

1. General description

Dual ultrafast power diode in a SOT1259 (3-lead TO-3P) plastic package.

2. Features and benefits

- Very low on-state loss
- Fast switching
- Soft recovery characteristic minimizes power consuming oscillations
- High reverse surge capability
- High thermal cycling performance
- Low thermal resistance

3. Applications

- Output rectifiers in high-frequency switched-mode power supplies

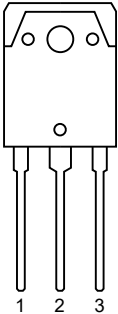
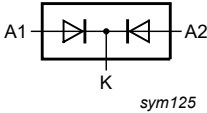
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_R	reverse voltage	DC	-	-	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 119$ °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	15	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode; Fig. 4	-	-	200	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode	-	-	220	A
Static characteristics						
V_F	forward voltage	$I_F = 30$ A; $T_j = 25$ °C; Fig. 6	-	1	1.2	V
		$I_F = 15$ A; $T_j = 25$ °C; Fig. 6	-	0.95	1.05	V
		$I_F = 15$ A; $T_j = 150$ °C	-	0.78	0.9	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ μ s; $T_j = 25$ °C; Fig. 7	-	18	25	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 <p style="text-align: center;">TO3P (SOT1259)</p>	
2	K	cathode		
3	A2	anode 2		
mb	mb	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYQ72EK-200	TO3P	Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO3P	SOT1259

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		-	200	V
V_{RWM}	crest working reverse voltage		-	200	V
V_R	reverse voltage	DC	-	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 119$ °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	15	A
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 119$ °C; square-wave pulse; both diodes conducting	-	30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode; Fig. 4	-	200	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; per diode	-	220	A
I_{RRM}	repetitive peak reverse current	$t_p = 2$ μ s; $\delta = 0.001$; per diode	-	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100$ μ s; per diode	-	0.2	A
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C
Electrostatic discharge					
V_{ESD}	electrostatic discharge voltage	C = 250 pF; R = 1.5 k Ω ; HBM	-	8	V

