V_{RM} = 400 V, $I_{F(AV)}$ = 20 A, t_{rr} = 50 ns
Fast Recovery Diode

FML-4204S

Data Sheet

Description

The FML-4204S is a fast recovery diode of 400 V / 20 A. The maximum t_{rr} of 50 ns is realized by optimizing a life-time control.

Features

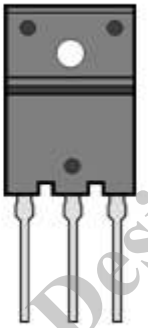
- V_{RM} ---------- 400 V
- $I_{F(AV)}$ ---------- 20 A
- V_F ---------- 1.3 V
- t_{rr1} ---------- 50 ns
- Bare Leads: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0

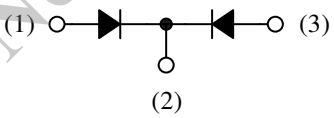
Applications

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

Package

TO3PF-3L





(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}		400	V
Repetitive Peak Reverse Voltage(1)	V_{RM}		400	V
Average Forward Current	$I_{F(AV)}$	See Figure 1 and Figure 2	20	A
Surge Forward Current(1)	I_{FSM}	Half cycle sine wave, positive side, 10 ms, 1 shot	100	A
I^2t Limiting Value(1)	I^2t	1 ms ≤ t ≤ 10 ms	50	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 = 10 A	—	—	1.3	V
		T_J = 100 °C, I_F = 10 A	—	0.94	—	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	—	—	400	µA
Reverse Recovery Time(1)	t_{rr1}	$I_F = I_{RP}$ = 500 mA, 90% recovery point, T_J = 25 °C	—	—	50	ns
	t_{rr2}	I_F = 500 mA, I_{RP} = 1000 mA, 75% recovery point, T_J = 25 °C	—	—	35	ns
Thermal Resistance (2)	$R_{th(J-C)}$		—	—	2.0	°C/W

Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Heatsink Mounting Screw Torque		0.686	—	0.882	N·m
Package Weight		—	6.5	—	g

(1) Specifies a value per chip; the FML-4204S consists of two chips.
(2) Refers to thermal resistance between junction and the case. The case temperature is measured at the backside near the screw hole.

Derating Curves

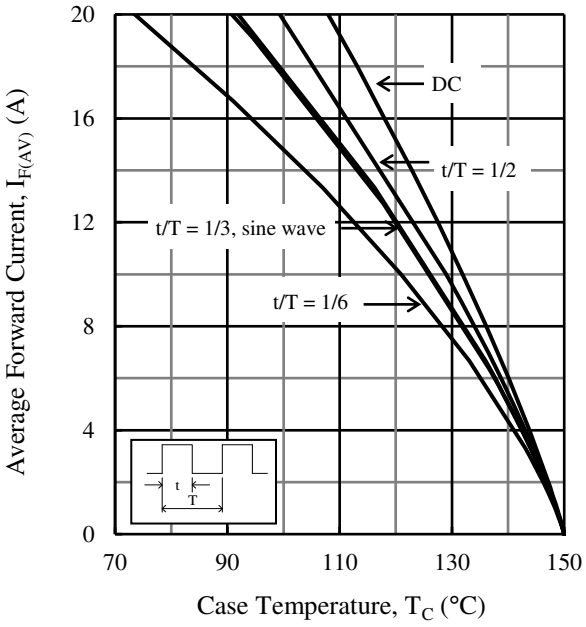


Figure 1. $I_{F(AV)}$ vs. T_C (T_J = 150 °C, V_R = 0 V)

