

$V_{RM} = 400\text{ V}$, $I_{F(AV)} = 20\text{ A}$, $t_{rr} = 50\text{ ns}$
Fast Recovery Diode
FML-4204S

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

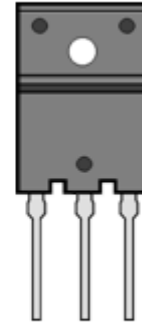
- V_{RM} ----- 400 V
- $I_{F(AV)}$ ----- 20 A
- V_F ----- 1.3 V
- t_{rr1} ----- 50 ns
- Bare Leads: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0

Applications

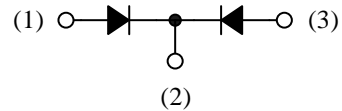
- Secondary-side Rectifier Diode
(Flyback Converter, LLC Converter, etc.)
- Freewheel Diode
(Offline Buck Converter, Offline Buck-boost Converter, etc.)

Package

TO3PF-3L



(1) (2) (3)



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

Not to scale

FML-4204S

Absolute Maximum Ratings

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

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	$1\text{ ms} \leq t \leq 10\text{ ms}$	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 ⁽¹⁾	V_F	$T_J = 25\text{ }^\circ\text{C}$, $I_F = 10\text{ A}$	—	—	1.3	V
		$T_J = 100\text{ }^\circ\text{C}$, $I_F = 10\text{ A}$	—	0.94	—	V
Reverse Leakage Current ⁽¹⁾	I_R	$V_R = V_{RM}$	—	—	50	μA
Reverse Leakage Current under High Temperature ⁽¹⁾	$H \cdot I_R$	$V_R = V_{RM}$, $T_J = 150\text{ }^\circ\text{C}$	—	—	400	μA
Reverse Recovery Time ⁽¹⁾	t_{rr1}	$I_F = I_{RP} = 500\text{ mA}$, 90% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	50	ns
	t_{rr2}	$I_F = 500\text{ mA}$, $I_{RP} = 1000\text{ mA}$, 75% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	35	ns
Thermal Resistance ⁽²⁾	$R_{th(J-C)}$		—	—	2.0	$^\circ\text{C/W}$

Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Heatsink Mounting Screw Torque		0.686	—	0.882	$\text{N}\cdot\text{m}$
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

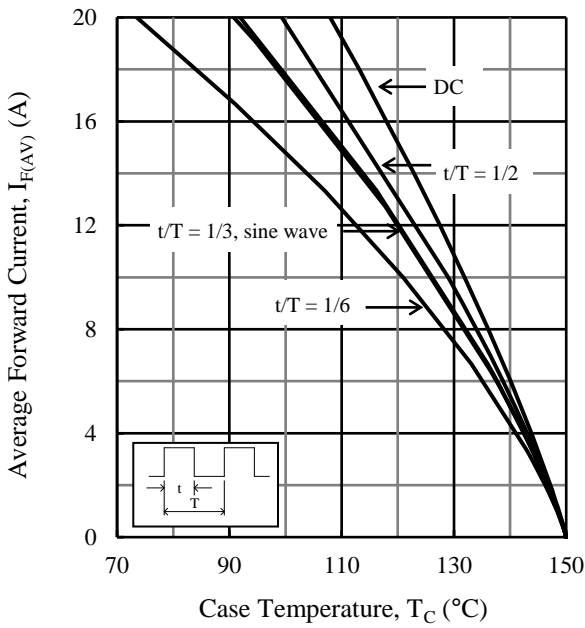


Figure 1. $I_{F(AV)}$ vs. T_C ($T_J = 150\text{ °C}$, $V_R = 0\text{ V}$)

