

1. General description

Hyperfast power diode in a 2-lead TO247 (SOD142) plastic package.

2. Features and benefits

- Fast switching and soft reverse recovery characteristics
- Low forward voltage drop
- Low leakage current
- Low reverse recovery current
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

- UPS
- EV Charger
- Welding Machine
- Air Conditioner

4. Quick reference data

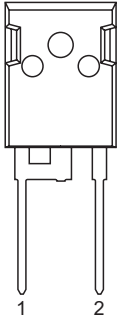
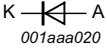
Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 90$ °C; Fig. 1 ; Fig. 2 ; Fig. 3	75			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 90$ °C; square-wave pulse	150			A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4	700			A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	750			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 75$ A; $T_j = 25$ °C; Fig. 6	-	2.2	2.75	V
		$I_F = 75$ A; $T_j = 150$ °C; Fig. 6	-	1.6	2.1	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	-	-	50	ns

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 75\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 25\text{ °C}$; Fig. 7	-	42	-	ns
		$I_F = 75\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 125\text{ °C}$; Fig. 7	-	106	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	mb	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYC75W-600P	TO247-2L	BYC75W-600PQ	Tube	30	SOD142	8-Aug-2019

7. Marking

Table 4. Marking codes

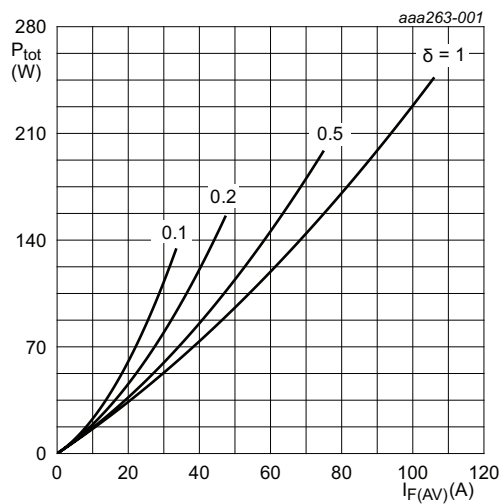
Type number	Marking codes
BYC75W-600P	BYC75W 600P

8. Limiting values

Table 5. Limiting values

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

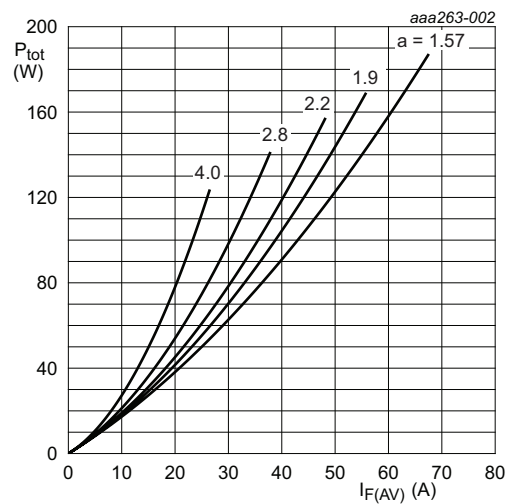
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 90\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	75	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 90\text{ }^\circ\text{C}$; square-wave pulse	150	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	700	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse	750	A
T_{stg}	storage temperature		-55 to 175	$^\circ\text{C}$
T_j	junction temperature		-55 to 175	$^\circ\text{C}$



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

$$V_o = 1.547\text{ V}; R_s = 0.0074\text{ }\Omega$$

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



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

$$V_o = 1.547\text{ V}; R_s = 0.0074\text{ }\Omega$$

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

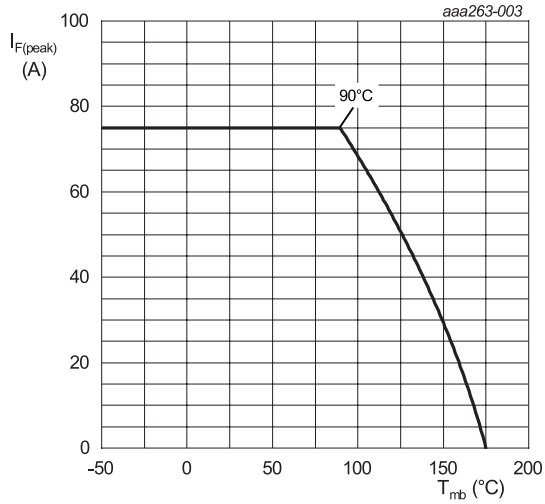


Fig. 3. Forward current as a function of mounting base temperature; typical values

