

Rectifier Module Circuit Series- Package S



Agency Approvals

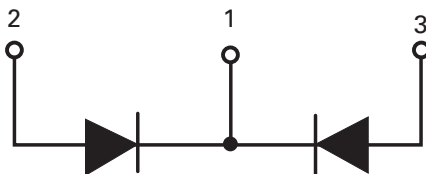
| AGENCY | AGENCY FILE NUMBER |
|--------|--------------------|
| | E71639 |

Circuit Diagram

B type



DK type



Features

- Low reverse recovery loss
- Low forward voltage
- High surge current capability
- Low inductance package

Applications

- Field supply for DC motors
- Line rectifiers for transistorized AC motor controllers
- Non-controllable rectifiers for AC/DC converter

Main Features

| Symbol | Value | Unit |
|-------------|--------------|------|
| $I_{F(AV)}$ | 130 to 200 | A |
| V_{RRM} | 1600 to 1800 | V |
| V_{RSM} | 1700 to 1900 | V |

Absolute Maximum Rating ($T_c = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Parameters | | Value | Unit |
|-----------|-------------------------------------|----------|-------|------|
| V_{RRM} | Repetitive Peak Reverse Voltage | MD16xxxS | 1600 | V |
| | | MD18xxxS | 1800 | |
| V_{RSM} | Non-Repetitive Peak Reverse Voltage | MD16xxxS | 1700 | V |
| | | MD18xxxS | 1900 | |

Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Parameters | Test Conditions | Values | | | | Unit |
|--------------|--------------------------------------|--|-------------|----------|----------|----------|-------------------|
| | | | MDxx130S | MDxx160S | MDxx180S | MDxx200S | |
| $I_{F(AV)}$ | Average Forward Current | Single phase, half wave 180°C conduction, T_c^1 | 130 | 160 | 180 | 200 | A |
| $I_{F(RMS)}$ | RMS Forward Current | | 204 | 250 | 280 | 310 | A |
| I_{FSM} | Non-Repetitive Surge Forward Current | $T_c=45^\circ\text{C}$, 50Hz, Single wave | 3500 | 5500 | 6000 | 6500 | A |
| | | $T_c=45^\circ\text{C}$, 60Hz, Single wave | 3800 | 6000 | 6500 | 7000 | |
| I^2t | I^2t (For Fusing) | $T_c=45^\circ\text{C}$, 50Hz, Single wave | 61.2 | 151.2 | 180.0 | 211.2 | KA ² s |
| | | $T_c=45^\circ\text{C}$, 60Hz, Single wave | 60.0 | 149.4 | 175.3 | 203.3 | |
| P_D | Power Dissipation | | 625 | 694 | 694 | 781 | W |
| T_J | Junction Temperature | | -40 to +150 | | | | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | | -40 to +125 | | | | $^\circ\text{C}$ |
| V_{ISO} | Insulation Test Voltage | AC, 50Hz, t=1min | 3000 | | | | V |

Note: 1. for MDxx130S & MDxx160S, $T_c=95^\circ\text{C}$; for MDxx180S, $T_c=90^\circ\text{C}$; for MDxx200S, $T_c=85^\circ\text{C}$

Electrical and Thermal Specifications ($T_c = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Unit |
|----------|---|--------------------------------------|-----|-----|------|---------------|
| I_{RM} | Reverse Leakage Current | $V_R=V_{RRM}$ | - | - | 500 | μA |
| | | $V_R=V_{RRM}, T_J=125^\circ\text{C}$ | - | - | 10 | mA |
| V_F | Forward Voltage | MDxx130S $I_F=400\text{A}$ | - | - | 1.5 | V |
| | | MDxx160S $I_F=500\text{A}$ | - | - | 1.5 | |
| | | MDxx180S $I_F=600\text{A}$ | - | - | 1.5 | |
| | | MDxx200S $I_F=600\text{A}$ | - | - | 1.5 | |
| V_{T0} | For power-loss calculations only $T_J=125^\circ\text{C}$ | MDxx130S | - | - | 0.85 | V |
| | | MDxx160S | - | - | 0.85 | |
| | | MDxx180S | - | - | 0.82 | |
| | | MDxx200S | - | - | 0.80 | |
| r_T | | MDxx130S | - | - | 1.6 | m Ω |
| | | MDxx160S | - | - | 1.2 | |
| | | MDxx180S | - | - | 1.1 | |
| | | MDxx200S | - | - | 1.0 | |

