

Standard Rectifier

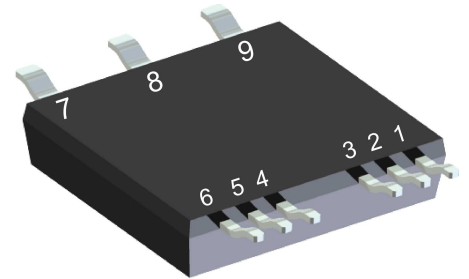
| | |
|-------------------------|----------|
| 3~ Rectifier | |
| V_{RRM} | = 1800 V |
| I_{DAV} | = 90 A |
| I_{FSM} | = 350 A |

ISOPLUS™
 Surface Mount Power Device
 3~ Rectifier Bridge


Part number

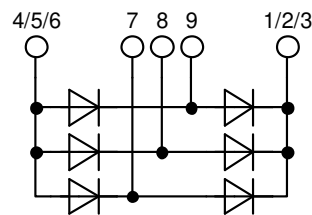
DMA90U1800LB

Marking on Product: DMA90U1800LB



Backside: isolated

 E72873



Features / Advantages:

- Rectifier diode
- Isolated back surface
- Low coupling capacity between pins and heatsink
- Enlarged creepage towards heatsink
- Application friendly pinout
- Low inductive current path
- High reliability

Applications:

- Line rectifying 50/60 Hz
- Drives
- SMPS
- UPS

Package: SMPD

- Isolation Voltage: 3000 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

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| Rectifier | | | | Ratings | | | |
|------------|--|--|-------------------|------------------------------|------|------|------------------|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| V_{RSM} | max. non-repetitive reverse blocking voltage | | | | | 1900 | V |
| V_{RRM} | max. repetitive reverse blocking voltage | | | | | 1800 | V |
| I_R | reverse current | $V_R = 1800$ V | | $T_{VJ} = 25^\circ\text{C}$ | | 40 | μA |
| | | $V_R = 1800$ V | | $T_{VJ} = 150^\circ\text{C}$ | | 1.5 | mA |
| V_F | forward voltage drop | $I_F = 30$ A | | $T_{VJ} = 25^\circ\text{C}$ | | 1.26 | V |
| | | | | | | 1.79 | V |
| | | $I_F = 90$ A | | $T_{VJ} = 150^\circ\text{C}$ | | 1.20 | V |
| | | | | | | 1.93 | V |
| I_{DAV} | bridge output current | $T_C = 110^\circ\text{C}$ rectangular | $d = \frac{1}{3}$ | $T_{VJ} = 175^\circ\text{C}$ | | 90 | A |
| V_{FO} | threshold voltage | } for power loss calculation only | | $T_{VJ} = 175^\circ\text{C}$ | | 0.81 | V |
| r_F | slope resistance | | | | | 12.7 | m Ω |
| R_{thJC} | thermal resistance junction to case | | | | | 1.1 | K/W |
| R_{thCH} | thermal resistance case to heatsink | | | | 0.4 | | K/W |
| P_{tot} | total power dissipation | | | $T_C = 25^\circ\text{C}$ | | 135 | W |
| I_{FSM} | max. forward surge current | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 45^\circ\text{C}$ | | 350 | A |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 380 | A |
| | | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 150^\circ\text{C}$ | | 300 | A |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 320 | A |
| I^2t | value for fusing | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 45^\circ\text{C}$ | | 615 | A ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 600 | A ² s |
| | | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 150^\circ\text{C}$ | | 450 | A ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 425 | A ² s |
| C_J | junction capacitance | $V_R = 400$ V; $f = 1$ MHz | | $T_{VJ} = 25^\circ\text{C}$ | | 11 | pF |



| Package SMPD | | Ratings | | | | |
|----------------|--|----------------------|------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 100 | A |
| T_{VJ} | virtual junction temperature | | -55 | | 175 | °C |
| T_{op} | operation temperature | | -55 | | 150 | °C |
| T_{stg} | storage temperature | | -55 | | 150 | °C |
| Weight | | | | 8.5 | | g |
| F_C | mounting force with clip | | 40 | | 130 | N |
| $d_{Spp/ App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 1.6 | | | mm |
| $d_{Spb/ Apb}$ | | terminal to backside | 4.0 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | 3000 | | | V |
| | | t = 1 minute | 2500 | | | V |



Part description

- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 90 = Current Rating [A]
- U = 3- Rectifier Bridge
- 1800 = Reverse Voltage [V]
- LB = SMPD-B

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|------------------|--------------------|---------------|----------|----------|
| Standard | DMA90U1800LB-TUB | DMA90U1800LB | Tube | 20 | 517130 |
| Alternative | DMA90U1800LB-TRR | DMA90U1800LB | Tape & Reel | 200 | 524497 |

