

Avalanche Rectifier

$$V_{RRM} = 2 \times 1800 \text{ V}$$

$$I_{FAV} = 10 \text{ A}$$

$$V_F = 1.21 \text{ V}$$

Phase leg

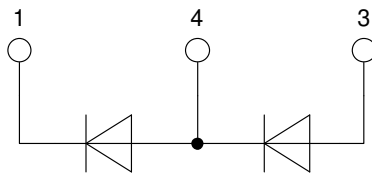
Part number

DAA10P1800PZ

Marking on Product: DAA10P1800PZ



Backside: anode/cathode



Features / Advantages:

- Avalanche rated
- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

Applications:

- Diode for main rectification
- For single and three phase bridge configurations

Package: TO-263 (D2Pak-HV)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- High creepage distance between terminals

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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					1900	V
V_{RRM}	max. repetitive reverse blocking voltage					1800	V
I_R	reverse current	$V_R = 1800$ V		$T_{VJ} = 25^\circ\text{C}$		10	μA
		$V_R = 1800$ V		$T_{VJ} = 150^\circ\text{C}$		0.7	mA
V_F	forward voltage drop	$I_F = 10$ A		$T_{VJ} = 25^\circ\text{C}$		1.26	V
		$I_F = 20$ A				1.53	V
		$I_F = 10$ A		$T_{VJ} = 150^\circ\text{C}$		1.21	V
		$I_F = 20$ A				1.57	V
I_{FAV}	average forward current	$T_C = 150^\circ\text{C}$	rectangular	$T_{VJ} = 175^\circ\text{C}$		10	A
V_{FO}	threshold voltage	} for power loss calculation only		$T_{VJ} = 175^\circ\text{C}$		0.82	V
r_F	slope resistance					37	m Ω
R_{thJC}	thermal resistance junction to case					1.5	K/W
R_{thCH}	thermal resistance case to heatsink				0.25		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		100	W
I_{FSM}	max. forward surge current	$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		150	A
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		160	A
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		130	A
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		140	A
I^2t	value for fusing	$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		115	A ² s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		105	A ² s
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		85	A ² s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		82	A ² s
C_J	junction capacitance	$V_R = 400$ V; $f = 1$ MHz		$T_{VJ} = 25^\circ\text{C}$		4	pF
P_{RSM}	max. surge reverse dissipation	$t_p = 10$ μs		$T_{VJ} = 175^\circ\text{C}$		1.6	kW



Package TO-263 (D2Pak-HV)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				1.5		g
F_C	mounting force with clip		20		60	N
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	4.2			mm
$d_{Spb/Apb}$		terminal to backside	4.7			mm

Product Marking



Part description

- D = Diode
- A = Avalanche Rectifier
- A = (up to 1800V)
- 10 = Current Rating [A]
- P = Phase leg
- 1800 = Reverse Voltage [V]
- PZ = TO-263AB (D2Pak) (2HV)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DAA10P1800PZ-TRL	DAA10P1800PZ	Tape & Reel	800	515331
Alternative	DAA10P1800PZ-TUB	DAA10P1800PZ	Tube	50	523842

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 175\text{ °C}$



Rectifier

$V_{0\ max}$	threshold voltage	0.82	V
$R_{0\ max}$	slope resistance *	10.2	mΩ

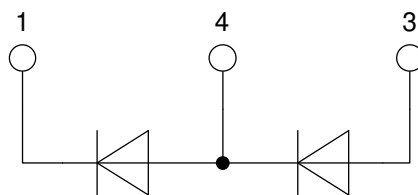


Outlines TO-263 (D2Pak-HV)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.06	4.83	0.160	0.190
A1	typ. 0.10		typ. 0.004	
A2	2.41		0.095	
b	0.51	0.99	0.020	0.039
b2	1.14	1.40	0.045	0.055
c	0.40	0.74	0.016	0.029
c2	1.14	1.40	0.045	0.055
D	8.38	9.40	0.330	0.370
D1	8.00	8.89	0.315	0.350
D2	2.3		0.091	
E	9.65	10.41	0.380	0.410
E1	6.22	8.50	0.245	0.335
e	2,54 BSC		0,100 BSC	
e1	4.28		0.169	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	1.02	1.68	0.040	0.066
W	typ. 0.02	0.040	typ. 0.0008	0.002

All dimensions conform with and/or within JEDEC standard.



