

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

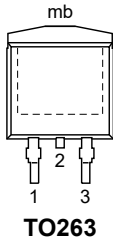

Table 1. Quick reference data

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; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	30	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ 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; Fig. 4	-	-	270	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	-	-	300	A
Static characteristics						
V_F	forward voltage	$I_F = 30$ A; $T_j = 25$ °C; Fig. 6	-	2	2.75	V
		$I_F = 30$ A; $T_j = 150$ °C; Fig. 6	-	1.38	-	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 50$ A/ μ s; $T_j = 25$ °C; Fig. 7	-	26	35	ns
		$I_F = 30$ A; $V_R = 200$ V; $dI_F/dt = 200$ A/ μ s; $T_j = 25$ °C; Fig. 7	-	35	-	ns

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $di_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 7	-	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 ^[1]		
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

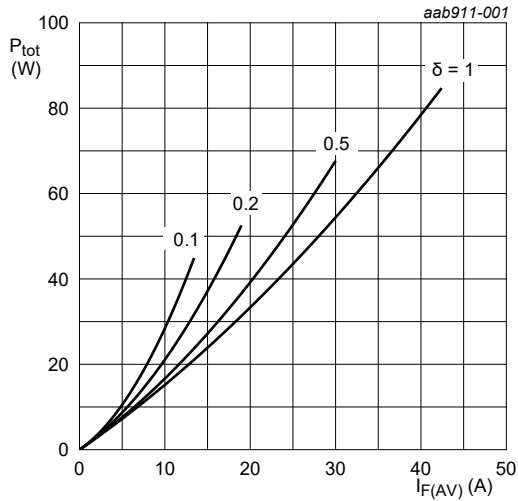
Type number	Package		Version
	Name	Description	
BYC30B-600P	-	Plastic single-ended surface-mounted packaged (D2PAK); 3 leads (one lead cropped) TO263	TO263

7. Limiting values

Table 4. Limiting values

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

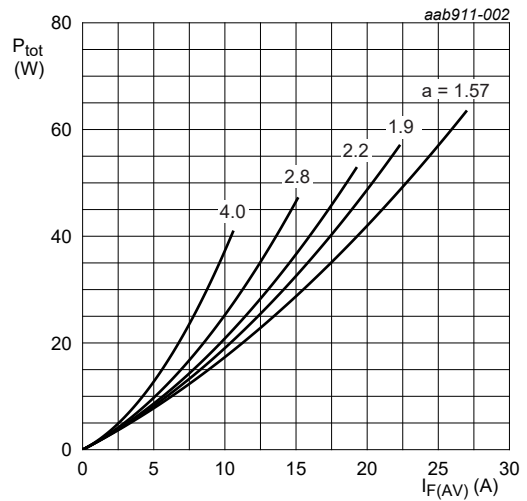
Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	600	V
V_{RWM}	crest working reverse voltage		-	600	V
V_R	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 101\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	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; Fig. 4	-	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

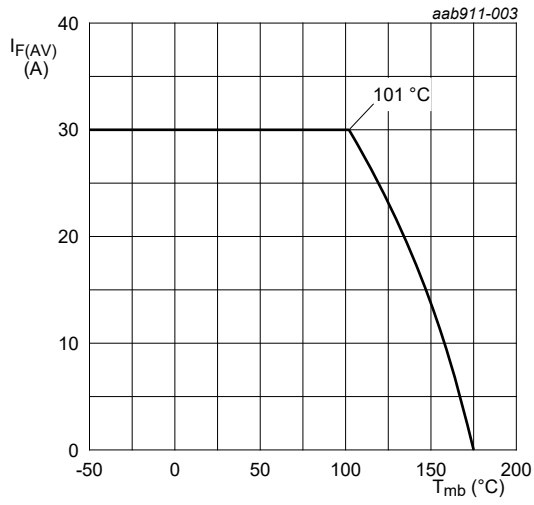


Fig. 3. Forward current as a function of mounting base temperature; maximum values

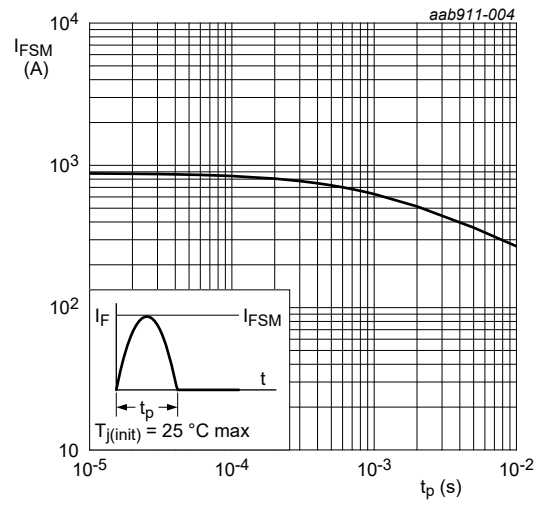


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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	Fig. 5	-	-	1.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	50	-	K/W

