Fast Recovery Diode

FMN-1206S

Mar/21/2011

Features

The FMN-1206S is a fast recovery diode which realize a peak reverse voltage of 600V and a typical forward voltage drop of 1.1V optimizing a tradeoff between V_F and trr. It has the characteristics suit for PFC circuit of both DCM and CRM.
The high current full-mold package achieves high performance in terms of heat release and isolation.

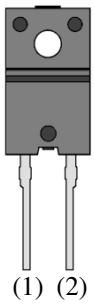
- V_{RM}---------- 600V
- V_F ---------- 1.3V max (I_F=20A)
- $I_{F(AV)}$----------20A
- t_{rr}---------- 100ns (IF=0.5A, IRP=1.0A, 75% of R.P.)

Applications

- PFC Circuit (DCM, CRM)
- High Current Secondary Side Rectifier
- High Frequency Rectifier Circuit, etc.

Package

TO-220F-2L



Equivalent circuit

Absolute maximum ratings Valid at Ta = 25°C, unless otherwise specified

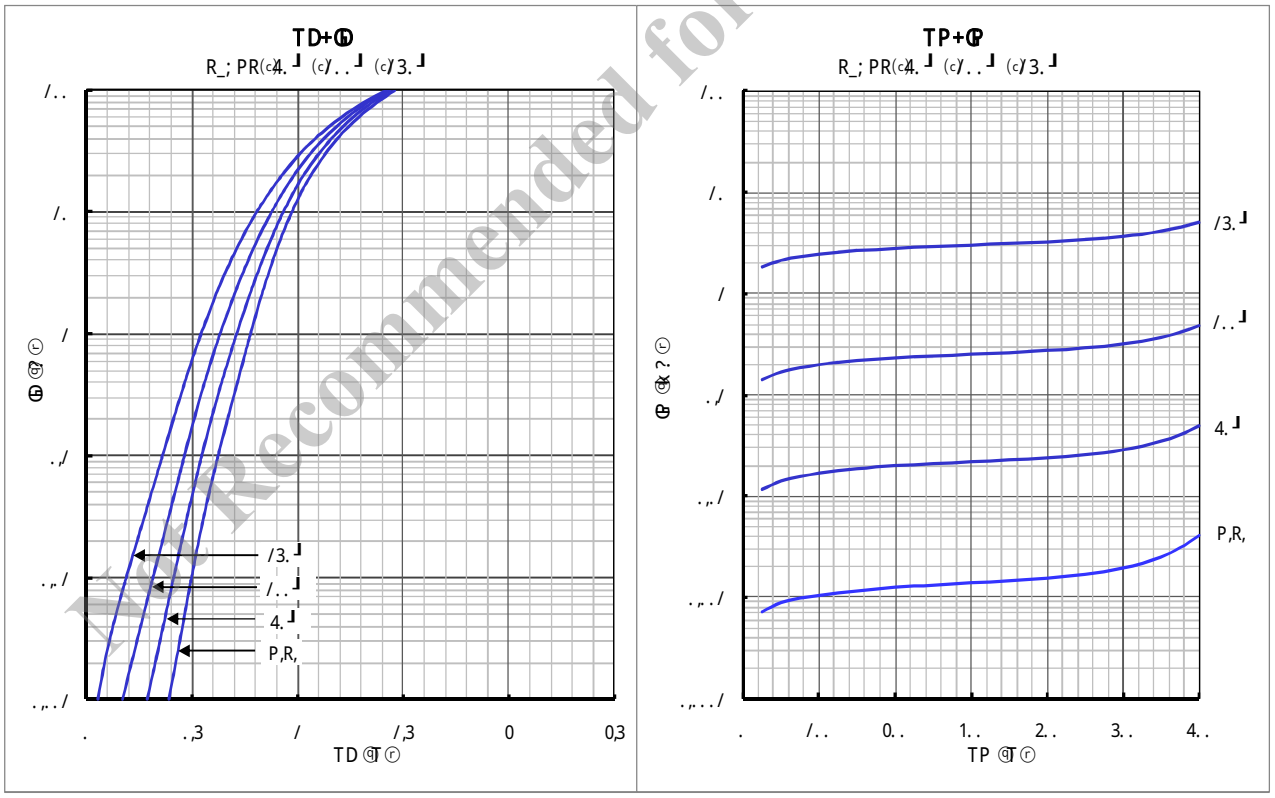
Characteristic	Symbol	Rating	Unit	Notes
Transient Peak Reverse Voltage	V_{RSM}	600	V	
Peak Reverse Voltage	V_{RM}	600	V	
Average Forward Current	$I_{F(AV)}$	20	A	
Peak Surge Forward Current	I_{FSM}	150	A	10msec. Half sinewave, one shot
I^2t Limiting Value	I^2t	112.5	A^2s	1msec┐ t┐ 10msec
Junction Temperature	T_j	-40ⓗ+150	°C	
Storage Temperature	T_{stg}	-40ⓗ+150	°C	

