

# High Voltage Standard Rectifier

$$V_{RRM} = 2200 \text{ V}$$

$$I_{FAV} = 30 \text{ A}$$

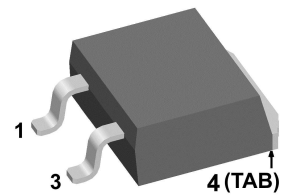
$$V_F = 1.24 \text{ V}$$

## Single Diode

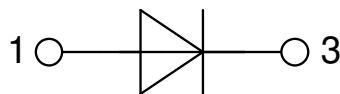
### Part number

**DNA30E2200PZ**

Marking on Product: 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

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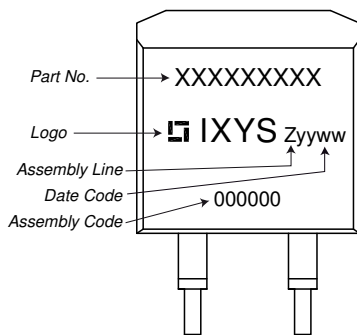


Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					2300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					2200	V
$I_R$	reverse current	$V_R = 2200$ V	$T_{VJ} = 25^\circ\text{C}$			40	$\mu\text{A}$
		$V_R = 2200$ V	$T_{VJ} = 150^\circ\text{C}$			1.5	mA
$V_F$	forward voltage drop	$I_F = 30$ A	$T_{VJ} = 25^\circ\text{C}$			1.26	V
		$I_F = 60$ A				1.53	V
		$I_F = 30$ A	$T_{VJ} = 150^\circ\text{C}$			1.24	V
		$I_F = 60$ A				1.63	V
$I_{FAV}$	average forward current	$T_C = 140^\circ\text{C}$ rectangular	$T_{VJ} = 175^\circ\text{C}$ d = 0.5			30	A
$V_{FO}$	threshold voltage	} for power loss calculation only				0.83	V
$r_F$	slope resistance					13.4	m $\Omega$
$R_{thJC}$	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			$T_C = 25^\circ\text{C}$		210	W
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			370	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			400	A
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			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	$T_{VJ} = 45^\circ\text{C}$			685	A <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			665	A <sup>2</sup> s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			495	A <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			480	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 700$ V; f = 1 MHz	$T_{VJ} = 25^\circ\text{C}$		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
<b>Weight</b>				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
$d_{Spb/Abp}$		terminal to backside	4.7			mm

**Product Marking**



**Part description**

- 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)

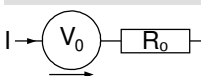
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DNA30E2200PZ-TRL	DNA30E2200PZ	Tape & Reel	800	514460
Alternative	DNA30E2200PZ-TUB	DNA30E2200PZ	Tube	50	525361

