# Standard Rectifier

| | | |
|---|---|---|
| $V_{RRM}$ | = | 1600 V |
| $I_{FAV}$ | = | 10 A |
| $V_F$ | = | 1.21 V |

Single Diode

**Part number**

DMA10I1600PA



Backside: cathode



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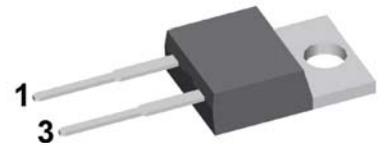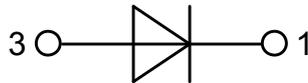
**Features / Advantages:**
● Planar passivated chips
● Very low leakage current
● Very low forward voltage drop
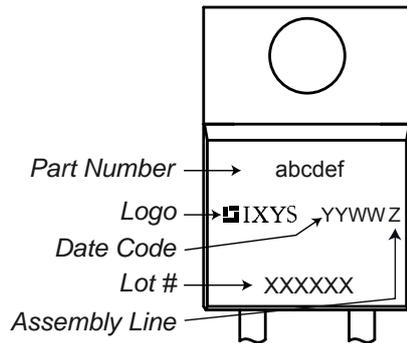● Improved thermal behaviour

**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

| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_{RSM}$ | max. non-repetitive reverse blocking voltage | | $T_{VJ}$ = 25°C | | | 1700 | V |
| $V_{RRM}$ | max. repetitive reverse blocking voltage | | $T_{VJ}$ = 25°C | | | 1600 | V |
| $I_R$ | reverse current, drain current | $V_R$ = 1600 V | $T_{VJ}$ = 25°C | | | 10 | µA |
| | | $V_R$ = 1600 V | $T_{VJ}$ = 150°C | | | 0.2 | mA |
| $V_F$ | forward voltage drop | $I_F$ = 10 A | $T_{VJ}$ = 25°C | | | 1.26 | V |
| | | $I_F$ = 20 A | | | | 1.53 | V |
| | | $I_F$ = 10 A | $T_{VJ}$ = 150 °C | | | 1.21 | V |
| | | $I_F$ = 20 A | | | | 1.57 | V |
| $I_{FAV}$ | average forward current | $T_C$ = 150°C | $T_{VJ}$ = 175°C | | | 10 | A |
| | | rectangular        d = 0.5 | | | | | |
| $V_{F0}$ | threshold voltage } for power loss calculation only | | $T_{VJ}$ = 175°C | | | 0.82 | V |
| $r_F$ | slope resistance | | | | | 37 | mΩ |
| $R_{thJC}$ | thermal resistance junction to case | | | | | 1.5 | K/W |
| $R_{thCH}$ | thermal resistance case to heatsink | | | | 0.50 | | K/W |
| $P_{tot}$ | total power dissipation | | $T_C$ = 25°C | | | 100 | W |
| $I_{FSM}$ | max. forward surge current | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 120 | A |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 130 | A |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 100 | A |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 110 | A |
| $I^2t$ | value for fusing | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 72 | A²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 70 | A²s |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 50 | A²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 50 | A²s |
| $C_J$ | junction capacitance | $V_R$ = 400 V   f = 1 MHz | $T_{VJ}$ = 25°C | | 4 | | pF |

| Package | TO-220 | | Ratings | | | |
|---|---|---|---|---|---|---|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| $I_{RMS}$ | RMS current | per terminal | | | 25 | 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 → abcdef

Logo → IXYS YYWW Z

Date Code

Lot # → XXXXXX

Assembly Line

**Part number**

D = Diode
M = Standard Rectifier
A = (up to 1800V)
10 = Current Rating [A]
I = Single Diode
1600 = Reverse Voltage [V]
PA = TO-220AC (2)

| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | DMA10I1600PA | DMA10I1600PA | Tube | 50 | 508780 |

**Equivalent Circuits for Simulation**    *\* on die level*    $T_{VJ} = 175°C$

I — $V_0$ — $R_0$ —    **Rectifier**
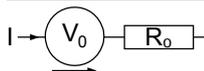
| | | | |
|---|---|---|---|
| $V_{0\,max}$ | threshold voltage | 0.82 | V |
| $R_{0\,max}$ | slope resistance * | 34 | mΩ |

