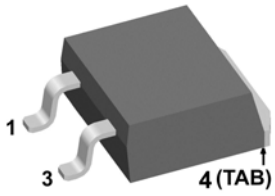
High Voltage Standard Rectifier

V_{RRM}	=	2200 V
I_{FAV}	=	30 A
V_F	=	1.24 V

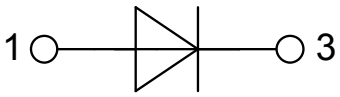
Single Diode

Part number

DNA30E2200PZ



Backside: anode



Features / Advantages:

- 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

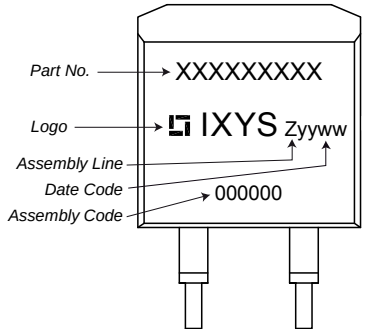
Package: TO-263 (D2Pak-HV)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			2300	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			2200	V
I_R	*reverse current*	V_R = 2200 V	T_{VJ} = 25°C			40	µA
		V_R = 2200 V	T_{VJ} = 150°C			1.5	mA
V_F	*forward voltage drop*	I_F = 30 A	T_{VJ} = 25°C			1.26	V
		I_F = 60 A				1.53	V
		I_F = 30 A	T_{VJ} = 150 °C			1.24	V
		I_F = 60 A				1.63	V
I_{FAV}	*average forward current*	T_C = 140°C	T_{VJ} = 175°C			30	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 175°C			0.83	V
r_F	*slope resistance* }					13.4	mΩ
R_{thJC}	*thermal resistance junction to case*					0.7	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.25		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			210	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			370	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			400	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			315	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			340	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			685	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			665	A²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			495	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			480	A²s
C_J	*junction capacitance*	V_R = 700 V; f = 1 MHz	T_{VJ} = 25°C		7		pF

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 number

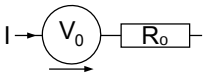
D = Diode
N = High Voltage Standard Rectifier
A = (>= 2000V)
30 = Current Rating [A]
E = Single Diode
2200 = Reverse Voltage [V]
PZ = TO-263AB (D2Pak) (2HV)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DNA30E2200PZ	DNA30E2200PZ	Tape & Reel	800	514460

Similar Part	Package	Voltage class
DNA30EM2200PZ	TO-263AB (D2Pak) (2HV)	2200
DNA30E2200PA	TO-220AC	2200
DNA30E2200FE	i4-Pac (2HV)	2200
DNA30E2200IY	TO-262 (I2Pak) (2HV)	2200

