

High Voltage Standard Rectifier

$$V_{RRM} = 2200V$$

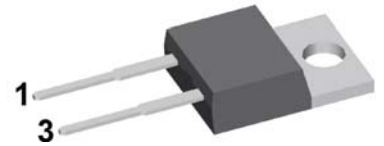
$$I_{FAV} = 30A$$

$$V_F = 1.24V$$

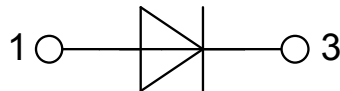
Single Diode

Part number

DNA30E2200PA



Backside: anode



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

Applications:

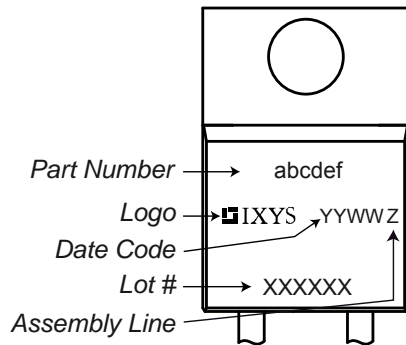
- Diode for main rectification
- For single and three phase bridge configurations

Package: TO-220

- 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 | $T_{VJ} = 25^{\circ}C$ | | | 2300 | V | |
| V_{RRM} | max. repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 2200 | V | |
| I_R | reverse current | $V_R = 2200 V$ | $T_{VJ} = 25^{\circ}C$ | | 40 | μA | |
| | | $V_R = 2200 V$ | $T_{VJ} = 150^{\circ}C$ | | 1.5 | mA | |
| V_F | forward voltage drop | $I_F = 30 A$ | $T_{VJ} = 25^{\circ}C$ | | 1.26 | V | |
| | | $I_F = 60 A$ | | | 1.53 | V | |
| | | $I_F = 30 A$ | $T_{VJ} = 150^{\circ}C$ | | 1.24 | V | |
| | | $I_F = 60 A$ | | | 1.63 | V | |
| I_{FAV} | average forward current | $T_C = 140^{\circ}C$ rectangular $d = 0.5$ | $T_{VJ} = 175^{\circ}C$ | | 30 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 175^{\circ}C$ | | 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 | | | 0.50 | | K/W | |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 210 | W | |
| I_{FSM} | max. forward surge current | $t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$ | $T_{VJ} = 45^{\circ}C$ | | 370 | A | |
| | | $t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$ | $V_R = 0 V$ | | 400 | A | |
| | | $t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$ | $T_{VJ} = 150^{\circ}C$ | | 315 | A | |
| | | $t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$ | $V_R = 0 V$ | | 340 | A | |
| I^2t | value for fusing | $t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$ | $T_{VJ} = 45^{\circ}C$ | | 685 | A ² s | |
| | | $t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$ | $V_R = 0 V$ | | 665 | A ² s | |
| | | $t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$ | $T_{VJ} = 150^{\circ}C$ | | 495 | A ² s | |
| | | $t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$ | $V_R = 0 V$ | | 480 | A ² s | |
| C_J | junction capacitance | $V_R = 700 V; f = 1 \text{ MHz}$ | $T_{VJ} = 25^{\circ}C$ | | 7 | pF | |

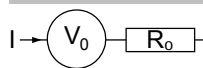
| Package TO-220 | | | Ratings | | | |
|----------------|------------------------------|--------------|---------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 35 | A |
| T_{stg} | storage temperature | | -55 | | 150 | °C |
| T_{vj} | virtual junction temperature | | -55 | | 175 | °C |
| Weight | | | | 2 | | g |
| M_D | mounting torque | | 0.4 | | 0.6 | Nm |
| F_C | mounting force with clip | | 20 | | 60 | N |

Product Marking

Part number

D = Diode
 N = High Voltage Standard Rectifier
 A = ($\geq 2000V$)
 30 = Current Rating [A]
 E = Single Diode
 2200 = Reverse Voltage [V]
 PA = TO-220AC (2)

