V_{RM} = 600 V, $I_{F(AV)}$ = 60 A, t_{rr} = 70 ns
Fast Recovery Diode

FMXR-4606S-SP

Data Sheet

Description

The FMXR-4606S-SP is a fast recovery diode of 600 V / 60 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 70 ns is realized by optimizing a life-time control.

Features

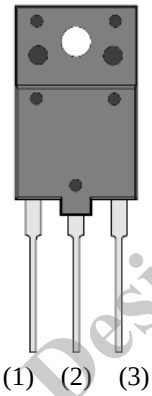
- V_{RM} ---------- 600 V
- $I_{F(AV)}$ ---------- 60 A
- V_F ---------- 2.5 V
- t_{rr} ---------- 70 ns
- Q_{rr} ---------- 170 nC
- Bare lead frame: Pb-free (RoHS compliant)

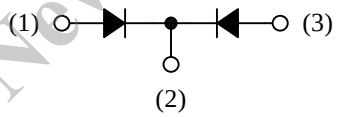
Applications

- CCM PFC Circuit
- Secondary Side Rectifier Diode
- Boost Diode

Package

TO3PF-3L





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

Not to scale

Absolute Maximum Ratings

Unless otherwise specified, T_A = 25 °C

Parameter	Symbol	Rating	Unit	Conditions
Peak Repetitive Reverse Voltage	V_{RSM}	600	V	
Repetitive Reverse Voltage	V_{RM}	600	V	
Average Forward Current	$I_{F(AV)}$	60	A	See Figure 3 and Figure 4
Surge Forward Current	I_{FSM}	120	A	Half cycle sine wave, positive side, 10 ms, 1 shot
I^2t Limiting Value	I^2t	72	A^2s	1 ms ≤ t ≤ 10 ms
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 = 30 A	—	—	2.5	V
		T_J = 100 °C, I_F = 30 A	—	2.2	—	V
Reverse Leakage Current[1]	I_R	V_R = V_{RM},	—	—	10	μA
Reverse Leakage Current Under High Temperature[1]	H·I_R	V_R = V_{RM}, T_J = 150 °C	—	—	1.5	mA
Reverse Recovery Time[1]	t_{rr}	I_F = 30 A, V_R = 400 V, di/dt = −200 A/μs, 100% recovery point	—	—	70	ns
Reverse Recovery Charge[1]	Q_{rr}	I_F = 30 A, V_R = 400 V, di/dt = −200 A/μs, 100% recovery point	—	—	170	nC
Thermal Resistance	$R_{th(J-F)}$	[2]	—	—	0.9	°C/W
	$R_{th(J-L)}$	[3]	—	—	1.2	°C/W

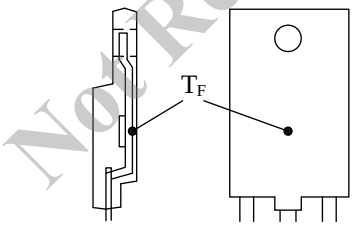


Figure 1. T_F Measurement Point

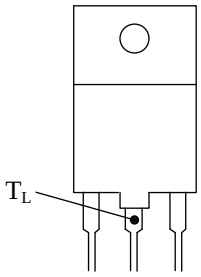


Figure 2. T_L Measurement Point

[1] The rating of one chip.
[2] $R_{th\ (J-F)}$ is thermal resistance between junction and the flame. T_F is the flame temperature (°C), measured at the point defined in Figure 1.
[3] $R_{th\ (J-L)}$ is thermal resistance between junction and the lead. T_L is the cathode lead temperature (°C), measured at the point defined in Figure 2.

Rating and Characteristic Curves

T_F is the flame temperature (°C), measured at the point defined in Figure 1.
T_L is the cathode lead temperature (°C), measured at the point defined in Figure 2.

