

## Standard Rectifier

$$V_{RRM} = 2 \times 1200 \text{ V}$$

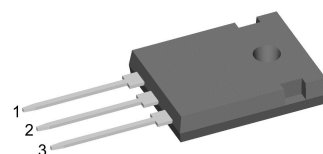
$$I_{FAV} = 50 \text{ A}$$

$$V_F = 1.26 \text{ V}$$

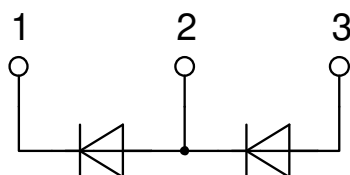
Phase leg

Part number

**DMA50P1200HB**



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-247

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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| Rectifier  |                                              |                                                   |                                | Ratings |      |      |                   |
|------------|----------------------------------------------|---------------------------------------------------|--------------------------------|---------|------|------|-------------------|
| Symbol     | Definition                                   | Conditions                                        |                                | min.    | typ. | max. | Unit              |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$                     |                                |         |      | 1300 | V                 |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$                     |                                |         |      | 1200 | V                 |
| $I_R$      | reverse current                              | $V_R = 1200\text{ V}$                             | $T_{VJ} = 25^{\circ}\text{C}$  |         |      | 40   | $\mu\text{A}$     |
|            |                                              | $V_R = 1200\text{ V}$                             | $T_{VJ} = 150^{\circ}\text{C}$ |         |      | 1.5  | mA                |
| $V_F$      | forward voltage drop                         | $I_F = 50\text{ A}$                               | $T_{VJ} = 25^{\circ}\text{C}$  |         |      | 1.30 | V                 |
|            |                                              | $I_F = 100\text{ A}$                              |                                |         |      | 1.61 | V                 |
|            |                                              | $I_F = 50\text{ A}$                               | $T_{VJ} = 150^{\circ}\text{C}$ |         |      | 1.26 | V                 |
|            |                                              | $I_F = 100\text{ A}$                              |                                |         |      | 1.66 | V                 |
| $I_{FAV}$  | average forward current                      | $T_C = 130^{\circ}\text{C}$                       | $T_{VJ} = 175^{\circ}\text{C}$ |         |      | 50   | A                 |
|            |                                              | 180° sine                                         |                                |         |      |      |                   |
| $V_{F0}$   | threshold voltage                            | } for power loss calculation only                 | $T_{VJ} = 175^{\circ}\text{C}$ |         |      | 0.81 | V                 |
| $r_F$      | slope resistance                             |                                                   |                                |         |      | 8.6  | m $\Omega$        |
| $R_{thJC}$ | thermal resistance junction to case          |                                                   |                                |         |      | 0.45 | K/W               |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                                   |                                |         | 0.3  |      | K/W               |
| $P_{tot}$  | total power dissipation                      |                                                   | $T_C = 25^{\circ}\text{C}$     |         |      | 330  | W                 |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^{\circ}\text{C}$  |         |      | 650  | A                 |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$             |         |      | 700  | A                 |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^{\circ}\text{C}$ |         |      | 555  | A                 |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$             |         |      | 595  | A                 |
| $I^2t$     | value for fusing                             | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^{\circ}\text{C}$  |         |      | 2.12 | kA <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$             |         |      | 2.04 | kA <sup>2</sup> s |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^{\circ}\text{C}$ |         |      | 1.54 | kA <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$             |         |      | 1.48 | kA <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$            | $T_{VJ} = 25^{\circ}\text{C}$  |         | 19   |      | pF                |

| Package TO-247 |                              |              | 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         |                              |              |         | 6    |      | g    |
| $M_D$          | mounting torque              |              | 0.8     |      | 1.2  | Nm   |
| $F_C$          | mounting force with clip     |              | 20      |      | 120  | N    |

### Product Marking



### Part description

D = Diode  
 M = Standard Rectifier  
 A = (up to 1800V)  
 50 = Current Rating [A]  
 P = Phase leg  
 1200 = Reverse Voltage [V]  
 HB = TO-247AD (3)

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DMA50P1200HB    | DMA50P1200HB       | Tube          | 30       | 522308   |