**Outlines   TO-220**
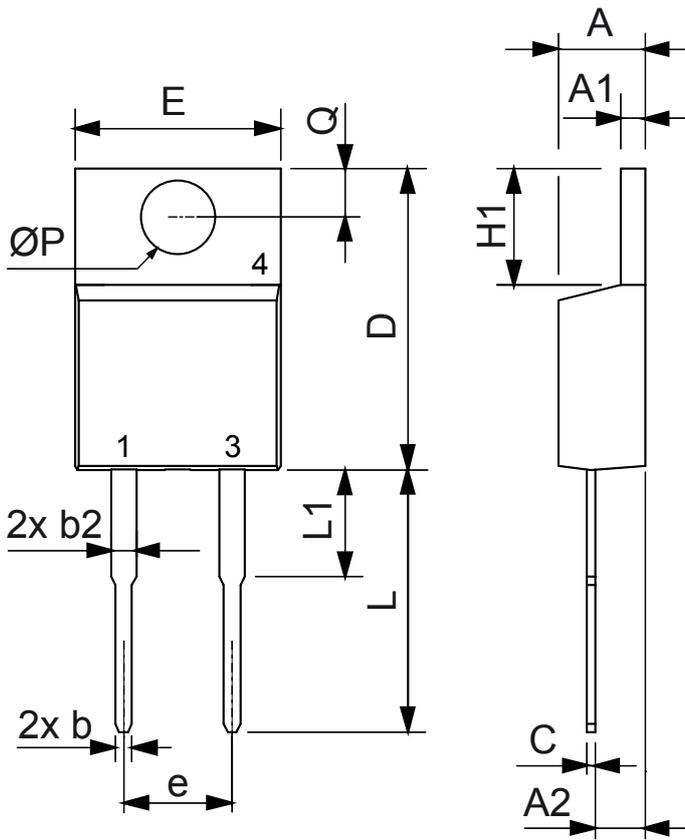
| Dim. | Millimeter | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 4.32 | 4.82 | 0.170 | 0.190 |
| A1 | 1.14 | 1.39 | 0.045 | 0.055 |
| A2 | 2.29 | 2.79 | 0.090 | 0.110 |
| b | 0.64 | 1.01 | 0.025 | 0.040 |
| b2 | 1.15 | 1.65 | 0.045 | 0.065 |
| C | 0.35 | 0.56 | 0.014 | 0.022 |
| 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 |
| ØP | 3.54 | 4.08 | 0.139 | 0.161 |
| Q | 2.54 | 3.18 | 0.100 | 0.125 |

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IXYS reserves the right to change limits, conditions and dimensions.   Data according to IEC 60747and per semiconductor unless otherwise specified   20130108b
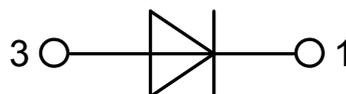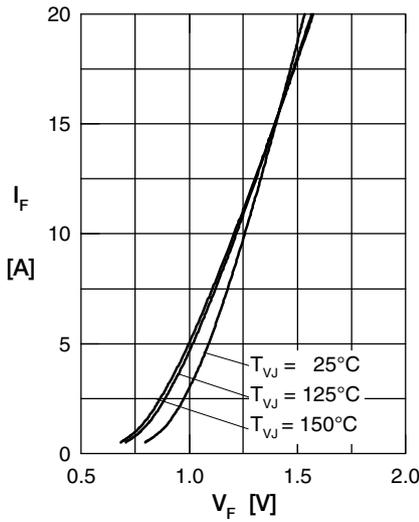
## Rectifier



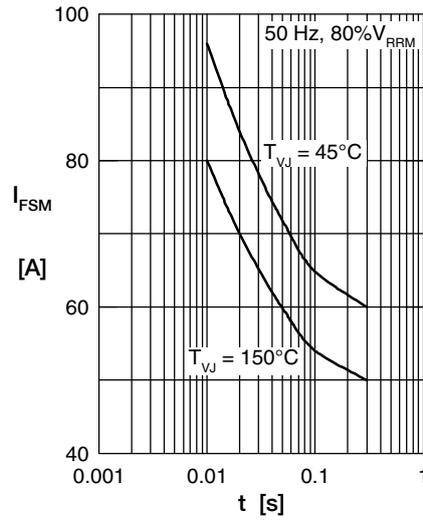Fig. 1 Forward current versus voltage drop per diode
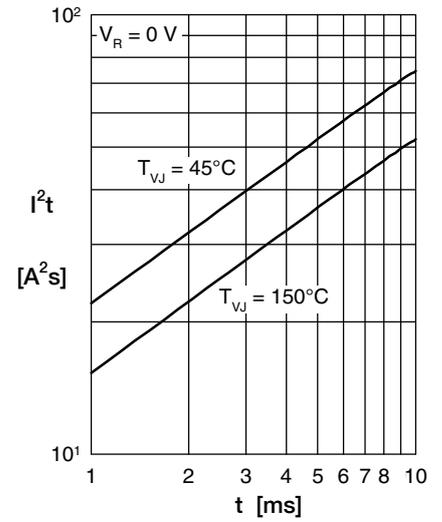


