

$V_{RM} = 600\text{ V}$, $I_{F(AV)} = 20\text{ A}$, $t_{rr} = 60\text{ ns}$
Fast Recovery Diode
FMXR-1206S

Description

The FMXR-1206S is a fast recovery diode of 600 V / 20 A. The low Q_{rr} characteristic allows the product to have almost no ringing at turn-off, leading to the realization of low-noise systems. The maximum t_{rr} of 60 ns is realized by optimizing a life-time control.

Features

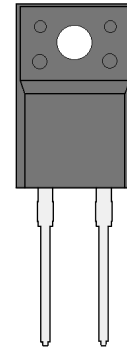
- V_{RM} ----- 600 V
- $I_{F(AV)}$ ----- 20 A
- V_F ----- 2.5 V
- t_{rr} ----- 60 ns
- Q_{rr} ----- 145 nC
- Bare lead frame: Pb-free (RoHS compliant)
- Flammability: Equivalent to UL94V-0

Applications

- PFC Circuit
- Freewheel Diode
(Offline Buck and Buck-boost Converter)

Package

TO220F-2L



(1)
(2)



(1) Cathode
(2) Anode

Not to scale

Absolute Maximum Ratings

Unless otherwise specified, $T_A = 25\text{ }^{\circ}\text{C}$

Parameter	Symbol	Conditions	Rating	Unit
Nonrepetitive Peak Reverse Voltage	V_{RSM}		600	V
Repetitive Peak Reverse Voltage	V_{RM}		600	V
Average Forward Current	$I_{F(AV)}$	See Figure 3 and Figure 4	20	A
Surge Forward Current	I_{FSM}	Half cycle sine wave, positive side, 10 ms, 1 shot	100	A
I^2t Limiting Value	I^2t	$1\text{ ms} \leq t \leq 10\text{ ms}$	50	A^2s
Junction Temperature	T_J		-40 to 150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}		-40 to 150	$^{\circ}\text{C}$

Electrical Characteristics

Unless otherwise specified, $T_A = 25\text{ }^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	V_F	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = 20\text{ A}$	—	—	2.5	V
		$T_J = 100\text{ }^{\circ}\text{C}$, $I_F = 20\text{ A}$	—	2.2	—	V
Reverse Leakage Current	I_R	$V_R = V_{RM}$	—	—	10	μA
Reverse Leakage Current Under High Temperature	$H \cdot I_R$	$V_R = V_{RM}$, $T_J = 150\text{ }^{\circ}\text{C}$	—	—	1	mA
Reverse Recovery Time	t_{rr}	$I_F = 20\text{ A}$, $V_R = 400\text{ V}$, $di/dt = -200\text{ A}/\mu\text{s}$, 100% recovery point	—	—	60	ns
Reverse Recovery Charge	Q_{rr}	$I_F = 20\text{ A}$, $V_R = 400\text{ V}$, $di/dt = -200\text{ A}/\mu\text{s}$, 100% recovery point	—	—	145	nC
Thermal Resistance	$R_{th(J-F)}$	(1)	—	—	2.8	$^{\circ}\text{C}/\text{W}$
	$R_{th(J-L)}$	(2)	—	—	3.2	$^{\circ}\text{C}/\text{W}$

Mechanical Characteristics

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

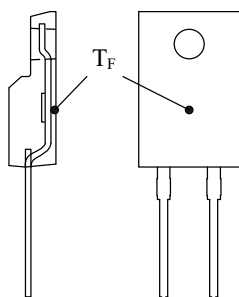


Figure 1. T_F Measurement Point

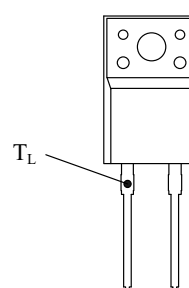


Figure 2. T_L Measurement Point

(1) $R_{th(J-F)}$ is thermal resistance between junction and the flame. T_F is the flame temperature ($^{\circ}\text{C}$), measured at the point defined in Figure 1.

(2) $R_{th(J-L)}$ is thermal resistance between junction and the lead. T_L is the cathode lead temperature ($^{\circ}\text{C}$), measured at the point defined in Figure 2.

Derating Curves

The measurement points of T_F and T_C are defined in Figure 1 and Figure 2.