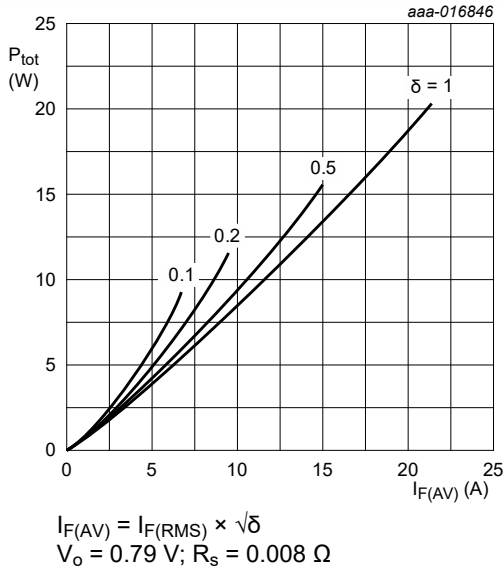


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; per diode; maximum values

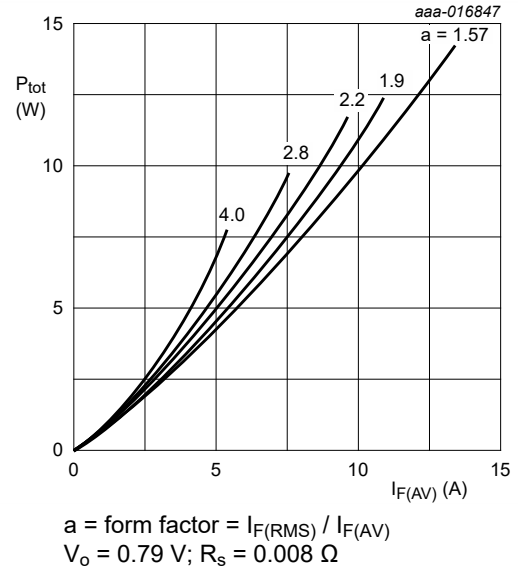


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values

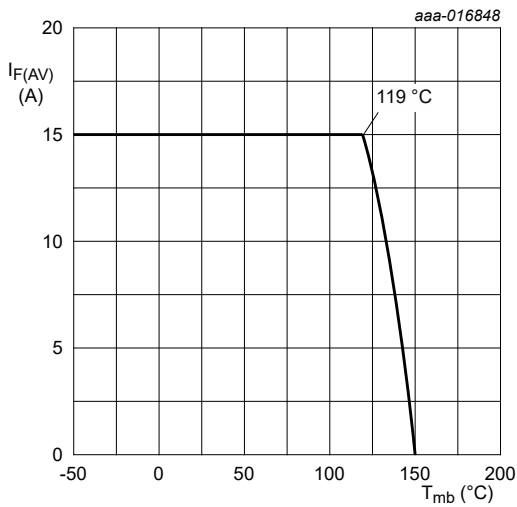


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

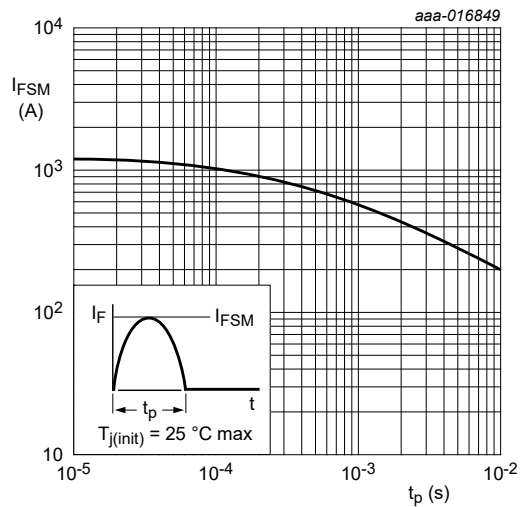


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; per diode; maximum values

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	with heatsink compound; per diode; Fig. 5	-	1.1	2	K/W
		with heatsink compound; both diodes conducting	-	0.7	1.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

