

## 60A 600V Fast Recovery Epitaxial Diode(FRED)

### Features

VOLTAGE	600 V
CURRENT	60A

- Ultrafast Recovery Time
- Soft Recovery Characteristics
- Low Forward Voltage
- Low stored Charge
- Low Leakage Current
- Low Recovery Loss

### PIN DESCRIPTION



TO-220AB



### Mechanical Data

- Case: TO-220AB
- Freewheeling, Snubber, Clamp
- Snubber Diode
- Switch Power Supplies
- Motor control
- Inverters Converters
- PFC

Package	Part No.	ROHS Status	Packing
TO-220AB	SI60U600	Pb-Free	Box (Tube)

### MAXIMUM RATINGS( $T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNITS
Maximum Recurrent Peak Reverse Voltage	$V_{RRM}$	<b>600</b>	V
Maximum RMS voltage	$V_{RMS}$	<b>320</b>	V
Maximum DC blocking voltage	$V_{DC}$	<b>600</b>	V
Average Rectified Forward Current	$I_{F(AV)}$	<b>60</b>	A
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load	$I_{FSM}$	<b>600</b>	A
Operating Junction Temperature	$T_J$	<b>-55 to150</b>	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_{STG}$	<b>-55 to150</b>	$^\circ\text{C}$

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	TYP	Max	Unit
<b>Static Characteristics</b>						
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>R</sub> =50uA	600	-	-	V
V <sub>F</sub>	Instantaneous forward voltage per diode	I <sub>F</sub> =60A , T <sub>a</sub> =25 °C	-	-	1.70	V
		I <sub>F</sub> =60A , T <sub>a</sub> =125 °C	-	-	1.60	V
I <sub>R</sub>	Reverse current per diode	V <sub>R</sub> =600V, T <sub>a</sub> =25 °C	-	-	10	uA
T <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =0.5A, I <sub>R</sub> =1A, I <sub>rr</sub> =0.25A	-	48	70	ns
		I <sub>F</sub> =1A, V <sub>R</sub> =30V, di/dt=-200A/us	-	32	-	ns

**Remark:**

- 1.Customer should obtain the latest version of datasheet before placing order, and verify the relevant information.
- 2.Cutting damage and chipping area can't beyond scribe line in given size range.
- 3.Testing system of T<sub>rr</sub> could be different, customer might take secondary test to evaluate if necessary.
- 4.Customer might choose the bonding wire material and diameter according to acutal situation ,while no less than our recommendation.

