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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

FAIRCHILD™

RHRG3060_F085
30A, 600V Hyperfast Rectifier

Features

- High Speed Switching (t_{rr}=45ns(Typ.) @ I_F=30A)
- Low Forward Voltage(V_F=1.64V(Typ.) @ I_F=30A)
- Avalanche Energy Rated
- AEC-Q101 Qualified

Applications

- Switching Power Supply
- Power Switching Circuits
- Automotive and General Purpose

Max Ratings (600V, 30A)

The RHRG3060_F085 is an Hyperfast™ diode with soft recovery characteristics (trr < 45ns). It has half the recovery time of ultrafast diode and is of silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as a freewheeling/clamping diode and rectifier in a variety of automotive switching power supplies and other power switching automotive applications. Its low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits, thus reducing power loss in the switching transistors.

Pin Assignments

TO-247-2L
1. Cathode   2. Anode

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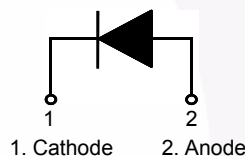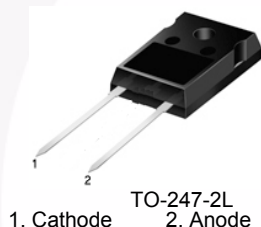
Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{RRM}	Peak Repetitive Reverse Voltage	600	V
V_{RWM}	Working Peak Reverse Voltage	600	V
V_R	DC Blocking Voltage	600	V
$I_{F(AV)}$	Average Rectified Forward Current @ T_C = 25°C	30	A
I_{FSM}	Non-repetitive Peak Surge Current (Halfwave 1 Phase 50Hz)	90	A
E_{AVL}	Avalanche Energy (1A, 40mH)	20	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature	- 55 to +175	°C

Thermal Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.66	°C/W
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	45	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Tube	Quantity
RHRG3060	RHRG3060_F085	TO-247	-	30

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions		Min.	Typ.	Max	Units
I_R	Instantaneous Reverse Current	V_R = 600V	T_C = 25 °C	-	-	250	uA
			T_C = 175 °C	-	-	1.5	mA
V_{FM}[1]	Instantaneous Forward Voltage	I_F = 30A	T_C = 25 °C	-	1.64	2.1	V
			T_C = 175 °C	-	1.24	1.7	V
t_{rr}[2]	Reverse Recovery Time	I_F =1A, di/dt = 200A/μs, V_{CC}= 390V	T_C = 25 °C	-	24	40	ns
		I_F =30A, di/dt = 200A/μs, V_{CC}= 390V	T_C = 25 °C	-	33	45	ns
			T_C = 175 °C	-	136	-	ns
t_a	Reverse Recovery Time	I_F =30A, di/dt = 200A/μs, V_{CC}= 390V	T_C = 25 °C	-	19	-	ns
t_b				-	14	-	ns
Q_{rr}	Reverse Recovery Charge			-	60	-	nC

Notes:

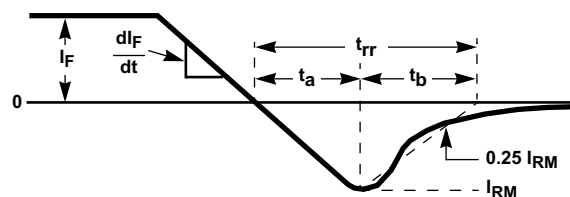1. Pulse : Test Pulse width = 300μs, Duty Cycle = 2%