Fig. 2 Surge overload current
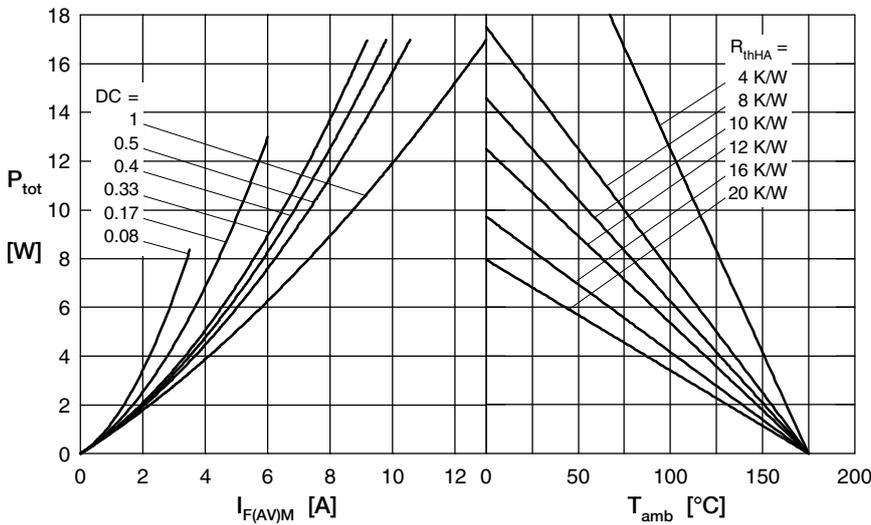


Fig. 3 $I^2t$ versus time per diode



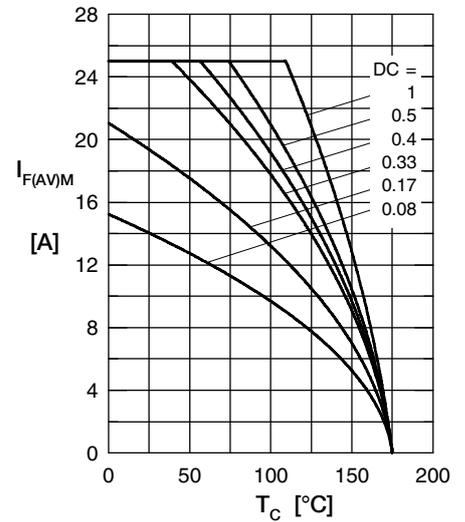Fig. 4 Power dissipation vs. direct output current and ambient temperature



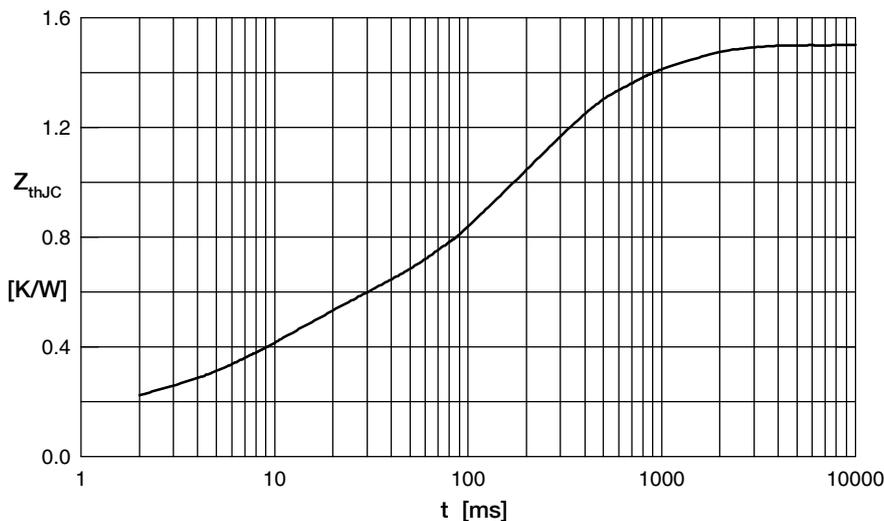Fig. 5 Max. forward current vs. case temperature



Fig. 6 Transient thermal impedance junction to case

Constants for $Z_{thJC}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.155 | 0.0005 |
| 2 | 0.332 | 0.0095 |
| 3 | 0.713 | 0.17 |
| 4 | 0.3 | 0.8 |
| 5 | 0.00001 | 0.00001 |

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