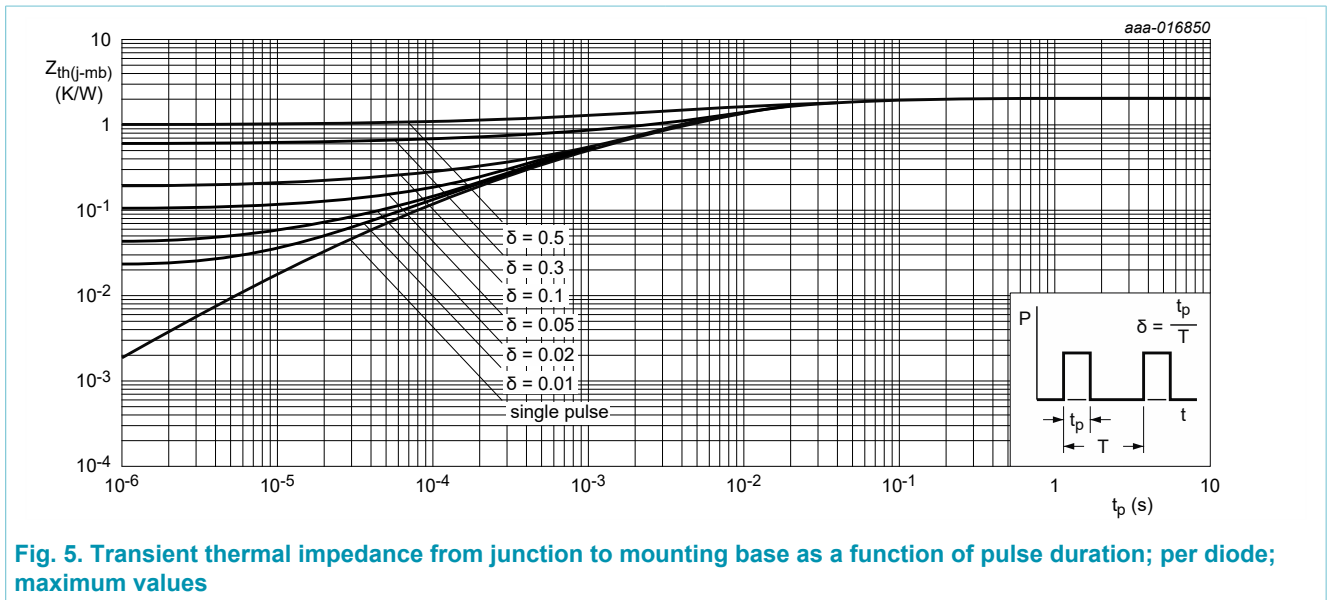


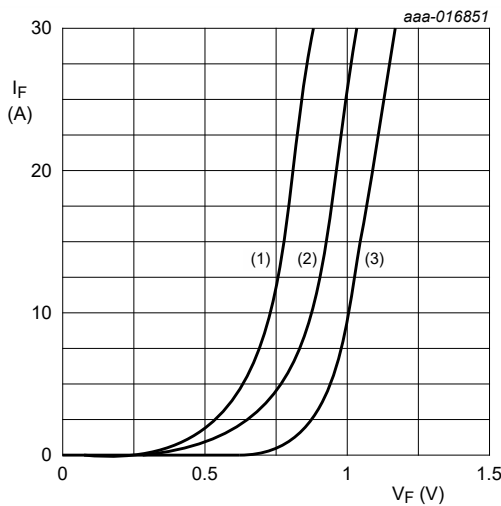
Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration; per diode; maximum values

9. Characteristics

Table 6. Characteristics

characteristics are per diode unless otherwise stated

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 30\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 6	-	1	1.2	V
		$I_F = 15\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 6	-	0.95	1.05	V
		$I_F = 15\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	0.78	0.9	V
I_R	reverse current	$V_R = 200\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	3	20	μA
		$V_R = 200\text{ V}; T_j = 100\text{ }^\circ\text{C}$	-	0.3	1	mA
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C};$ Fig. 7	-	18	25	ns
I_{RM}	peak reverse recovery current		-	1	-	A
Q_r	recovered charge	$I_F = 2\text{ A}; V_R = 30\text{ V}; dI_F/dt = 20\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C};$ Fig. 7	-	6	15	nC
		$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C};$ Fig. 7	-	10	-	nC
V_{FR}	forward recovery voltage	$I_F = 1\text{ A}; dI_F/dt = 10\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C};$ Fig. 8	-	1	-	V



$V_o = 0.79\text{ V}; R_s = 0.008\ \Omega$
 (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, per diode

