

# High Voltage Standard Rectifier

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

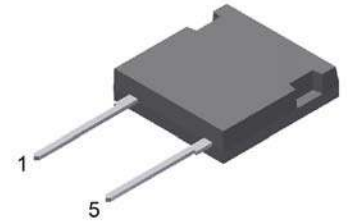
$$I_{FAV} = 30 \text{ A}$$

$$V_F = 1,22 \text{ V}$$

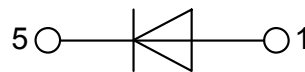
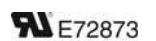
## Single Diode

Part number

**DNA30E2200FE**



Backside: isolated



### 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: i4-Pac

- Isolation Voltage: 3000 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

### Disclaimer Notice

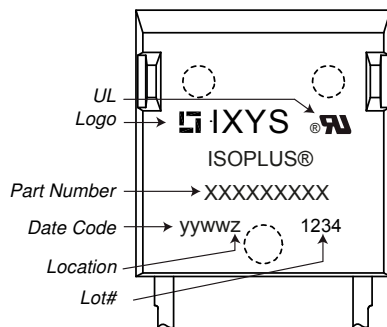
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					2300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					2200	V
$I_R$	reverse current	$V_R = 2200$ V		$T_{VJ} = 25^\circ\text{C}$		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		$T_{VJ} = 25^\circ\text{C}$		1,25	V
		$I_F = 60$ A				1,50	V
		$I_F = 30$ A		$T_{VJ} = 150^\circ\text{C}$		1,22	V
		$I_F = 60$ A				1,59	V
$I_{FAV}$	average forward current	$T_C = 110^\circ\text{C}$		$T_{VJ} = 175^\circ\text{C}$		30	A
		rectangular	d = 0.5				
$V_{FO}$	threshold voltage			$T_{VJ} = 175^\circ\text{C}$		0,83	V
$r_F$	slope resistance					12,8	m $\Omega$
						} for power loss calculation only	
$R_{thJC}$	thermal resistance junction to case					1,35	K/W
$R_{thCH}$	thermal resistance case to heatsink				0,2		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		110	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 i4-Pac		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			70	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>				5,5		g
$F_C$	mounting force with clip		20		120	N
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	13,8			mm
$d_{Spb/Apb}$		terminal to backside	5,1			mm
$V_{ISOL}$	isolation voltage	t = 1 second 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3000			V
		t = 1 minute	2500			V

### Product Marking



### Part description

D = Diode  
 N = High Voltage Standard Rectifier  
 A = ( $\geq 2000V$ )  
 30 = Current Rating [A]  
 E = Single Diode  
 2200 = Reverse Voltage [V]  
 FE = i4-Pac (2HV)

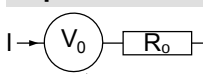
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DNA30E2200FE	DNA30E2200FE	Tube	25	508861

Similar Part	Package	Voltage class
DNA30E2200PA	TO-220AC	2200
DNA30E2200PZ	TO-263AB (D2Pak) (2HV)	2200
DNA30EM2200PZ	TO-263AB (D2Pak) (2HV)	2200
DNA30E2200IY	TO-262 (2HV) (I2PAK)	2200

