

# High Voltage Standard Rectifier

<b>3~ Rectifier</b>	
$V_{RRM}$	= 2200 V
$I_{DAV}$	= 90 A
$I_{FSM}$	= 370 A

Half 3~ Bridge, Common Cathode

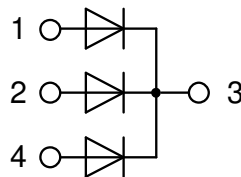
Part number

**DNA90YC2200NA**



Backside: isolated

 E72873



## 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: SOT-227B (minibloc)

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper internally DCB isolated
- Advanced power cycling

## Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).

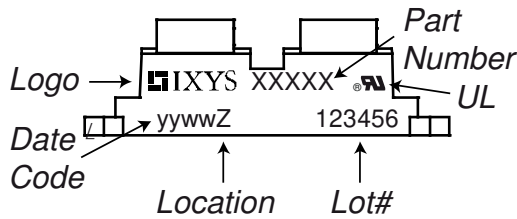


Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					2300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					2200	V
$I_R$	reverse current	$V_R = 2200$ V		$T_{VJ} = 25^\circ\text{C}$		100	$\mu\text{A}$
		$V_R = 2200$ V		$T_{VJ} = 150^\circ\text{C}$		1.5	mA
$V_F$	forward voltage drop	$I_F = 30$ A		$T_{VJ} = 25^\circ\text{C}$		1.23	V
		$I_F = 90$ A				1.70	V
		$I_F = 30$ A		$T_{VJ} = 125^\circ\text{C}$		1.21	V
		$I_F = 90$ A				1.85	V
$I_{DAV}$	bridge output current	$T_C = 85^\circ\text{C}$	rectangular	$T_{VJ} = 150^\circ\text{C}$		90	A
			$d = \frac{1}{3}$				
$V_{FO}$	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.86	V
$r_F$	slope resistance					11.4	m $\Omega$
						} for power loss calculation only	
$R_{thJC}$	thermal resistance junction to case					1.2	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.1		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		$T_{VJ} = 45^\circ\text{C}$		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 SOT-227B (minibloc)		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			150	A
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		150	°C
<b>Weight</b>				30		g
$M_D$	mounting torque		1.1		1.5	Nm
$M_T$	terminal torque		1.1		1.5	Nm
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	10.5	3.2		mm
$d_{Spb/Apb}$		terminal to backside	8.6	6.8		mm
$V_{ISOL}$	isolation voltage	t = 1 second		3000		V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2500		V

**Product Marking**



**Part description**

- D = Diode
- N = High Voltage Standard Rectifier
- A = (>= 2000V)
- 90 = Current Rating [A]
- YC = Half 3~ Bridge, Common Cathode
- 2200 = Reverse Voltage [V]
- NA = SOT-227B (minibloc)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DNA90YC2200NA	DNA90YC2200NA	Tube	10	513723

Similar Part	Package	Voltage class
DNA90YA2200NA	SOT-227B (minibloc)	2200

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 150^{\circ}C$



**Rectifier**

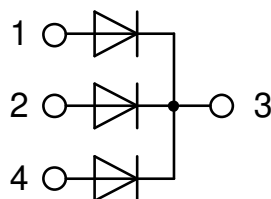
$V_{0\ max}$	threshold voltage	0.86	V
$R_{0\ max}$	slope resistance *	9.5	mΩ



**Outlines SOT-227B (minibloc)**



Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106



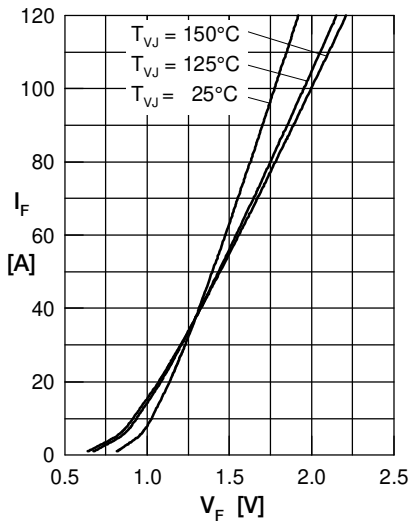
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

