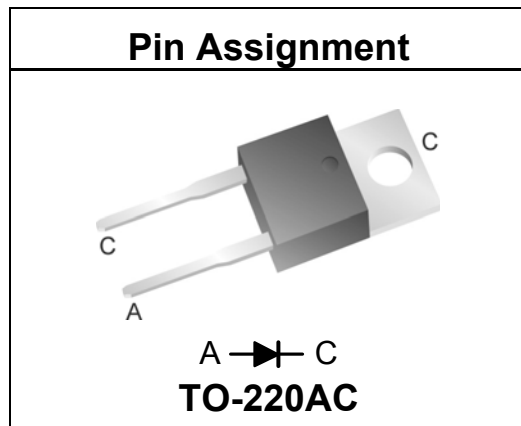


# 600V, 6A Qspeed “X-Series” PFC Rectifier

## Product Summary

$I_{F(AV)}$	6	A
$V_{RRM}$	600	V
$Q_{RR}$ (Typ at 125°C)	75	nC
$I_{RRM}$ (Typ at 125°C)	3.1	A
Softness $t_b/t_a$ (Typ at 125°C)	0.7	



### RoHS Compliant

Package uses Lead-free plating and Green mold compound.

## General Description

Using advanced Silicon technology, the X-Series power rectifier is specifically designed to offer better performance in PFC Boost applications. When compared with other Silicon rectifier technologies, X-Series rectifiers offer higher efficiencies, lower surrounding device temperatures, and/or better EMI performance, at an attractive price point.

Utilizing proprietary Qspeed Silicon technology, this device offers a low reverse recovery current. Its soft recovery reduces electrical stress on surrounding circuit elements (especially the switching transistors), and helps to reduce heat, lower unnecessary component guard-banding and snubbing, and increase efficiency.

## Applications

- Power Factor Correction (PFC) Boost Diode
- AC/DC power supplies and adapters
- Freewheeling diodes

## Features

- Designed for PFC operation
- Low  $Q_{RR}$ , Low  $I_{RRM}$ , Low EMI
- High  $dI/dt$  capable (1000A/us)
- Soft recovery
- Enables snubberless operation for cost savings

## Absolute Maximum Ratings

Absolute maximum ratings are the values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Symbol	Parameter	Conditions	Rating	Units
$V_{RRM}$	Peak repetitive reverse voltage		600	V
$I_{F(AV)}$	Average forward current	$T_J = 150^\circ\text{C}$ , $T_C = ^\circ\text{C}$	6	A
$I_{FSM}$	Non-repetitive peak surge current	60Hz, 1/2 cycle	50	A
$T_J$	Maximum junction temperature		150	°C
$T_{STG}$	Storage temperature		-55 to 150	°C
	Lead soldering temperature	Leads at 1.6mm from case, 10 sec	300	°C
$P_D$	Power dissipation	$T_C = 25^\circ\text{C}$	56	W

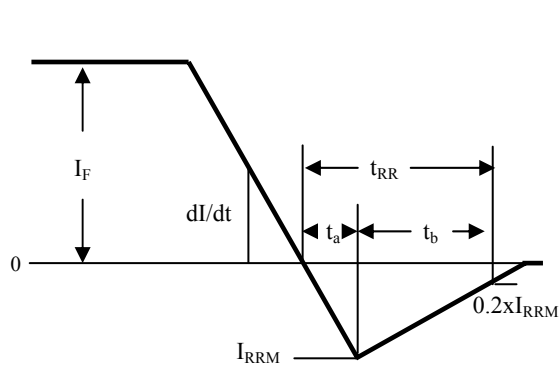
## Thermal Resistance

Symbol	Resistance from:	Conditions	Rating	Units
$R_{\theta JA}$	Junction to ambient	TO-220	62	°C/W
$R_{\theta JC}$	Junction to case	TO-220	2.2	°C/W