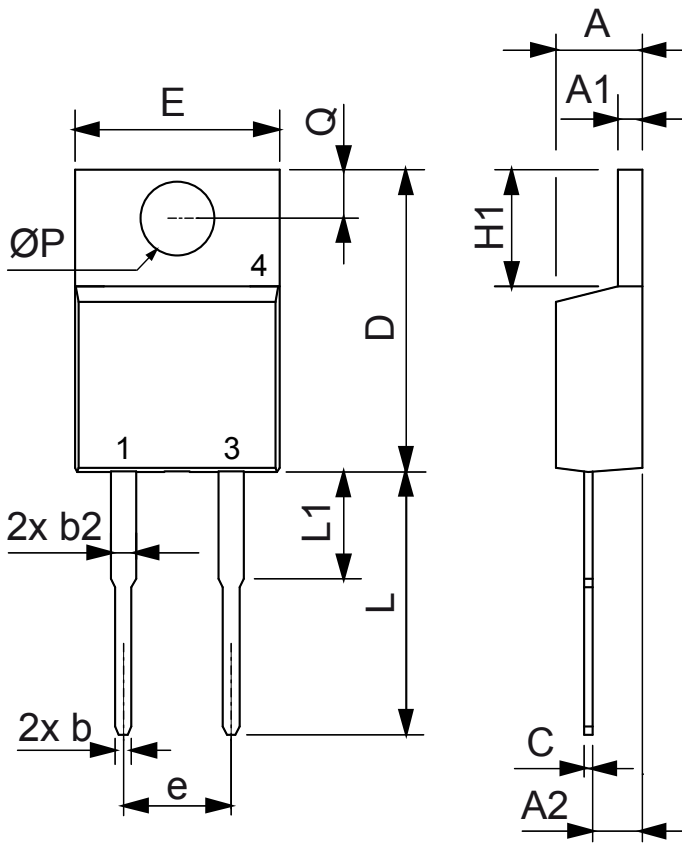
| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|--------------|--------------------|---------------|----------|----------|
| Standard | DNA30E2200PA | DNA30E2200PA | Tube | 50 | 507762 |

| Similar Part | Package | Voltage class |
|---------------|----------------------|---------------|
| DNA30E2200PZ | TO-263AB (D2Pak) | 2200 |
| DNA30EM2200PZ | TO-263AB (D2Pak) | 2200 |
| DNA30E2200FE | i4-Pac (2HV) | 2200 |
| DNA30E2200IY | TO-262 (2HV) (I2PAK) | 2200 |

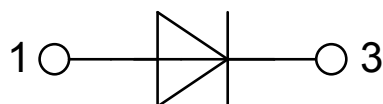
Equivalent Circuits for Simulation
** on die level*
 $T_{vj} = 175^\circ C$

Rectifier

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

Outlines TO-220



| Dim. | Millimeter | | Inches | |
|-----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.32 | 4.82 | 0.170 | 0.190 |
| A1 | 1.14 | 1.39 | 0.045 | 0.055 |
| A2 | 2.29 | 2.79 | 0.090 | 0.110 |
| b | 0.64 | 1.01 | 0.025 | 0.040 |
| b2 | 1.15 | 1.65 | 0.045 | 0.065 |
| C | 0.35 | 0.56 | 0.014 | 0.022 |
| D | 14.73 | 16.00 | 0.580 | 0.630 |
| E | 9.91 | 10.66 | 0.390 | 0.420 |
| e | 5.08 | BSC | 0.200 | BSC |
| H1 | 5.85 | 6.85 | 0.230 | 0.270 |
| L | 12.70 | 13.97 | 0.500 | 0.550 |
| L1 | 2.79 | 5.84 | 0.110 | 0.230 |
| $\varnothing P$ | 3.54 | 4.08 | 0.139 | 0.161 |
| Q | 2.54 | 3.18 | 0.100 | 0.125 |