Electrical characteristics Valid at Ta = 25°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Limits			Unit
			MIN.	TYP.	MAX.	
Forward Voltage Drop	V_F	I_F=20A		ⓓ	1.3	V
Reverse Leakage Current	I_R	V_R=V_{RM}	ⓓ	ⓓ	200	μA
Reverse Leakage Current Under High Temperature	H^nI_R	V_R=V_{RM}, T_j=150°C	ⓓ	ⓓ	20	mA
Reverse Recovery Time	trr1	I_F= I_{RP}=500mA, T_j=25°C, 90% Recovery point	ⓓ	ⓓ	150	ns
	trr2	I_F=500mA,I_{RP}=1A, T_j=25°C, 75% Recovery point	ⓓ	ⓓ	100	ns
Thermal Resistance	$R_{th(j-l)}$	Between junction and case	ⓓ	ⓓ	4.0	°C /W

Performance Curves

φ φ



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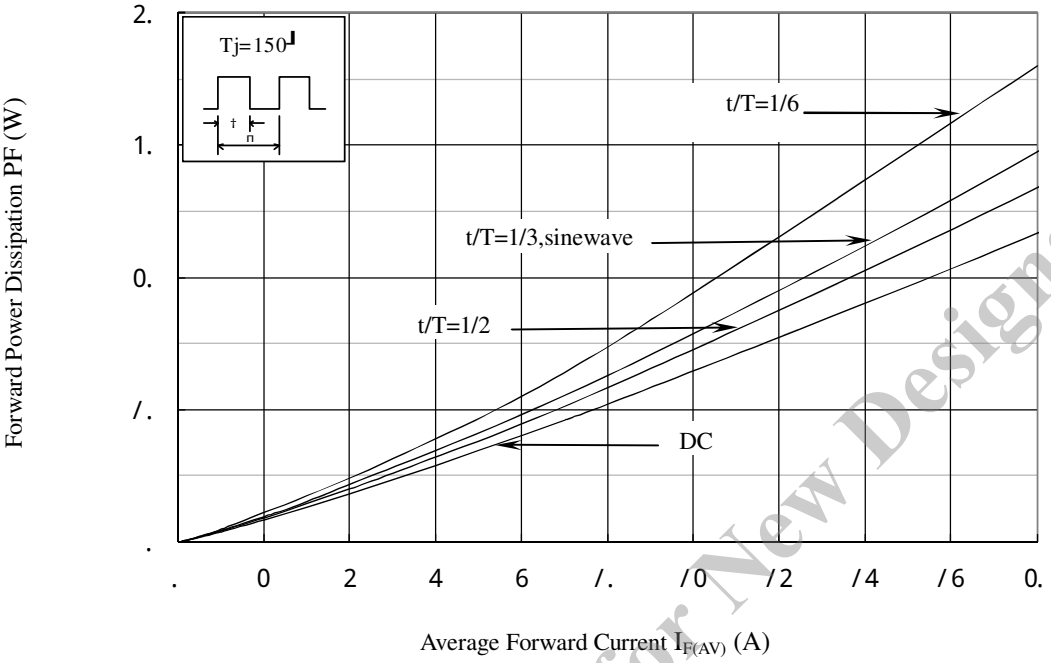
Characteristics

