

V_{RM} = 600 V, I_{F(AV)} = 60 A, t_{rr} = 100 ns
Fast Recovery Diode
FMNS-4606S

Description

The FMNS-4606S is a 600 V, 60 A, fast recovery diode. The maximum V_F of 1.3 V and the maximum t_{rr} of 100 ns (I_F : I_{RP} = 1 : 2) are realized by optimizing the trade-off relationship between V_F and t_{rr}. The low thermal resistance package achieves high performance in terms of heat dissipation.

Features

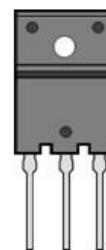
- V_{RM}----- 600 V
- I_{F(AV)}----- 60 A
- V_F----- 1.3 V
- t_{rr1} (I_F = I_{RP})----- 150 ns
- Bare Lead Frame: Pb-free (RoHS Compliant)
- Flammability: Equivalent to UL94V-0

Applications

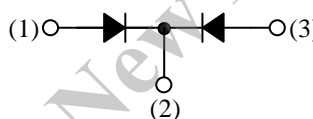
- PFC Circuit
- Inverter Circuit
- Secondary-side Rectifier Diode
(Flyback Converter, LLC Converter, etc.)
- Freewheel Diode
(Offline Buck Converter, Offline Buck-boost Converter, etc.)

Package

TO3PF-3L



(1) (2) (3)



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

Not to scale

Not Recommended for New Designs

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 1 and Figure 2	60	A
Surge Forward Current	I_{FSM}	Half cycle sine wave, positive side, 10 ms, 1 shot	200	A
I^2t Limiting Value	I^2t	$1\text{ ms} \leq t \leq 10\text{ ms}$	200	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	$T_J = 25\text{ }^\circ\text{C}$, $I_F = 30\text{ A}$	—	—	1.3	V
Reverse Leakage Current ⁽¹⁾	I_R	$V_R = V_{RM}$	—	—	200	μA
Reverse Leakage Current under High Temperature ⁽¹⁾	$H \cdot I_R$	$V_R = V_{RM}$, $T_J = 150\text{ }^\circ\text{C}$	—	—	20	mA
Reverse Recovery Time ⁽¹⁾	t_{rr1}	$I_F = I_{RP} = 500\text{ mA}$, 90% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	150	ns
	t_{rr2}	$I_F = 500\text{ mA}$, $I_{RP} = 1\text{ A}$, 75% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	100	ns
Thermal Resistance ⁽²⁾	$R_{th(J-C)}$		—	—	1.7	$^\circ\text{C/W}$

Mechanical Characteristics

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

⁽¹⁾ The rating of one chip.

⁽²⁾ $R_{th(J-C)}$ is thermal resistance between junction and case.

Rating and Characteristic Curves

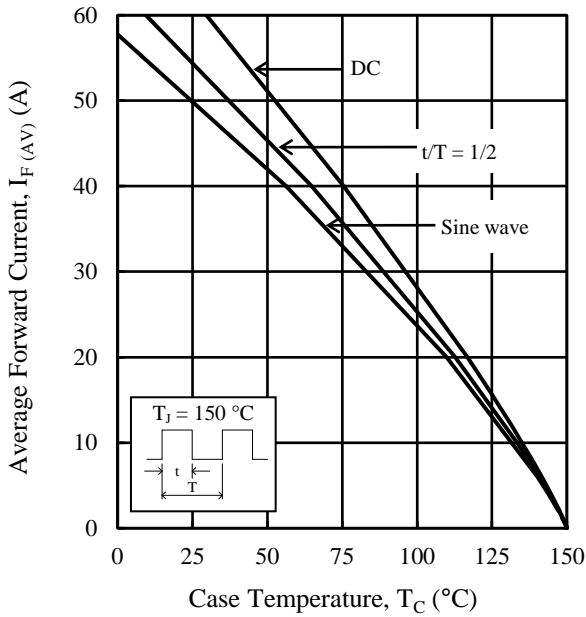


Figure 1. Typical Characteristics: $I_{F(AV)}$ vs. T_C ($V_R = 0\text{ V}$)