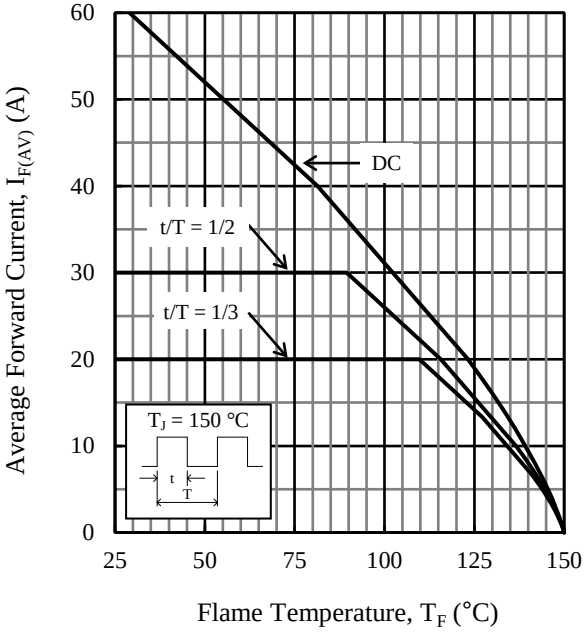


Figure 3. $I_{F(AV)}$ vs. T_F Typical Characteristics (V_F = 0 V)

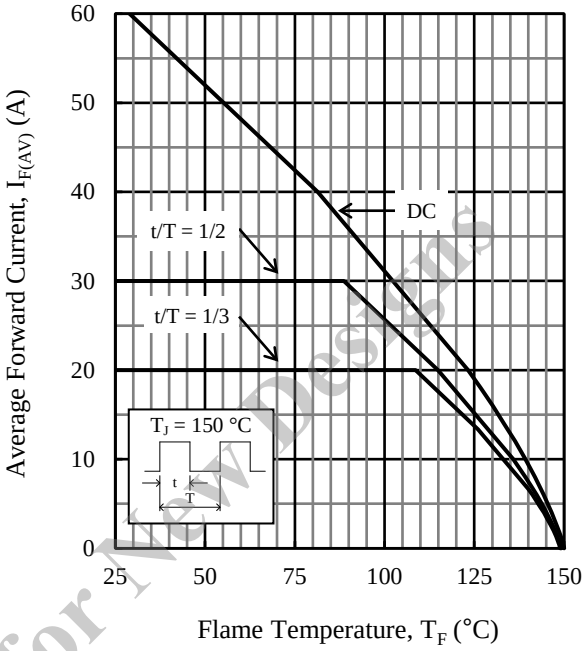


Figure 4. $I_{F(AV)}$ vs. T_F Typical Characteristics (V_R = 600 V)

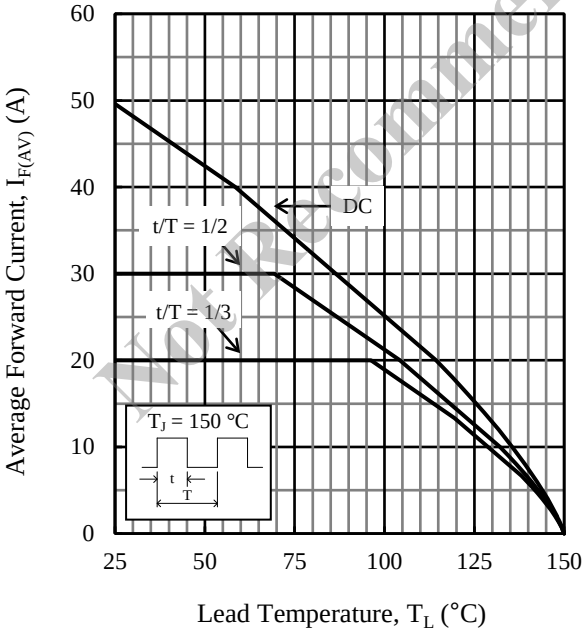


Figure 5. $I_{F(AV)}$ vs. T_L Typical Characteristics (V_R = 0 V)

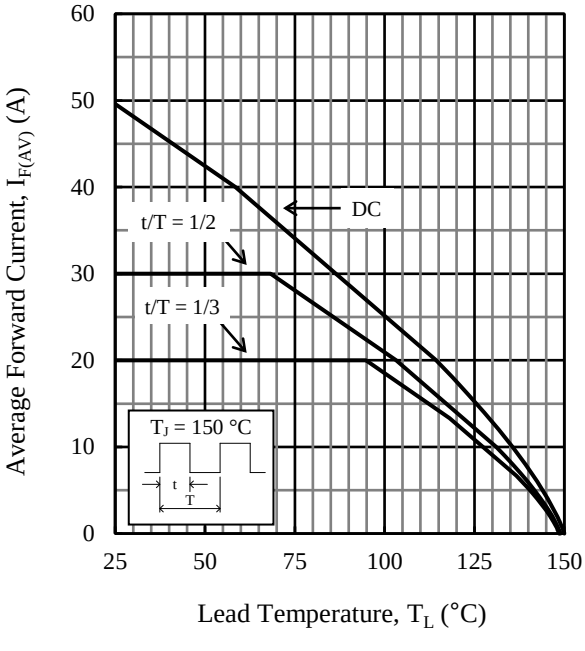


Figure 6. $I_{F(AV)}$ vs. T_L Typical Characteristics (V_R = 600 V)