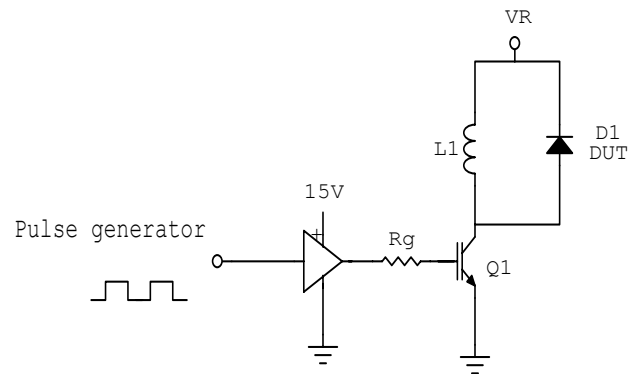
**Electrical Specifications** @T<sub>J</sub>= 25°C (unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units	
<b>DC Characteristics</b>							
I <sub>R</sub>	Reverse current	V <sub>R</sub> = 600V, T <sub>J</sub> = 25°C	-	-	150	μA	
		V <sub>R</sub> = 600V, T <sub>J</sub> = 125°C	-	0.7	-	mA	
V <sub>F</sub>	Forward voltage	I <sub>F</sub> = 6A, T <sub>J</sub> = 25°C	-	2.35	-	V	
		I <sub>F</sub> = 6A, T <sub>J</sub> = 150°C	-	2.1	-	V	
C <sub>J</sub>	Junction capacitance	V <sub>R</sub> = 10V, 1MHz	-	30	-	pF	
<b>Dynamic Characteristics</b>							
t <sub>RR</sub>	Reverse recovery time	dI/dt = 200A/μs V <sub>R</sub> =400, I <sub>F</sub> =6A	T <sub>J</sub> =25°C	-	24	-	ns
			T <sub>J</sub> =125°C	-	33	-	ns
Q <sub>RR</sub>	Reverse recovery charge	dI/dt = 200A/μs V <sub>R</sub> =400, I <sub>F</sub> =6A	T <sub>J</sub> =25°C	-	31	-	nC
			T <sub>J</sub> =125°C	-	75	-	nC
I <sub>R</sub> RM	Maximum reverse recovery current	dI/dt = 200A/μs V <sub>R</sub> =400, I <sub>F</sub> =6A	T <sub>J</sub> =25°C	-	2.0	-	A
			T <sub>J</sub> =125°C	-	3.1	-	A
S	Softness factor = $\frac{t_b}{t_a}$	dI/dt = 200A/μs V <sub>R</sub> =400, I <sub>F</sub> =6A	T <sub>J</sub> =25°C	-	1.0	-	
			T <sub>J</sub> =125°C	-	0.7	-	

Note to component engineers: Qspeed X-Series rectifiers employ Schottky technologies in their design and construction. Component engineers therefore should plan their test setups to be similar to traditional Schottky test setups. (For further details, see Qspeed application note AN-300.)

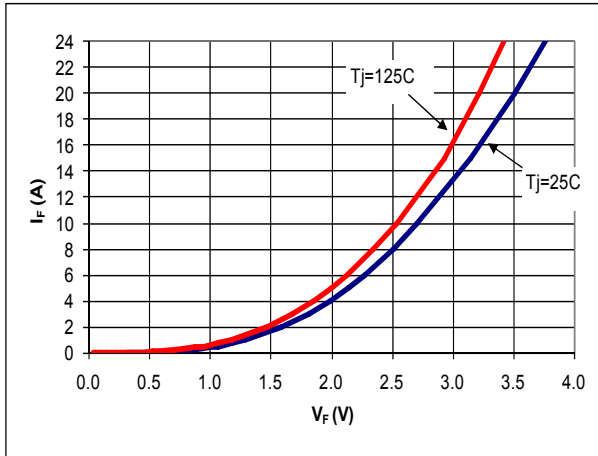


**Figure 1. Reverse Recovery Definitions**

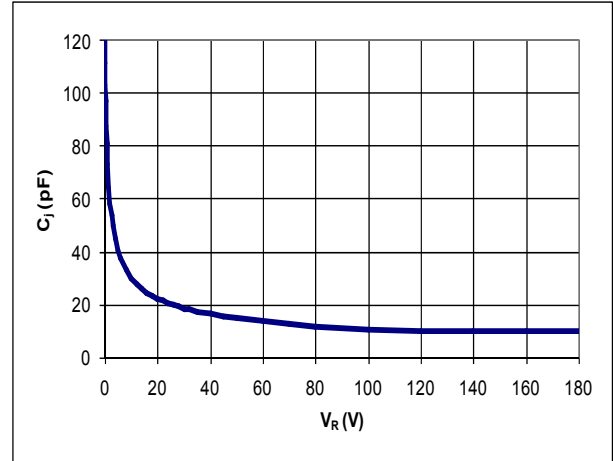


**Figure 2. Reverse Recovery Test Circuit**

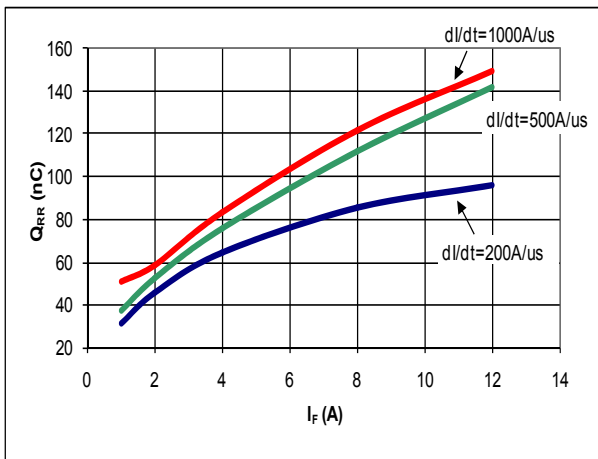
**Electrical Specifications @T<sub>J</sub>= 25°C (unless otherwise specified)**



