**$V_{RM}$ = 200 V, $I_{F(AV)}$ = 10 A, $t_{rr}$ = 30 ns**
**Fast Recovery Diode**

# FMX-12SL

**Data Sheet**

## Description

The FMX-12SL is a fast recovery diode of 200 V / 10 A. The maximum $t_{rr}$ of 30 ns is realized by optimizing a life-time control.

## Features

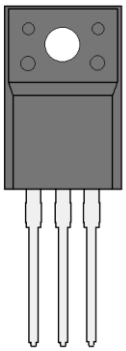
- $V_{RM}$ ---------- 200 V
- $I_{F(AV)}$ ---------- 10 A
- $V_F$ ---------- 1.25 V
- $t_{rr1}$ ---------- 30 ns
- Bare Lead Frame: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0

## Applications

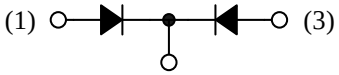
- Secondary Side Rectifier Diode
  (Flyback Converter, LLC Converter, etc.)
- Freewheel Diode
  (Offline Buck and Buck-boost Converter)

## Package

TO220F-3L



(1) (2) (3)




(1) Anode
(2) Cathode
(3) Anode

Not to scale

## Absolute Maximum Ratings

Unless otherwise specified, $T_A$ = 25 °C.

| Parameter | Symbol | Conditions | Rating | Unit |
|---|---|---|---|---|
| Nonrepetitive Peak Reverse Voltage(1) | $V_{RSM}$ | | 200 | V |
| Repetitive Peak Reverse Voltage(1) | $V_{RM}$ | | 200 | V |
| Average Forward Current | $I_{F(AV)}$ | See Figure 1 and Figure 2 | 10 | A |
| Surge Forward Current(1) | $I_{FSM}$ | Half cycle sine wave, positive side, 10 ms, 1 shot | 65 | A |
| $I^2t$ Limiting Value(1) | $I^2t$ | 1 ms ≤ t ≤ 10 ms | 21 | $A^2s$ |
| Junction Temperature | $T_J$ | | −40 to 150 | °C |
| Storage Temperature | $T_{STG}$ | | −40 to 150 | °C |

## Electrical Characteristics

Unless otherwise specified, $T_A$ = 25 °C.

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage Drop(1) | $V_F$ | $T_J$ = 25 °C, $I_F$ = 5 A | — | — | 1.25 | V |
| | | $T_J$ = 100 °C, $I_F$ = 5 A | — | 0.85 | — | V |
| Reverse Leakage Current(1) | $I_R$ | $V_R = V_{RM}$ | — | — | 50 | μA |
| Reverse Leakage Current under High Temperature(1) | $H \cdot I_R$ | $V_R = V_{RM}$, $T_J$ = 150 °C | — | — | 10 | mA |
| Reverse Recovery Time(1) | $t_{rr1}$ | $I_F = I_{RP}$ = 100 mA, 90% recovery point, $T_J$ = 25 °C | — | — | 30 | ns |
| | $t_{rr2}$ | $I_F$ = 100 mA, $I_{RP}$ = 200 mA, 75% recovery point, $T_J$ = 25 °C | — | — | 25 | ns |
| Thermal Resistance(2) | $R_{th(J-C)}$ | | — | — | 4.0 | °C/W |

## Mechanical Characteristics

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Heatsink Mounting Screw Torque | | 0.490 | — | 0.686 | N·m |
| Package Weight | | — | 1.8 | — | g |

(1) Specifies a value per chip; the FMX-12SL consists of two chips.

(2) $R_{th\ (J-C)}$ is thermal resistance between junction and the case. The case temperature is measured at the back side near the screw hole.

