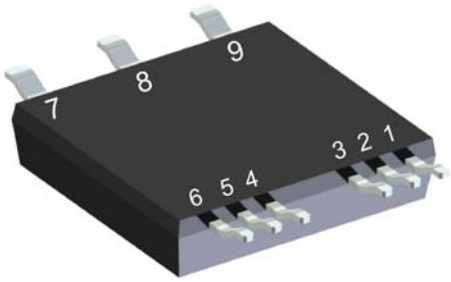
# Standard Rectifier

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

ISOPLUS™
Surface Mount Power Device
3~ Rectifier Bridge

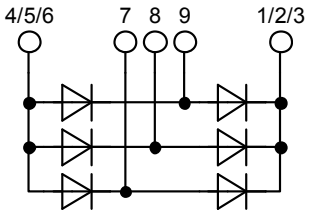
**Part number**

DMA90U1800LB




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:**

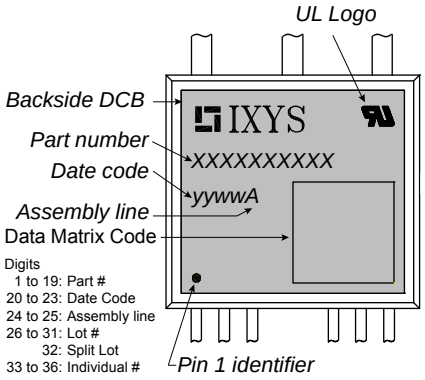
- Line rectifying 50/60 Hz
- Drives
- SMPS
- UPS

**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

| Rectifier | | | | Ratings | | | |
|---|---|---|---|---|---|---|---|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1900 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1800 | V |
| $I_R$ | *reverse current* | $V_R$ = 1800 V | $T_{VJ}$ = 25°C | | | 40 | µA |
| | | $V_R$ = 1800 V | $T_{VJ}$ = 150°C | | | 1.5 | mA |
| $V_F$ | *forward voltage drop* | $I_F$ = 30 A | $T_{VJ}$ = 25°C | | | 1.26 | V |
| | | $I_F$ = 90 A | | | | 1.79 | V |
| | | $I_F$ = 30 A | $T_{VJ}$ = 150 °C | | | 1.20 | V |
| | | $I_F$ = 90 A | | | | 1.93 | V |
| $I_{DAV}$ | *bridge output current* | $T_C$ = 110°C | $T_{VJ}$ = 175°C | | | 90 | A |
| | | rectangular d = ⅓ | | | | | |
| $V_{F0}$ | *threshold voltage* } *for power loss calculation only* | | $T_{VJ}$ = 175°C | | | 0.81 | V |
| $r_F$ | *slope resistance* } | | | | | 12.7 | mΩ |
| $R_{thJC}$ | *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°C | | | 135 | W |
| $I_{FSM}$ | *max. forward surge current* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°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°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°C | | | 615 | A²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 600 | A²s |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 450 | A²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 425 | A²s |
| $C_J$ | *junction capacitance* | $V_R$ = 400 V; f = 1 MHz | $T_{VJ}$ = 25°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 | 50/60 Hz, RMS; $I_{ISOL}$ ≤ 1 mA | 3000 | | | V |
| | | t = 1 minute | | 2500 | | | V |



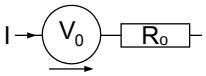

**Part number**

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 | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | DMA90U1800LB | DMA90U1800LB | Blister | 45 | 511747 |
| Alternative | DMA90U1800LB-TRR | DMA90U1800LB | Tape & Reel | 200 | 511740 |

