

Standard Rectifier

$$V_{RRM} = 2 \times 1600 \text{ V}$$

$$I_{FAV} = 10 \text{ A}$$

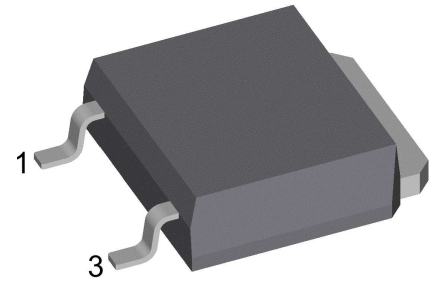
$$V_F = 1.27 \text{ V}$$

Phase leg

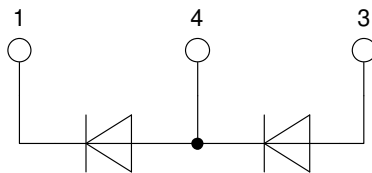
Part number

DMA10P1600UZ

Marking on Product: MAUMZP



Backside: anode/cathode



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour
- High commutation robustness
- High surge capability

Applications:

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

Package: TO-252 (DPak)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- High creepage distance between terminals

Terms and Conditions of Usage

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;

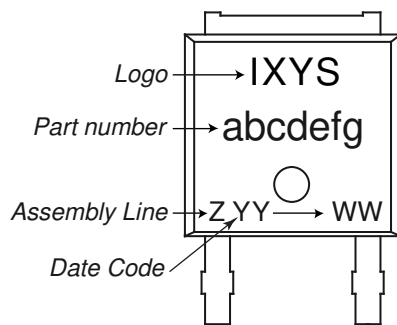
- the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

| Rectifier | | | | Ratings | | | |
|------------|--|---|-------------------------|---------|------|------------------|--|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit | |
| V_{RSM} | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1700 | V | |
| V_{RRM} | max. repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1600 | V | |
| I_R | reverse current | $V_R = 1600\text{ V}$ | $T_{VJ} = 25^{\circ}C$ | | 5 | μA | |
| | | $V_R = 1600\text{ V}$ | $T_{VJ} = 150^{\circ}C$ | | 0.05 | mA | |
| V_F | forward voltage drop | $I_F = 5\text{ A}$ | $T_{VJ} = 25^{\circ}C$ | | 1.29 | V | |
| | | $I_F = 10\text{ A}$ | | | 1.55 | V | |
| | | $I_F = 5\text{ A}$ | $T_{VJ} = 150^{\circ}C$ | | 1.27 | V | |
| | | $I_F = 10\text{ A}$ | | | 1.63 | V | |
| I_{FAV} | average forward current | $T_C = 140^{\circ}C$ 180° sine | $T_{VJ} = 175^{\circ}C$ | | 10 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 175^{\circ}C$ | | 0.90 | V | |
| r_F | slope resistance | | | | 37 | m Ω | |
| R_{thJC} | thermal resistance junction to case | | | | 2 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.5 | | K/W | |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 75 | W | |
| I_{FSM} | max. forward surge current | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | $T_{VJ} = 45^{\circ}C$ | | 100 | A | |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$ | | 110 | A | |
| | | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | $T_{VJ} = 150^{\circ}C$ | | 85 | A | |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$ | | 92 | A | |
| I^2t | value for fusing | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | $T_{VJ} = 45^{\circ}C$ | | 50 | A ² s | |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$ | | 50 | A ² s | |
| | | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | $T_{VJ} = 150^{\circ}C$ | | 36 | A ² s | |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$ | | 35 | A ² s | |
| C_J | junction capacitance | $V_R = 400\text{ V}; f = 1\text{ MHz}$ | $T_{VJ} = 25^{\circ}C$ | | 1 | pF | |

| Package TO-252 (DPak) | | | Ratings | | | |
|-----------------------|--|----------------------|---------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 20 | A |
| T_{VJ} | virtual junction temperature | | -55 | | 175 | °C |
| T_{op} | operation temperature | | -55 | | 150 | °C |
| T_{stg} | storage temperature | | -55 | | 150 | °C |
| Weight | | | | 0.3 | | g |
| F_C | mounting force with clip | | 20 | | 60 | N |
| $d_{Spp/App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 3.6 | | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 3.0 | | | mm |

