

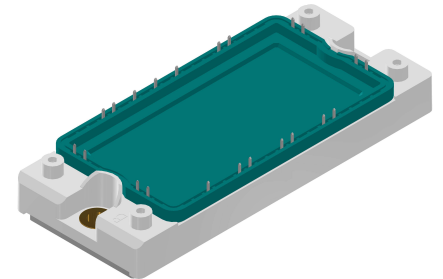
Thyristor Module

| |
|---------------------------|
| 3~ Rectifier |
| $V_{RRM} = 1800\text{ V}$ |
| $I_{DAV} = 120\text{ A}$ |
| $I_{FSM} = 500\text{ A}$ |

3~ Rectifier Bridge, half-controlled (high-side) + free wheeling Diode

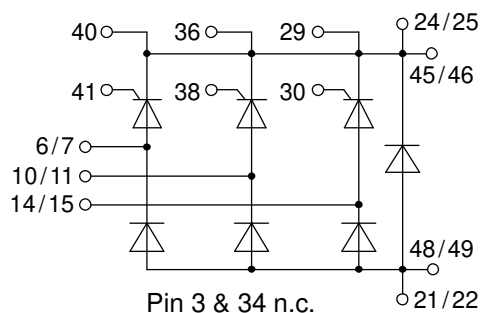
Part number

MCMA120UJ1800ED



Backside: isolated

 E72873



Features / Advantages:

- Thyristor/Standard Rectifier for line frequency
- Planar passivated chips
- Long-term stability
- Low forward voltage drop
- Leads suitable for PC board soldering
- Copper base plate with Direct Copper Bonded Al₂O₃-ceramic
- Improved temperature and power cycling

Applications:

- Diode for main rectification
- For single and three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