2. Guaranteed by design

Test Circuit and Waveforms

t_{rr} Test Circuit
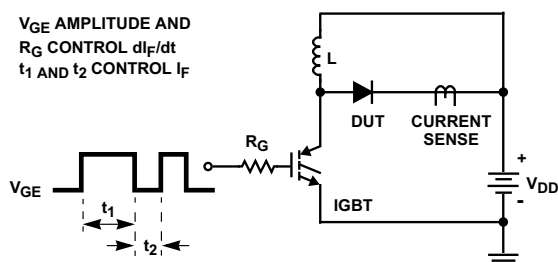
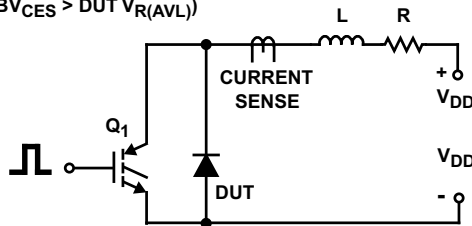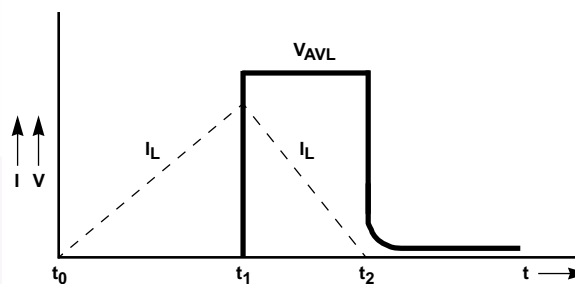### t_{rr} Waveforms and Definitions

Avalanche Energy Test Circuit

I = 1A
L = 40mH
R < 0.1Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

Avalanche Current and Voltage Waveforms

Typical Performance Characteristics

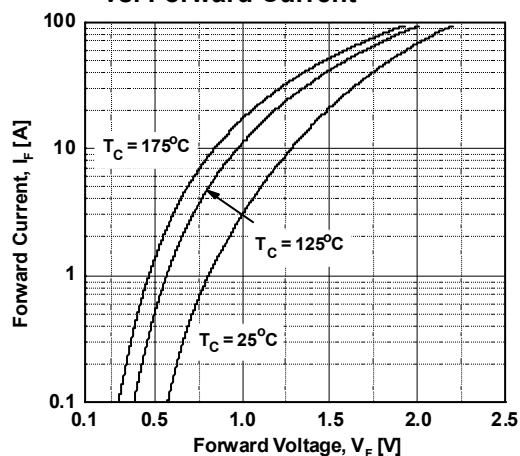### Figure 1. Typical Forward Voltage Drop vs. Forward Current

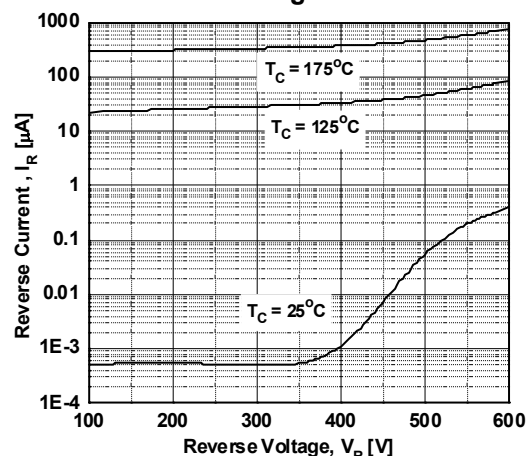### Figure 2. Typical Reverse Current vs. Reverse Voltage