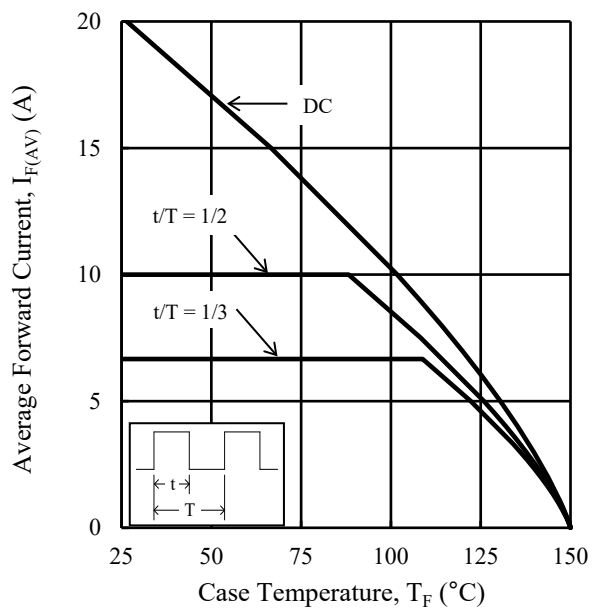


Figure 3. $I_{F(AV)}$ vs. T_F ($T_J = 150$ °C, $V_R = 0$ V)

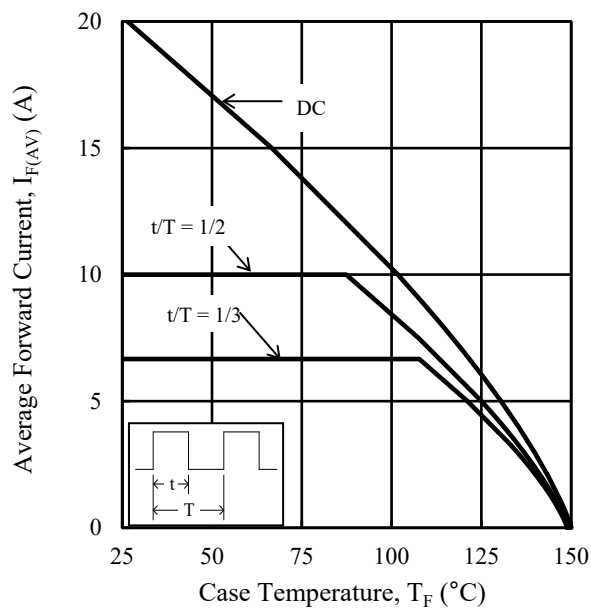


Figure 4. $I_{F(AV)}$ vs. T_F ($T_J = 150$ °C, $V_R = 600$ V)

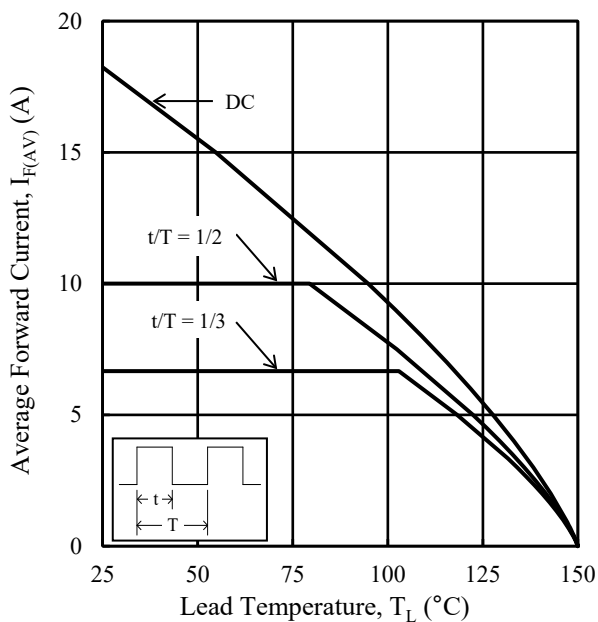


Figure 5. $I_{F(AV)}$ vs. T_L ($T_J = 150$ °C, $V_R = 0$ V)

