

High Voltage Standard Rectifier

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

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

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

Single Diode

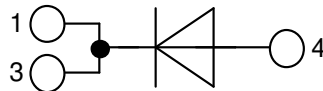
Part number

DNA30EM2200PZ

Marking on Product: DNA30EM2200PZ



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
- High creepage distance between terminals

Disclaimer Notice

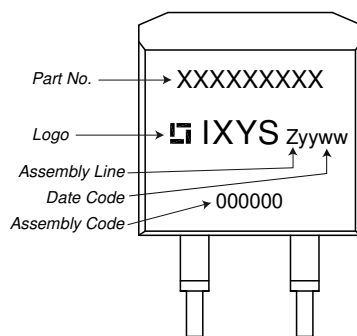
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| Rectifier | | | | Ratings | | | |
|------------|--|-----------------------------------|-------------|------------------------------|------|------|------------------|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| V_{RSM} | max. 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 | μA |
| | | $V_R = 2200$ 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 | $T_{VJ} = 175^\circ\text{C}$ | | 30 | A |
| V_{FO} | threshold voltage | } for power loss calculation only | | $T_{VJ} = 175^\circ\text{C}$ | | 0.83 | V |
| r_F | slope resistance | | | | | 13.4 | m Ω |
| 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 ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 665 | A ² s |
| | | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 150^\circ\text{C}$ | | 495 | A ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 480 | A ² 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 |
| 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
- N = High Voltage Standard Rectifier
- A = (>= 2000V)
- 30 = Current Rating [A]
- EM = Single Diode
- 2200 = Reverse Voltage [V]
- PZ = TO-263AB (D2Pak) (2HV)

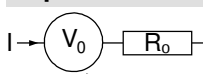
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|-------------------|--------------------|---------------|----------|----------|
| Standard | DNA30EM2200PZ-TRL | DNA30EM2200PZ | Tape & Reel | 800 | 514467 |
| Alternative | DNA30EM2200PZ-TUB | DNA30EM2200PZ | Tube | 50 | 525368 |

| Similar Part | Package | Voltage class |
|--------------|------------------------|---------------|
| DNA30E2200PZ | 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