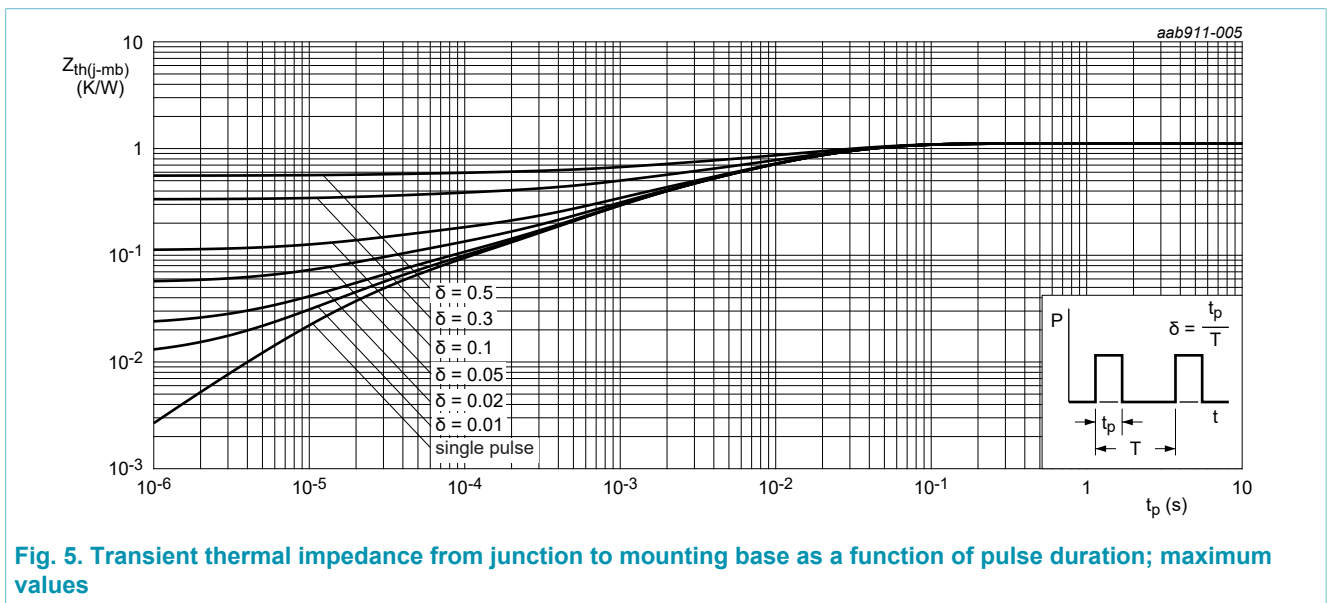
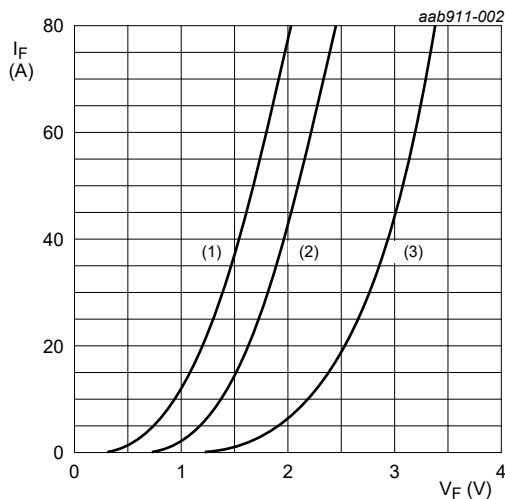