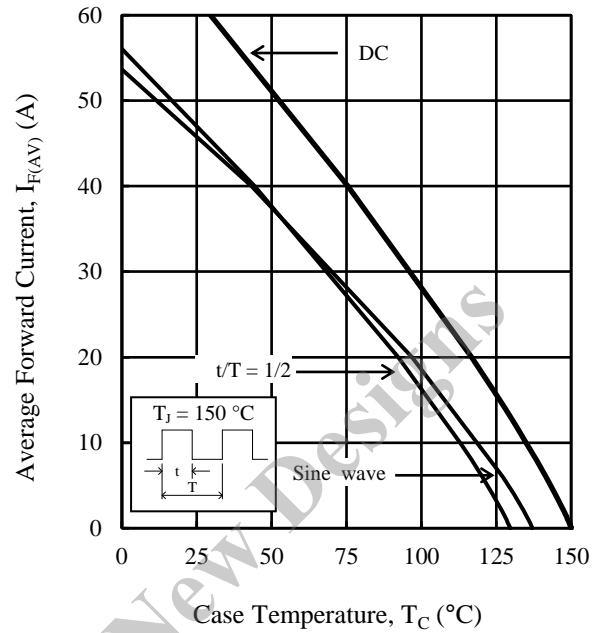


Figure 2. Typical Characteristics: $I_{F(AV)}$ vs. T_C ($V_R = 600\text{ V}$)