Rectifier

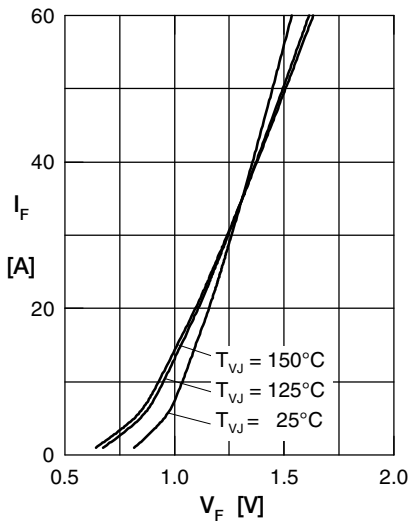


Fig. 1 Forward current versus voltage drop per diode

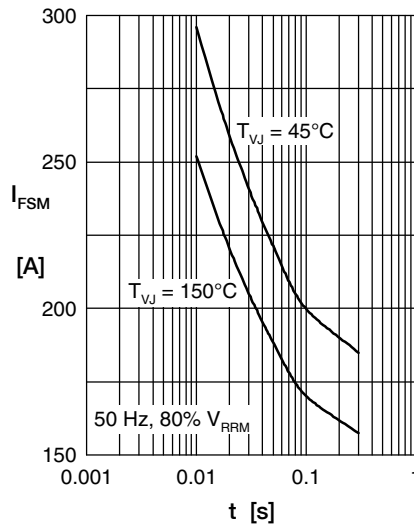


Fig. 2 Surge overload current

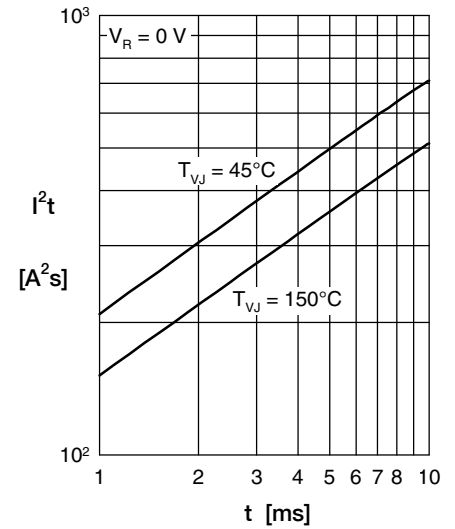


Fig. 3 I^2t versus time per diode

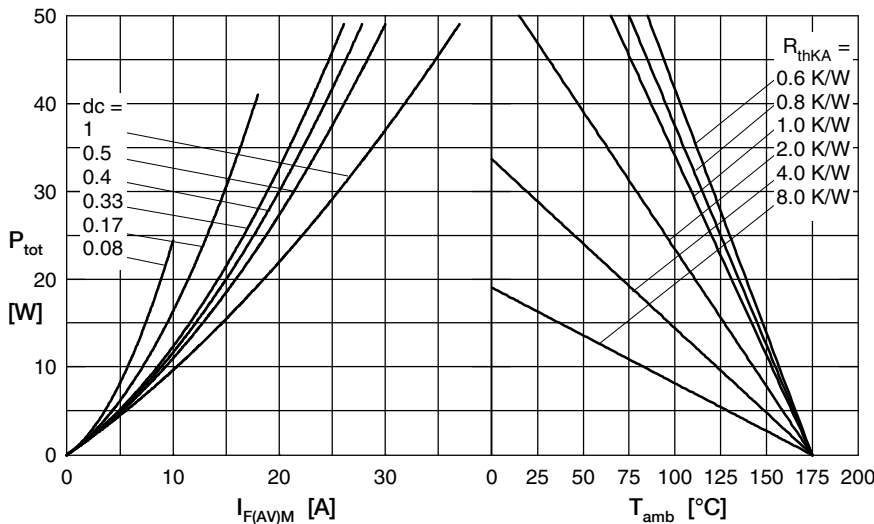


Fig. 4 Power dissipation versus direct output current and ambient temperature

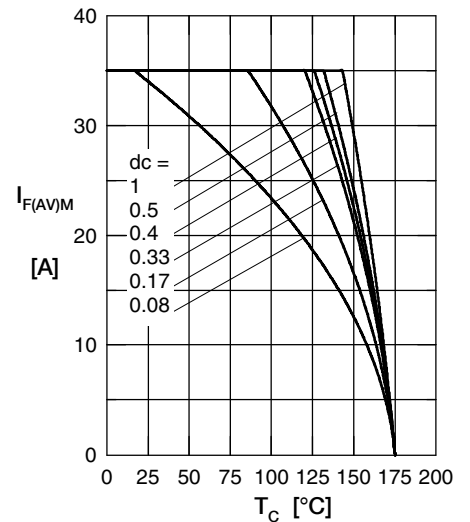


Fig. 5 Max. forward current versus case temperature

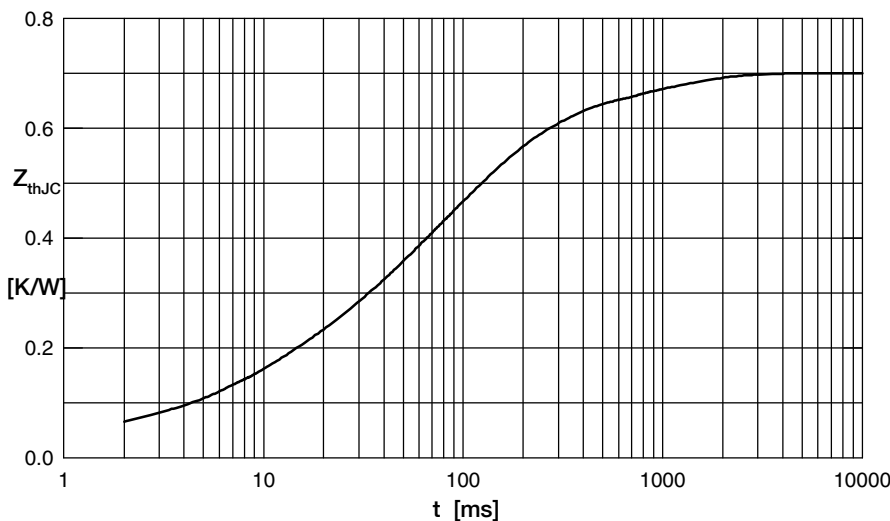


Fig. 6 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

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