## Typical Operating Characteristics

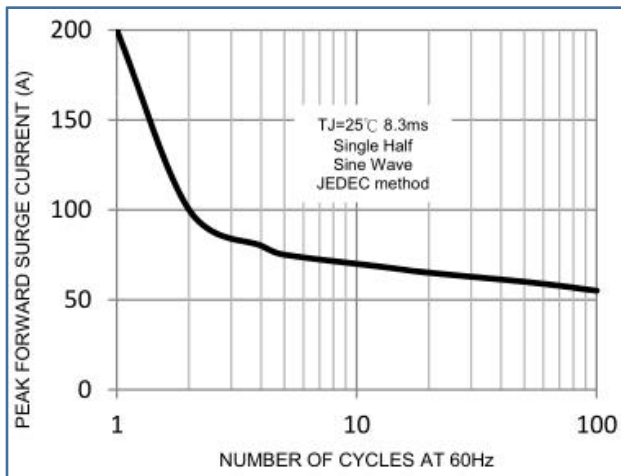


FIG.1-Maximum Non-Repetitive Forward Surge Current

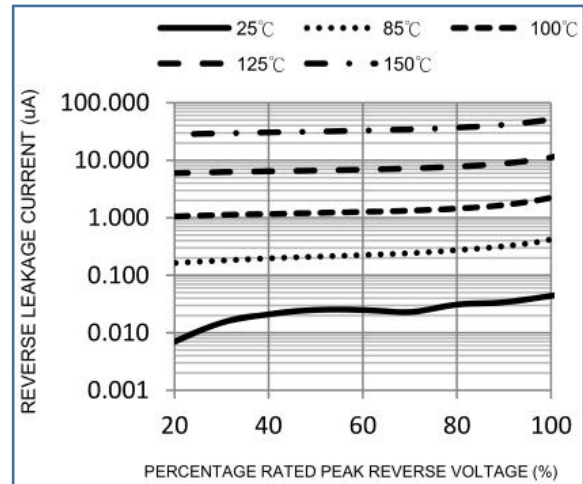


FIG.2-Typical Reverse Characteristics

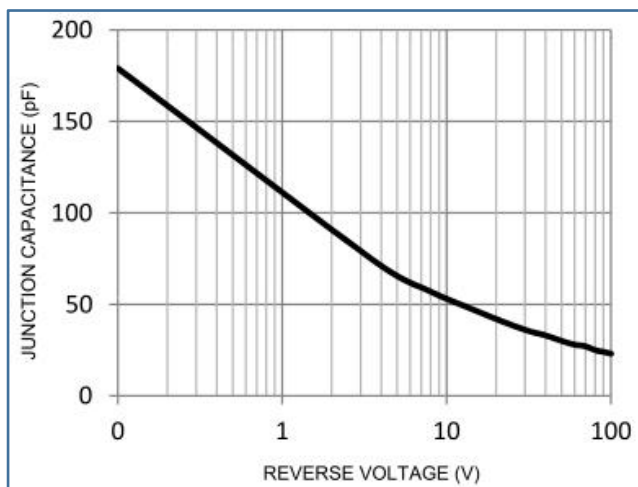


FIG.3 Typical Junction Capacitance

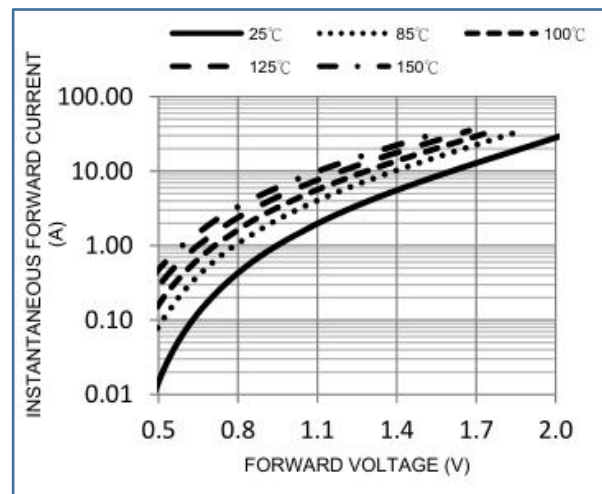
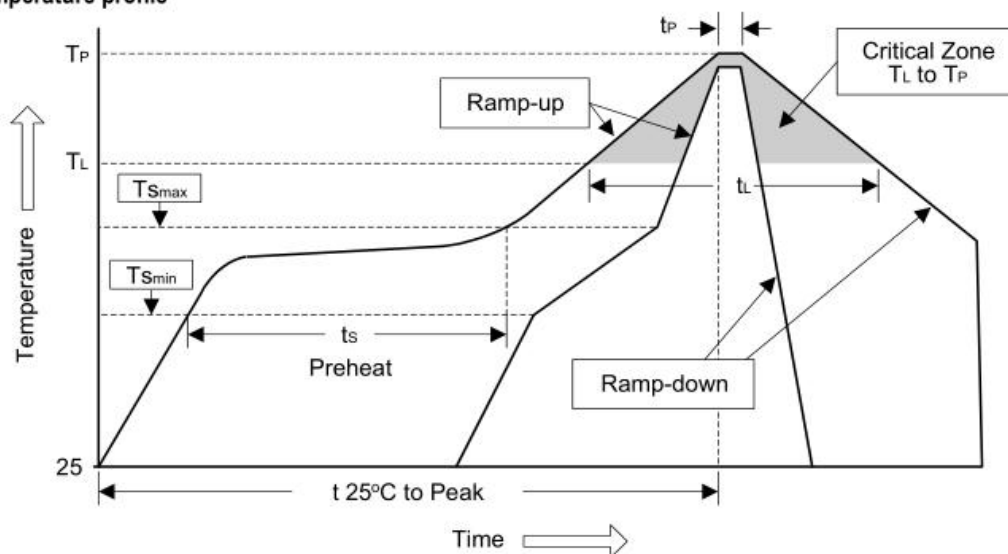


FIG.4 Typical Forward Characteristics

## Soldering Methods for Products

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate(TL to TP)	<3°C/sec	<3°C/sec
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(min to max)(ts)	60 to 120 sec	60 to 180 sec
Ts max to TL		
- ramp-up rate	<3°C/sec	<3°C/sec
Time maintained above:		
-Temperature(TL)	183°C	217°C
-Time(t L)	60 to 150 sec	60 to 150 sec
Peak Temperature(T p)	240°C+0/-5°C	250°C+0/-5°C
Time within 5°C of actual Peak Temperature	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25 °C to Peak Temperature	<6 minutes	<8 minutes