## Equivalent Circuits for Simulation

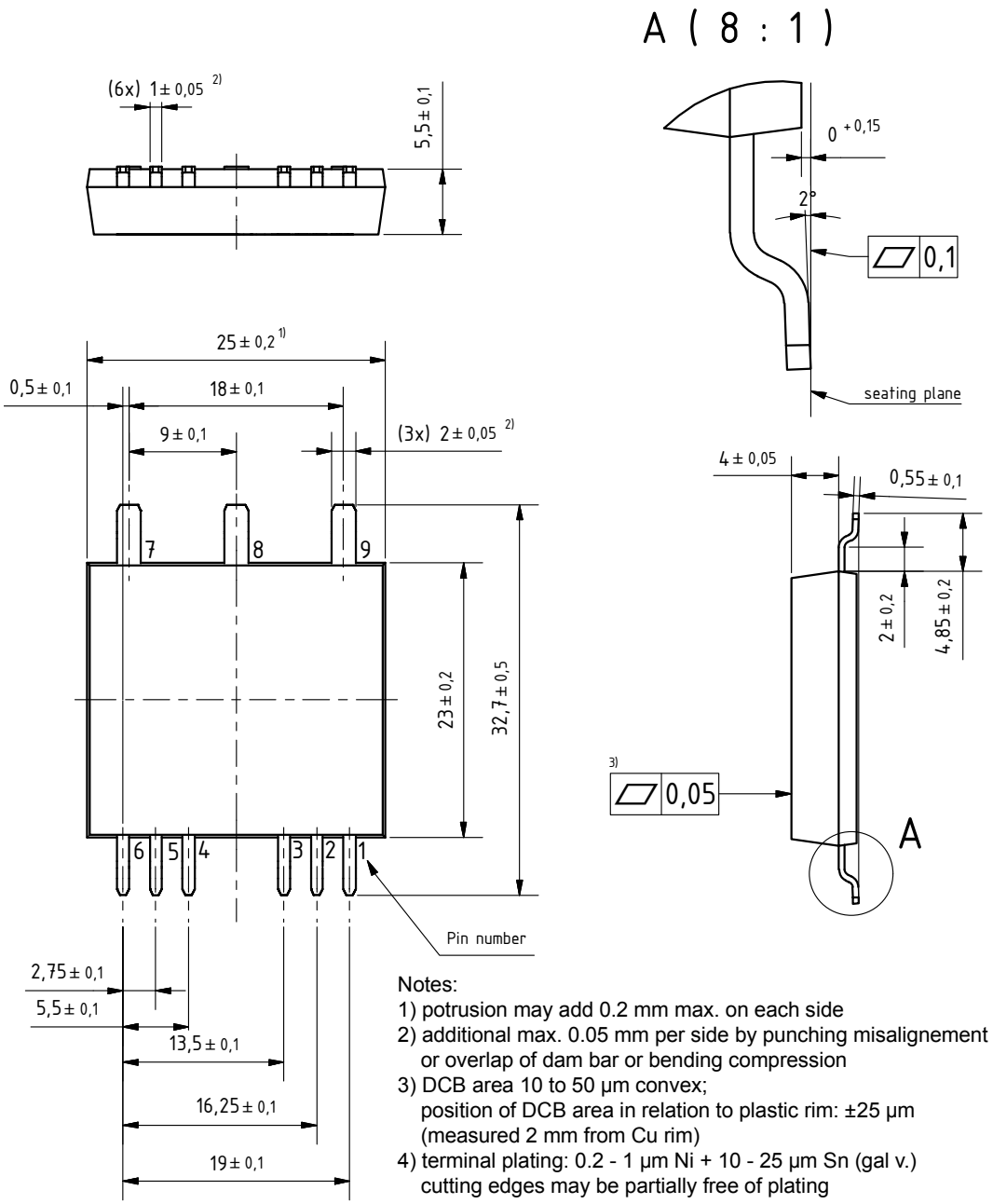
** on die level* $T_{VJ}$ = 175 °C



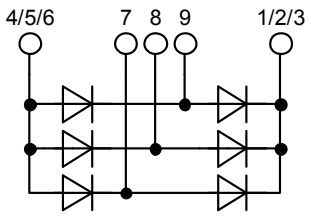

**Rectifier**

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

## Outlines SMPD




Notes:
1) potrusion may add 0.2 mm max. on each side
2) additional max. 0.05 mm per side by punching misalignement 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: ±25 µm (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

