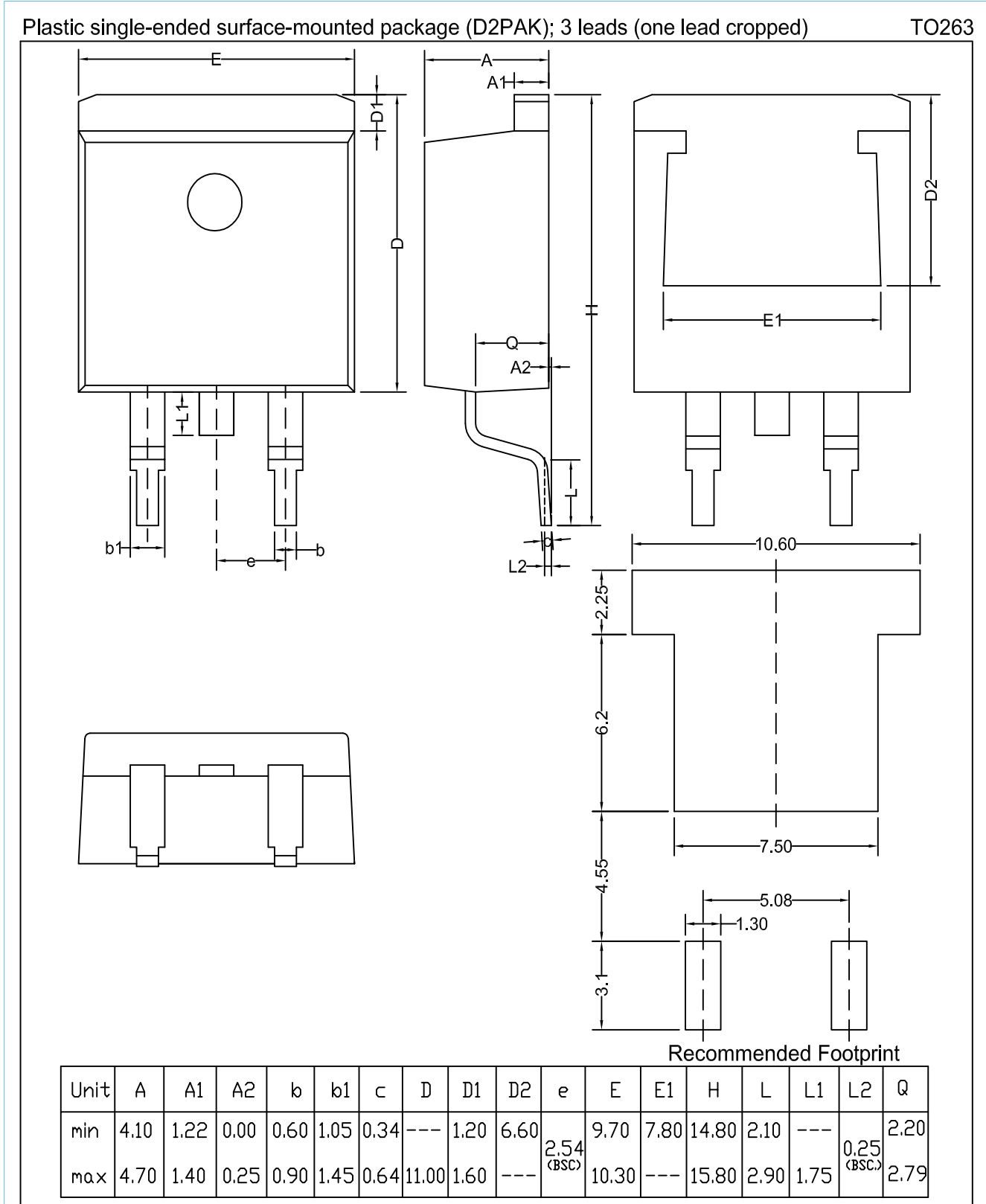


Fig. 8. Package outline TO263

## 11. Legal information

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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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