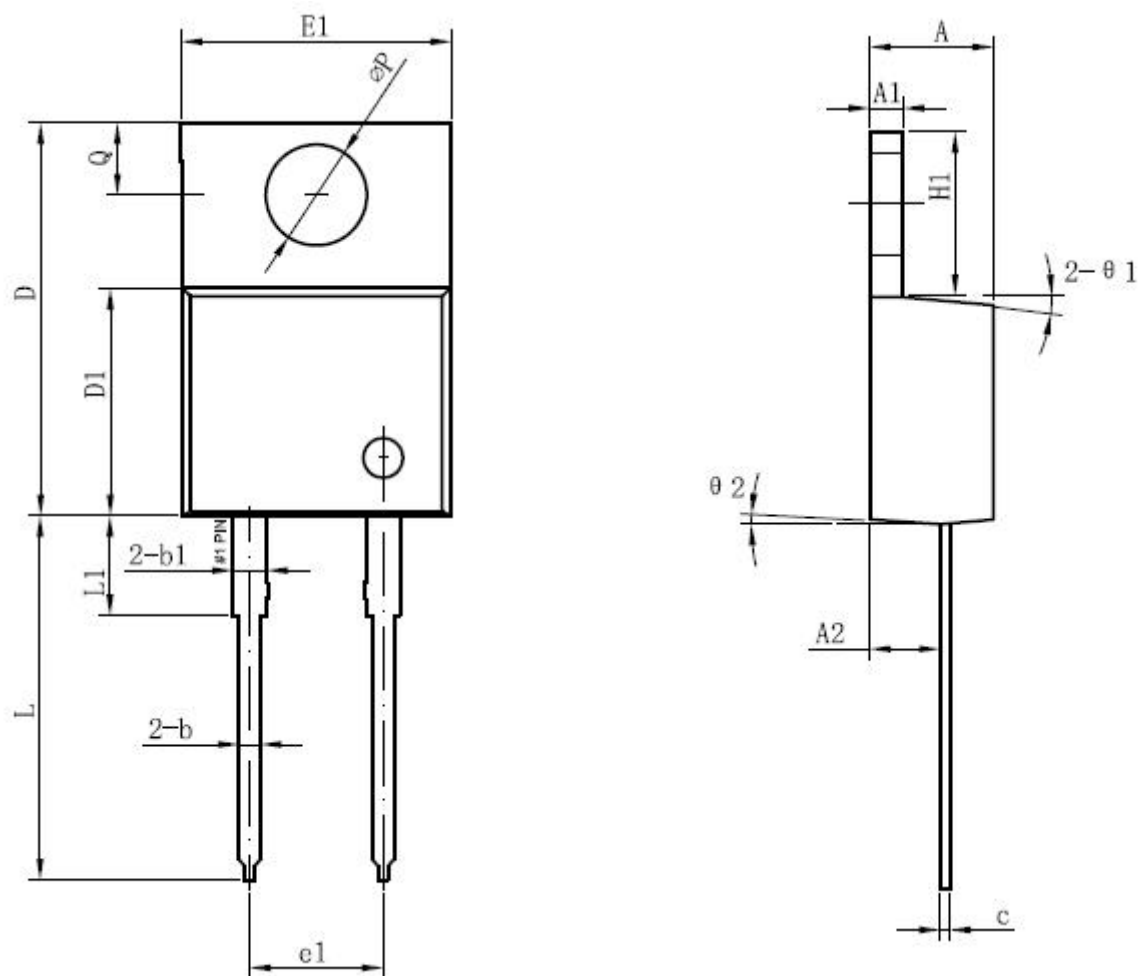
Figure 1: Temperature profile



- Note :**
- 1.Storage environment: Temperature=10°C to 35@Humidity=45%±15%
  - 2.Reflow soldering of surface-mount devices
  - 3.Flow(wave) soldering(solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices	245°C±5°C	5sec±1sec
Pb-free devices	250°C+0/-5°C	5sec±1sec

## Package Outline



Millimeter(mm)					
Symbol	Min	Max	Symbol	Min	Max
A	4.55	4.85	E	10.01	10.31
A1	1.17	1.37	E1	9.98	10.38
A2	2.59	2.89	e1	5.08Typ	
b	0.71	0.96	H1	6.04	6.44
b1	1.27Typ		L	13.00	14.08
c	0.36	0.61	L1	3.80Typ	
D	14.64	15.24	Q	2.54	2.94
D1	8.55	8.85	ΦP	3.74	4.04

**■ Important Notice**

Si-Trend reserves the right to change all product specifications and data without prior notice ; Our customer Please confirm to place an order confirmation before make the integrity of information complete and up-to-date ◦

Any semiconductor under specific conditions are possible to certain failure or malfunction rate ; Customers are responsible in the use of Si-Trend products to system design and manufacturing in compliance with safety standards and adopting safety measures , To avoid the potential risk of failure may cause the personal safety and property loss ◦

Si-Trend Always refine on to provide more excellent products

**■ Modify record**

Date	Version	Description	Pagination
20170826	A.0	original	6