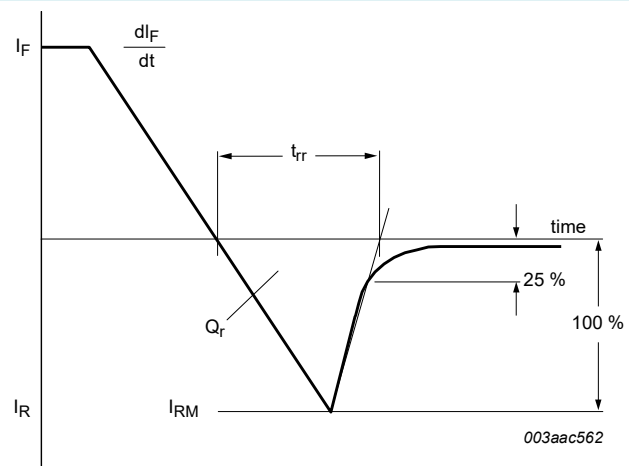


Fig. 7. Reverse recovery definitions; ramp recovery

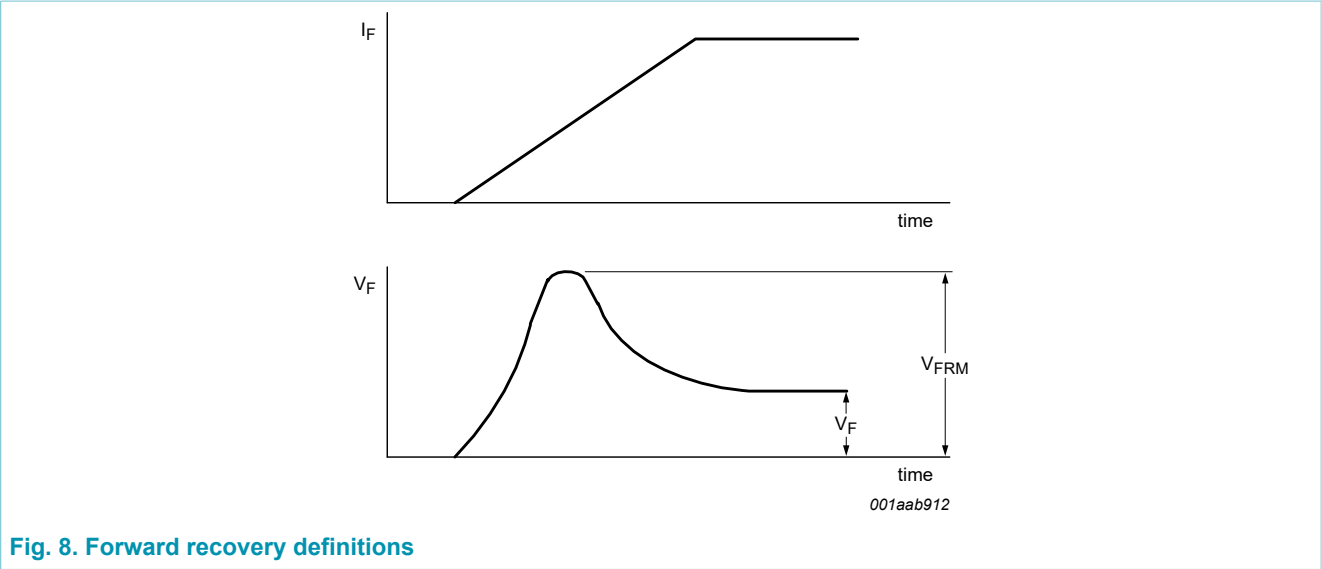
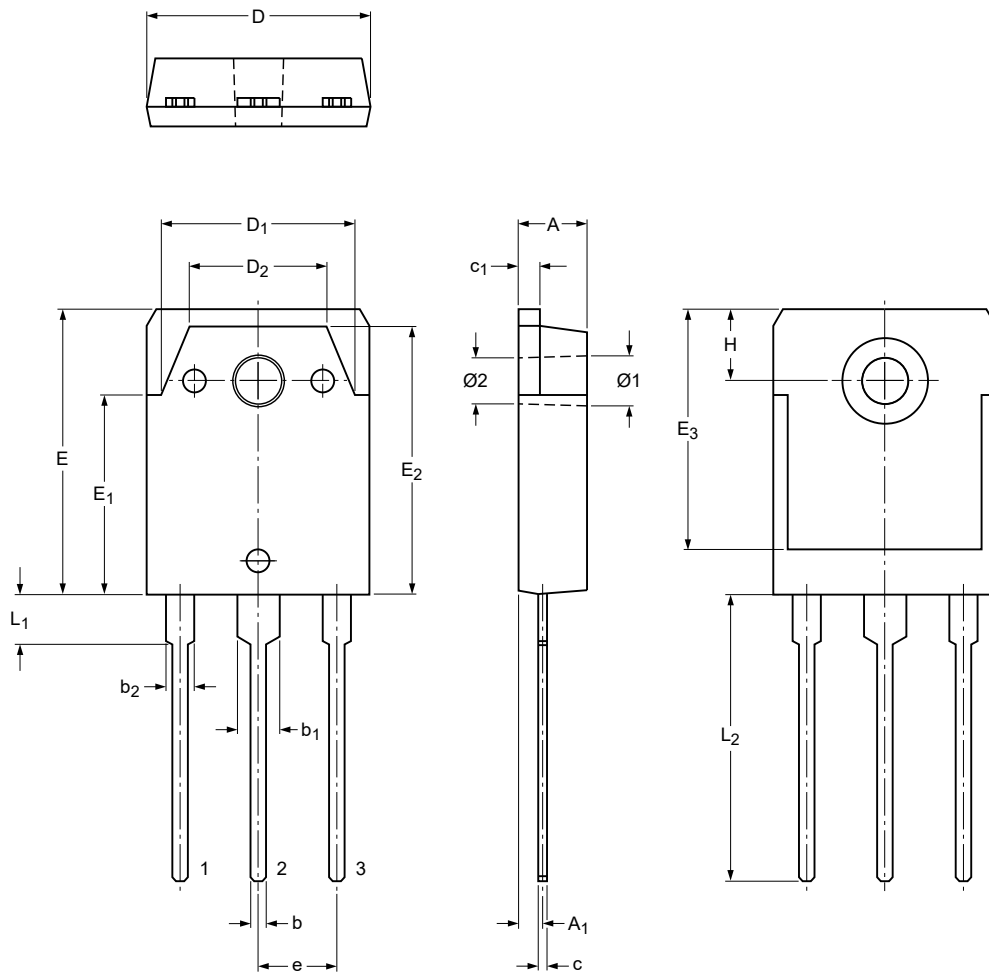