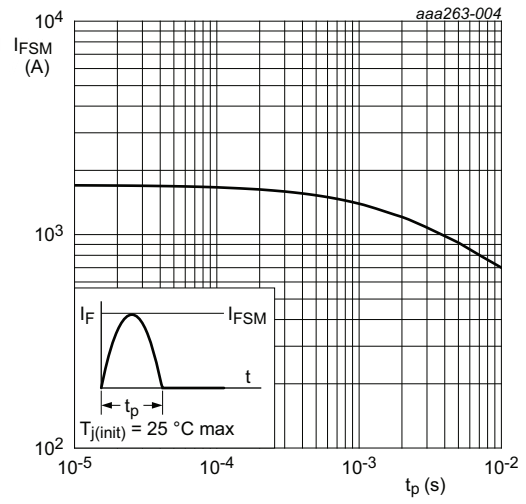


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 5	-	0.43	0.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

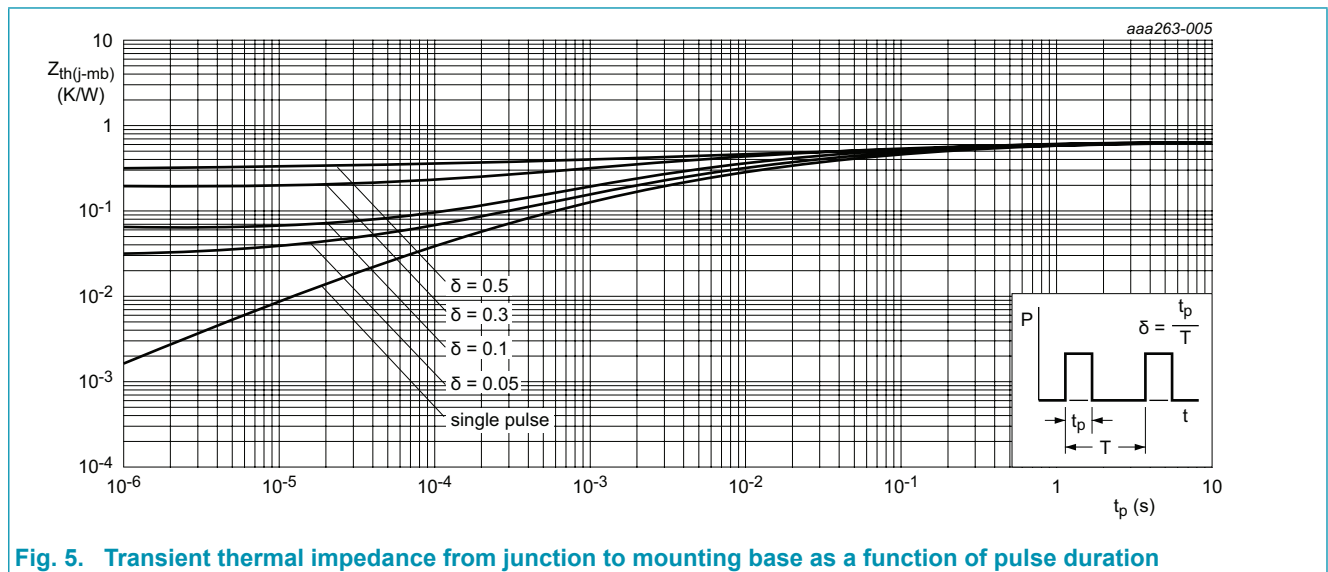
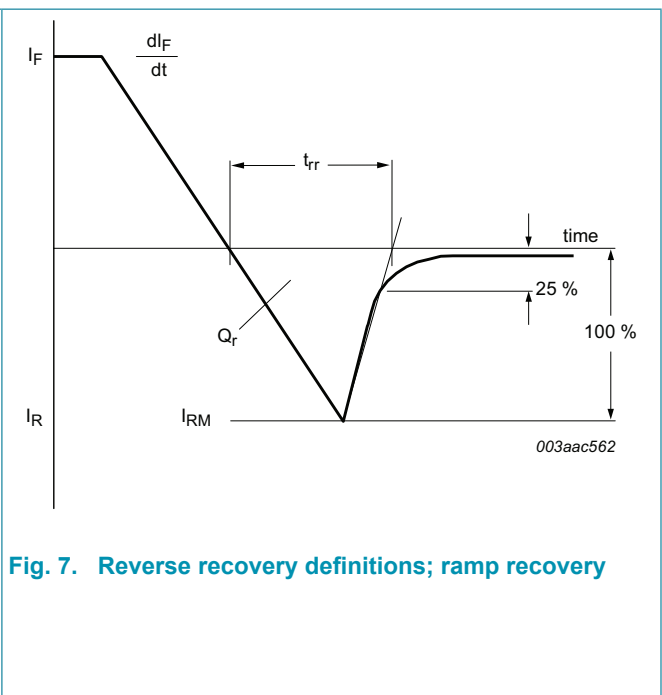
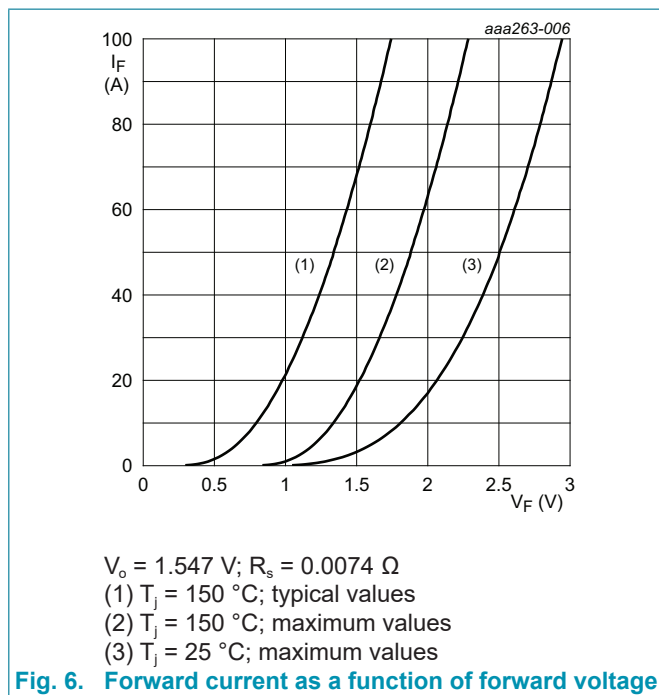