Equivalent Circuits for Simulation

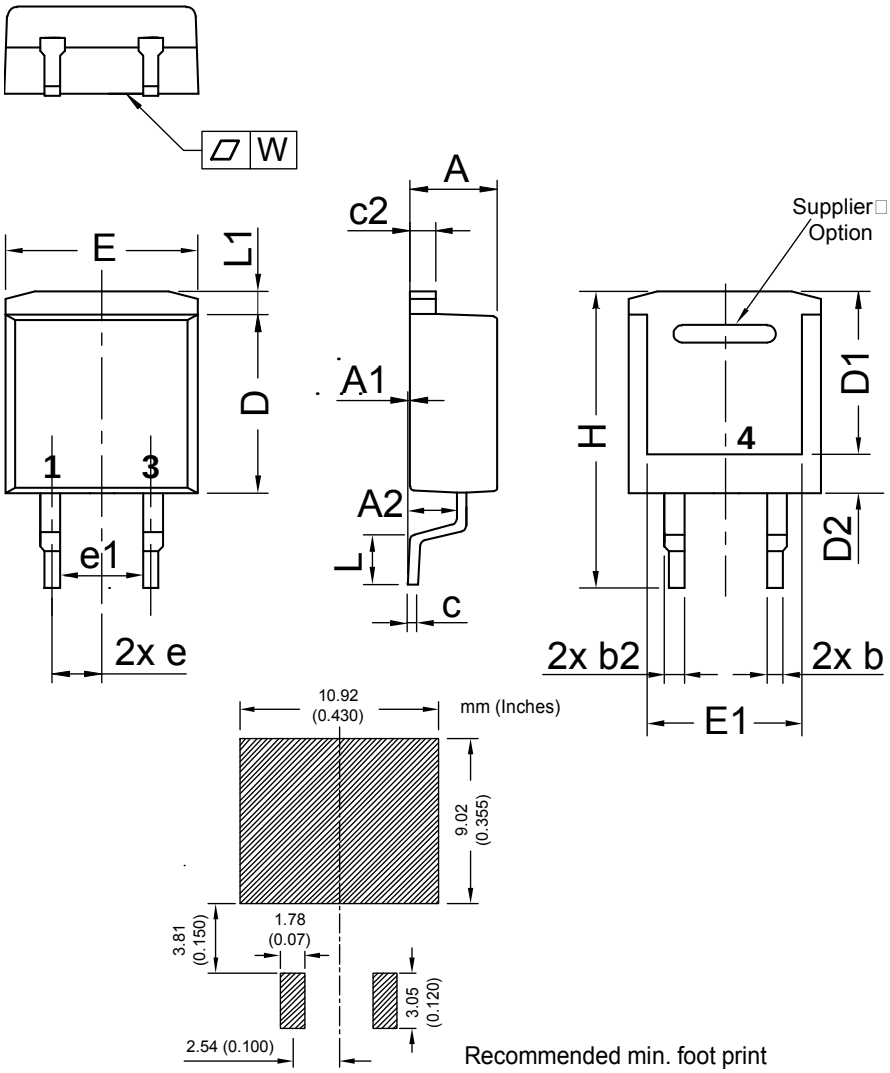
** on die level* T_{VJ} = 175 °C



Rectifier

$V_{0\,max}$	*threshold voltage*	0.83	V
$R_{0\,max}$	*slope resistance **	10.2	mΩ

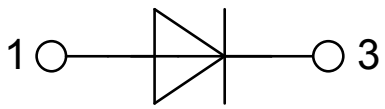
Outlines TO-263 (D2Pak-HV)



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.