### Equivalent Circuits for Simulation

\* on die level

$T_{VJ} = 175^\circ C$

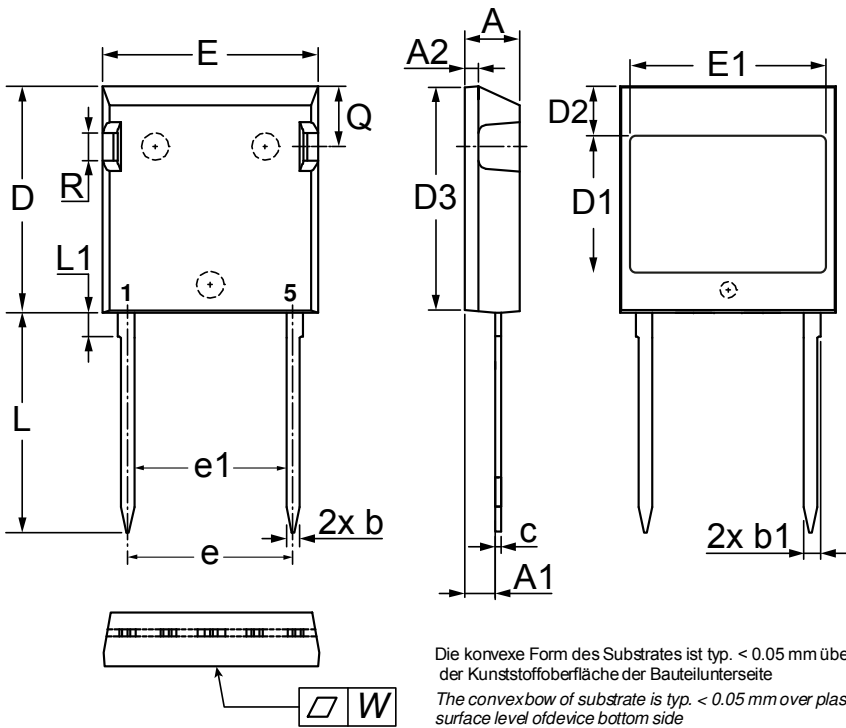


Rectifier

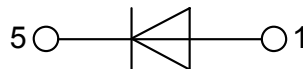
$V_{0\ max}$	threshold voltage	0,83	V
$R_{0\ max}$	slope resistance *	10,2	mΩ



Outlines i4-Pac



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.83	5.21	0.190	0.205
A1	2.59	3.00	0.102	0.118
A2	1.17	2.16	0.046	0.085
b	1.14	1.40	0.045	0.055
b1	1.47	1.73	0.058	0.068
c	0.51	0.74	0.020	0.029
D	20.80	21.34	0.819	0.840
D1	11.70	12.30	0.460	0.484
D2	5.50	6.10	0.216	0.240
D3	20.30	20.70	0.799	0.815
E	19.56	20.29	0.770	0.799
E1	17.50	18.10	0.689	0.712
e	15.24	BSC	0.600	BSC
e1	14.10	BSC	0.555	BSC
L	19.81	21.34	0.780	0.840
L1	2.11	2.59	0.083	0.102
Q	5.33	6.20	0.210	0.244
R	2.54	4.57	0.100	0.180
W	-	0.10	-	0.004



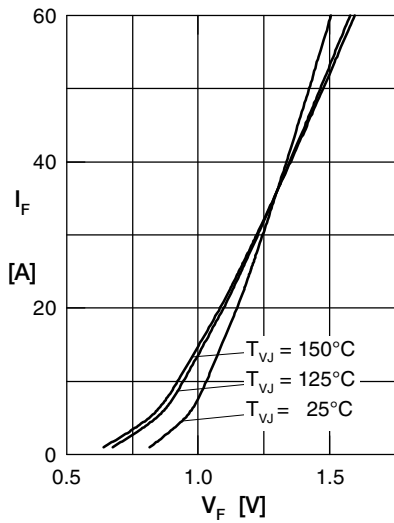
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