## Derating Curves

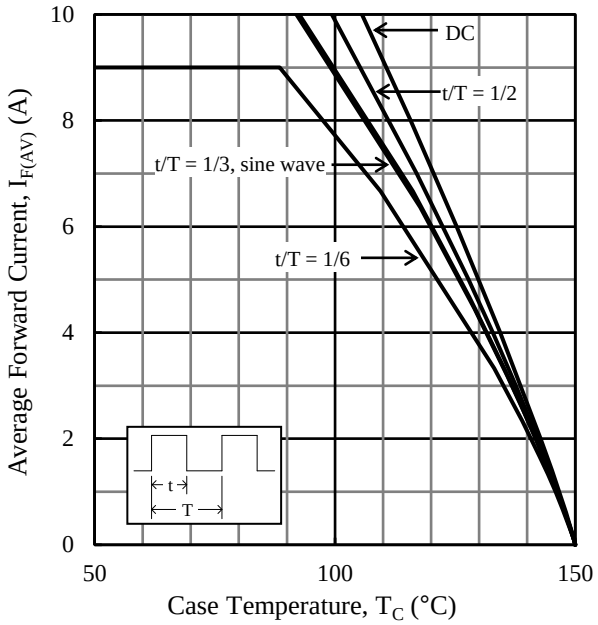



Figure 1. $I_{F(AV)}$ vs. $T_C$ ($T_J$ = 150 °C, $V_R$ = 0 V)

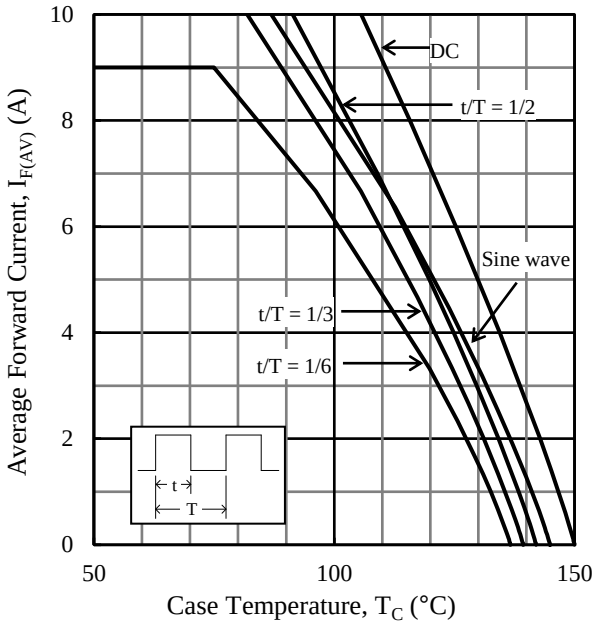



Figure 2. $I_{F(AV)}$ vs. $T_C$ ($T_J$ = 150 °C, $V_R$ = 200 V)

## Characteristic Curves

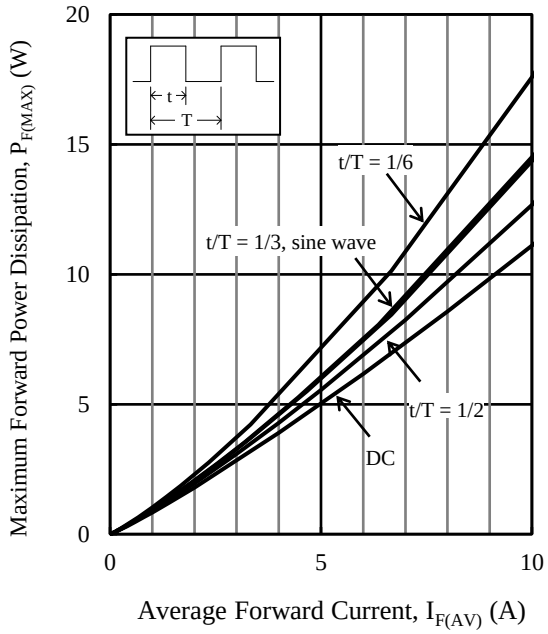



Figure 3. $P_{F(MAX)}$ vs. $I_{F(AV)}$ ($T_J$ = 150 °C)

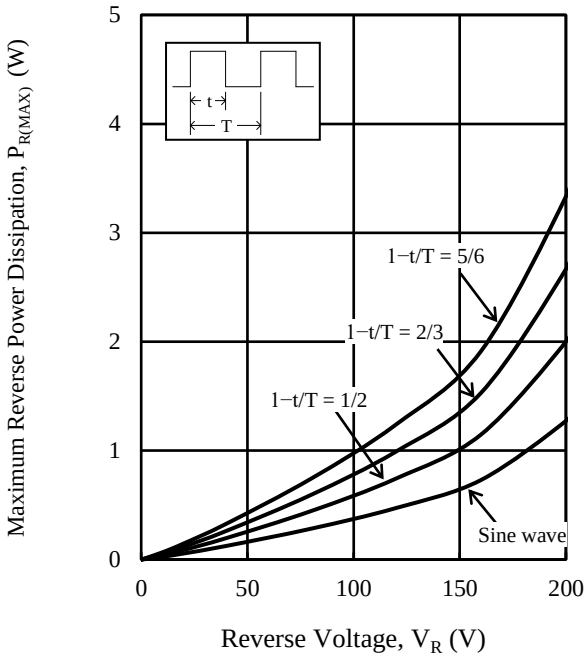



Figure 4. $P_{R(MAX)}$ vs. $V_R$ ($T_J$ = 150 °C)

