Avalanche Rectifier

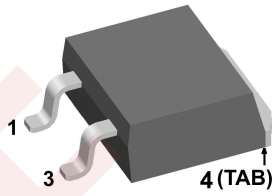
V_{RRM} = 2x 1800 V
I_{FAV} = 10 A
V_F = 1.21 V

Phase leg

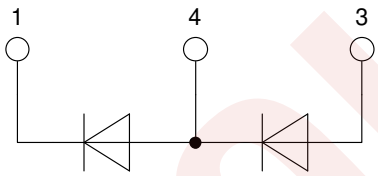
Part number

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

Disclaimer Notice

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Rectifier

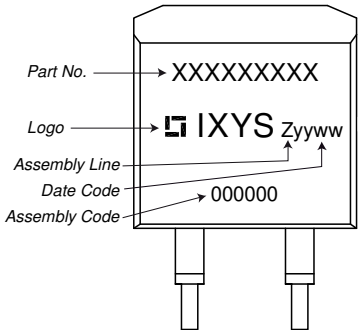
Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1900	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1800	V
I_R	*reverse current*	V_R = 1800 V	T_{VJ} = 25°C			10	µA
		V_R = 1800 V	T_{VJ} = 150°C			0.7	mA
V_F	*forward voltage drop*	I_F = 10 A	T_{VJ} = 25°C			1.26	V
		I_F = 20 A				1.53	V
		I_F = 10 A	T_{VJ} = 150°C			1.21	V
		I_F = 20 A				1.57	V
I_{FAV}	*average forward current*	T_C = 150°C	T_{VJ} = 175°C			10	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 175°C			0.82	V
r_F	*slope resistance* }					37	mΩ
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°C			100	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°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°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°C			115	A^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			105	A^2s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			85	A^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			82	A^2s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		4		pF
P_{RSM}	*max. surge reverse dissipation*	t_p = 10 µs	T_{VJ} = 175°C			1.6	kW

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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



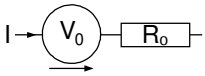
Part description

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 °C



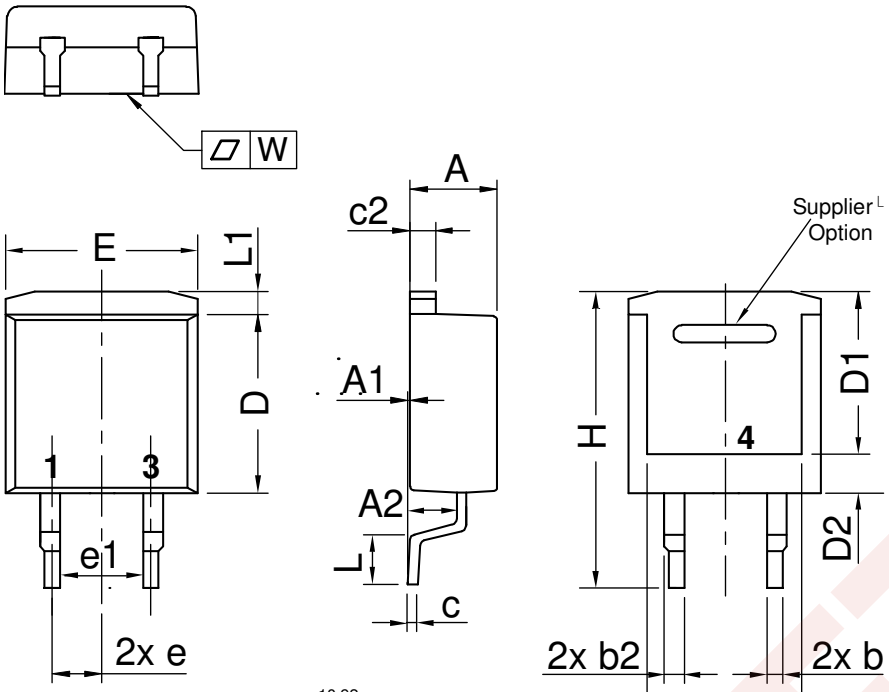
Rectifier

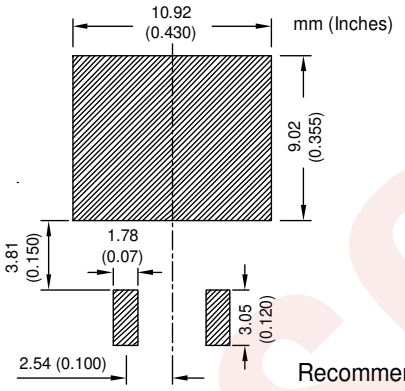
$V_{0\ max}$	*threshold voltage*	0.82	V
$R_{0\ max}$	*slope resistance **	10.2	mΩ

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Outlines TO-263 (D2Pak-HV)

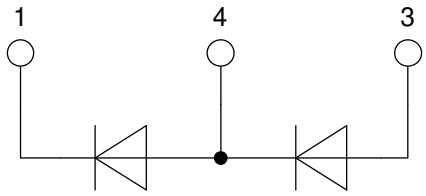




Recommended min. foot print

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.