Product Marking



Part description

- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 10 = Current Rating [A]
- P = Phase leg
- 1600 = Reverse Voltage [V]
- UZ = TO-252AA (DPak) (2HV)

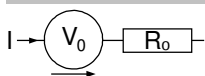
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|------------------|--------------------|---------------|----------|----------|
| Standard | DMA10P1600UZ-TRL | MAUMZP | Tape & Reel | 2500 | 524589 |
| Alternative | DMA10P1600UZ-TUB | MAUMZP | Tube | 70 | 524582 |

| Similar Part | Package | Voltage class |
|--------------|-----------------------|---------------|
| DMA10P1200UZ | TO-252AA (DPak) (2HV) | 1200 |

Equivalent Circuits for Simulation

* on die level

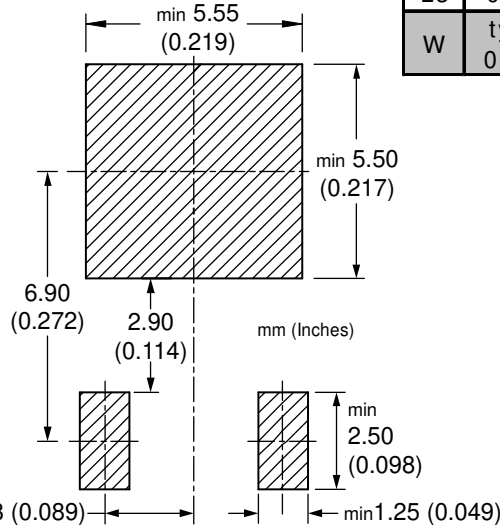
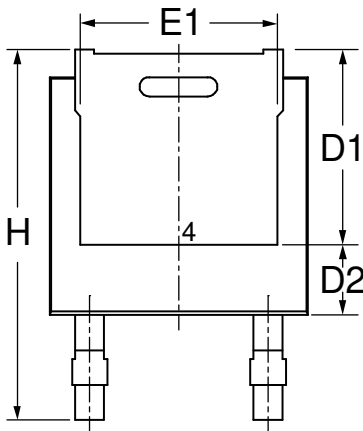
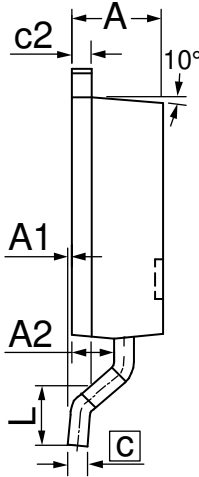
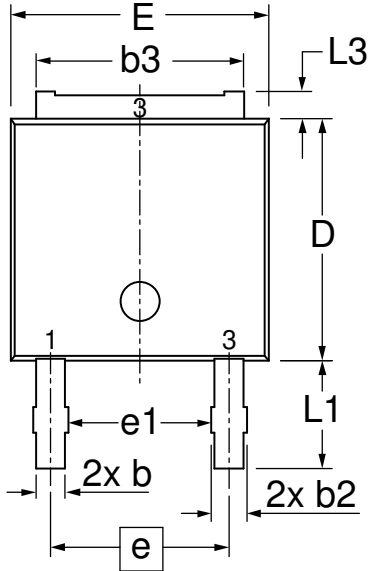
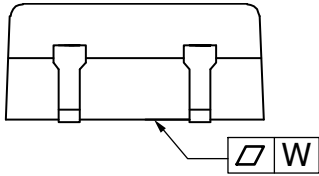
$T_{VJ} = 175\text{ °C}$



Rectifier

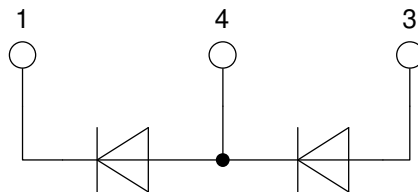
| | | | |
|--------------|--------------------|-----|----|
| $V_{0\ max}$ | threshold voltage | 0.9 | V |
| $R_{0\ max}$ | slope resistance * | 34 | mΩ |