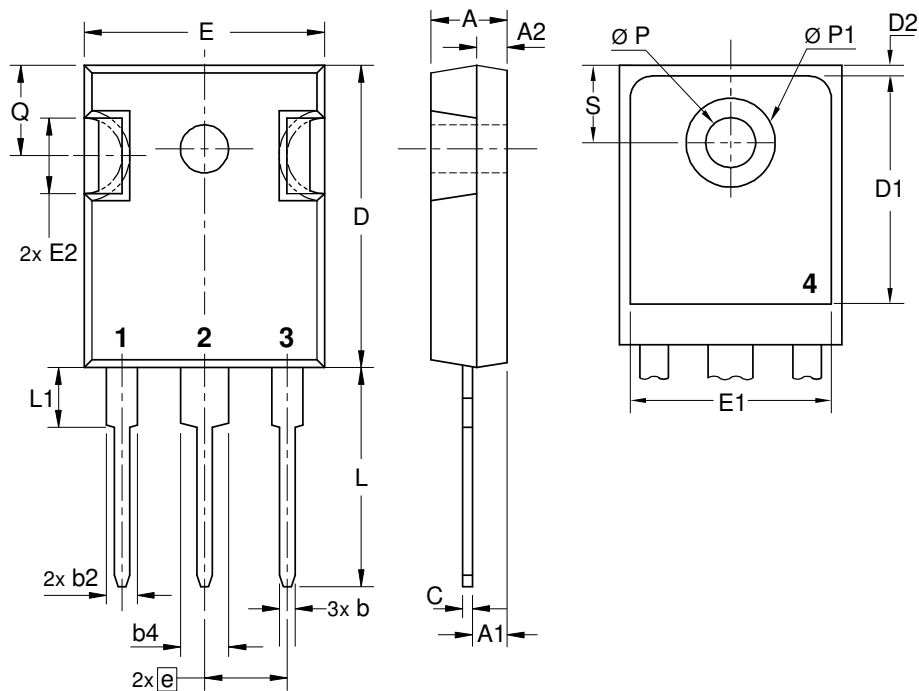
| Similar Part | Package      | Voltage class |
|--------------|--------------|---------------|
| DMA50P1600HB | TO-247AD (3) | 1600          |
| DMA50P1200HR | ISO247 (3)   | 1200          |

### Equivalent Circuits for Simulation

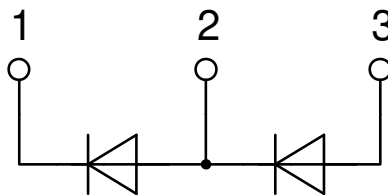
\* on die level

$T_{VJ} = 175^{\circ}\text{C}$

|                                                                                     |                    |                  |    |
|-------------------------------------------------------------------------------------|--------------------|------------------|----|
|  |                    | <b>Rectifier</b> |    |
| $V_{0\max}$                                                                         | threshold voltage  | 0.81             | V  |
| $R_{0\max}$                                                                         | slope resistance * | 6                | mΩ |

**Outlines TO-247**


| Sym. | Inches |       | Millimeter |       |
|------|--------|-------|------------|-------|
|      | min.   | max.  | min.       | max.  |
| A    | 0.185  | 0.209 | 4.70       | 5.30  |
| A1   | 0.087  | 0.102 | 2.21       | 2.59  |
| A2   | 0.059  | 0.098 | 1.50       | 2.49  |
| D    | 0.819  | 0.845 | 20.79      | 21.45 |
| E    | 0.610  | 0.640 | 15.48      | 16.24 |
| E2   | 0.170  | 0.216 | 4.31       | 5.48  |
| e    | 0.215  | BSC   | 5.46       | BSC   |
| L    | 0.780  | 0.800 | 19.80      | 20.30 |
| L1   | -      | 0.177 | -          | 4.49  |
| Ø P  | 0.140  | 0.144 | 3.55       | 3.65  |
| Q    | 0.212  | 0.244 | 5.38       | 6.19  |
| S    | 0.242  | BSC   | 6.14       | BSC   |
| b    | 0.039  | 0.055 | 0.99       | 1.40  |
| b2   | 0.065  | 0.094 | 1.65       | 2.39  |
| b4   | 0.102  | 0.135 | 2.59       | 3.43  |
| c    | 0.015  | 0.035 | 0.38       | 0.89  |
| D1   | 0.515  | -     | 13.07      | -     |
| D2   | 0.020  | 0.053 | 0.51       | 1.35  |
| E1   | 0.530  | -     | 13.45      | -     |
| Ø P1 | -      | 0.29  | -          | 7.39  |



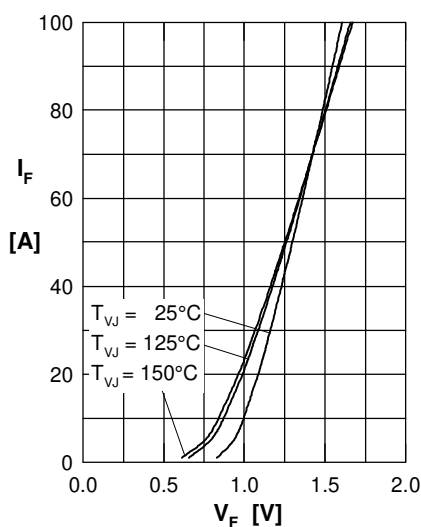
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