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

$T_{VJ} = 175\text{ °C}$

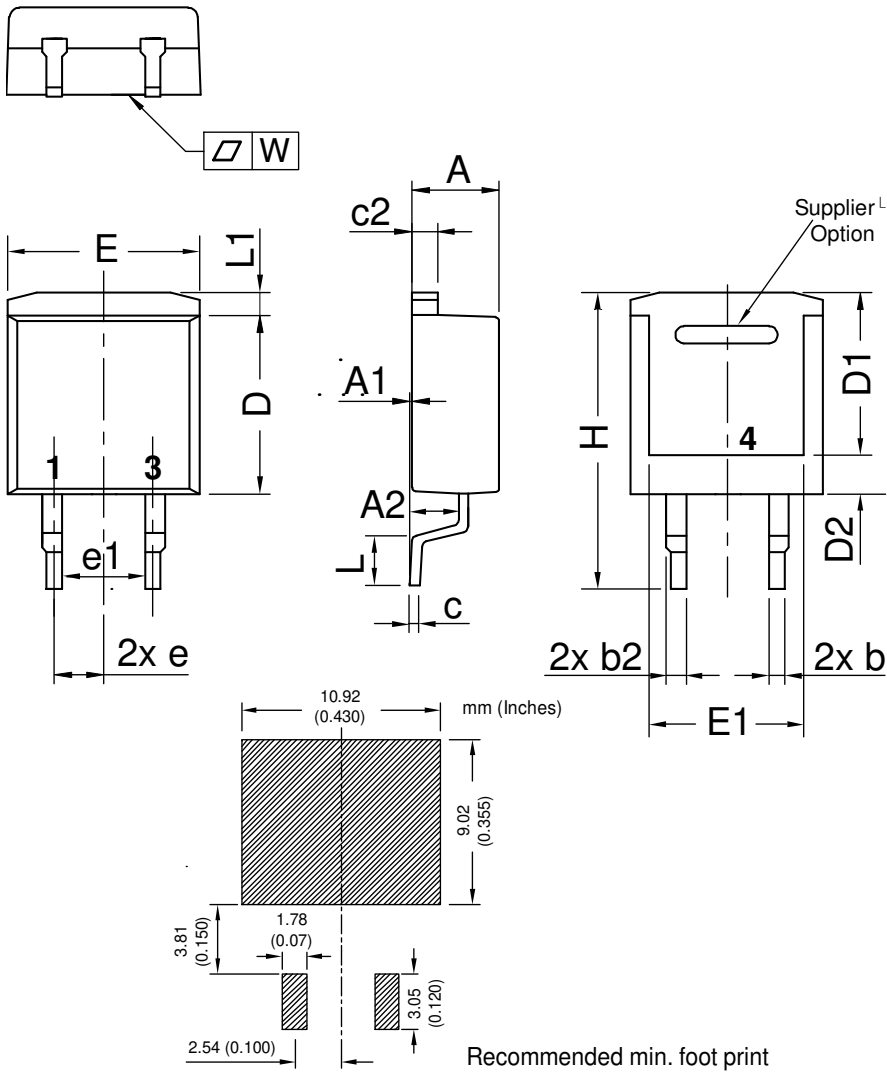


**Rectifier**

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

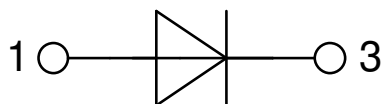


**Outlines TO-263 (D2Pak-HV)**



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**

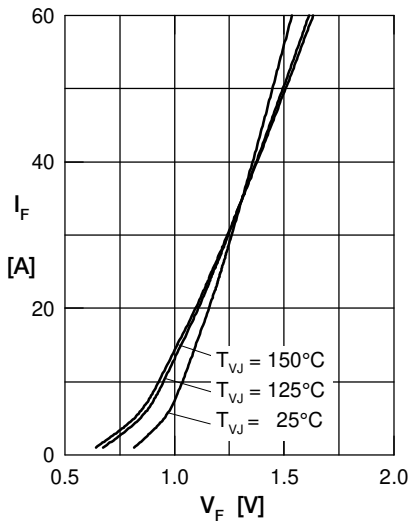


Fig. 1 Forward current versus voltage drop per diode

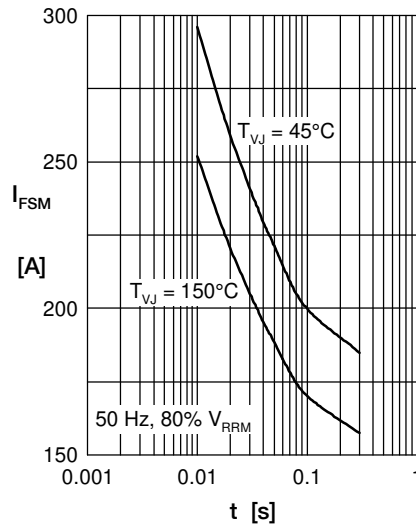