Outlines TO-252 (DPak)



Recommended min. foot print

| Dim | Millimeters | | Inches | |
|-----|-------------|-------|-------------|-------|
| | min | max | min | max |
| A | 2.18 | 2.39 | 0.086 | 0.094 |
| A1 | 0.00 | 0.13 | 0.000 | 0.005 |
| A2 | 0.97 | 1.17 | 0.038 | 0.046 |
| b | 0.64 | 0.89 | 0.025 | 0.035 |
| b2 | 0.76 | 1.14 | 0.030 | 0.045 |
| b3 | 5.08 | 5.59 | 0.200 | 0.220 |
| c | 0.46 | 0.61 | 0.018 | 0.024 |
| c2 | 0.46 | 0.58 | 0.018 | 0.023 |
| D | 5.97 | 6.22 | 0.235 | 0.245 |
| D1 | 4.57 | 5.21 | 0.180 | 0.205 |
| D2 | 2.03 | | 0.080 | |
| E | 6.35 | 6.73 | 0.250 | 0.265 |
| E1 | 4.32 | 5.21 | 0.170 | 0.205 |
| e | 4.57 | | 0.180 | |
| e1 | 3.62 | | 0.143 | |
| H | 9.15 | 10.34 | 0.360 | 0.407 |
| L | 1.40 | 1.78 | 0.055 | 0.070 |
| L1 | 2.54 | 2.92 | 0.100 | 0.115 |
| L3 | 0.64 | 1.02 | 0.025 | 0.040 |
| W | typ. 0.02 | 0.040 | typ. 0.0008 | 0.000 |



