

FMXB-2102

December, 2005

General Description

An SBD for overheating detection is incorporated together with a secondary side rectification FRD into a TO220F package.

By using the temperature change of the leakage current of the built-in SBD, high-precision heating protection can be performed without using expensive temperature sensors, such as a thermistor and a posistor.

Applications

- For an overcurrent protection, a partial short circuit and an impedance short protection.

An overcurrent protection is possible for a secondary side output, especially for each output of a multi-output power supply.

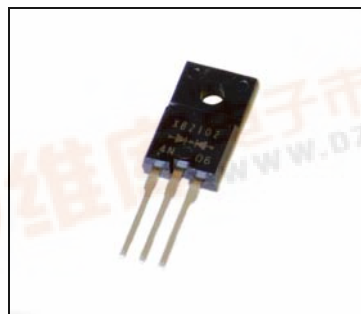
- For an overcurrent protection of a peak-load power supply units.

Thermal protection is possible even for the unit kept in a peak-load state.

Features

- Built-in SBD for an overheating detection together with a FRD in a TO220F package.
(By combining together in a single package, FMXB-2102 excels in heat performance.)
- High-precision heating protection without expensive temperature sensors such as a thermistor and a posistor.

Package---TO220F-2Pin



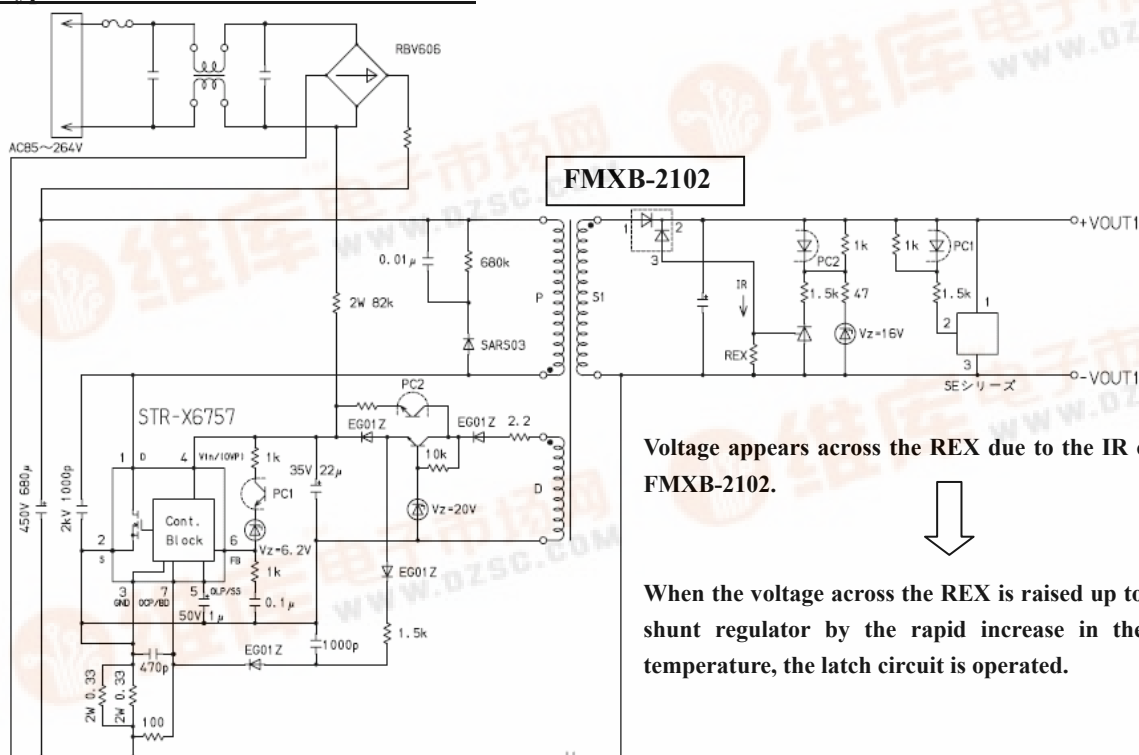
Typical connection

The typical connection below shows that the overheating protection with a small component count and a minimal temperature variation is realized and a single diode enables to combine a latch circuit with an overvoltage protection circuit.

This circuit allows to adjust a latch temperature easily by adjusting a detection resistor.

Note: In the case of dead short, the overheating protection is not available because there is no voltage appearing on the secondary-side. In this case, please protect the unit by the primary side detection as usual.

Typical connection



Voltage appears across the REX due to the IR of SBD in the FMXB-2102.



When the voltage across the REX is raised up to the Vref of a shunt regulator by the rapid increase in the IR at high temperature, the latch circuit is operated.