Package: E2-Pack

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

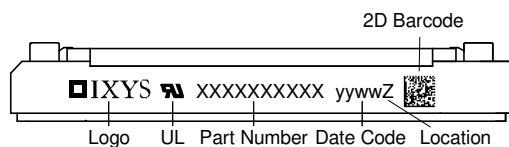
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| Rectifier | | | Ratings | | | |
|----------------|--|--|-------------------------|------|------|-------------------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| $V_{RSM/DSM}$ | max. non-repetitive reverse/forward blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1900 | V |
| $V_{RRM/DRM}$ | max. repetitive reverse/forward blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1800 | V |
| I_{RD} | reverse current, drain current | $V_{R/D} = 1800 V$ | $T_{VJ} = 25^{\circ}C$ | | 50 | μA |
| | | $V_{R/D} = 1800 V$ | $T_{VJ} = 125^{\circ}C$ | | 10 | mA |
| V_T | forward voltage drop | $I_T = 40 A$ | $T_{VJ} = 25^{\circ}C$ | | 1.33 | V |
| | | $I_T = 120 A$ | | | 1.70 | V |
| | | $I_T = 40 A$ | $T_{VJ} = 125^{\circ}C$ | | 1.36 | V |
| | | $I_T = 120 A$ | | | 1.88 | V |
| I_{DAV} | bridge output current | $T_C = 80^{\circ}C$ rectangular $d = 1/3$ | $T_{VJ} = 150^{\circ}C$ | | 120 | A |
| V_{T0} | threshold voltage | } for power loss calculation only | $T_{VJ} = 150^{\circ}C$ | | 0.83 | V |
| r_T | slope resistance | | | | 13.6 | m Ω |
| R_{thJC} | thermal resistance junction to case | | | | 0.65 | K/W |
| R_{thCH} | thermal resistance case to heatsink | | | 0.1 | | K/W |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 190 | W |
| I_{TSM} | max. forward surge current | $t = 10 ms; (50 Hz), sine$ | $T_{VJ} = 45^{\circ}C$ | | 500 | A |
| | | $t = 8,3 ms; (60 Hz), sine$ | $V_R = 0 V$ | | 540 | A |
| | | $t = 10 ms; (50 Hz), sine$ | $T_{VJ} = 150^{\circ}C$ | | 425 | A |
| | | $t = 8,3 ms; (60 Hz), sine$ | $V_R = 0 V$ | | 460 | A |
| I^2t | value for fusing | $t = 10 ms; (50 Hz), sine$ | $T_{VJ} = 45^{\circ}C$ | | 1.25 | kA ² s |
| | | $t = 8,3 ms; (60 Hz), sine$ | $V_R = 0 V$ | | 1.22 | kA ² s |
| | | $t = 10 ms; (50 Hz), sine$ | $T_{VJ} = 150^{\circ}C$ | | 905 | A ² s |
| | | $t = 8,3 ms; (60 Hz), sine$ | $V_R = 0 V$ | | 880 | A ² s |
| C_J | junction capacitance | $V_R = 400 V f = 1 MHz$ | $T_{VJ} = 25^{\circ}C$ | | 18 | pF |
| P_{GM} | max. gate power dissipation | $t_p = 30 \mu s$ | $T_C = 150^{\circ}C$ | | 10 | W |
| | | $t_p = 300 \mu s$ | | | 5 | W |
| P_{GAV} | average gate power dissipation | | | | 0.5 | W |
| $(di/dt)_{cr}$ | critical rate of rise of current | $T_{VJ} = 150^{\circ}C; f = 50 Hz$ repetitive, $I_T = 120 A$ | | | 100 | A/ μs |
| | | $t_p = 200 \mu s; di_G/dt = 0.45 A/\mu s;$ $I_G = 0.45 A; V = 2/3 V_{DRM}$ non-repet., $I_T = 40 A$ | | | 500 | A/ μs |
| $(dv/dt)_{cr}$ | critical rate of rise of voltage | $V = 2/3 V_{DRM}$ $R_{GK} = \infty; \text{method 1 (linear voltage rise)}$ | $T_{VJ} = 150^{\circ}C$ | | 1000 | V/ μs |
| V_{GT} | gate trigger voltage | $V_D = 6 V$ | $T_{VJ} = 25^{\circ}C$ | | 1.4 | V |
| | | | $T_{VJ} = -40^{\circ}C$ | | 1.6 | V |
| I_{GT} | gate trigger current | $V_D = 6 V$ | $T_{VJ} = 25^{\circ}C$ | | 70 | mA |
| | | | $T_{VJ} = -40^{\circ}C$ | | 150 | mA |
| V_{GD} | gate non-trigger voltage | $V_D = 2/3 V_{DRM}$ | $T_{VJ} = 150^{\circ}C$ | | 0.2 | V |
| I_{GD} | gate non-trigger current | | | | 5 | mA |
| I_L | latching current | $t_p = 10 \mu s$ | $T_{VJ} = 25^{\circ}C$ | | 150 | mA |
| | | $I_G = 0.45 A; di_G/dt = 0.45 A/\mu s$ | | | | |
| I_H | holding current | $V_D = 6 V R_{GK} = \infty$ | $T_{VJ} = 25^{\circ}C$ | | 100 | mA |
| t_{gd} | gate controlled delay time | $V_D = 1/2 V_{DRM}$ $I_G = 0.45 A; di_G/dt = 0.45 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 2 | μs |
| t_q | turn-off time | $V_R = 100 V; I_T = 40 A; V = 2/3 V_{DRM}$ $di/dt = 10 A/\mu s dv/dt = 20 V/\mu s t_p = 200 \mu s$ | $T_{VJ} = 125^{\circ}C$ | | 500 | μs |



| Package E2-Pack | | Ratings | | | | |
|-----------------|--|-------------------------------------|--------------|------|------|--------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 50 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 150 | °C |
| T_{op} | operation temperature | | -40 | | 125 | °C |
| T_{stg} | storage temperature | | -40 | | 125 | °C |
| Weight | | | | 176 | | g |
| M_D | mounting torque | | 3 | | 6 | Nm |
| $d_{Spp/App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 6.0 | | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 12.0 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second t = 1 minute | 3600 3000 | | | V V |
| | | 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | | | | |



Part description

- M = Module
- C = Thyristor (SCR)
- M = Thyristor
- A = (up to 1800V)
- 120 = Current Rating [A]
- UJ = 3- Rectifier Bridge, half-controlled (high-side) + free wheeling Diode
- 1800 = Reverse Voltage [V]
- ED = E2-Pack

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | MCMA120UJ1800ED | MCMA120UJ1800ED | Box | 6 | 510125 |