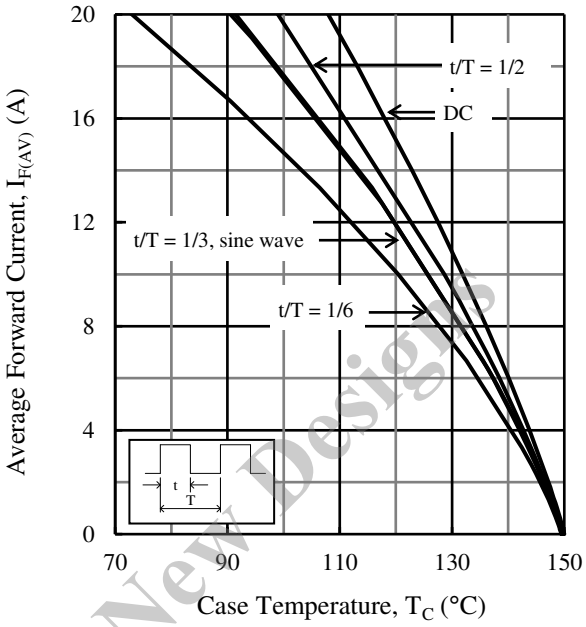


Figure 2. $I_{F(AV)}$ vs. T_C (T_J = 150 °C, V_R = 400 V)