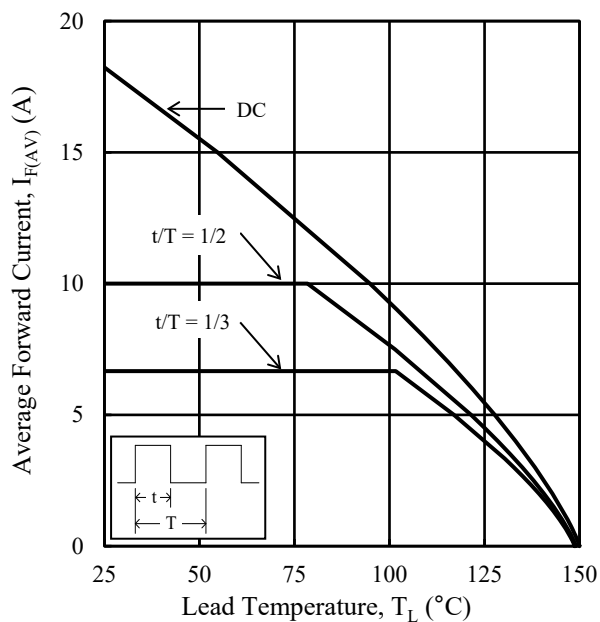


Figure 6. $I_{F(AV)}$ vs. T_L ($T_J = 150$ °C, $V_R = 600$ V)

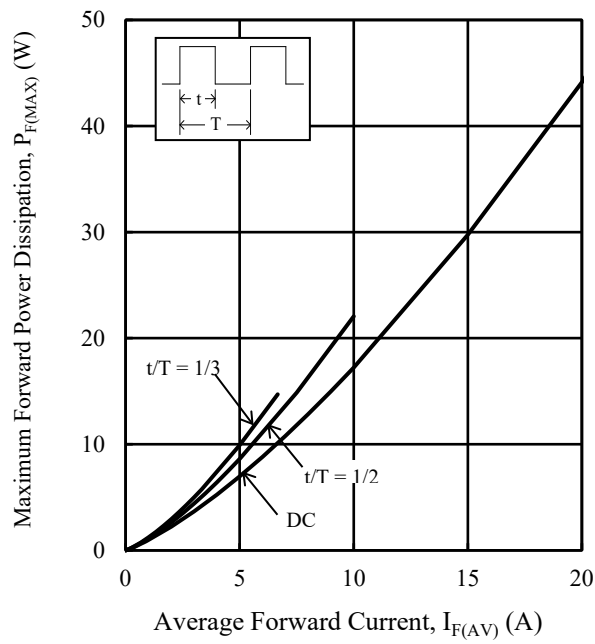


Figure 7. $P_{F(MAX)}$ vs. $I_{F(AV)}$ ($T_J = 150\text{ }^{\circ}\text{C}$)

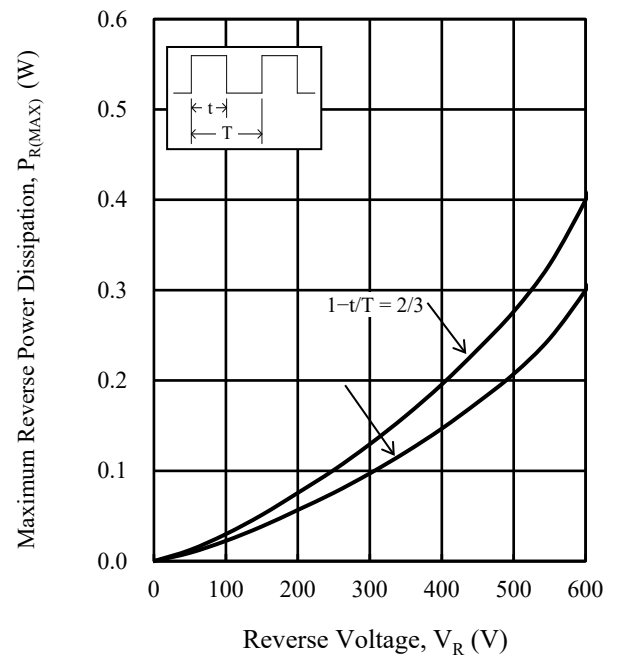


Figure 8. $P_{R(MAX)}$ vs. V_R ($T_J = 150\text{ }^{\circ}\text{C}$)