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

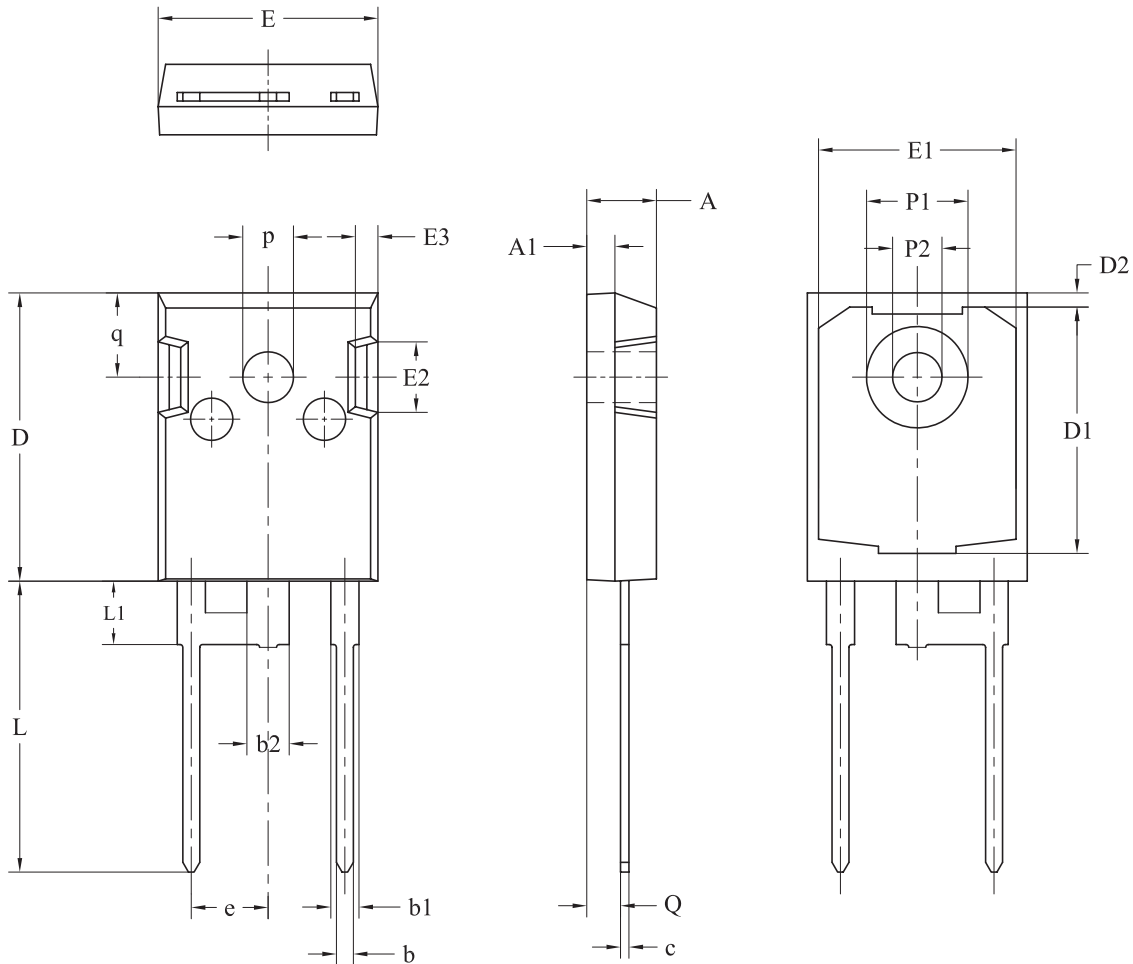
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward current	$I_F = 75 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	2.2	2.75	V
		$I_F = 75 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 6}$	-	1.6	2.1	V
I_R	reverse current	$V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	10	μA
		$V_R = 600 \text{ V}; T_j = 125 \text{ }^\circ\text{C}$	-	-	1	mA
Dynamic characteristics						
Q_r	reverse charge	$I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	85	-	nC
		$I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	640	-	nC
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	-	50	ns
		$I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	42	-	ns
		$I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	106	-	ns
I_{RM}	peak reverse recovery current	$I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	4.1	-	A
		$I_F = 75 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{ Fig. 7}$	-	12.2	-	A



11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 2 lead TO-247

SOD142



Dimensions(mm are the original dimensions)

Unit	A	A ₁	b	b ₁	b ₂	c	D	D ₁	D ₂	e	E	E ₁	E ₂	E ₃	L	L ₁	p	P ₁	P ₂	q	Q	
max	5.2	2.1	1.4	2.2	3.2	0.7	20.6	17.68	1.2	5.45	15.75	14.22	5.2	1.8	20.9	4.75	3.7	7.3	3.6	6.18	2.6	
nom																						
min	4.7	1.9	1.0	1.8	2.8	0.5	20.3	17.28	0.8		15.45	13.82	4.8	1.4	20.4	4.25	3.5	7.1	3.4	5.78	2.2	

Outline version	References				European projection	Issue date
	IEC	JEDEC	EIAJ			
SOD142		TO-247				19-08-08

12. 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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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