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Die Structure: Silicon Planer Diode (FRD, SBD)

§1. Absolute Maximum Ratings and Electrical Characteristics

<FRD part>

•Absolute Maximum Ratings

No.	Parameter	Symbol	Unit	Rating	Conditions
1	Transient Peak Reverse Voltage	VRSM	V	200	
2	Peak Reverse Voltage	VRM	V	200	
3	Average Forward Current	IF(AV)	A	10	
4	Peak Surge Forward Current	IFSM	A	150	10msec. Half sine-wave, one shot
5	I ² t Limiting Value	I ² t	A ² S	112.5	1msec ≤ t ≤ 10msec
6	Junction Temperature	Tj	°C	-40 to +150	
7	Storage Temperature	Tstg	°C	-40 to +150	

•Electrical Characteristics

No.	Parameter	Symbol	Unit	Rating	Conditions
1	Forward Voltage Drop	V _F	V	0.98 max.	IF=10A
2	Reverse Leakage Current	I _R	μA	200 max.	VR=VRM
3	Reverse Leakage Current Under High Temperature	H•I _R	mA	50 max.	VR=VRM, Tj=150°C
4	Reverse Recovery Time	trr1	ns	30 max	IF=IRP=500mA 90% Recovery point
		trr2	ns	25 max	IF=500mA, IRP=1A 75% Recovery point
5	Thermal Resistance	Rth(j-c)	°C/W	4.0 max.	Between Junction and case

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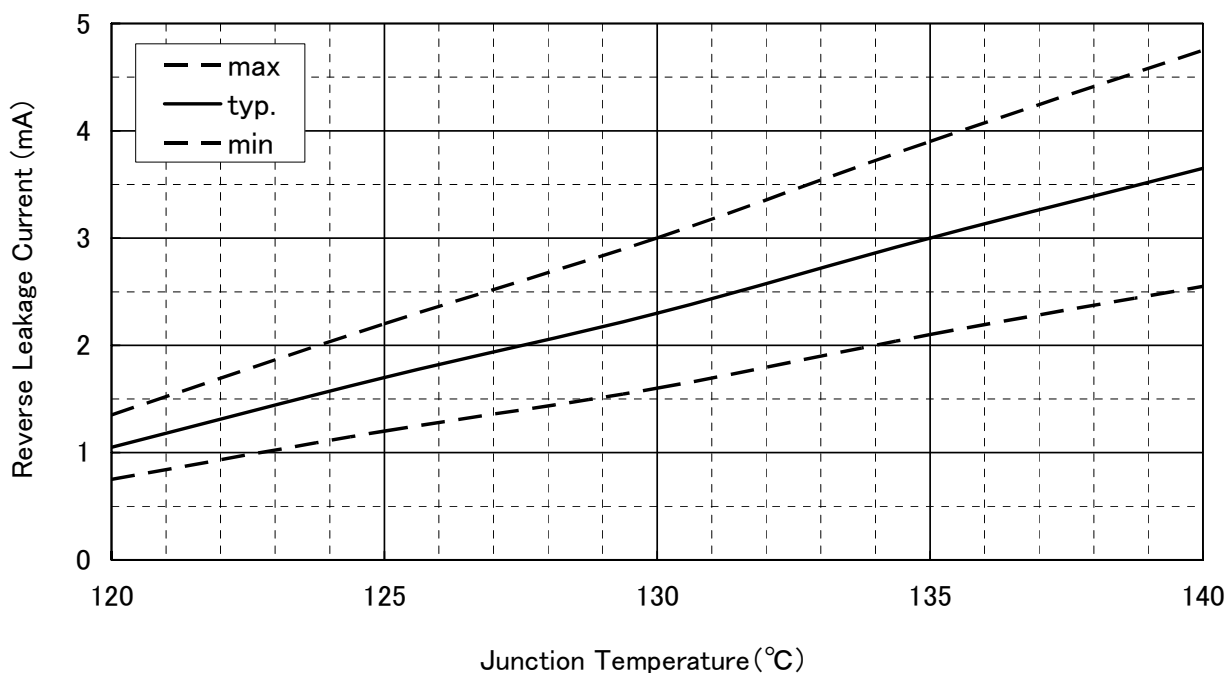
<SBD part>

•Absolute Maximum Ratings

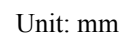
No.	Parameter	Symbol	Unit	Rating	Conditions
1	Transient Peak Reverse Voltage	VRSM	V	90	
2	Peak Reverse Voltage	VRM	V	90	
3	Junction Temperature	T _j	°C	-40 to +150	
4	Storage Temperature	T _{stg}	°C	-40 to +150	

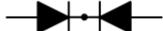
•Electrical Characteristics

No.	Parameter	Symbol	Unit	Rating			Conditions
				min.	typ.	max.	
1	Reverse Leakage Current	I _{R1}	μA	-	-	100	V _R =15V
		I _{R2}	mA	-	-	2.0	V _R =90V
2	Reverse Leakage Current Under High Temperature	H•I _{R1}	mA	1.60	2.30	3.00	V _R =15V, T _j =130°C
		H•I _{R2}	mA	-	-	55	V _R =90V, T _j =150°C

IR—T_j Characteristics of SBD at 15V

2-1 Package type, physical dimensions and material



Part Number	Marking		
	Type Name	Polarity	Lot number
FMXB-2102	XB2102		<p>1st letter: Last digit of year</p> <p>2nd letter: Month From 1 to 9 for Jan. to Sep., O for Oct., N for Nov., D for Dec.</p> <p>3rd & 4th letter: Day</p> <p>e.g.: 5N28 (November 28, 2005)</p>

Fast Recovery Diode with built-in SBD for temperature detection



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Fast Recovery Diode with built-in SBD for temperature detection



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