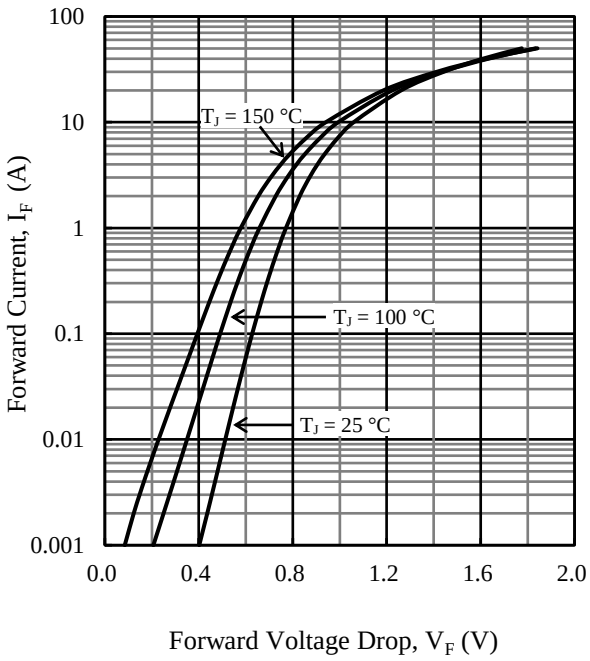



Figure 5. Typical Characteristics: $I_F$ vs. $V_F$

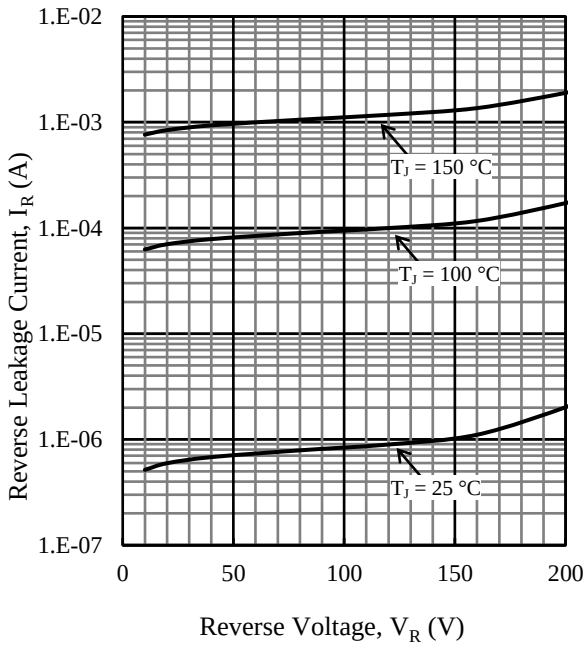



Figure 6. Typical Characteristics: $I_R$ vs. $V_R$

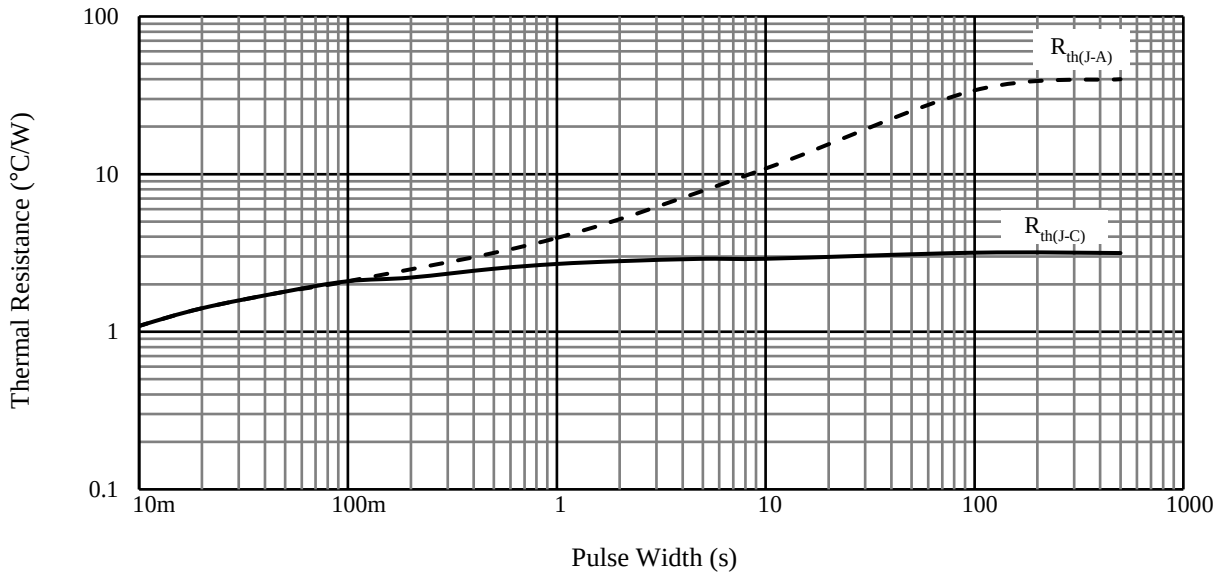
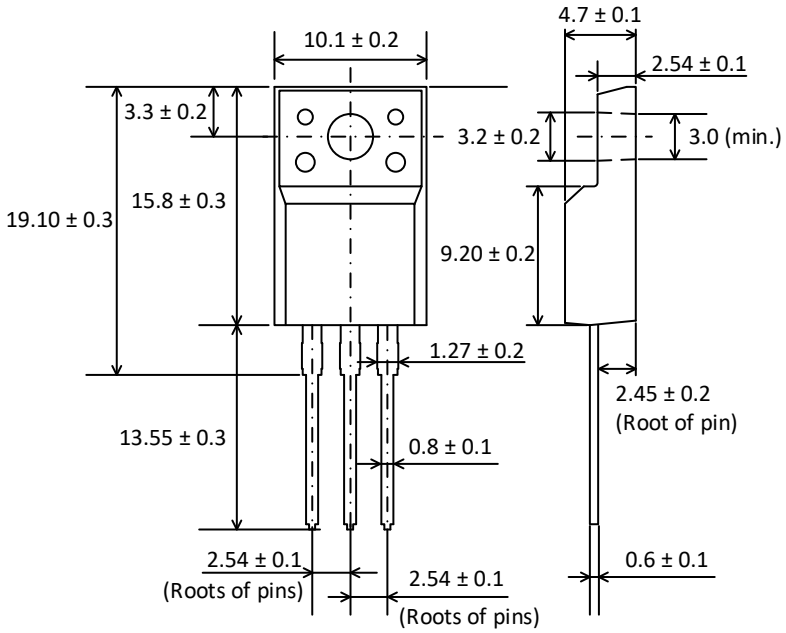



Figure 7. Typical Transient Thermal Resistance Characteristics

## Physical Dimensions

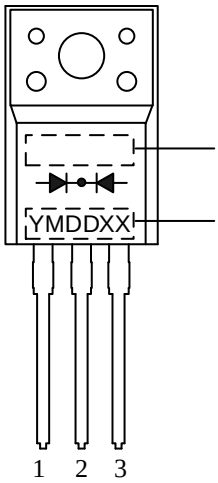
● **TO220F-3L**




**NOTES:**

- Dimensions in millimeters
- All the dimensions exclude mold flashes.
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the products, it is required to minimize the working time within the following limits:
  Flow: 260 °C / 10 s, 1 time
  Soldering Iron: 350 °C / 3.5 s, 1 time
  Soldering should be at a distance of at least 1.5 mm from the body of the product.

## Marking Diagram




Specific Device Code (See Table 1)

Lot Number:
Y is the last digit of the year of manufacture (0 to 9)
M is the month of the year (1 to 9, O, N, or D)
DD is the day of the month (01 to 31)
XX is the control number

Table 1. Specific Device Code

| Specific Device Code | Part Number |
|---|---|
| X12SL | FMX-12SL |

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