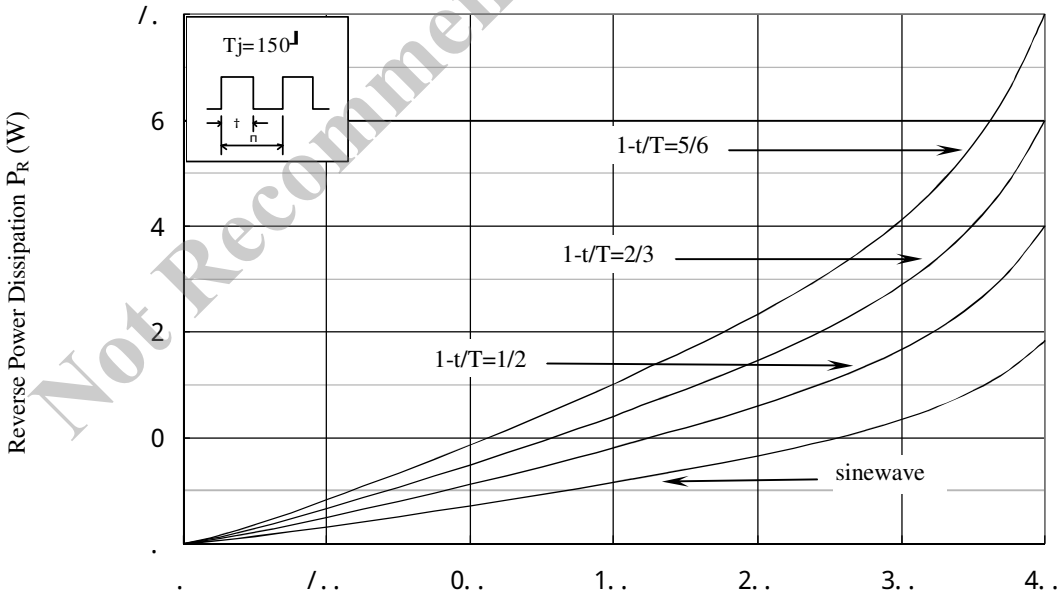
Average Forward Current ⓓ Forward Power Dissipation