Characteristic Curves

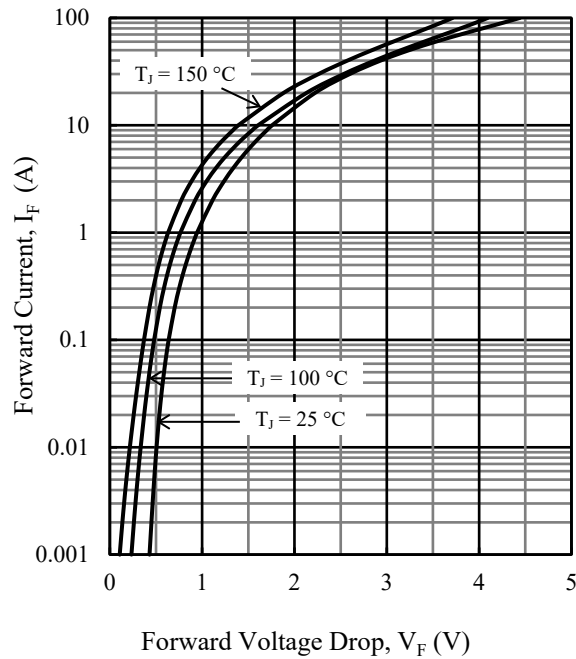


Figure 9. Typical Characteristics: I_F vs. V_F

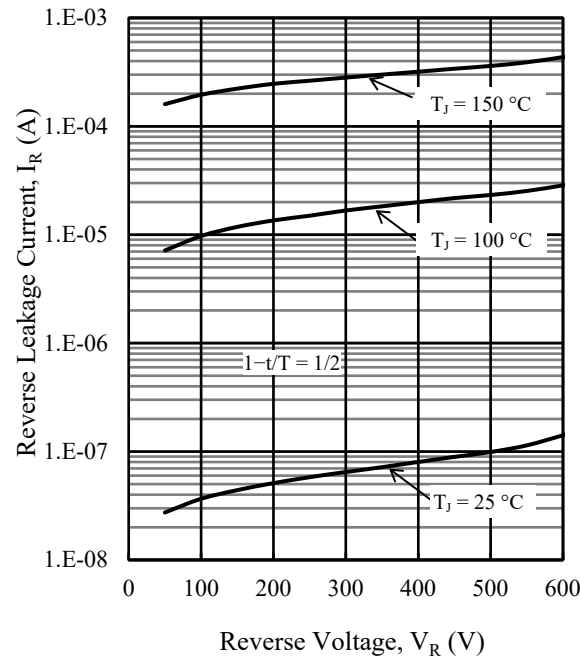


Figure 10. Typical Characteristics: I_R vs. V_R

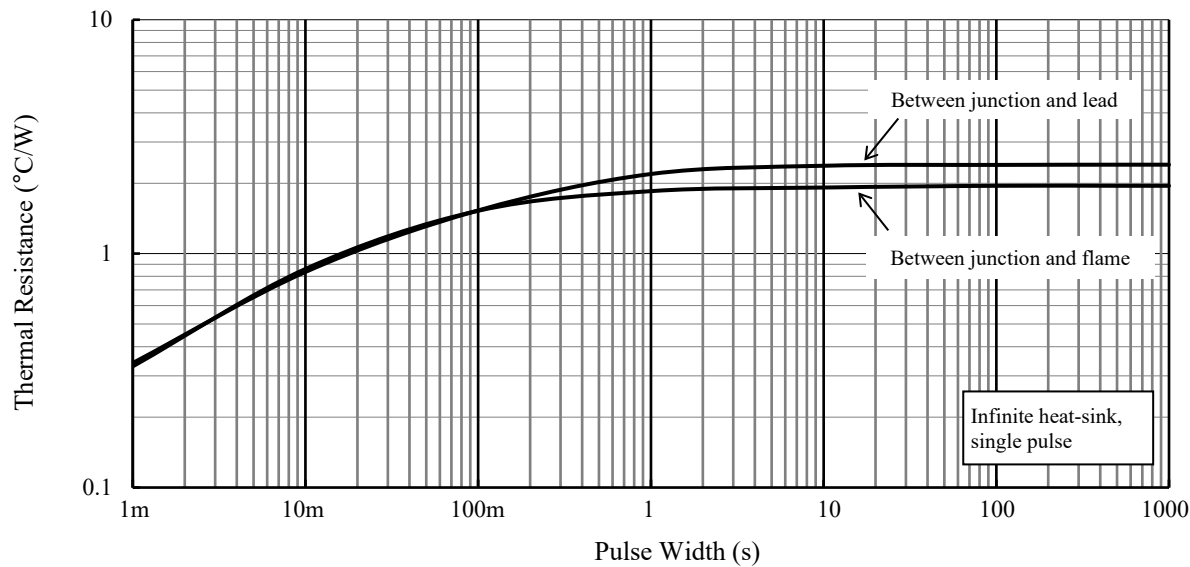
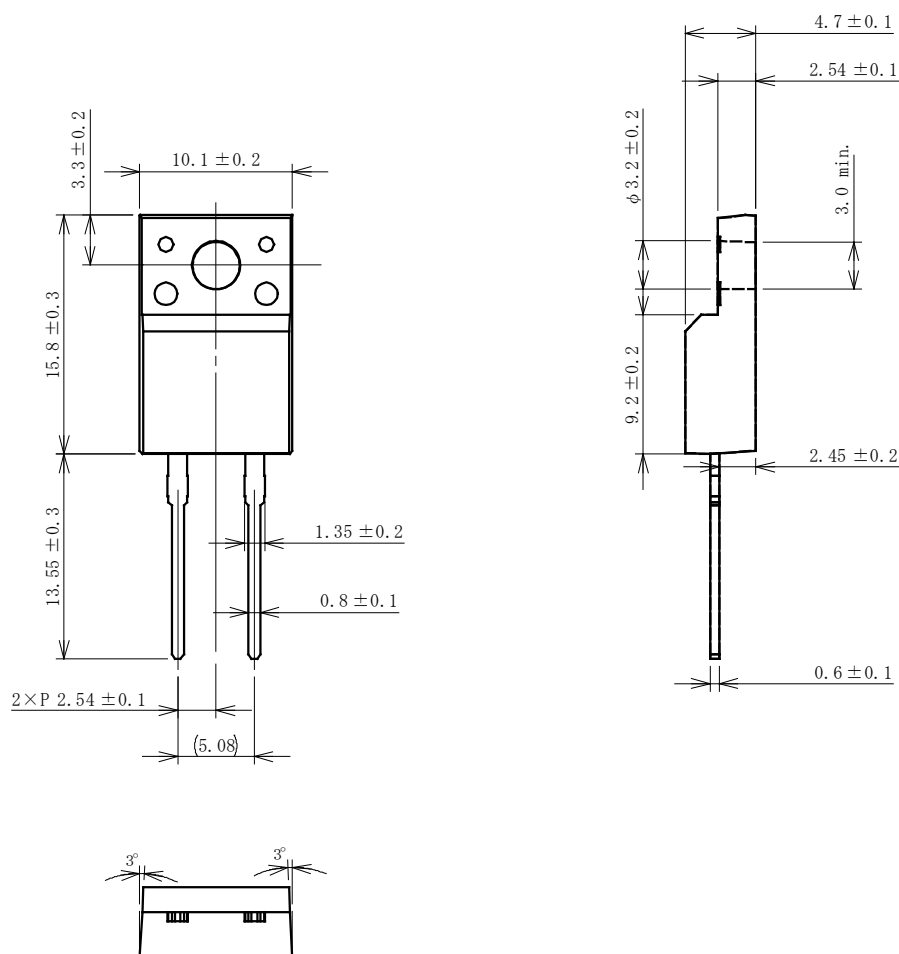


Figure 11. Typical Transient Thermal Resistance

Physical Dimensions

• TO220F-2L