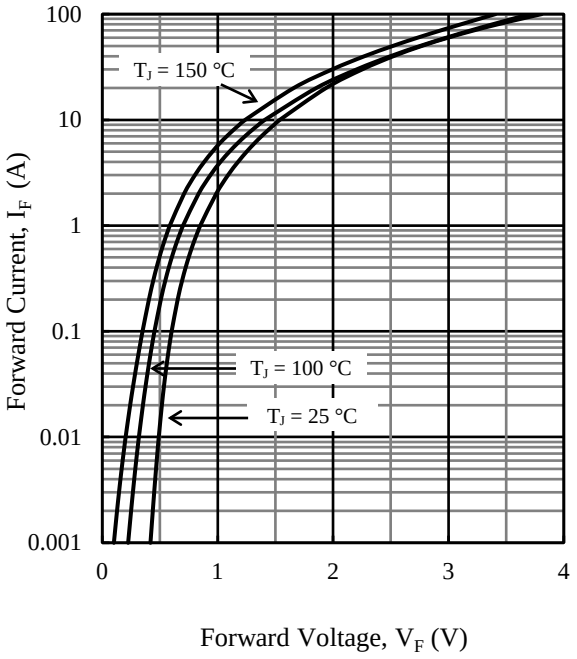


Figure 7. V_F vs. I_F Typical Characteristics

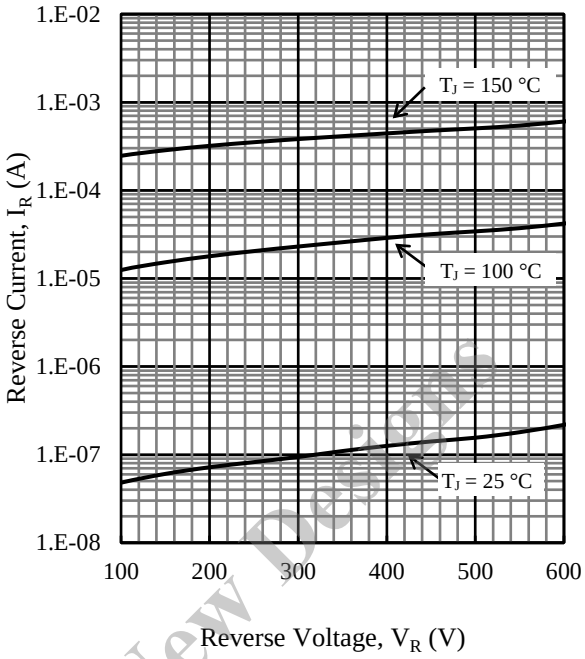


Figure 8. V_R vs. I_R Typical Characteristics

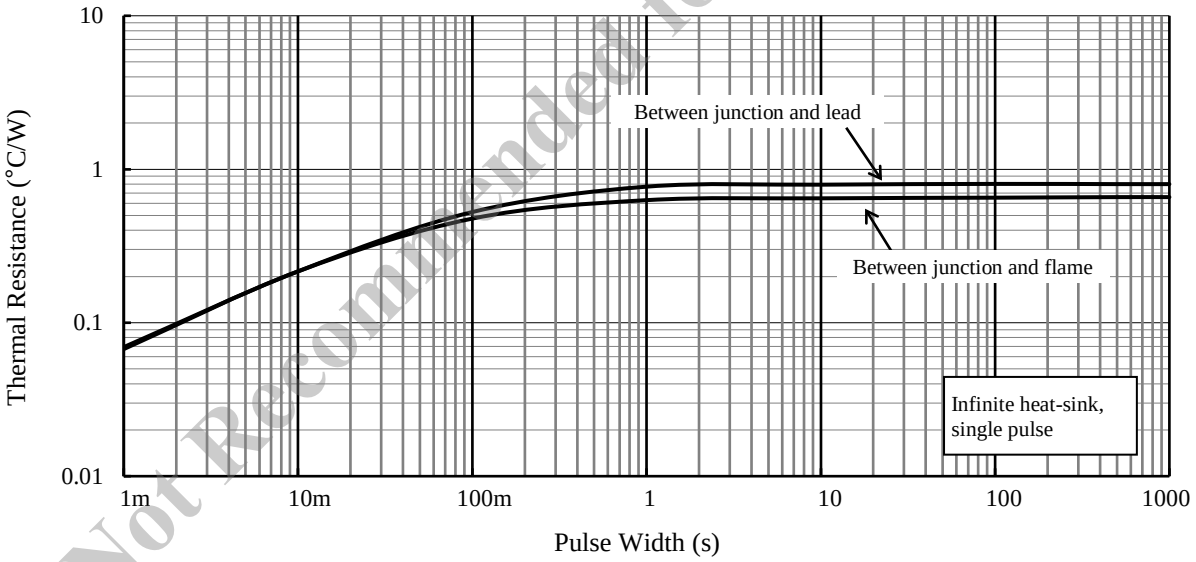
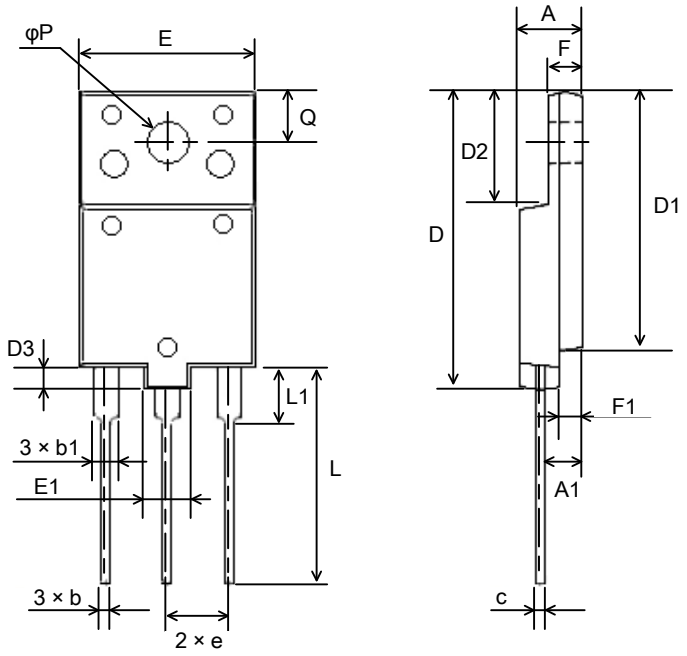


Figure 9. Typical Transient Thermal Resistance

Physical Dimensions

● **TO3PF-3L**

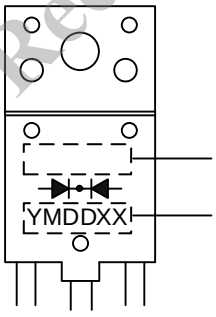


Symbol	Min.	Nom.	Max.
A	5.30	5.50	5.70
A1	3.10	3.30	3.50
b	0.65	0.75	0.95
b1	1.80	2.00	2.20
c	0.80	0.90	1.10
D	26.30	26.50	26.70
D1	22.80	23.00	23.20
D2	9.80	10.00	10.20
D3	1.80	2.00	2.20
E	15.30	15.50	15.70
E1	3.80	4.00	4.20
e	5.25	5.45	5.65
F	2.80	3.00	3.20
F1	1.80	2.00	2.20
L	19.10	19.30	19.50
L1	4.80	5.00	5.20
Q	4.30	4.50	4.70
φP	3.40	3.60	3.80

NOTES:

- Dimensions in millimeters
- 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 ± 5 °C / 10 ± 1 s, 2 times
  Soldering Iron: 380 ± 10 °C / 3.5 ± 0.5 s, 1 time
  Soldering should be at a distance of at least 1.5 mm from the body of the product.
- Recommended screw torque for TO3PF: 0.686 N·m to 0.882 N·m (7 kgf·cm to 9 kgf·cm)

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
XR4606	FMXR-4606S-SP

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