



**THE DATASHEET OF
MC68HC11E1CFN2R2**



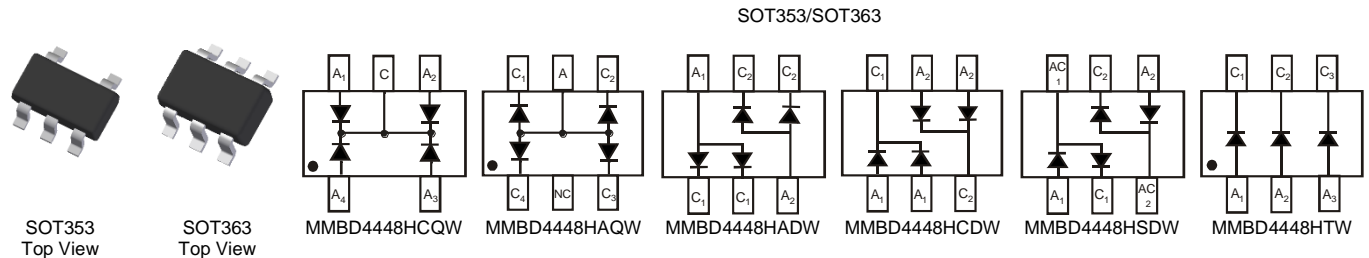
Features

- Fast Switching Speed
- Low Forward Voltage: Maximum of 0.72V at 5mA
- Low Reverse Current: Maximum of 100nA at 70V
- Fast Reverse Recovery: Maximum of 4ns
- Low Capacitance: Maximum of 3.5pF
- Small Surface-Mount Package
- For General-Purpose Switching Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The MMBD4448HADWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: SOT353 or SOT363
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead-Free Plating). Solderable per MIL-STD-202, Method 208 ^{e3}
- Orientation: See Diagrams Below
- Weight: 0.006 grams (Approximate)

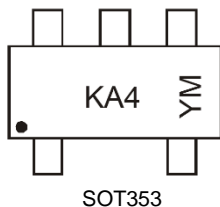


Ordering Information (Note 4)

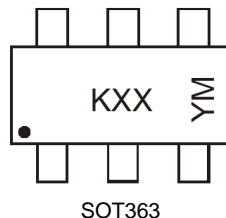
| Part Number | Package | Packing | |
|-------------------|---------|---------|-------------|
| | | Qty. | Carrier |
| MMBD4448HADW-7-F | SOT363 | 3000 | Tape & Reel |
| MMBD4448HADWQ-7-F | SOT363 | 3000 | Tape & Reel |
| MMBD4448HAQW-7-F | SOT363 | 3000 | Tape & Reel |
| MMBD4448HCDW-7-F | SOT363 | 3000 | Tape & Reel |
| MMBD4448HCQW-7-F | SOT353 | 3000 | Tape & Reel |
| MMBD4448HSDW-7-F | SOT363 | 3000 | Tape & Reel |
| MMBD4448HTW-7-F | SOT363 | 3000 | Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

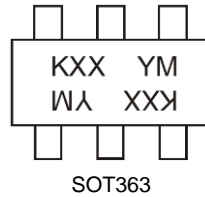


KA4 = Product Type Marking Code
KA4 = MMBD4448HCQW
YM = Date Code Marking
Y = Year (ex: K = 2023); A Bar on Top of the "Y" Denotes AT Sites
M = Month (ex: 9 = September)



KXX = Product Type Marking Code,
ex: KA5 = MMBD4448HAQW
KAA = MMBD4448HTW
YM = Date Code Marking
Y = Year (ex: K = 2023); A Bar on Top of the "Y" Denotes AT Sites
M = Month (ex: 9 = September)

Marking Information (continued)



KXX = Product Type Marking Code,

ex: KA6 = MMBD4448HADW

KA7 = MMBD4448HCDW

KAB = MMBD4448HSDW

YM = Date Code Marking

Y = Year (ex: K = 2023); A Bar on Top of the "Y" Denotes AT Sites

M = Month (ex: 9 = September)

