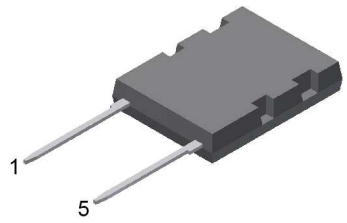
# High Voltage Standard Rectifier

| | | |
|---|---|---|
| $V_{RRM}$ | = | 2200 V |
| $I_{FAV}$ | = | 120 A |
| $V_F$ | = | 1.23 V |

Single Diode

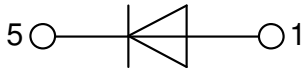
**Part number**

**DNA120E2200KO**




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:** ISOPLUS264

- Isolation Voltage: 3600 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**

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.



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## Rectifier

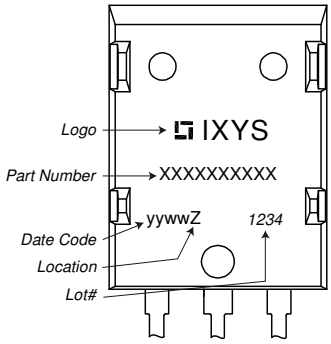
| Symbol | Definition | Conditions | | Ratings min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 2300 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 2200 | V |
| $I_R$ | *reverse current* | $V_R$ = 2200 V | $T_{VJ}$ = 25°C | | | 100 | µA |
| | | $V_R$ = 2200 V | $T_{VJ}$ = 150°C | | | 3.5 | mA |
| $V_F$ | *forward voltage drop* | $I_F$ = 120 A | $T_{VJ}$ = 25°C | | | 1.31 | V |
| | | $I_F$ = 240 A | | | | 1.64 | V |
| | | $I_F$ = 120 A | $T_{VJ}$ = 150°C | | | 1.23 | V |
| | | $I_F$ = 240 A | | | | 1.68 | V |
| $I_{FAV}$ | *average forward current* | $T_C$ = 125°C | $T_{VJ}$ = 175°C | | | 120 | A |
| | | rectangular d = 0.5 | | | | | |
| $V_{F0}$ | *threshold voltage* } *for power loss calculation only* | | $T_{VJ}$ = 175°C | | | 0.75 | V |
| $r_F$ | *slope resistance* } | | | | | 3.8 | mΩ |
| $R_{thJC}$ | *thermal resistance junction to case* | | | | | 0.25 | K/W |
| $R_{thCH}$ | *thermal resistance case to heatsink* | | | | 0.2 | | K/W |
| $P_{tot}$ | *total power dissipation* | | $T_C$ = 25°C | | | 600 | W |
| $I_{FSM}$ | *max. forward surge current* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 2.00 | kA |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 2.16 | kA |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 1.70 | kA |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 1.84 | kA |
| $I^2t$ | *value for fusing* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 20.0 | kA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 19.4 | kA²s |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 14.5 | kA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 14.0 | kA²s |
| $C_J$ | *junction capacitance* | $V_R$ = 700 V; f = 1 MHz | $T_{VJ}$ = 25°C | | 88 | | pF |



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| Package ISOPLUS264 | | | | 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 |
| **Weight** | | | | | 10 | | 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* | 5.0 | | | mm |
| $V_{ISOL}$ | *isolation voltage* | t = 1 second | 50/60 Hz, RMS; $I_{ISOL}$ ≤ 1 mA | 3600 | | | V |
| | | t = 1 minute | | 3000 | | | V |

## Product Marking



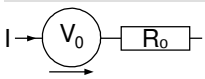

## Part description

D = Diode
N = High Voltage Standard Rectifier
A = (>= 2000V)
120 = Current Rating [A]
E = Single Diode
2200 = Reverse Voltage [V]
KO = ISOPLUS264 (2HV)

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | DNA120E2200KO | DNA120E2200KO | Tube | 25 | 523314 |