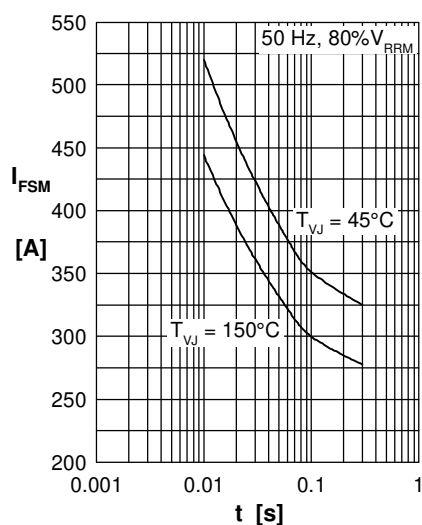


Fig. 2 Surge overload current versus time per diode

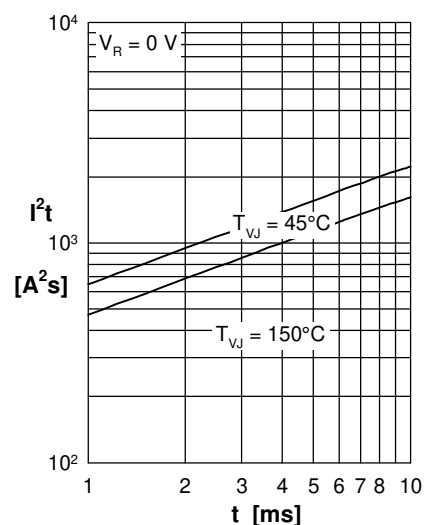
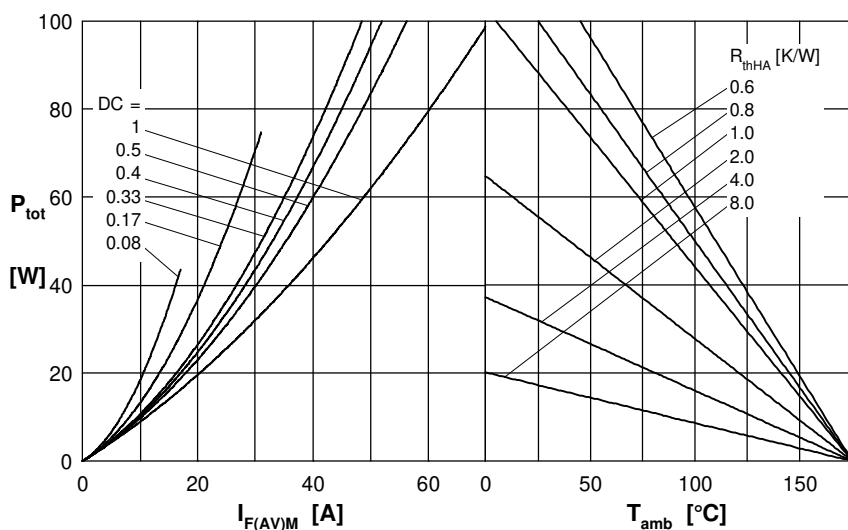

 Fig. 3  $I^2t$  versus time per diode


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

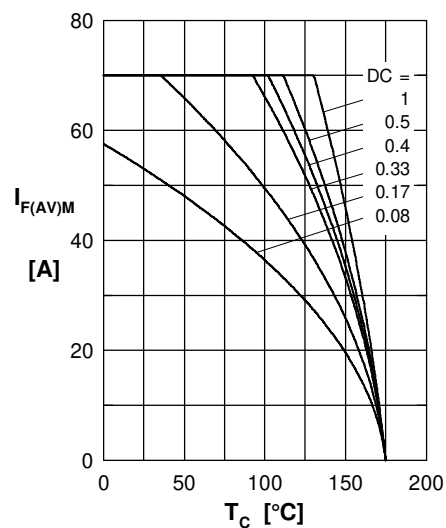


Fig. 5 Max. forward current versus case temperature per diode

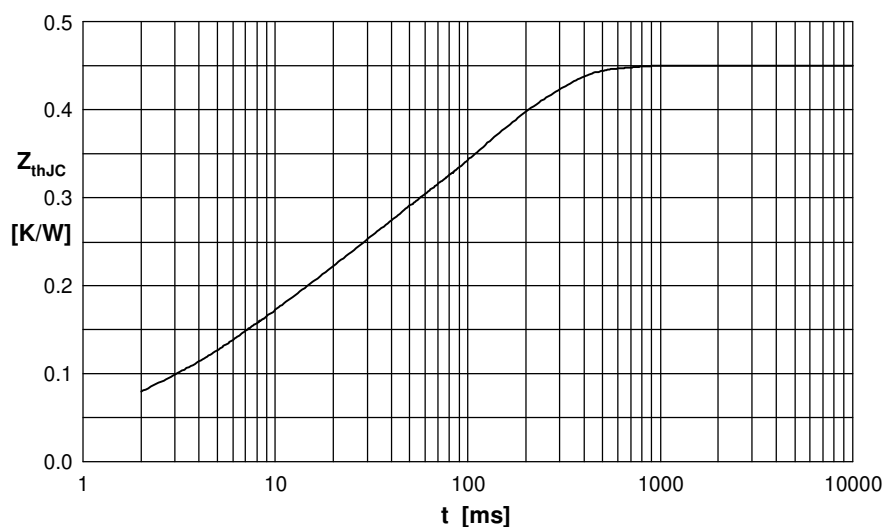


Fig. 6 Transient thermal impedance junction to case versus time per diode

 Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.033           | 0.0006    |
| 2 | 0.075           | 0.0038    |
| 3 | 0.124           | 0.0170    |
| 4 | 0.218           | 0.1400    |

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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