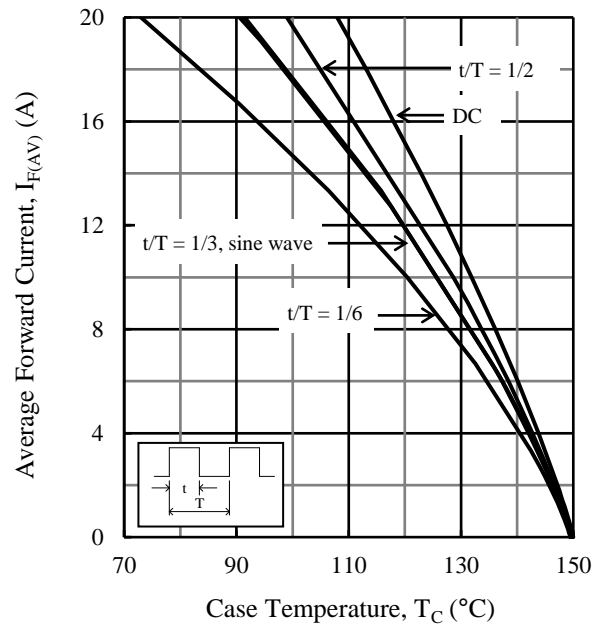


Figure 2. $I_{F(AV)}$ vs. T_C ($T_J = 150\text{ °C}$, $V_R = 400\text{ V}$)