Mechanical Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Unit |
|--------|-------------------|------------------|-----|-----|-----|------|
| Torque | Module-to-Sink | Recommended (M6) | 3 | | 5 | N·m |
| Torque | Module Electrodes | Recommended (M6) | 3 | | 5 | N·m |

Electrical and Thermal Specifications ($T_c = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Parameters | Test Conditions | Max | Unit |
|------------|------------------|-----------------|------|------|
| R_{thJC} | Junction-to-Case | MDxx130S | 0.20 | K/W |
| | | MDxx160S | 0.18 | |
| | | MDxx180S | 0.18 | |
| | | MDxx200S | 0.16 | |

Figure 1: Forward current vs.voltage drop



Figure 2: Max Non-Repetitive Forward Surge Current



Figure 3: Forward current vs.Case temperature



Figure 4: Transient Thermal Impedance



Figure 5: Power dissipation vs. $I_{F(AV)}$ for MDxx130S



Figure 5: Power dissipation vs. $I_{F(AV)}$ for MDxx160S



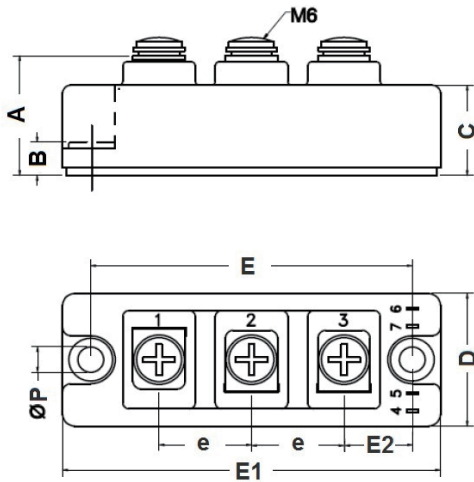
Figure 5: Power dissipation vs. $I_{F(AV)}$ for MDxx180S



Figure 5: Power dissipation vs. $I_{F(AV)}$ for MDxx200S



Dimensions-Package S



| Dimension | Inches | | Millimeters | |
|-----------|--------|-------|-------------|------|
| | Max | Max | Min | Max |
| A | 1.181 | 1.220 | 30.0 | 31.0 |
| B | 0.323 | 0.346 | 8.2 | 8.8 |
| C | 0.894 | 0.917 | 22.7 | 23.3 |
| D | 1.311 | 1.350 | 33.3 | 34.3 |
| E | 3.130 | 3.169 | 79.5 | 80.5 |
| E1 | 3.681 | 3.720 | 93.5 | 94.5 |
| E2 | 0.650 | 0.689 | 16.5 | 17.5 |
| e | 0.886 | 0.925 | 22.5 | 23.5 |
| P | 0.244 | 0.268 | 6.2 | 6.8 |

Packing Selector

| Part Number | V_{RRM} | | $I_{F(AV)}$ | Circuit Type | Package |
|-----------------|-----------|-------|-------------|--------------|---------|
| | 1600V | 1800V | | | |
| MDxx130S-BM2MM | X | X | 130A | B | S |
| MDxx130S-DKM2MM | X | X | | DK | |
| MDxx160S-BM2MM | X | X | 160A | B | |
| MDxx160S-DKM2MM | X | X | | DK | |
| MDxx180S-BM2MM | X | X | 180A | B | |
| MDxx180S-DKM2MM | X | X | | DK | |
| MDxx200S-BM2MM | X | X | 200A | B | |
| MDxx200S-DKM2MM | X | X | | DK | |

Packing Options

| Part Number | Marking | Weight | Packing Mode | M.O.Q |
|----------------|----------------|--------|--------------|-------|
| MDxxxxxS-xM2MM | MDxxxxxS-xM2MM | 170g | Bulk Pack | 50 |

Part Numbering System



Part Marking System