Rectifier

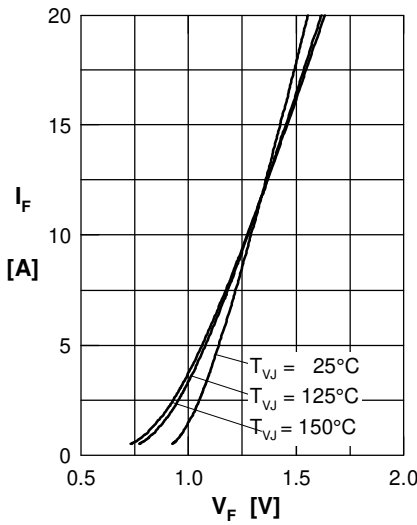


Fig. 1 Forward current versus voltage drop per diode

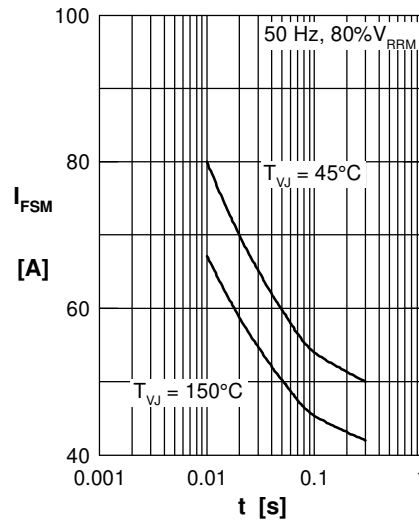


Fig. 2 Surge overload current

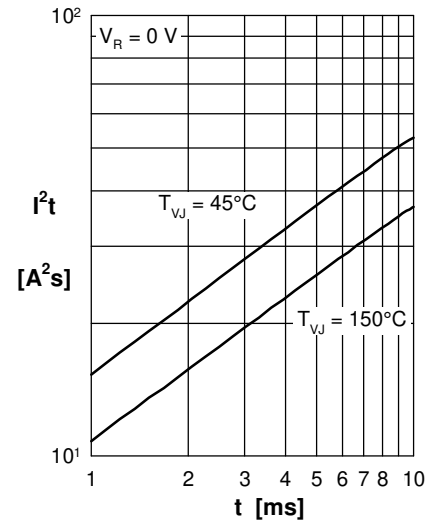


Fig. 3 I^2t versus time per diode

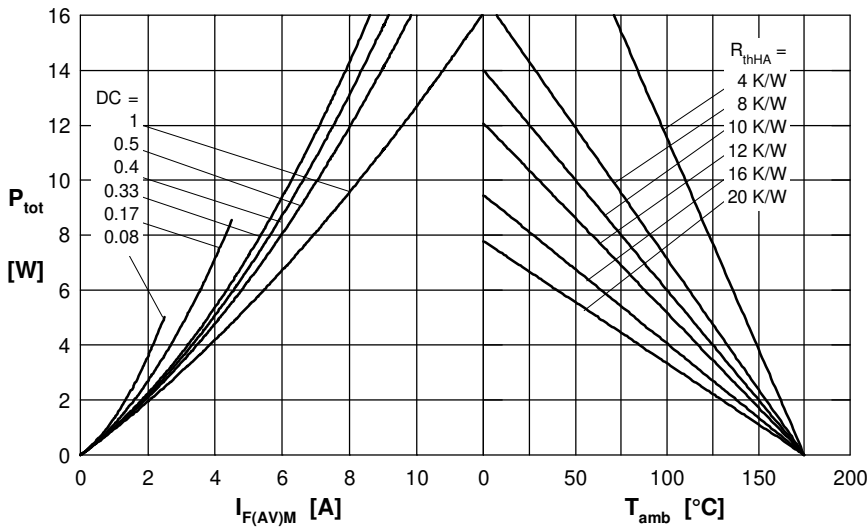


Fig. 4 Power dissipation vs. direct output current and ambient temperature

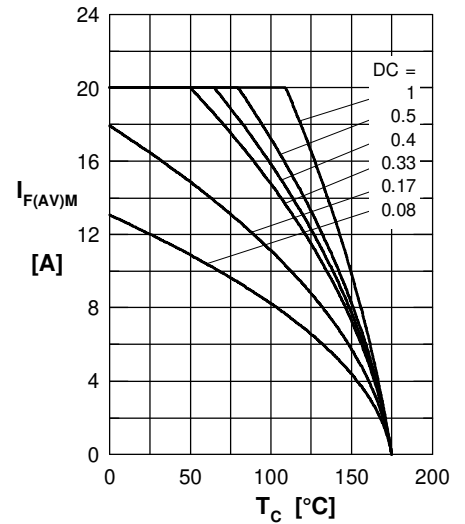


Fig. 5 Max. forward current vs. case temperature

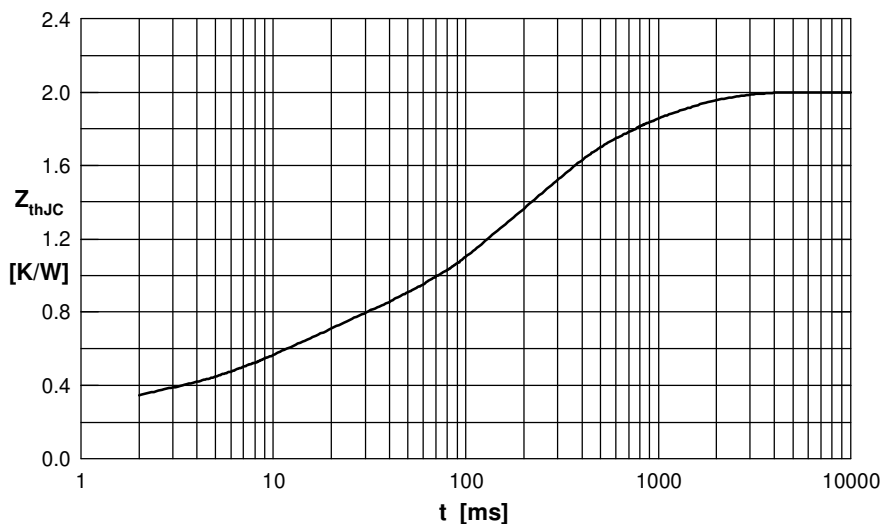


Fig. 6 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.275 | 0.0005 |
| 2 | 0.385 | 0.0105 |
| 3 | 0.880 | 0.1700 |
| 4 | 0.460 | 0.8500 |