Characteristic Curves

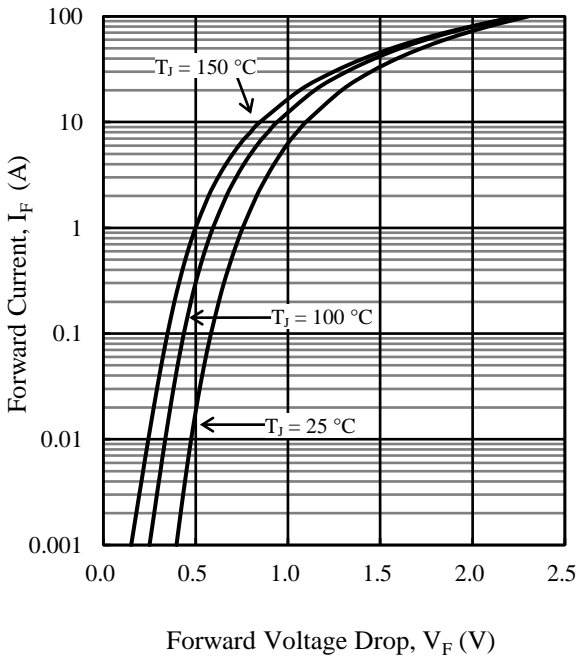


Figure 3. Typical Characteristics: I_F vs. V_F

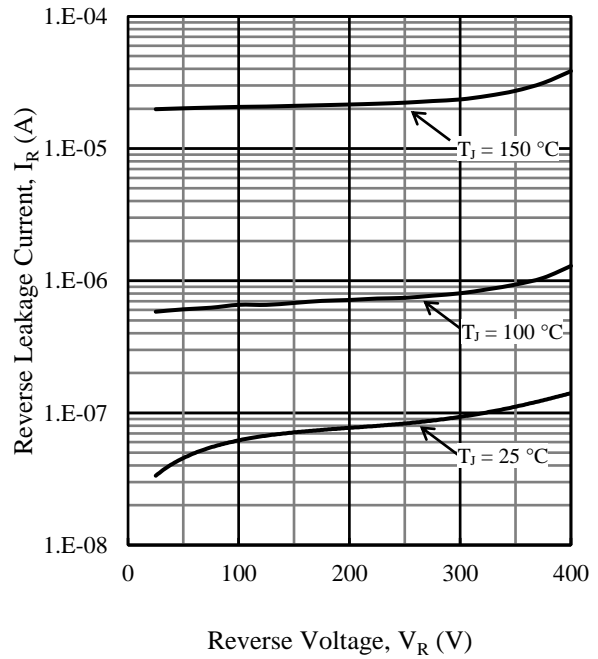
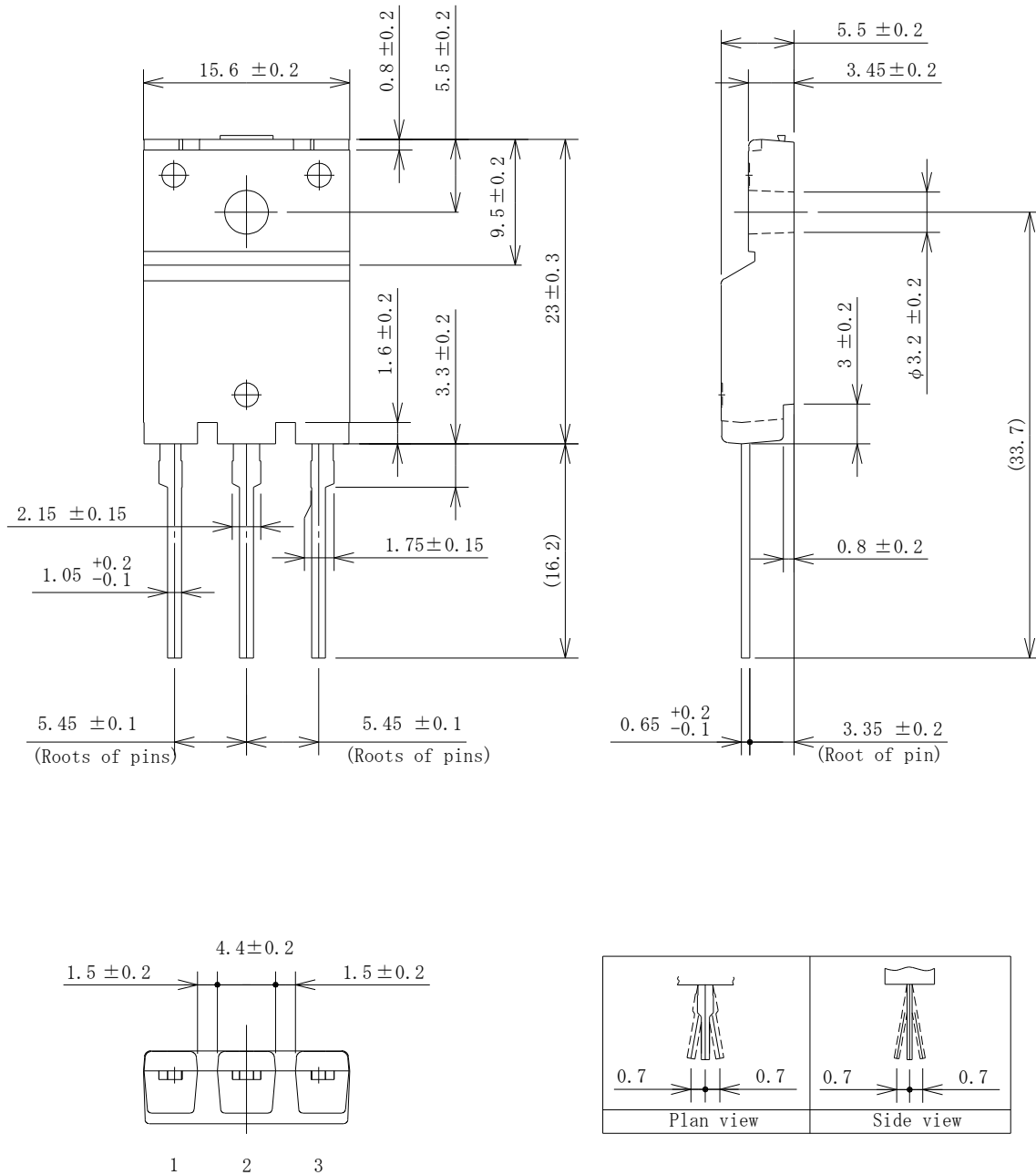


Figure 4. Typical Characteristics: I_R vs. V_R

FML-4204S

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

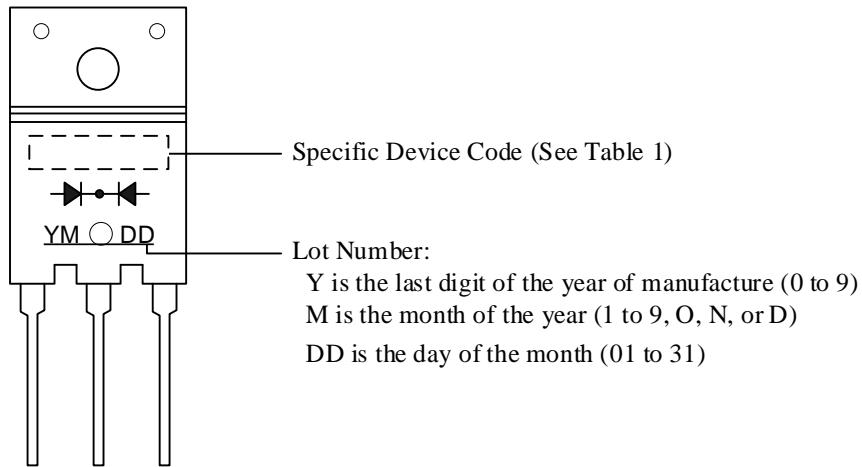


Table 1. Specific Device Code

Specific Device Code	Part Number
L4204S	FML-4204S

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