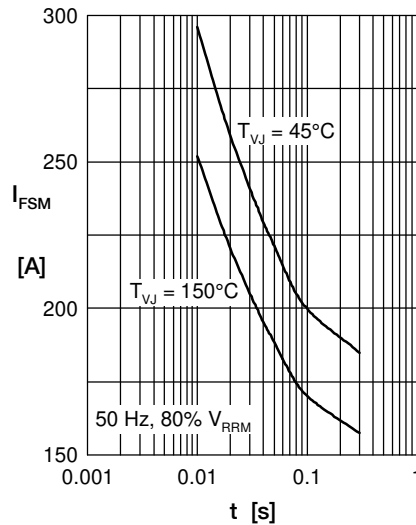


Fig. 2 Surge overload current

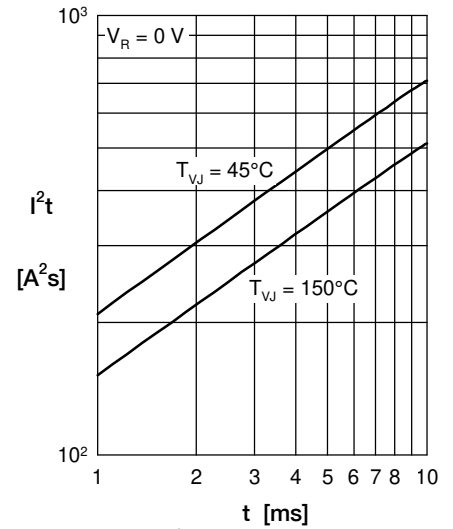
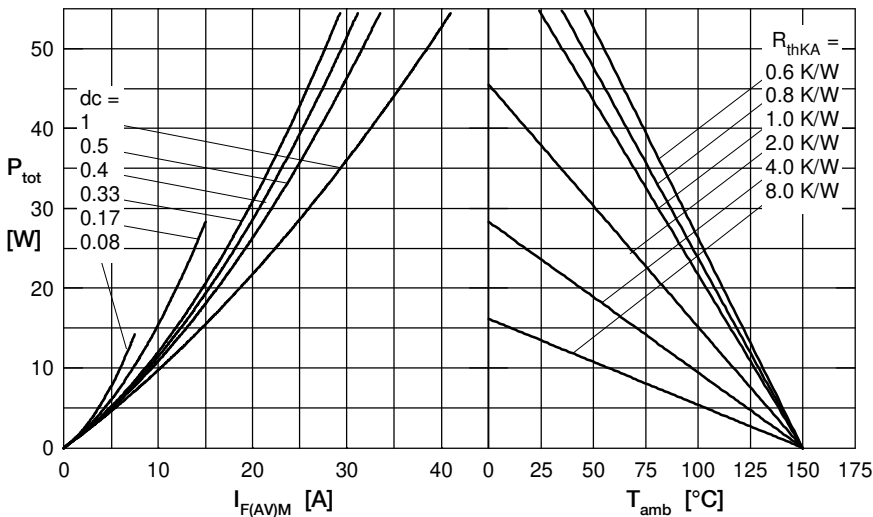

 Fig. 3  $I^2t$  versus time per diode


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

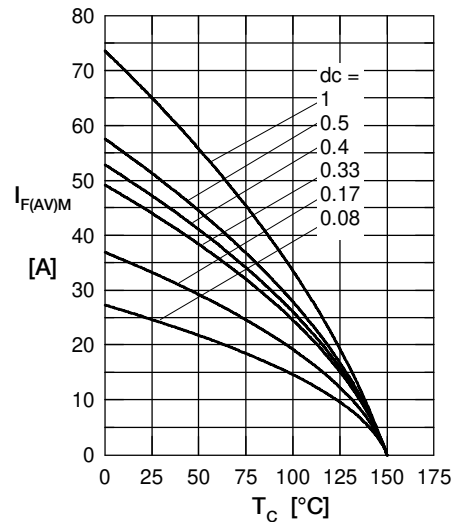


Fig. 5 Max. forward current versus case temperature

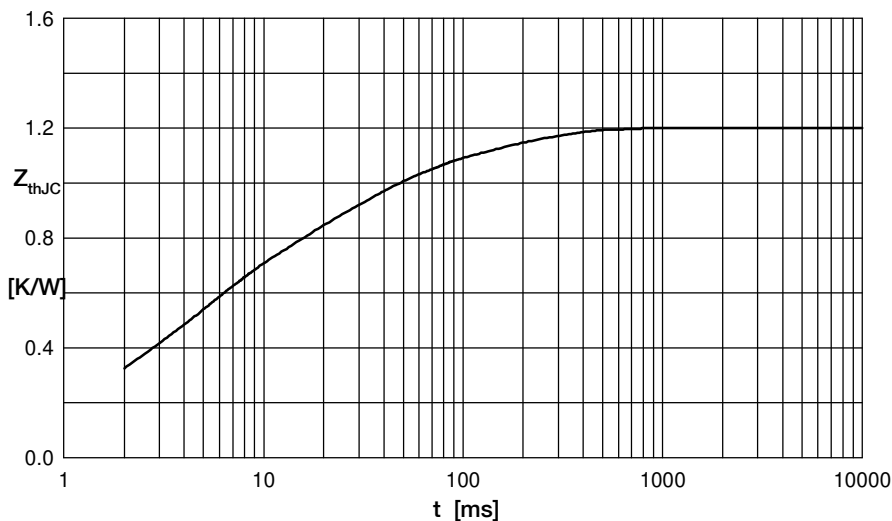


Fig. 6 Transient thermal impedance junction to case

 Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.06	0.0004
2	0.2	0.00265
3	0.34	0.0045
4	0.4	0.0242
5	0.2	0.15