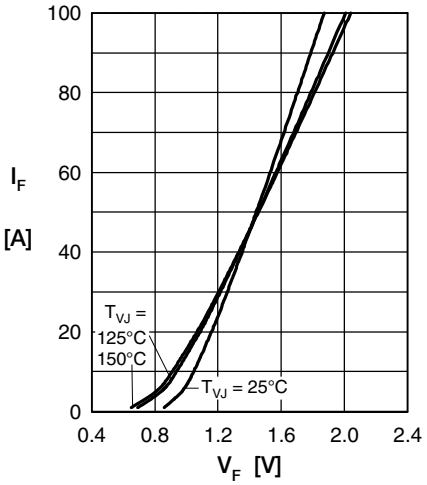



Fig. 1 Forward current vs. voltage drop per diode

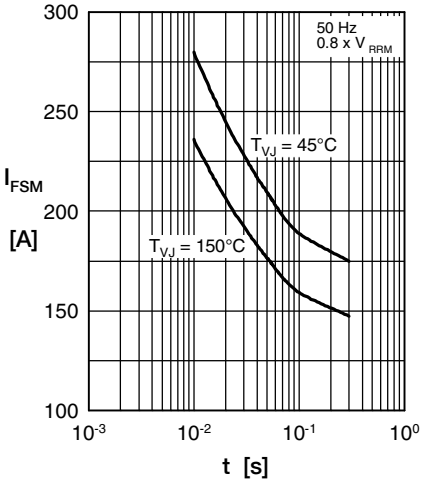



Fig. 2 Surge overload current vs. time per diode

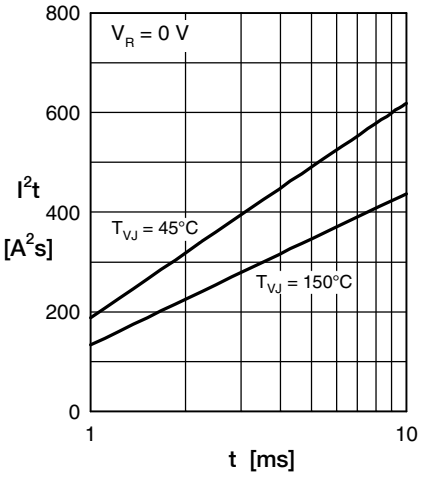



Fig. 3 $I^2t$ vs. time per diode

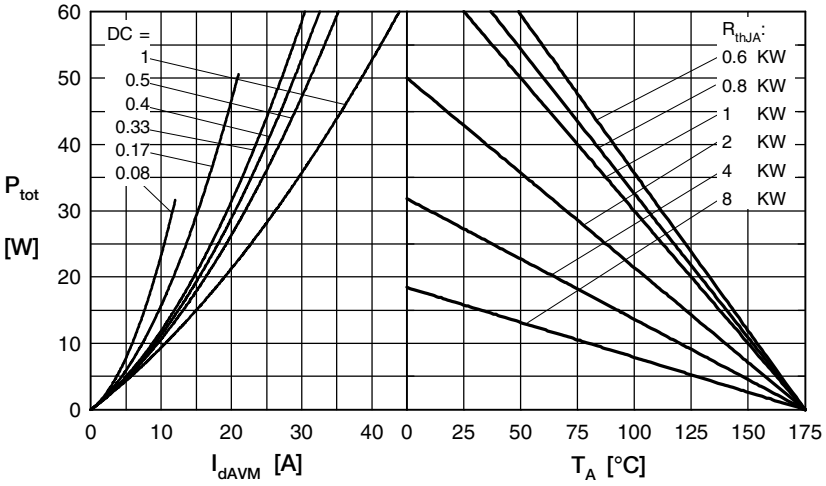



Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

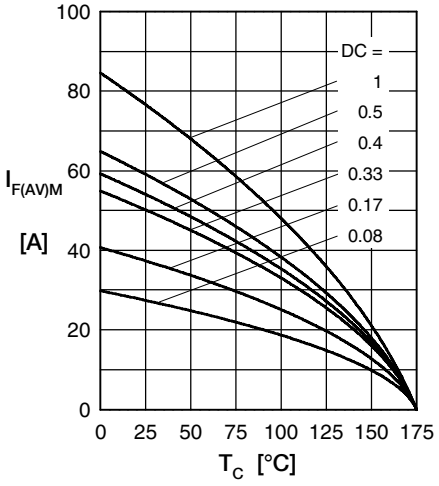



Fig. 5 Max. forward current vs. case temperature per diode

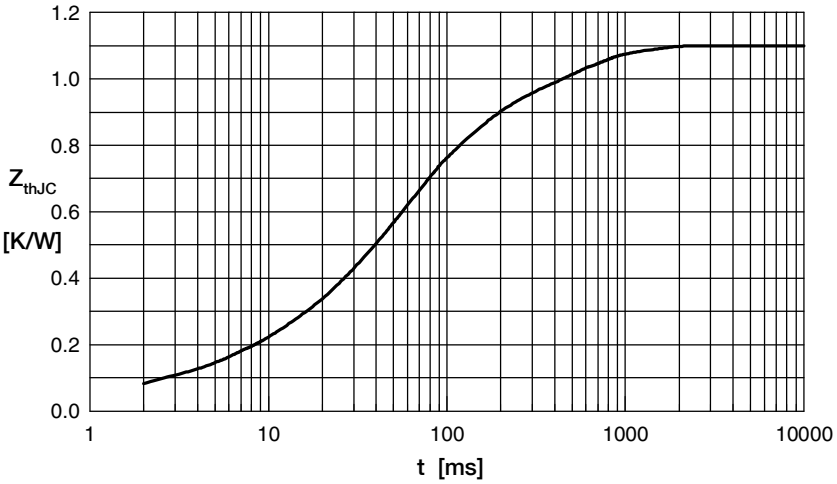



Fig. 6 Transient thermal impedance junction to case vs. time per diode

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 |

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