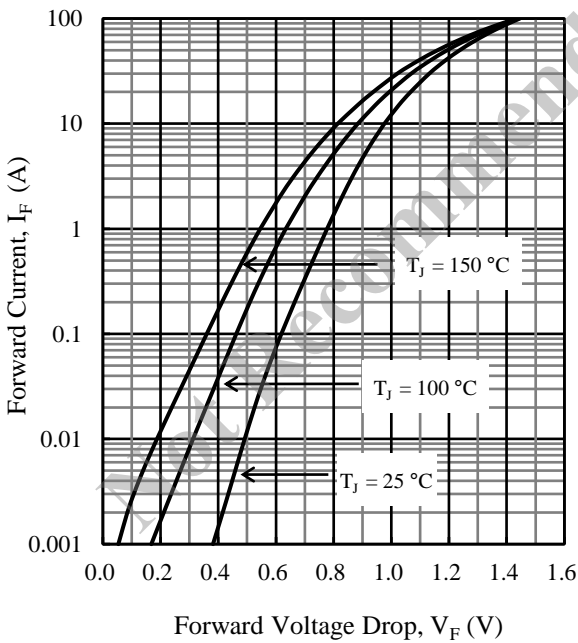


Figure 3. Typical Characteristics: I_F vs. V_F

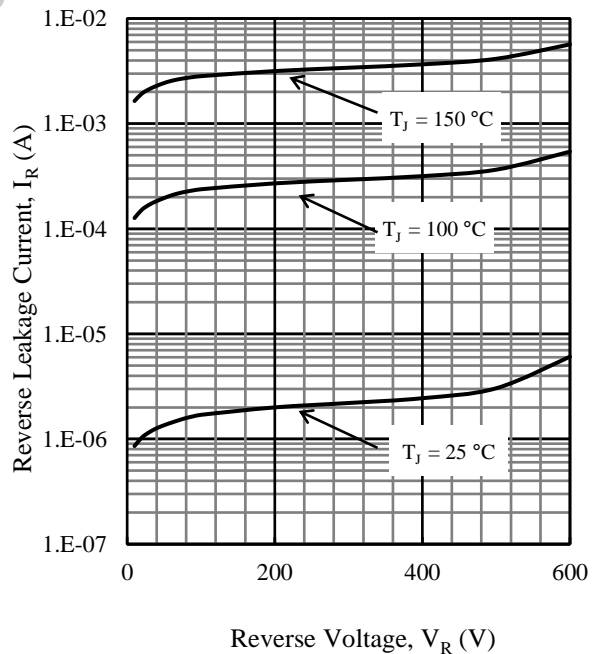
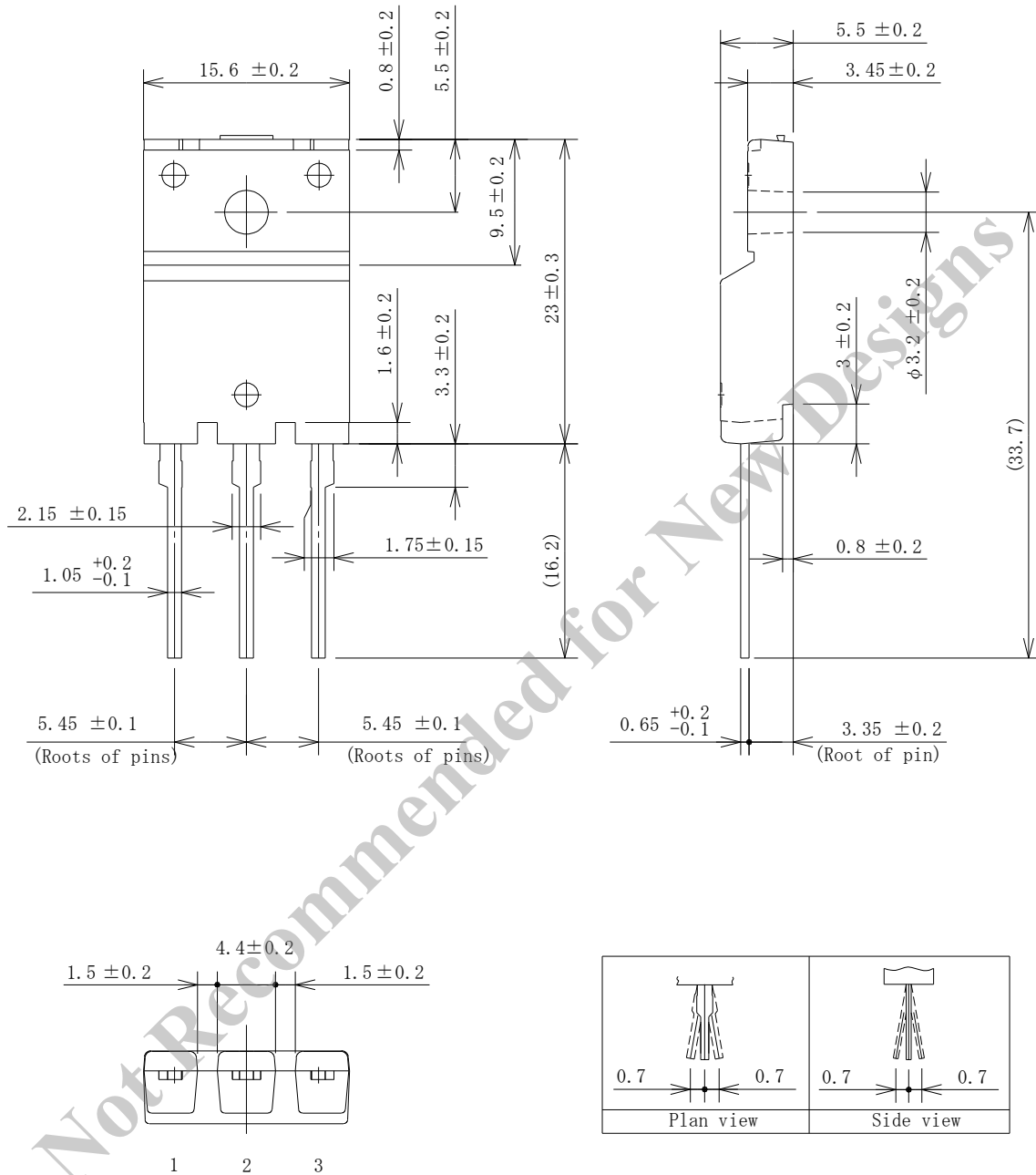


Figure 4. Typical Characteristics: I_R vs. V_R

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

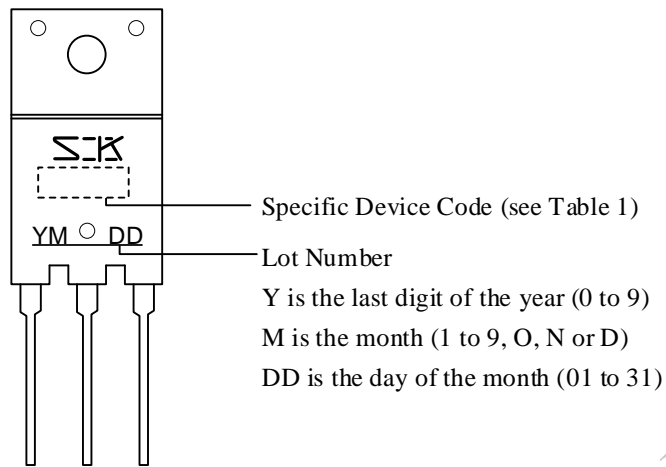


Table 1. Specific Device Code

Specific Device Code	Part Number
NS4606	FMNS-4606S

Not Recommended for New Designs

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