$I_{F(AV)}$ "" P_F



Reverse Voltage ⓓ Reverse Power Dissipation

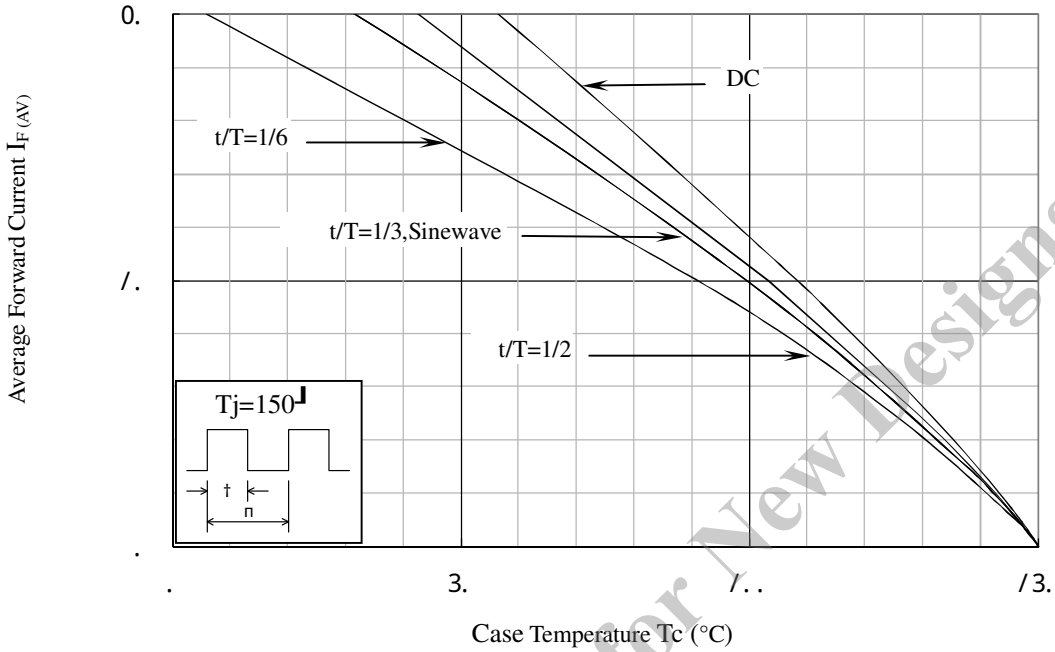
V_R "" P_R



Derating

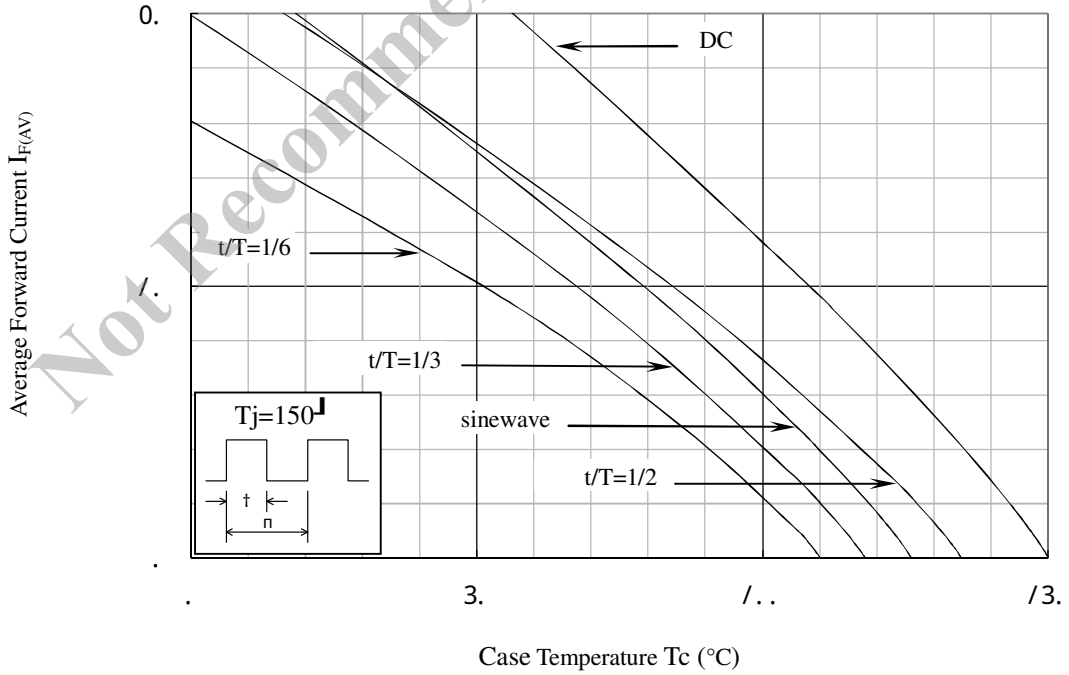
Case Temperature — Average Forward Current

Tc ···· $I_{F(AV)}$ V_R=0(V)



Case Temperature — Average Forward Current

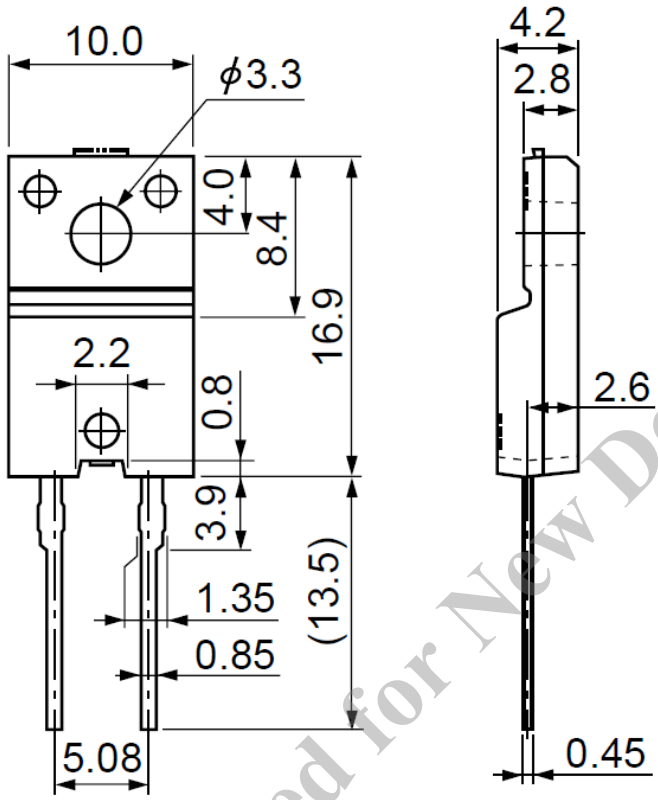
Tc ···· $I_{F(AV)}$ V_R=600(V)