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 175\text{ °C}$



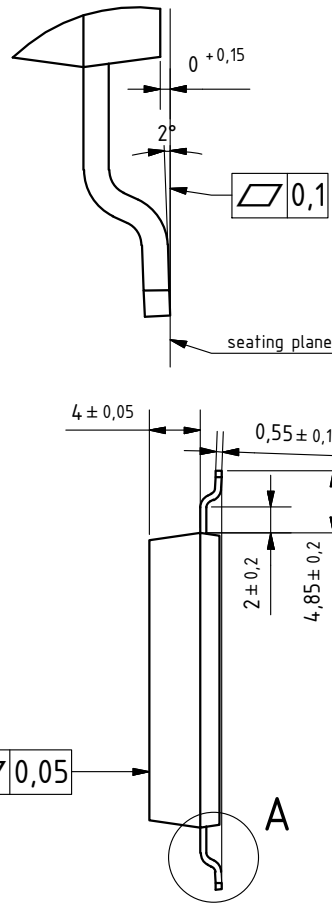
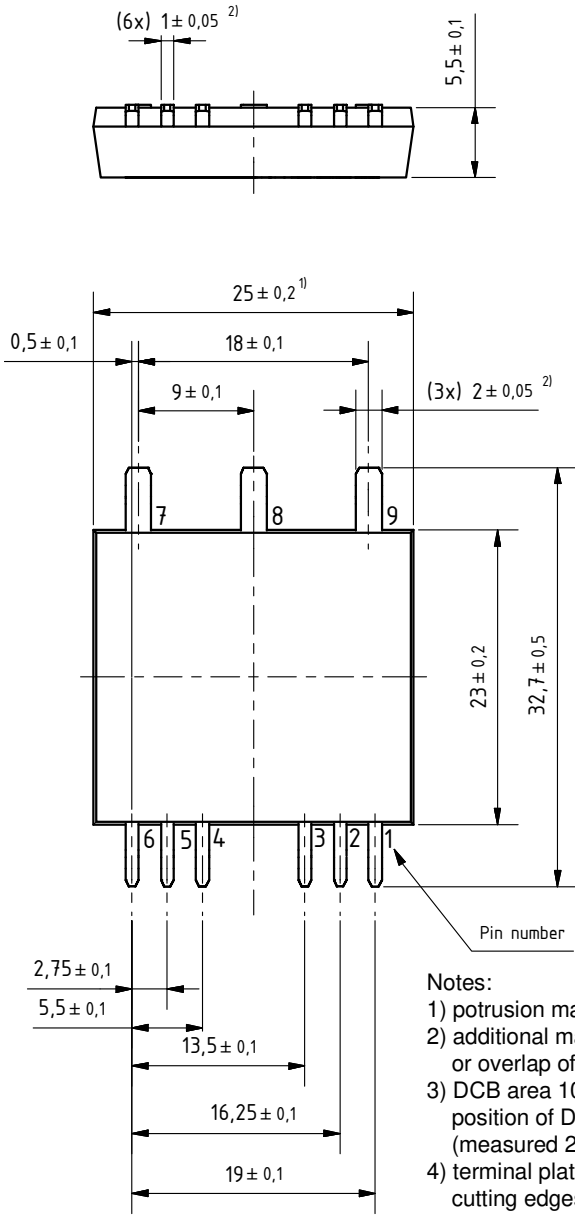
Rectifier

| | | | |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage | 0.81 | V |
| $R_{0\ max}$ | slope resistance * | 10.1 | mΩ |



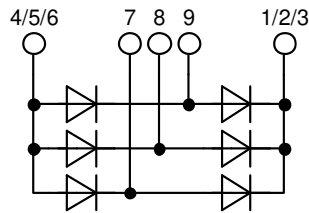
Outlines SMPD

A (8 : 1)



Notes:

- 1) protrusion may add 0.2 mm max. on each side
- 2) additional max. 0.05 mm per side by punching misalignment or overlap of dam bar or bending compression
- 3) DCB area 10 to 50 μm convex; position of DCB area in relation to plastic rim: $\pm 25 \mu\text{m}$ (measured 2 mm from Cu rim)
- 4) terminal plating: 0.2 - 1 μm Ni + 10 - 25 μm Sn (gal v.) cutting edges may be partially free of plating