Date Code Key

| Year | 2000 | - | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 |
|------|------|---|------|------|------|------|------|------|------|------|------|------|
| Code | L | - | K | L | M | N | P | R | S | T | U | V |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---------------------|-------------|------|
| Non-Repetitive Peak Reverse Voltage | V _{RM} | 100 | V |
| Peak Repetitive Reverse Voltage | V _{RRM} | 80 | V |
| Working Peak Reverse Voltage | V _{RWM} | | |
| DC Blocking Voltage | V _R | | |
| RMS Reverse Voltage | V _{R(RMS)} | 57 | V |
| Forward Continuous Current (Note 5) | I _{FM} | 500 | mA |
| Non-Repetitive Peak Forward Surge Current | I _{FSM} | @ t = 1.0μs | 4.0 |
| | | @ t = 1.0s | 1.0 |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 200 | mW |
| Thermal Resistance Junction to Ambient Air (Note 5) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|------------------------------------|--------------------|------|-------|------|---|
| Reverse Breakdown Voltage (Note 6) | V _{(BR)R} | 80 | — | V | I _R = 100μA |
| Forward Voltage | V _F | 0.62 | 0.72 | V | I _F = 5.0mA |
| | | — | 0.855 | | I _F = 10mA |
| | | — | 1.0 | | I _F = 100mA |
| | | — | 1.25 | | I _F = 150mA |
| Reverse Current (Note 6) | I _R | — | 100 | nA | V _R = 70V |
| | | — | 50 | μA | V _R = 75V, T _J = +150°C |
| | | — | 30 | μA | V _R = 25V, T _J = +150°C |
| | | — | 25 | nA | V _R = 20V |
| Total Capacitance | C _T | — | 3.5 | pF | V _R = 6V, f = 1.0MHz |
| Reverse Recovery Time | t _{rr} | — | 4.0 | ns | V _R = 6V, I _F = 5mA |

Notes: 5. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Incorporated's suggested pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
6. Short duration pulse test used to minimize self-heating effect.