FMN-1206S

Package Outline

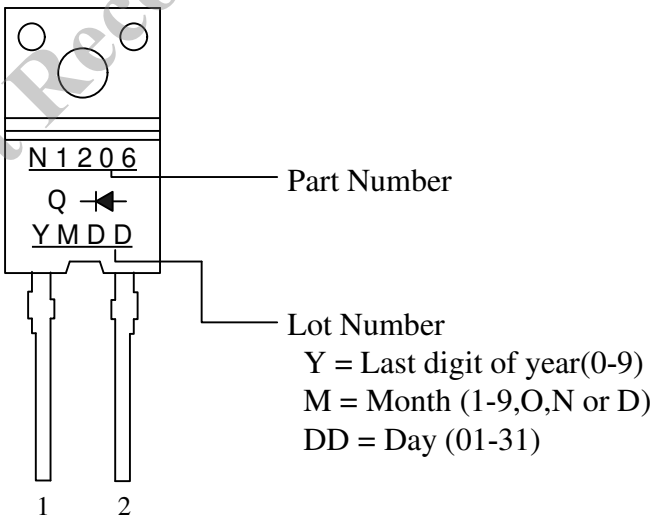
TO-220F-2L



NOTES:

1) All liner dimensions are in millimeters
2) Pb-free. Device composition compliant with the RoHS directive

Marking Diagram



OPERATING PRECAUTIONS

Because reliability can be affected adversely by improper storage environments and handling methods, please observe the following cautions.

Cautions for Storage

- Ensure that storage conditions comply with the standard temperature (5 to 35°C) and the standard relative humidity (around 40 to 75%); avoid storage locations that experience extreme changes in temperature or humidity.
- Avoid locations where dust or harmful gases are present and avoid direct sunlight.
- Reinspect for rust on leads and solderability of the products that have been stored for a long time.

Cautions for Testing and Handling

When tests are carried out during inspection testing and other standard test periods, protect the products from power surges from the testing device, shorts between the product pins, and wrong connections. Ensure all test parameters are within the ratings specified by Sanken for the products.

Remarks About Using Silicone Grease with a Heatsink

- When silicone grease is used in mounting the products on a heatsink, it shall be applied evenly and thinly. If more silicone grease than required is applied, it may produce excess stress.
- Volatile-type silicone greases may crack after long periods of time, resulting in reduced heat radiation effect. Silicone greases with low consistency (hard grease) may cause cracks in the mold resin when screwing the products to a heatsink. Our recommended silicone greases for heat radiation purposes, which will not cause any adverse effect on the product life, are indicated below:

Type	Suppliers
G746	Shin-Etsu Chemical Co., Ltd.
YG6260	Momentive Performance Materials Inc.
SC102	Dow Corning Toray Co., Ltd.

Cautions for Mounting to a Heatsink

- When the flatness around the screw hole is insufficient, such as when mounting the products to a heatsink that has an extruded (burred) screw hole, the products can be damaged, even with a lower than recommended screw torque. For mounting the products, the mounting surface flatness should be 0.05mm or less.
- Please select suitable screws for the product shape. Do not use a flat-head machine screw because of the stress to the products. Self-tapping screws are not recommended. When using self-tapping screws, the screw may enter the hole diagonally, not vertically, depending on the conditions of hole before threading or the work situation. That may stress the products and may cause failures.
- Recommended screw torque

Package	Recommended Screw Torque
TO-220 , TO-220F	0.490 to 0.686 N·m (5 to 7 kgf·cm)
TO-3P , TO-3PF	0.686 to 0.882 N·m (7 to 9 kgf·cm)
SLA	0.588 to 0.784 N·m (6 to 8 kgf·cm)

- For tightening screws, if a tightening tool (such as a driver) hits the products, the package may crack, and internal stress fractures may occur, which shorten the lifetime of the electrical elements and can cause catastrophic failure. Tightening with an air driver makes a substantial impact. In addition, a screw torque higher than the set torque can be applied and the package may be damaged. Therefore, an electric driver is recommended.
  When the package is tightened at two or more places, first pre-tighten with a lower torque at all places, then tighten with the specified torque. When using a power driver, torque control is mandatory.
- Please pay special attention about the slack of the press mold. In case that the hole diameter of the heatsink is less than 4 mm, it may cause the resin crack at tightening.

Soldering

- When soldering the products, please be sure to minimize the working time, within the following limits:
  260 ± 5 °C 10 ± 1 s (Flow, 2 times)
  380 ± 10 °C 3.5 ± 0.5 s (Soldering iron, 1 time)
- Soldering should be at a distance of at least 1.5 mm from the body of the products.

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