Characteristic Curves

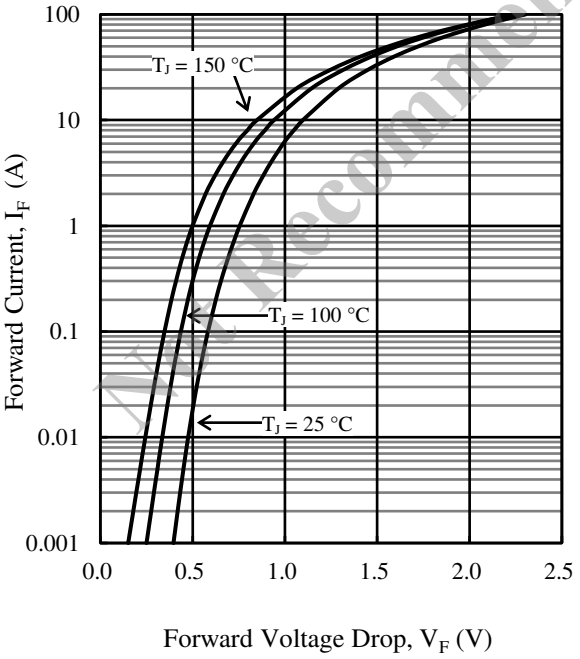


Figure 3. Typical Characteristics: I_F vs. V_F

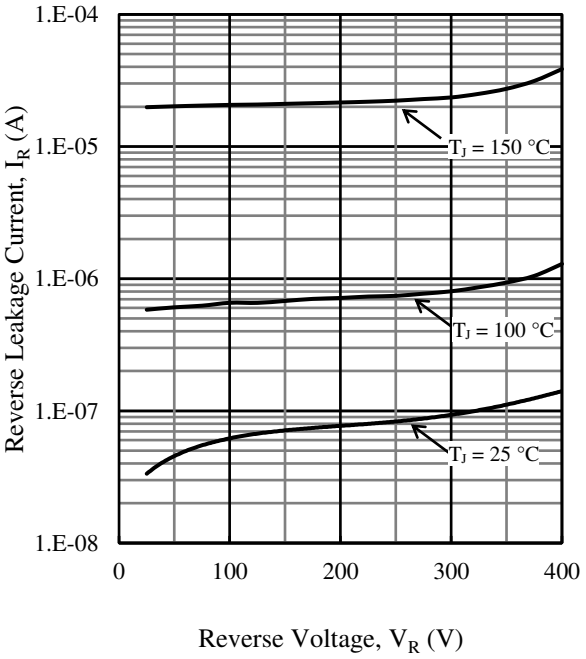
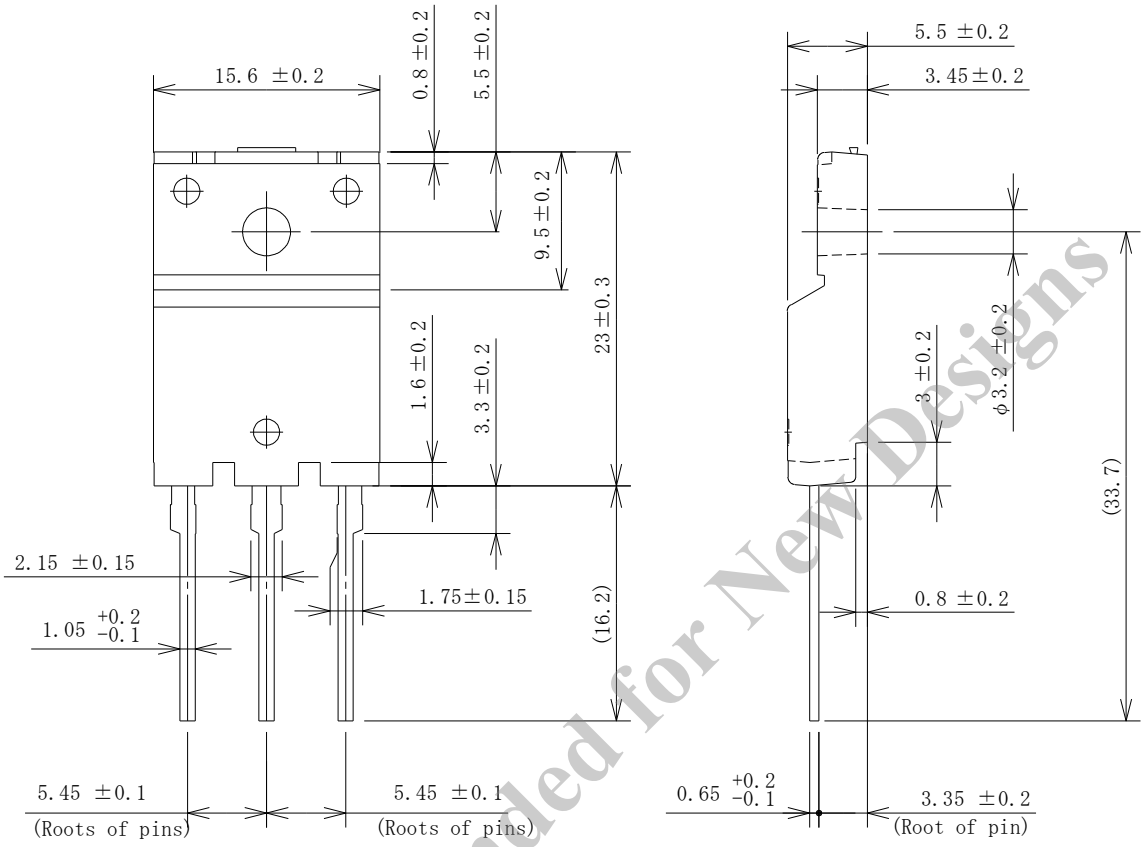
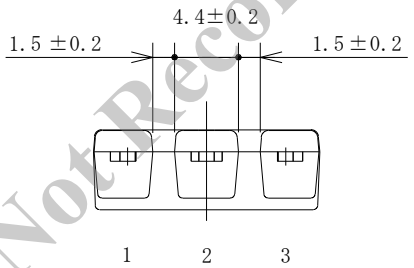


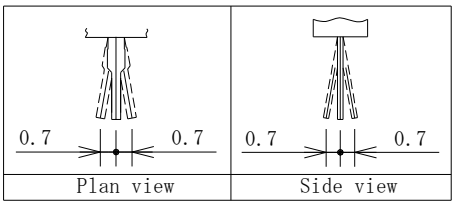
Figure 4. Typical Characteristics: I_R vs. V_R

Physical Dimensions

● **TO3PF-3L**



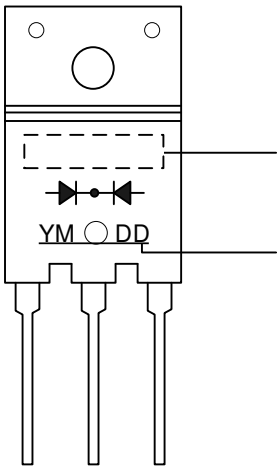




NOTES:

- Dimensions in millimeters
- Maximum gate burr height is 0.3 mm.
- 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.

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)

Table 1. Specific Device Code

Specific Device Code	Part Number
L4204S	FML-4204S

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