Fig. 8. Forward recovery definitions

10. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO3P

SOT1259



Dimensions (mm are the original dimensions)

Unit	A	A ₁	b	b ₁	b ₂	c	c ₁	D	D ₁	D ₂	e	E	E ₁	E ₂	E ₃	H	L ₁	L ₂	Ø1	Ø2
max	5.0	1.6	1.2	3.2	2.2	0.75	1.65	15.8	13.8	9.8		20.1	14.1	18.9	17.06	5.2	3.7	20.3	3.5	3.3
nom											5.45									
min	4.6	1.2	0.8	2.8	1.8	0.55	1.45	15.4	13.4	9.4	(typ)	19.7	13.7	18.5	16.46	4.8	3.3	19.7	3.3	3.1

sot1259_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1259	TO3P				14-10-21 14-10-22

Fig. 9. Package outline TO3P (SOT1259)

11. Package outline

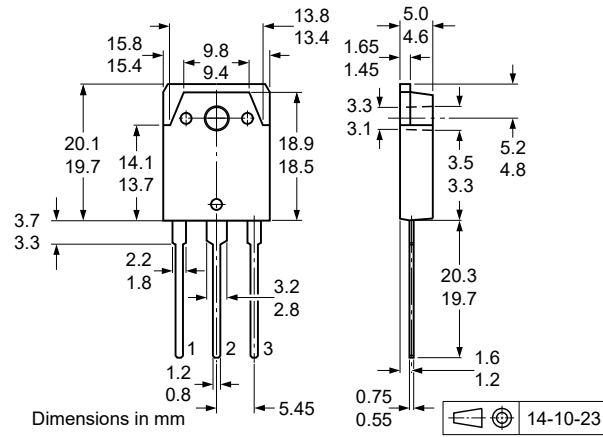


Fig. 10. Package outline TO3P (SOT1259)

12. 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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Date of release: 26 September 2018

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