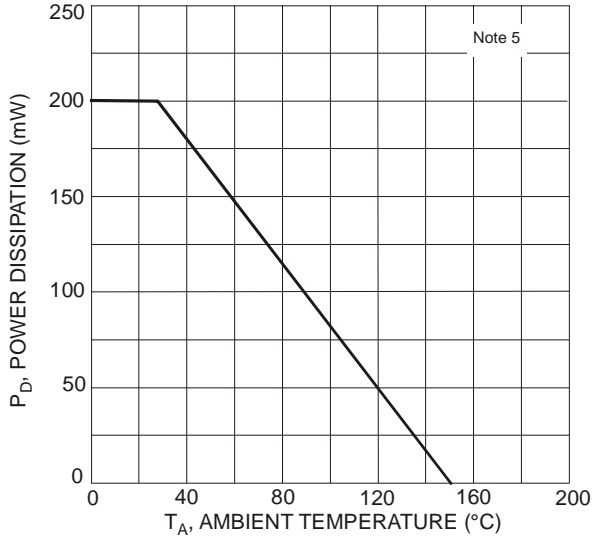


Figure 1 Power Derating Curve, Total Package

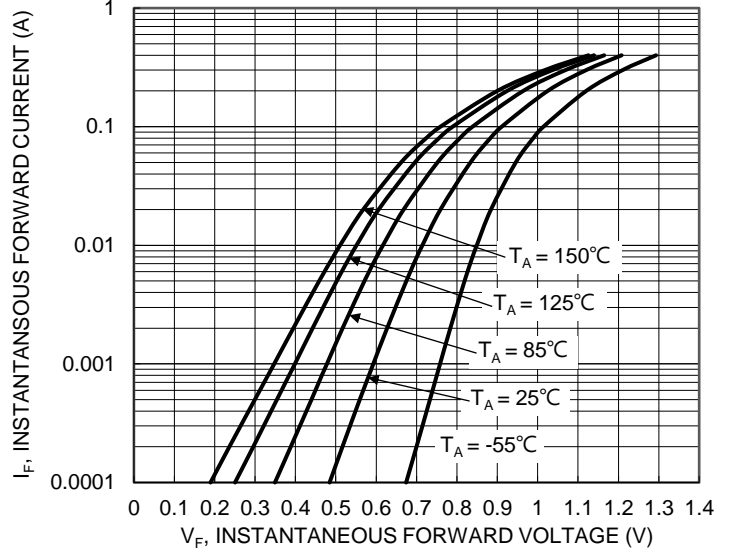


Figure 2 Typical Forward Characteristics, per Element

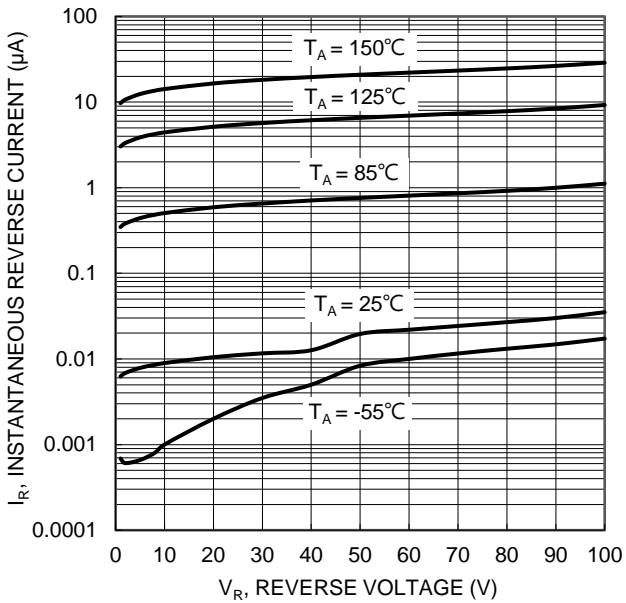


Figure 3 Typical Reverse Characteristics, per Element

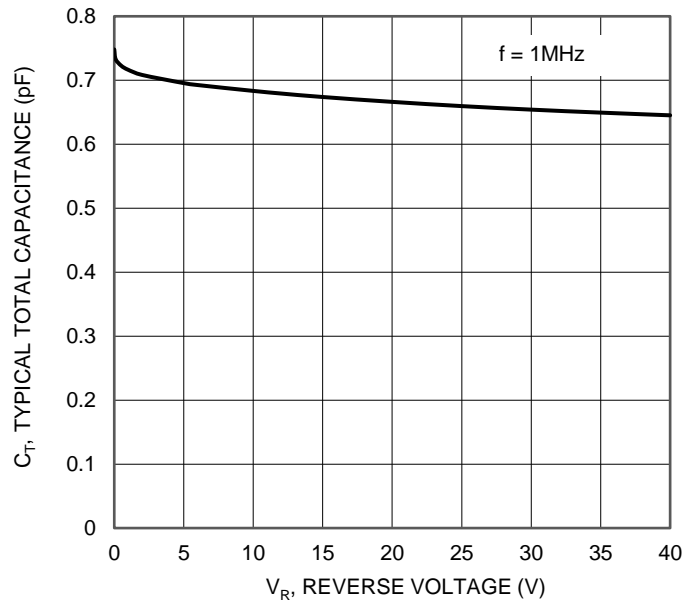
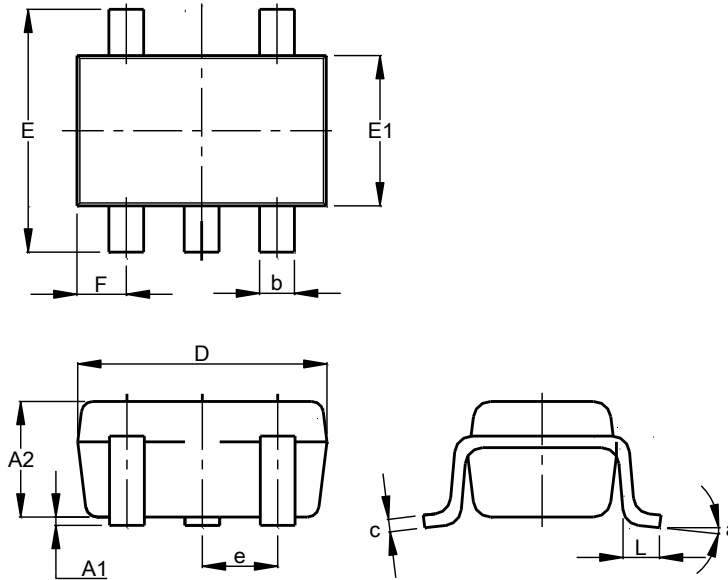