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150^{\circ}C$

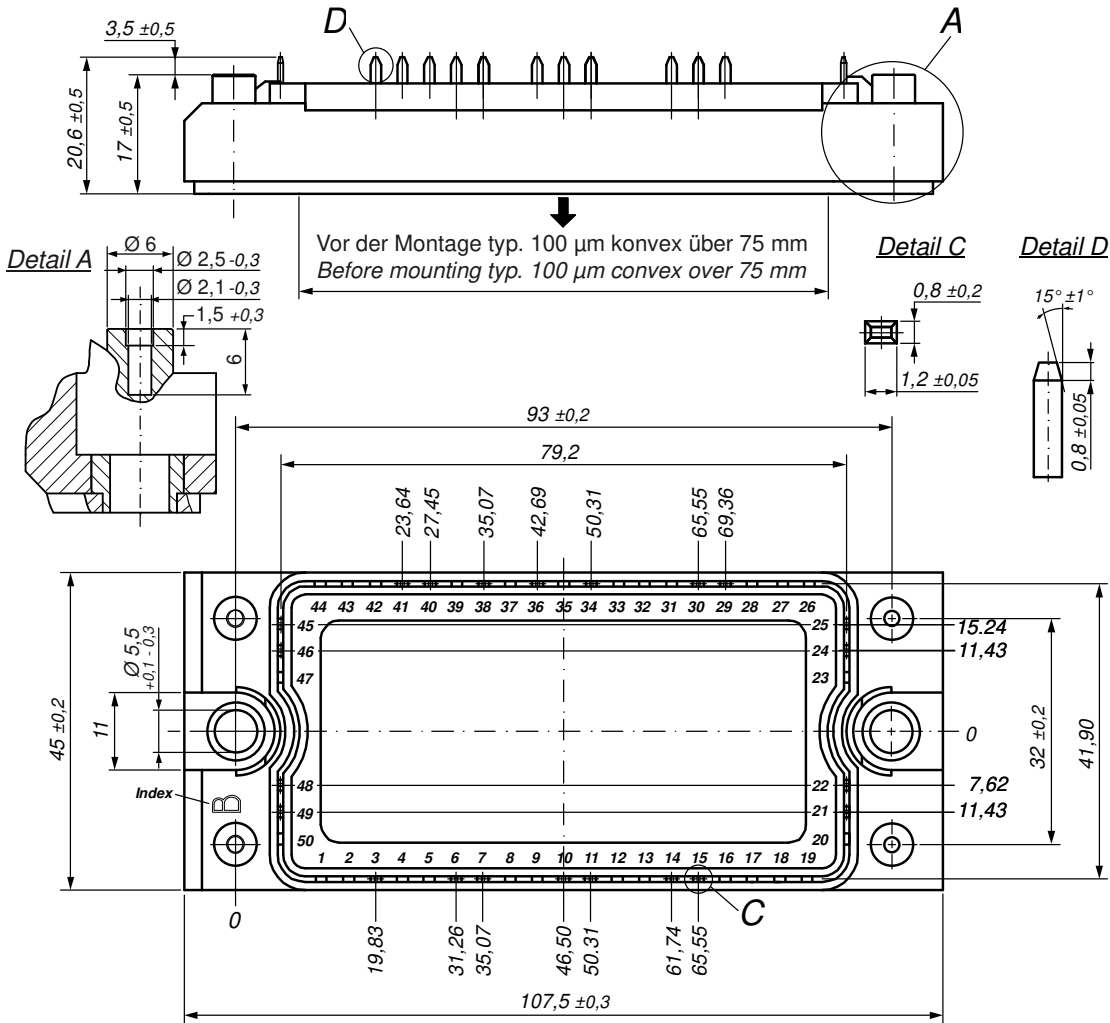


Thyristor

| | | | |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage | 0.83 | V |
| $R_{0\ max}$ | slope resistance * | 10.5 | mΩ |



Outlines E2-Pack



Bemerkung / Note:

- Nichttolerierete Maße nach / *Measure without tolerances according DIN ISO 2768-T1-m*
- PCB-Lochmuster / *PCB hole pattern: see pin position*
- Toleranz Pin-Position und PCB-Lochmuster / *Tolerance of pin position and PCB hole pattern: $\oplus 0.1$*
- Montageanleitung / *Mounting instruction: www.ixys.com Application note IXAN0024*

Detail A: PCB-Montage / *Mounting on PCB*

- Empfohlene, selbstschneidende Schraube / *Recommended, self-tapping screw: EJOT PT® (Größe / size: K25)*
- Max. Schraubenlänge / *Max. screw length: PCB-Dicke / thickness + 6 mm (max. Lochtiefe / hole depth)*
- Empfohlenes Drehmoment / *Recommended mounting torque: 1.5 Nm*