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: $270^\circ\text{C} / 7 \text{ s}, 1 \text{ time}$
 Soldering Iron: $350^\circ\text{C} / 3.5 \text{ s}, 1 \text{ time}$
 Soldering should be at a distance of at least 1.5 mm from the body of the product.

Marking Diagram

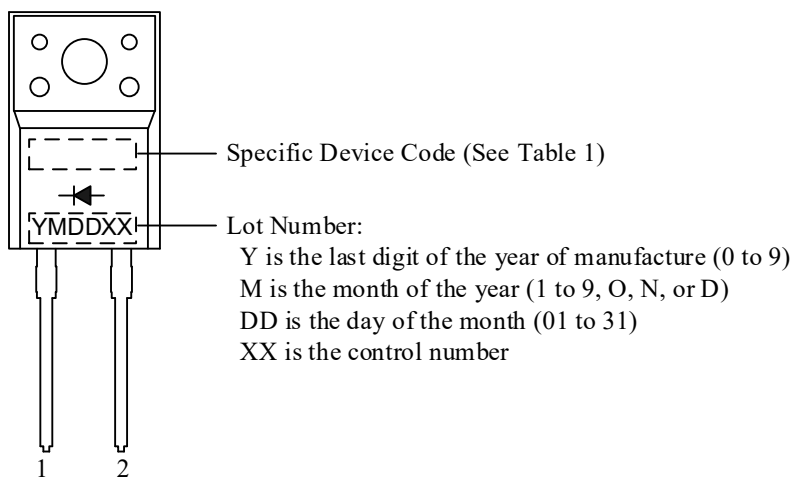


Table 1. Specific Device Code

Specific Device Code	Part Number
XR1206	FMXR-1206S

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