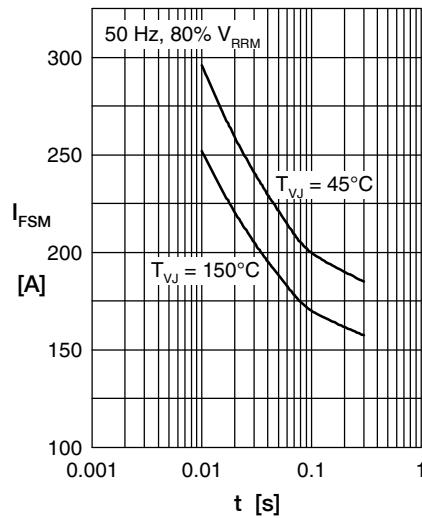


Fig. 2 Surge overload current

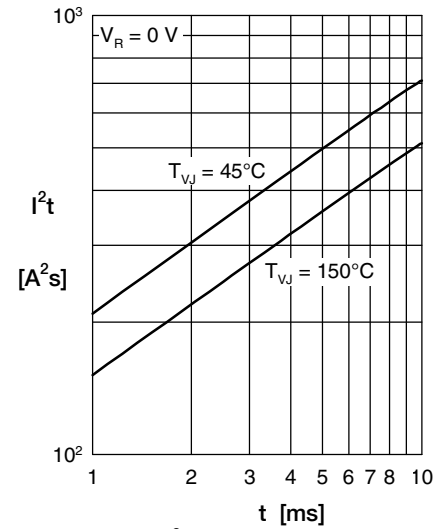
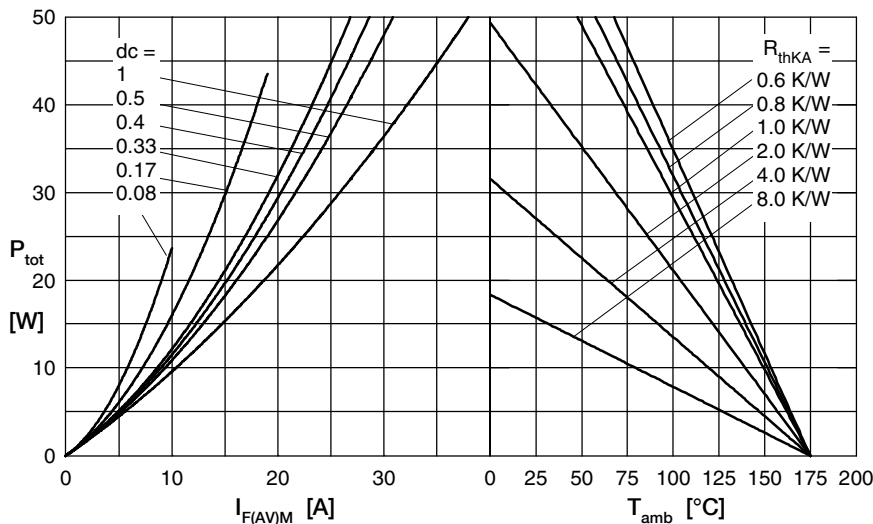

 Fig. 3  $I^2t$  versus time per diode


Fig. 4 Power dissipation versus direct output current &amp; ambient temperature

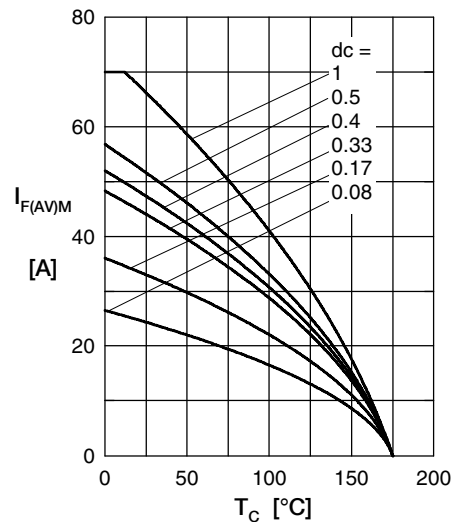


Fig. 5 Max. forward current versus case temperature

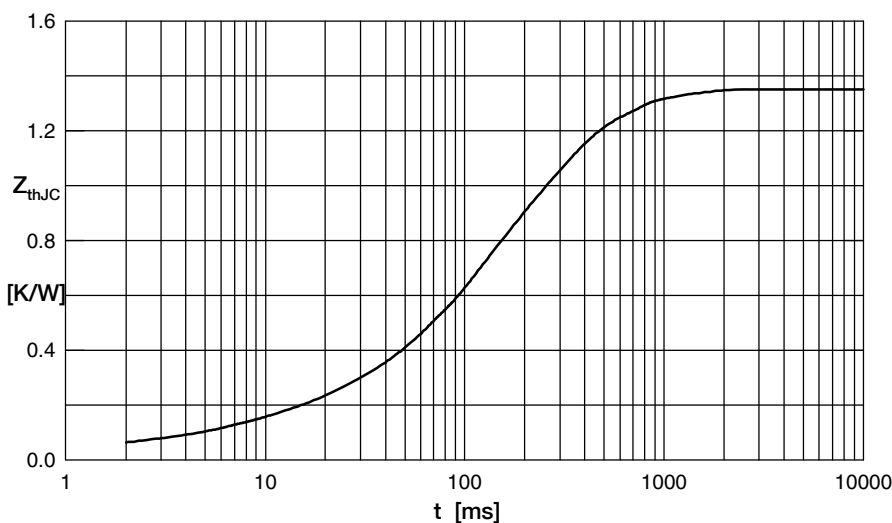


Fig. 6 Transient thermal impedance junction to case

 Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.03	0.0003
2	0.072	0.0065
3	0.122	0.083
4	0.736	0.152
5	0.39	0.4