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Rectifier

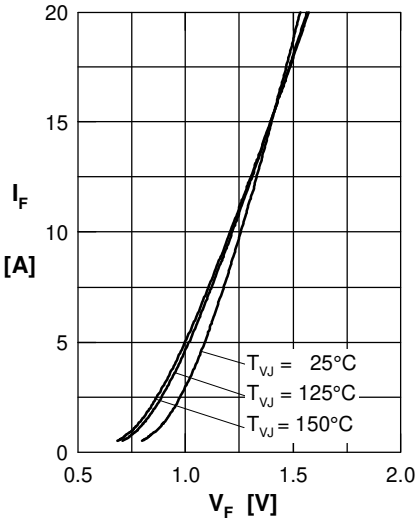


Fig. 1 Forward current versus voltage drop per diode

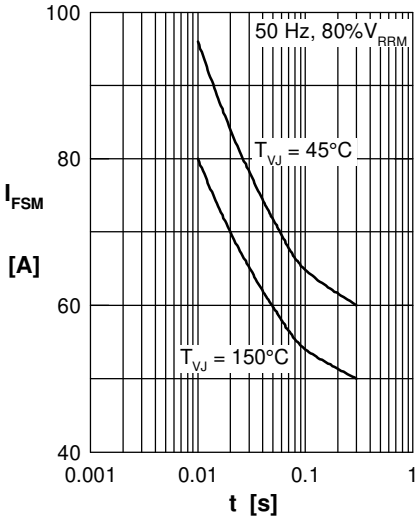


Fig. 2 Surge overload current

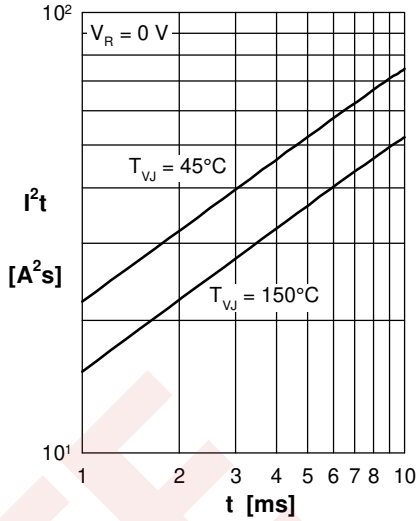


Fig. 3 I^2t versus time per diode

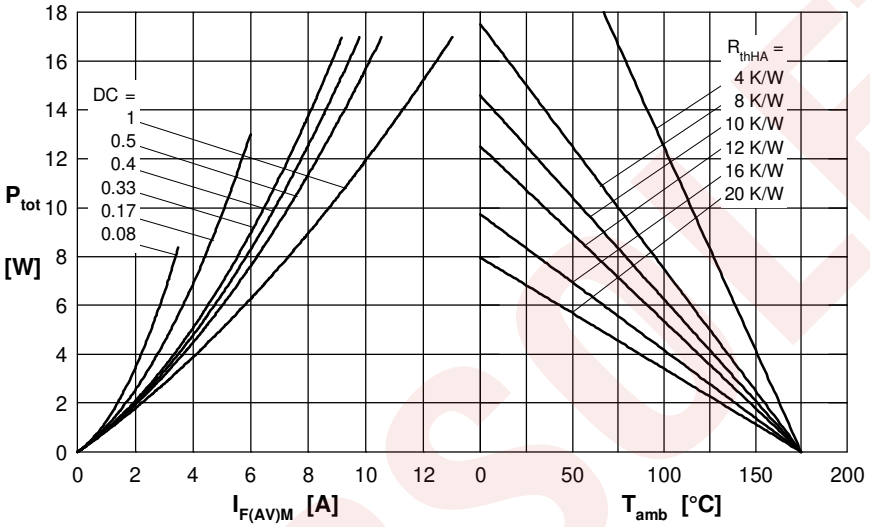


Fig. 4 Power dissipation vs. direct output current and ambient temperature

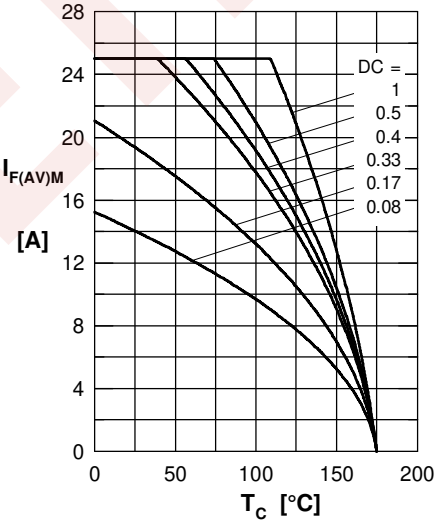


Fig. 5 Max. forward current vs. case temperature

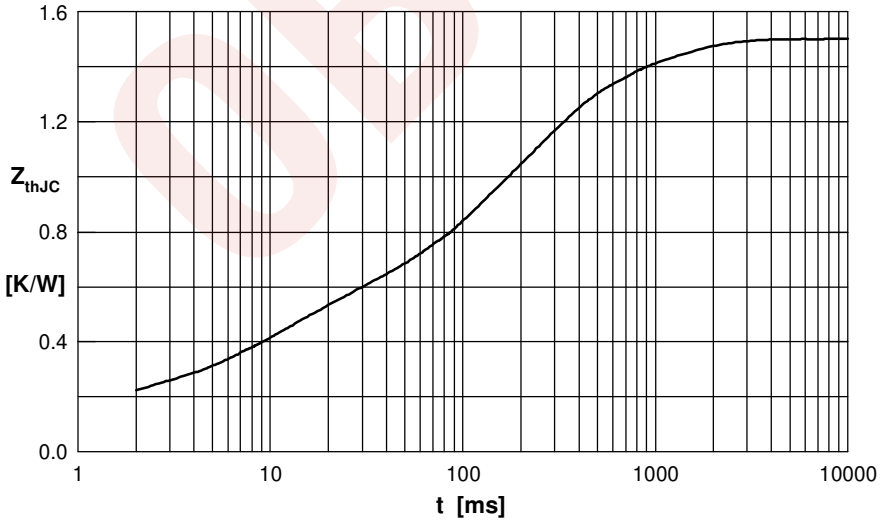


Fig. 6 Transient thermal impedance junction to case

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

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