Rectifier

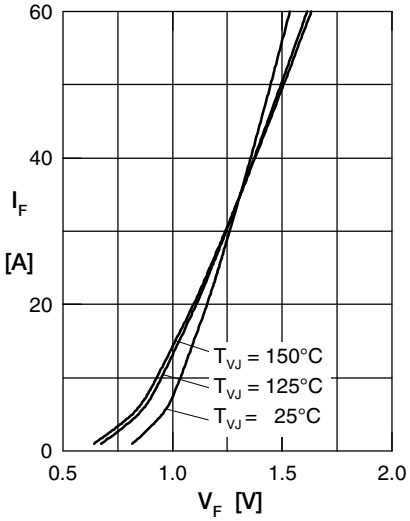


Fig. 1 Forward current versus voltage drop per diode

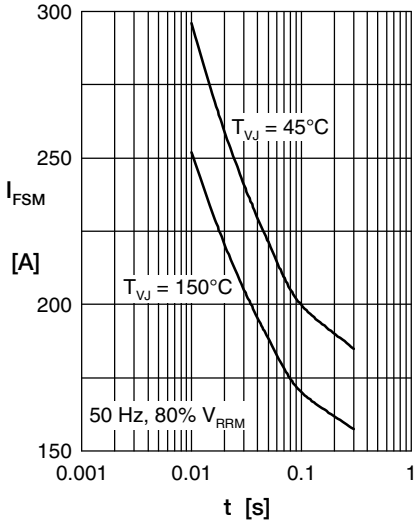


Fig. 2 Surge overload current

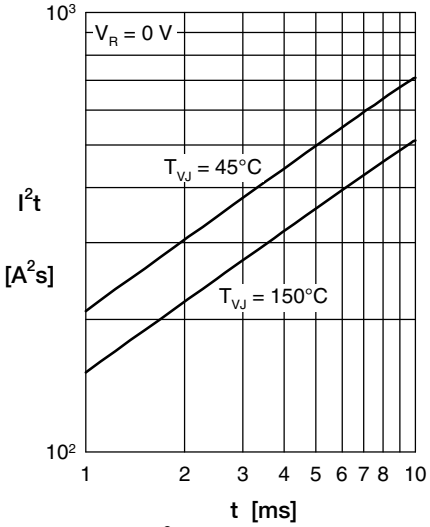


Fig. 3 I^2t versus time per diode

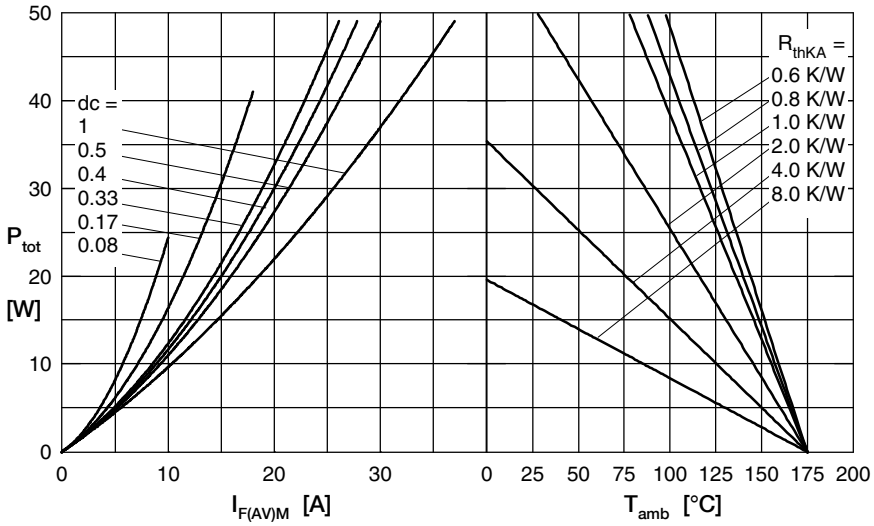


Fig. 4 Power dissipation vs. direct output current & ambient temperature

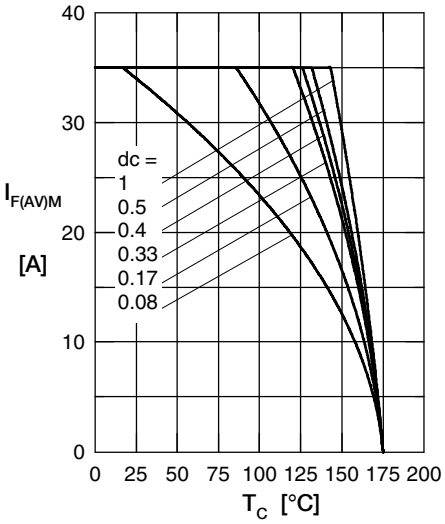


Fig. 5 Max. forward current versus case temperature

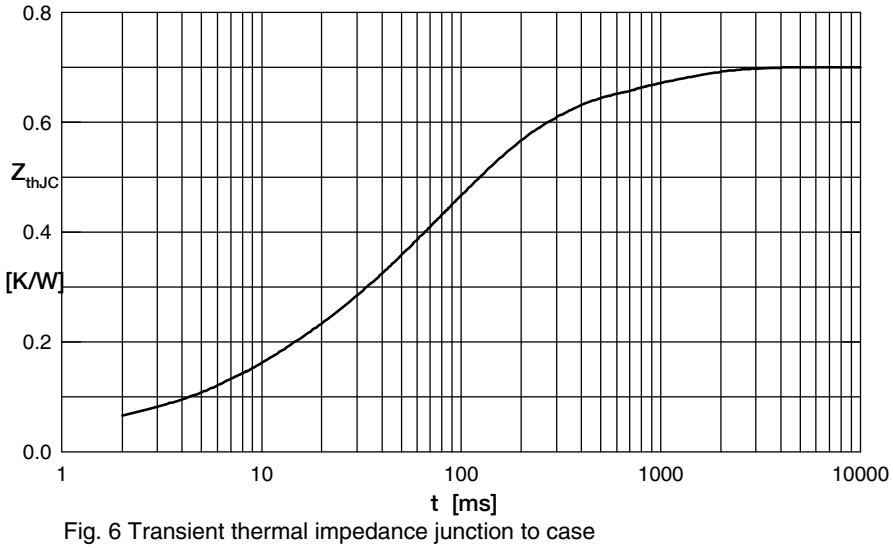


Fig. 6 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.03	0.0003
2	0.072	0.0065
3	0.131	0.027
4	0.367	0.105
5	0.1	0.8