## Equivalent Circuits for Simulation

** on die level* $T_{VJ}$ = 175°C



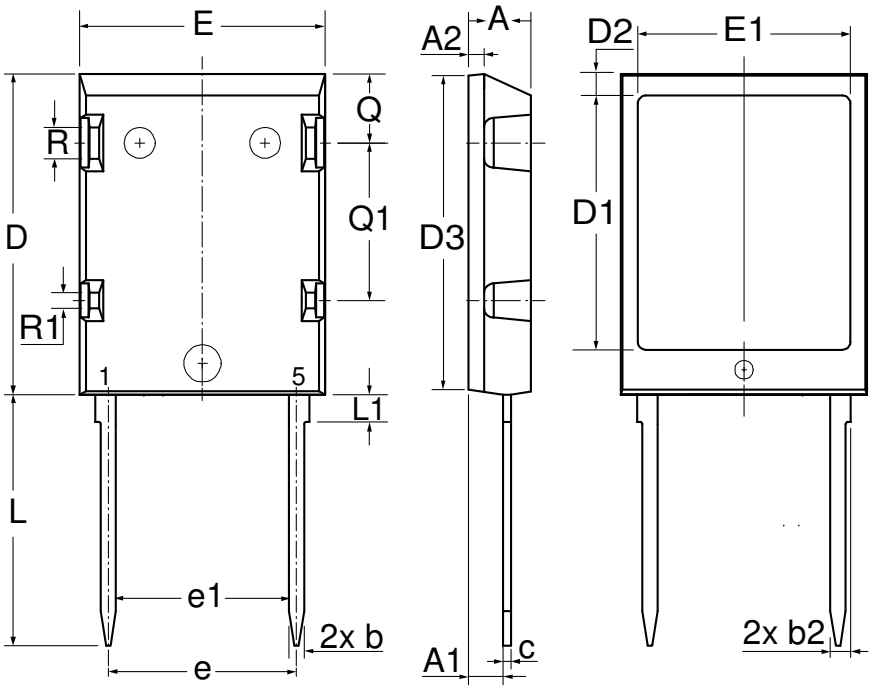

**Rectifier**

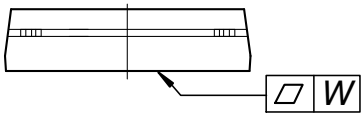
| | | | |
|---|---|---|---|
| $V_{0\ max}$ | *threshold voltage* | 0.75 | V |
| $R_{0\ max}$ | *slope resistance ** | 1.2 | mΩ |



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## Outlines ISOPLUS264

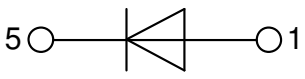



Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite

*The convex bow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side*

| 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 | 1.40 | 0.046 | 0.055 |
| b | 1.14 | 1.40 | 0.045 | 0.055 |
| b2 | 1.60 | 1.83 | 0.063 | 0.072 |
| c | 0.51 | 0.74 | 0.020 | 0.029 |
| D | 25.91 | 26.42 | 1.020 | 1.040 |
| D1 | 20.34 | 20.85 | 0.801 | 0.821 |
| D2 | 1.65 | 2.03 | 0.065 | 0.080 |
| D3 | 25.29 | 25.78 | 1.000 | 1.020 |
| E | 19.56 | 20.29 | 0.770 | 0.799 |
| E1 | 16.97 | 17.53 | 0.668 | 0.690 |
| e | 15.24 | BSC | 0.600 | BSC |
| e1 | 14.10 | BSC | 0.555 | BSC |
| L | 19.81 | 20.83 | 0.780 | 0.820 |
| L1 | 2.03 | 2.59 | 0.080 | 0.102 |
| Q | 5.33 | 5.97 | 0.210 | 0.235 |
| Q1 | 12.45 | 13.03 | 0.490 | 0.513 |
| R | 3.81 | 4.57 | 0.150 | 0.180 |
| R1 | 2.54 | 3.30 | 0.100 | 0.130 |
| W | - | 0.10 | - | 0.004 |