Fig. 2 Surge overload current

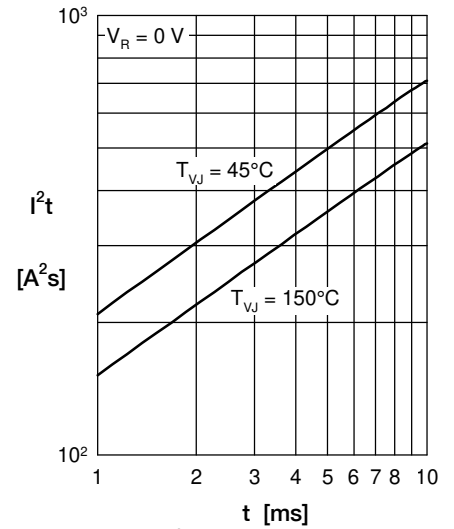


Fig. 3  $I^2t$  versus time per diode

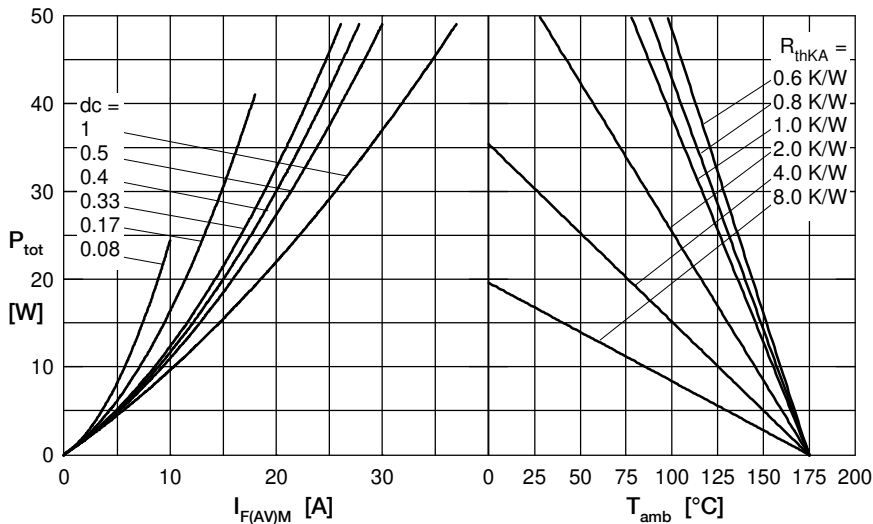


Fig. 4 Power dissipation vs. direct output current & ambient temperature

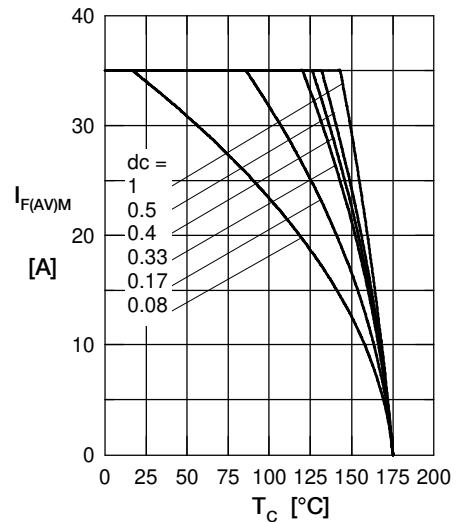


Fig. 5 Max. forward current versus case temperature

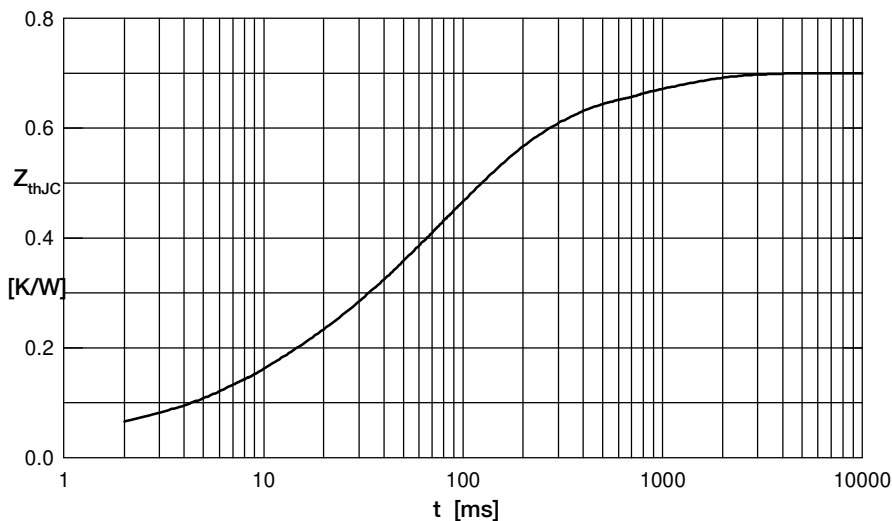


Fig. 6 Transient thermal impedance junction to case

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