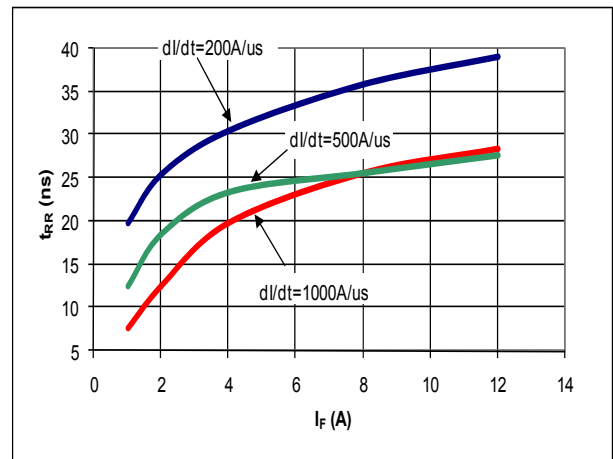
**Figure 3. Typical I<sub>F</sub> vs V<sub>F</sub>**



**Figure 4. Typical C<sub>J</sub> vs V<sub>R</sub>**



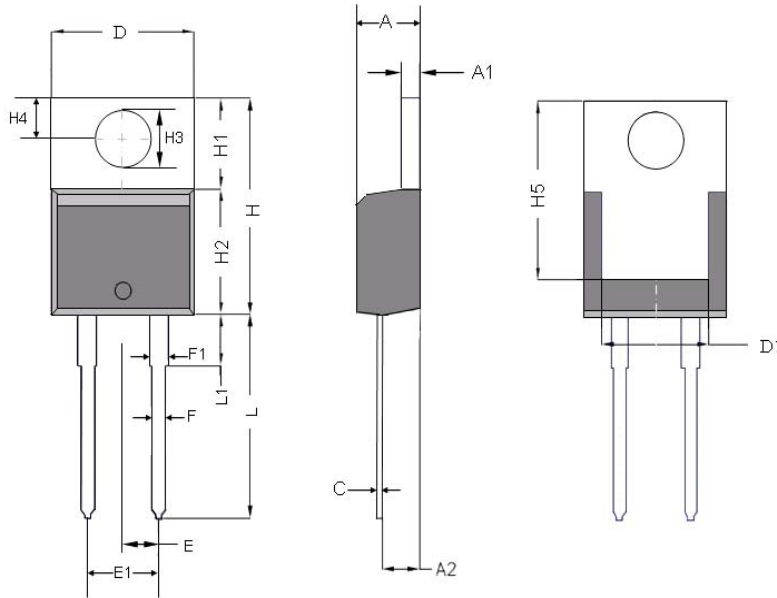
**Figure 5. Typical Q<sub>RR</sub> vs I<sub>F</sub> at T<sub>J</sub> = 125C**



**Figure 6. Typical t<sub>RR</sub> vs I<sub>F</sub> at T<sub>J</sub> = 125C**

## Dimensional Outline Drawings

TO-220AC Conforms to JEDEC outline TO-220AC



Dim	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	4.32	4.57	0.170	0.180
<b>A1</b>	1.14	1.40	0.045	0.055
<b>A2</b>	2.03	2.74	0.080	0.108
<b>C</b>	0.356	0.610	0.014	0.024
<b>D</b>	9.65	10.67	0.380	0.420
<b>D1</b>	7.57	7.67	0.298	0.302
<b>E</b>	2.49	2.59	0.098	0.102
<b>E1</b>	5.03	5.13	0.198	0.202
<b>F</b>	0.508	1.016	0.020	0.040
<b>F1</b>	1.14	1.78	0.045	0.070
<b>H</b>	14.71	16.51	0.579	0.650
<b>H1</b>	5.84	6.55	0.230	0.258
<b>H2</b>	8.51	9.02	0.335	0.355
<b>H3</b>	3.53	3.96	0.139	0.156
<b>H4</b>	2.54	3.05	0.100	0.120
<b>H5</b>	12.34	13.00	0.486	0.512
<b>L</b>	13.00	14.22	0.512	0.560
<b>L1</b>	---	6.35	---	0.250

Controlling dimensions are in millimeters

## Ordering Information

Part Number	Package	Packing
LXA06T600	TO-220AC	50 units/tube

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