Rectifier

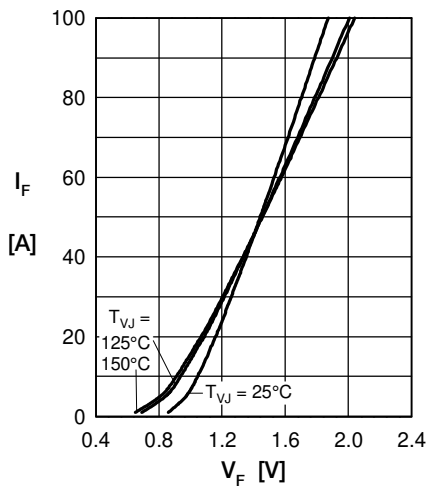


Fig. 1 Forward current vs. voltage drop per diode

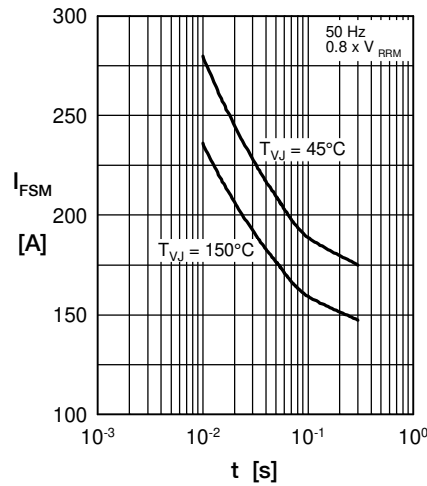


Fig. 2 Surge overload current vs. time per diode

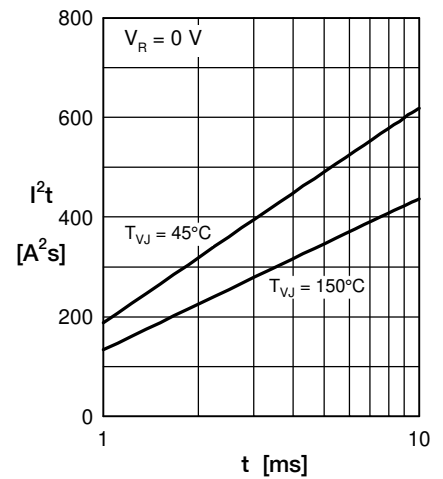


Fig. 3 I^2t vs. time per diode

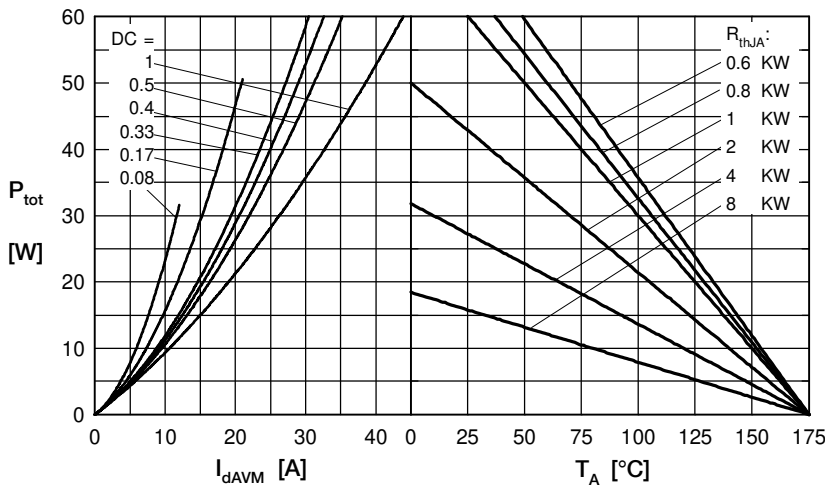


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

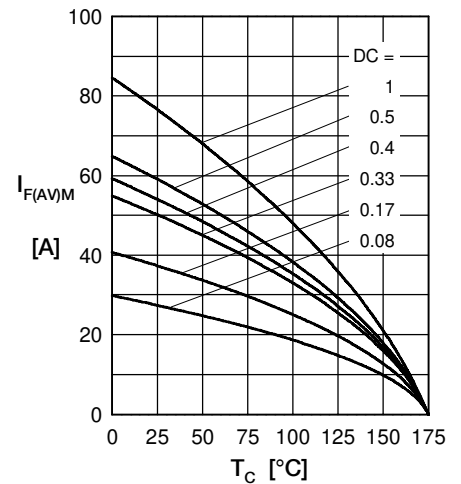


Fig. 5 Max. forward current vs. case temperature per diode

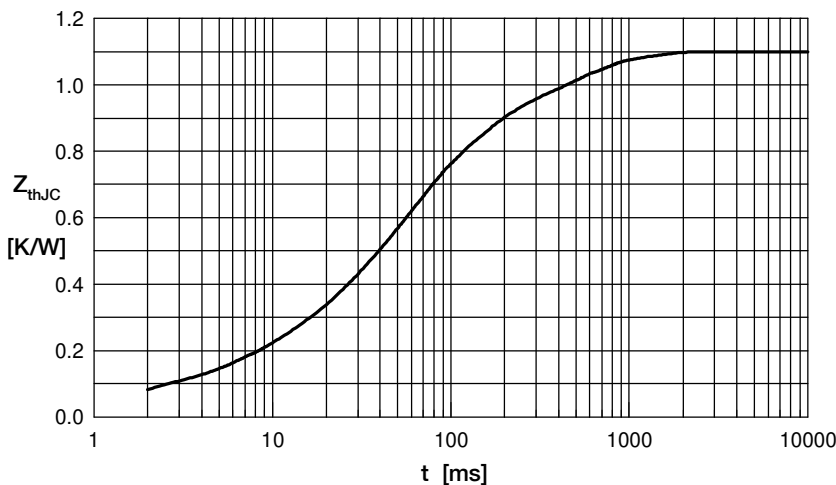


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

| i | R_{th} (K/W) | t_i (s) |
|---|----------------|-----------|
| 1 | 0.030 | 0.0003 |
| 2 | 0.072 | 0.0045 |
| 3 | 0.092 | 0.0530 |
| 4 | 0.606 | 0.0520 |
| 5 | 0.300 | 0.4000 |