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration; maximum values

9. Characteristics

Table 6. Characteristics

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



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

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

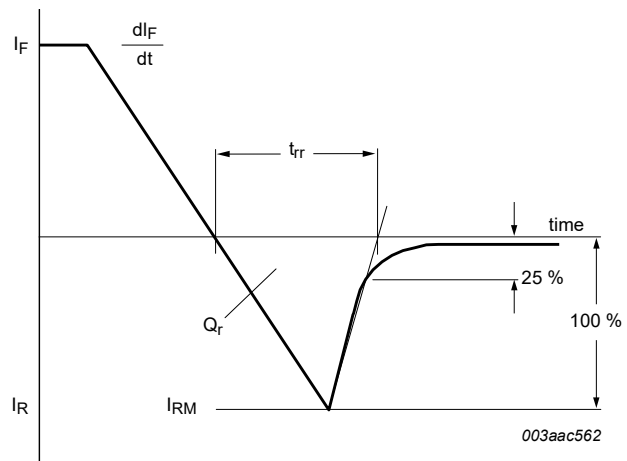


Fig. 7. Reverse recovery definitions; ramp recovery

10. Package outline

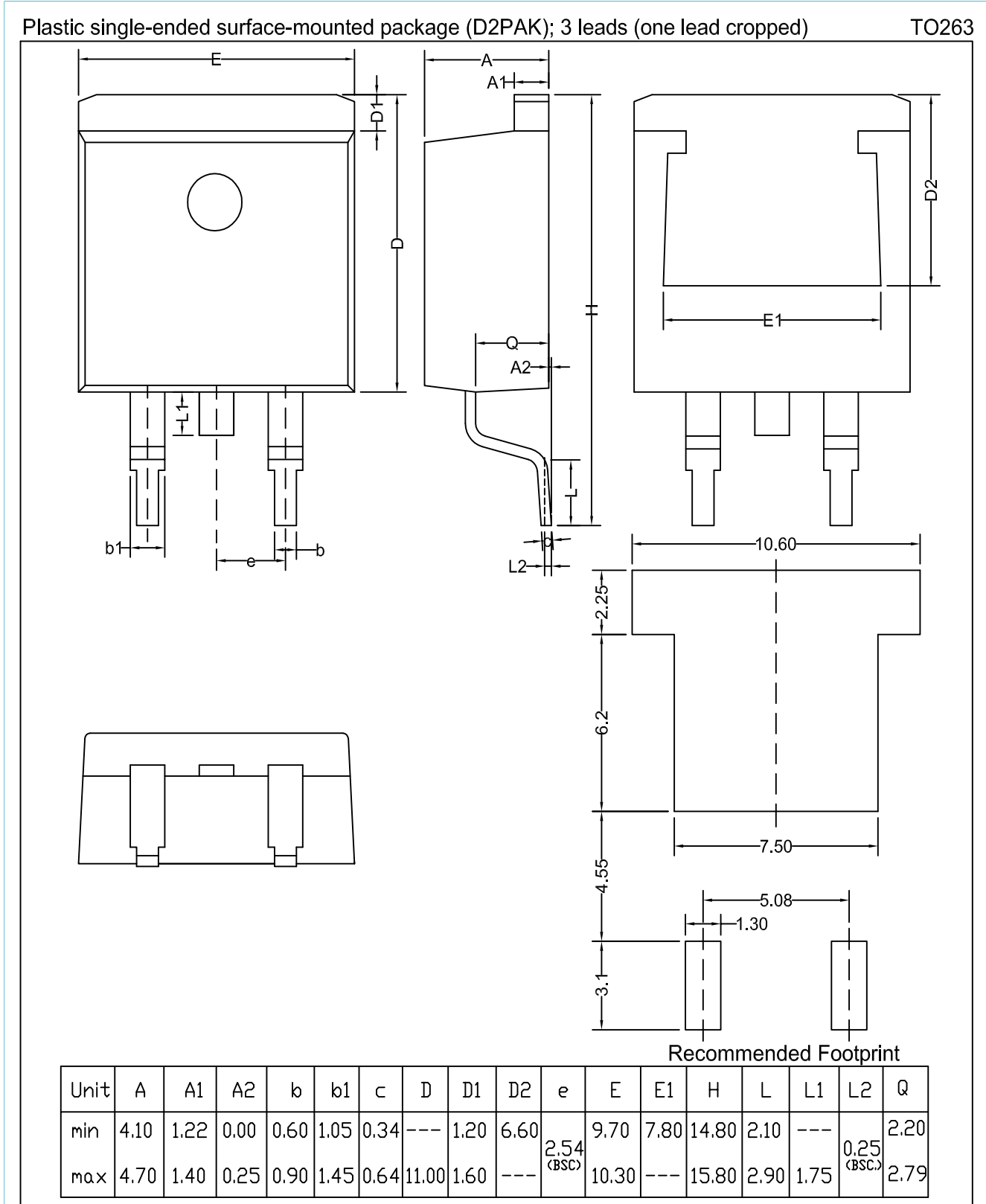


Fig. 8. Package outline TO263

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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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 31 May 2017