$T_{VJ} = 175\text{ °C}$

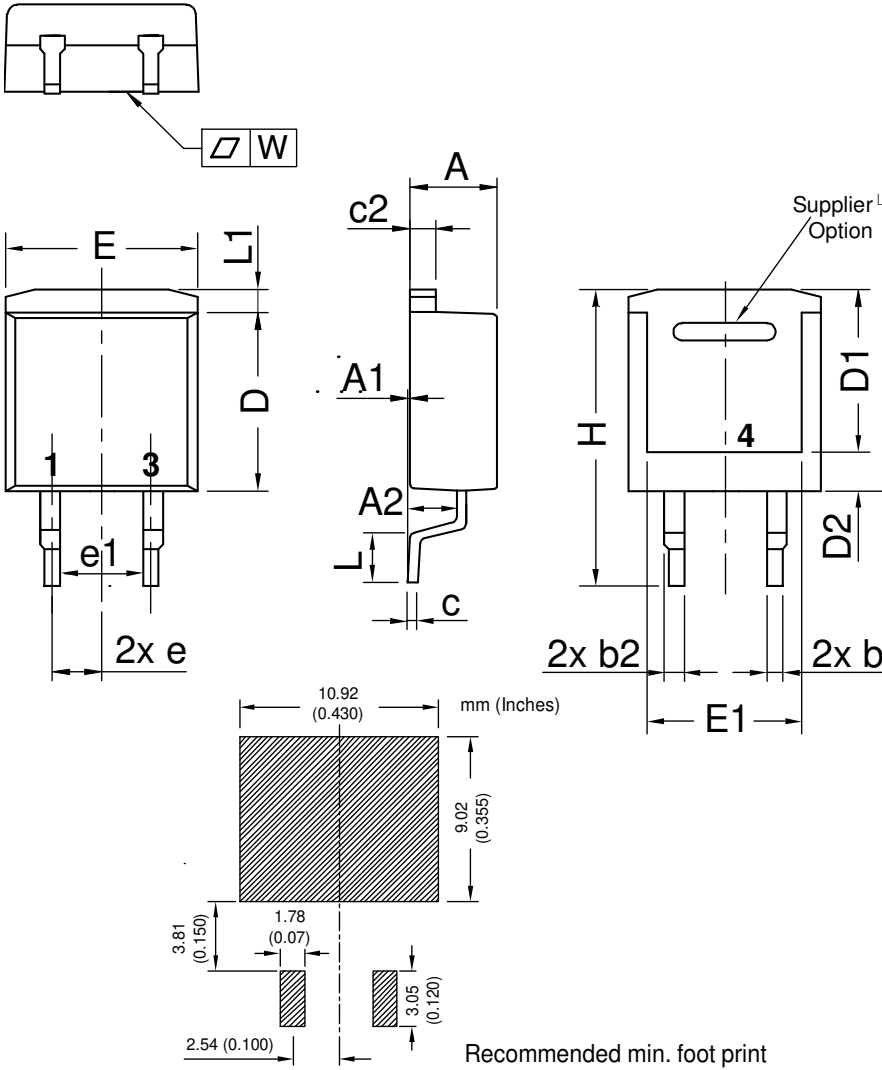


Rectifier

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

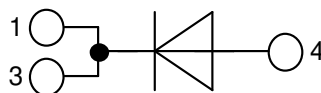


Outlines TO-263 (D2Pak-HV)



| 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.