Figure 4 Typical Total Capacitance, per Element

Package Outline Dimensions

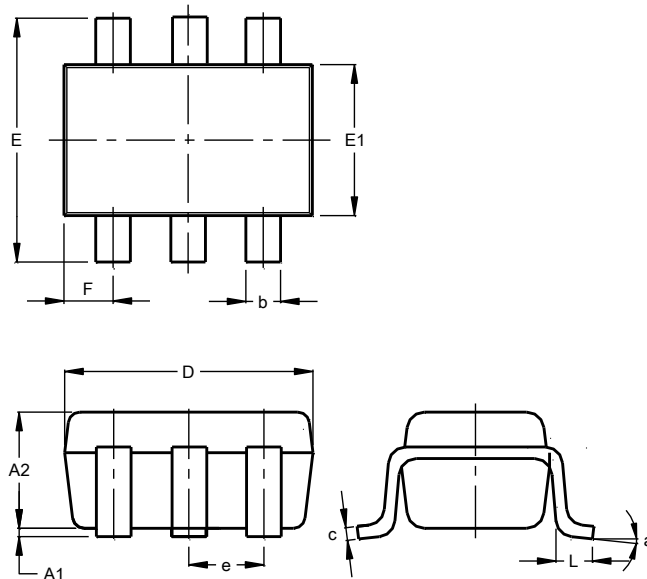
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT353



| SOT353 | | | |
|-----------------------------|-----------|------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.10 | 0.30 | 0.25 |
| c | 0.10 | 0.22 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| F | 0.40 | 0.45 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

SOT363

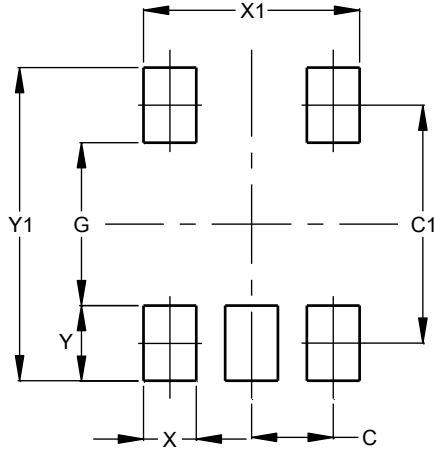


| SOT363 | | | |
|-----------------------------|-----------|------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.10 | 0.30 | 0.25 |
| c | 0.10 | 0.22 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| F | 0.40 | 0.45 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

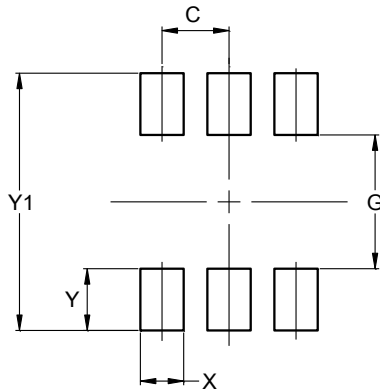
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT353



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| C1 | 1.900 |
| G | 1.300 |
| X | 0.420 |
| X1 | 1.720 |
| Y | 0.600 |
| Y1 | 2.500 |

SOT363



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 1.300 |
| X | 0.420 |
| Y | 0.600 |
| Y1 | 2.500 |

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