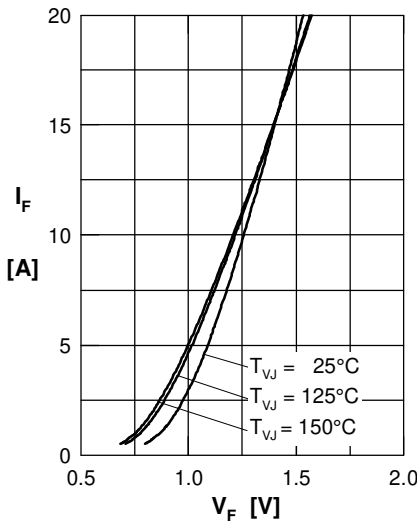
Rectifier


Fig. 1 Forward current versus voltage drop per diode

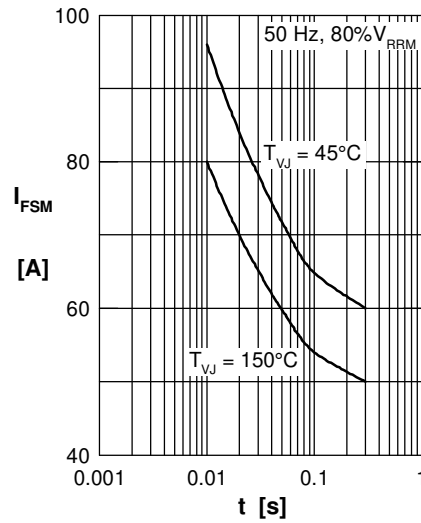


Fig. 2 Surge overload current

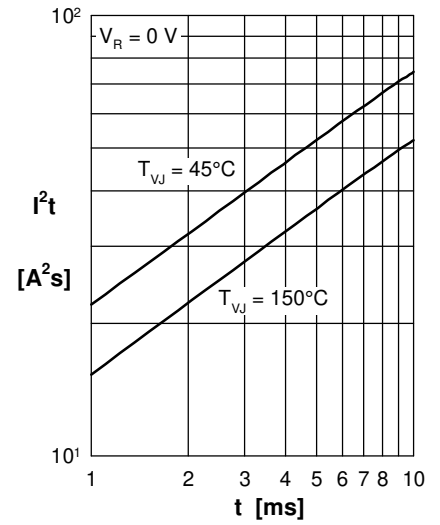
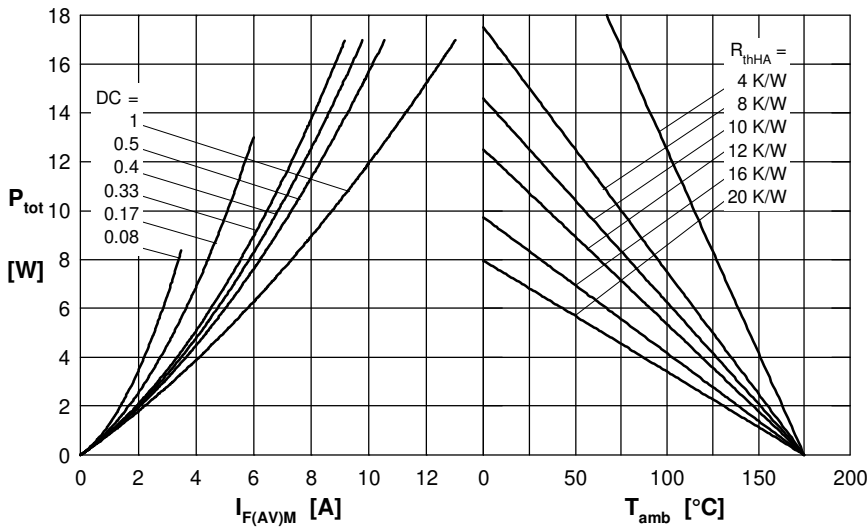

 Fig. 3 I^2t versus time per diode


Fig. 4 Power dissipation vs. direct output current and ambient temperature

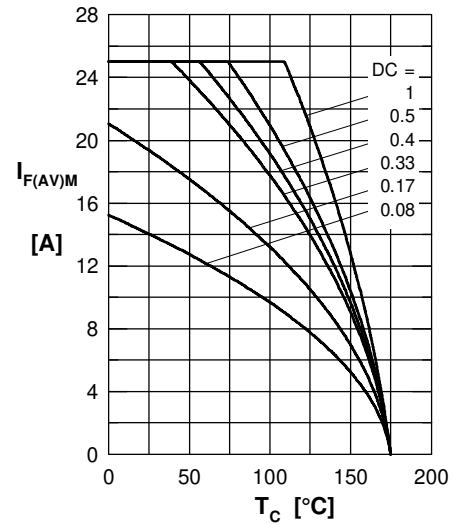


Fig. 5 Max. forward current vs. case temperature

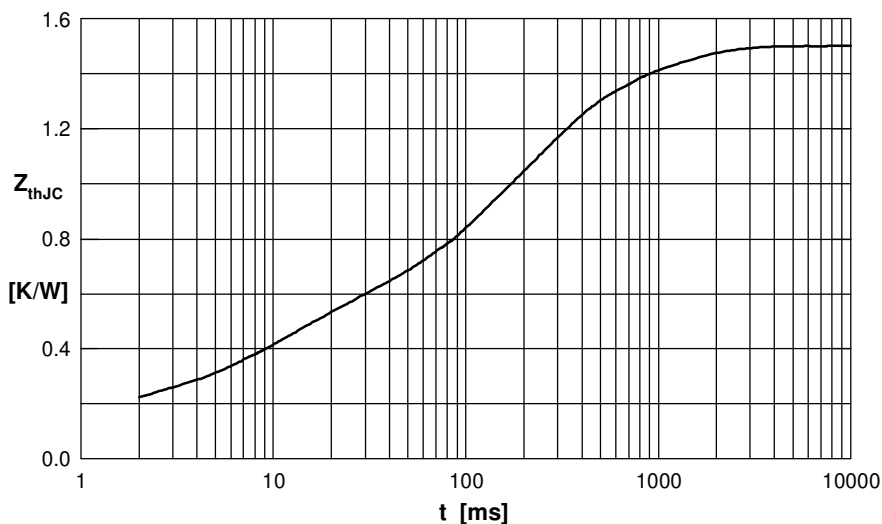


Fig. 6 Transient thermal impedance junction to case

 Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.155	0.0005
2	0.332	0.0095
3	0.713	0.17
4	0.3	0.8