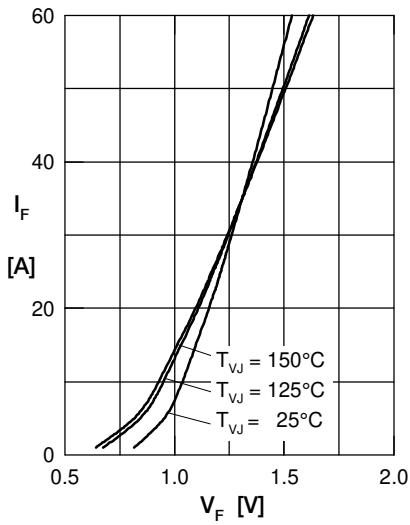
Rectifier


Fig. 1 Forward current versus voltage drop per diode

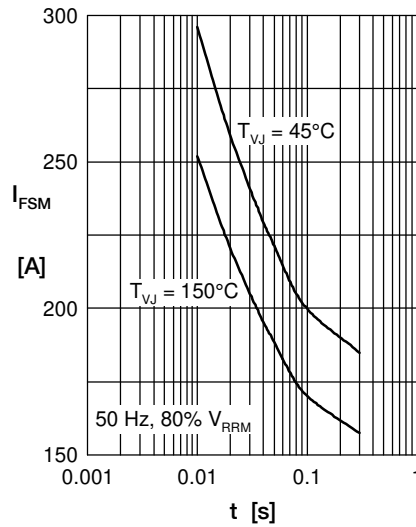


Fig. 2 Surge overload current

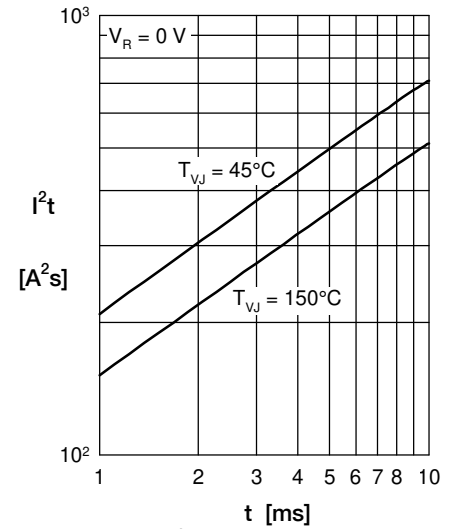
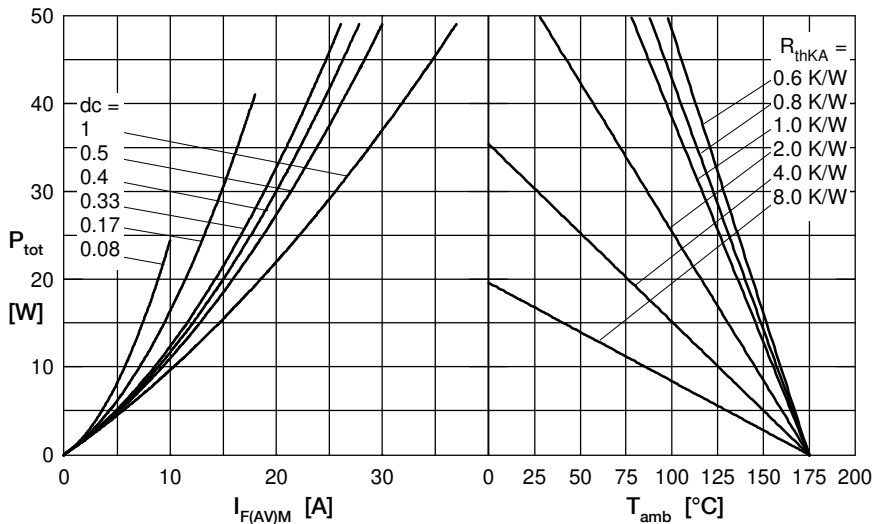

 Fig. 3 I^2t versus time per diode


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

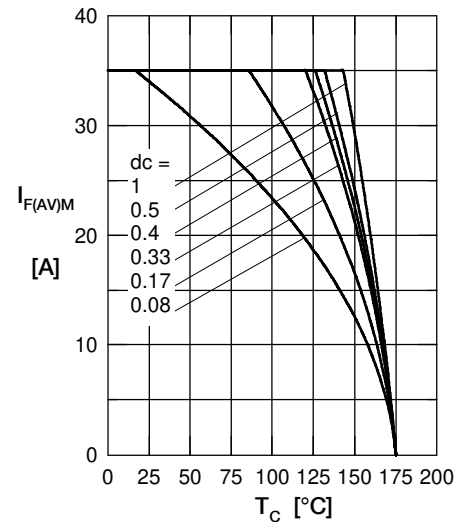


Fig. 5 Max. forward current versus case temperature

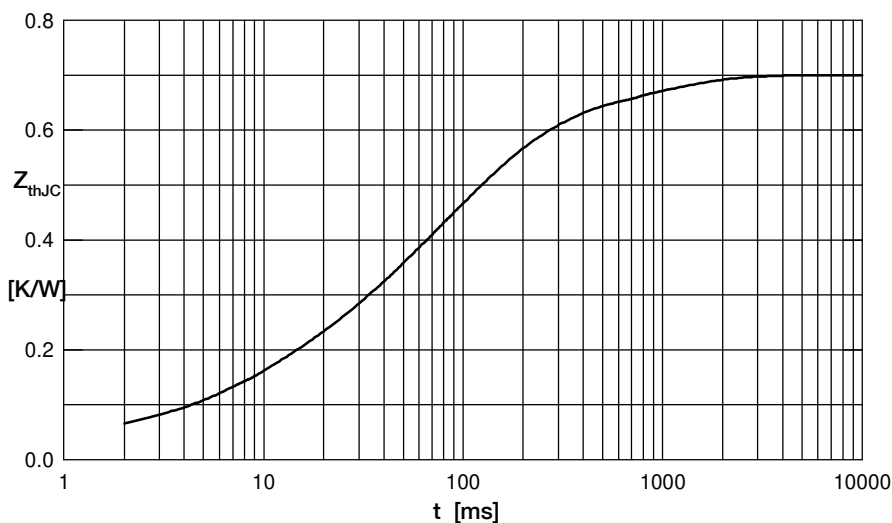


Fig. 6 Transient thermal impedance junction to case

 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 |