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## Rectifier

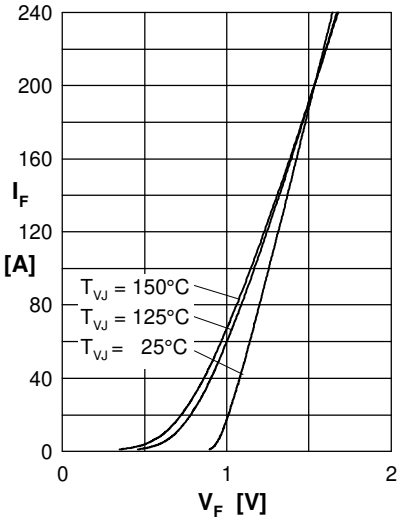



Fig. 1 Forward current versus voltage drop per diode

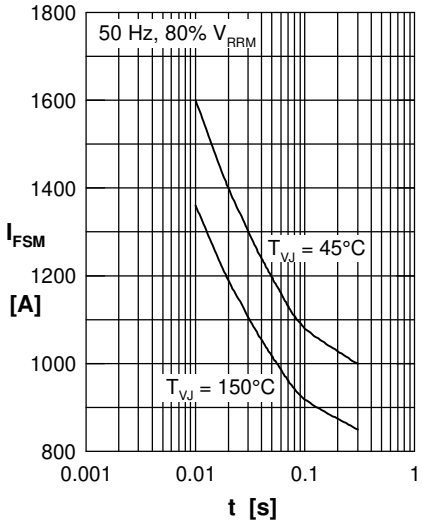



Fig. 2 Surge overload current

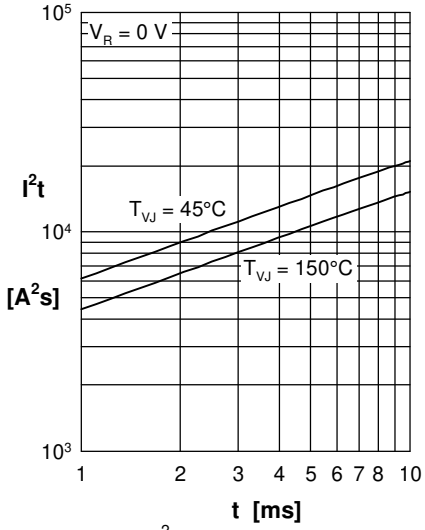



Fig. 3 $I^2t$ versus time per diode

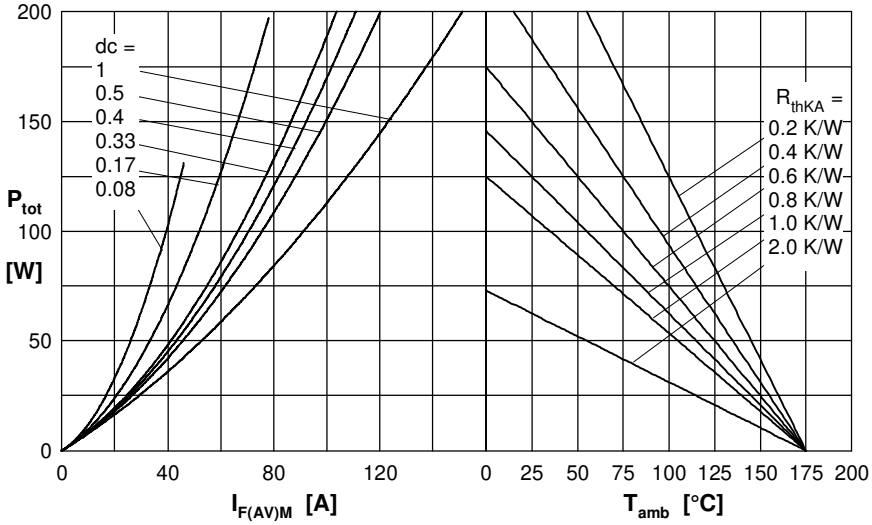



Fig. 4 Power dissipation versus direct output current & ambient temperature

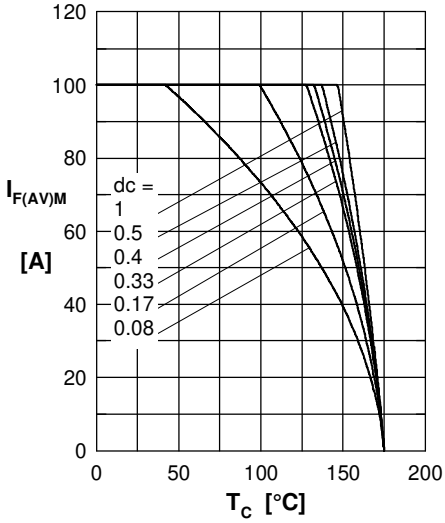



Fig. 5 Max. forward current versus case temperature

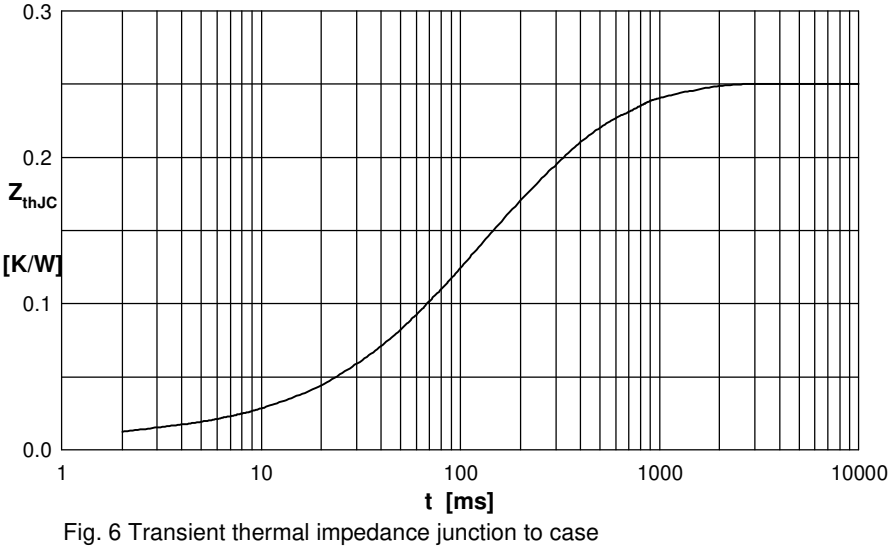



Fig. 6 Transient thermal impedance junction to case

Constants for $Z_{thJC}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.01 | 0.001 |
| 2 | 0.05 | 0.050 |
| 3 | 0.12 | 0.150 |
| 4 | 0.07 | 0.500 |



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