Figure 3. Typical Junction Capacitance
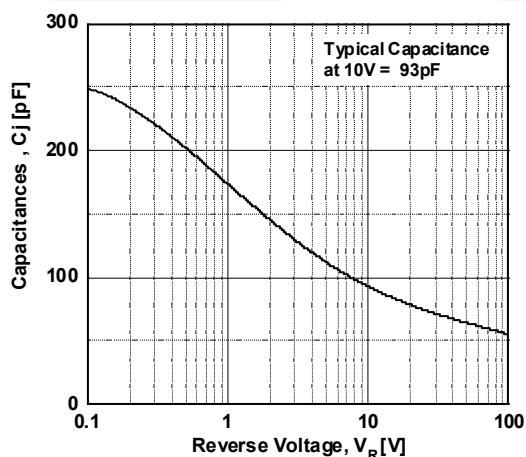
Figure 4. Typical Reverse Recovery Time vs. di/dt
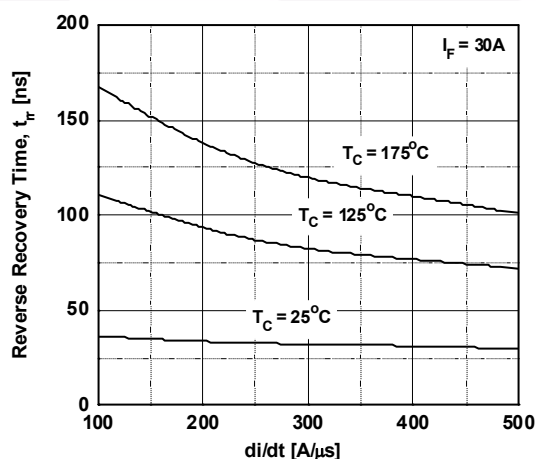

Figure 5. Typical Reverse Recovery Current vs. di/dt
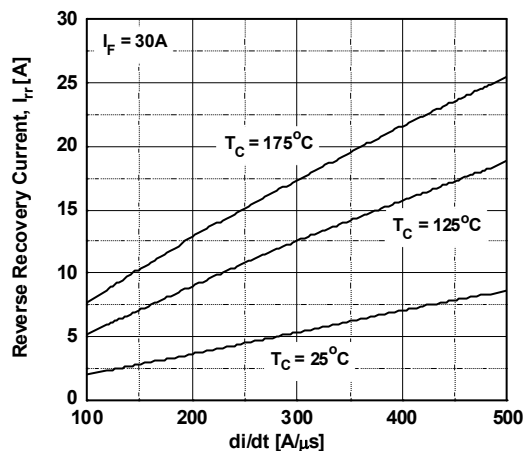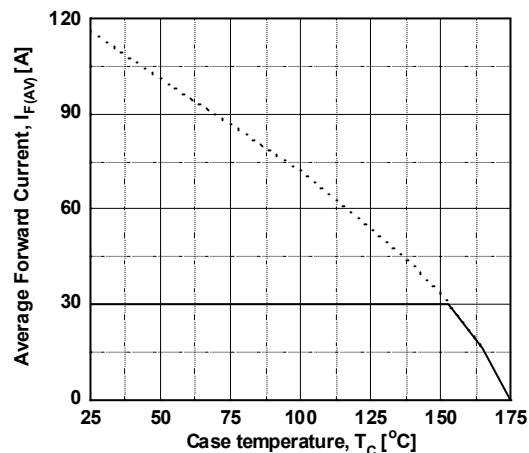

Figure 6. Forward Current Derating Curve

Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge
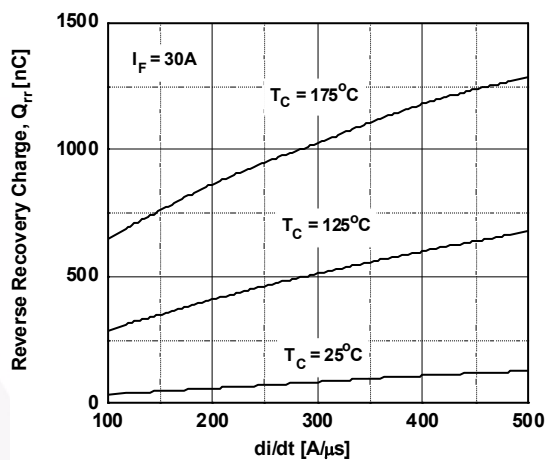
Figure 8. Transient Thermal Response Curve

* Notes :

1. $Z_{thJC}(t) = 0.66\ ^o C/W$ Typ.

2. Duty Factor, $D = t_1/t_2$

3. $T_{JM} - T_C = P_{DM} * Z_{thJC}(t)$
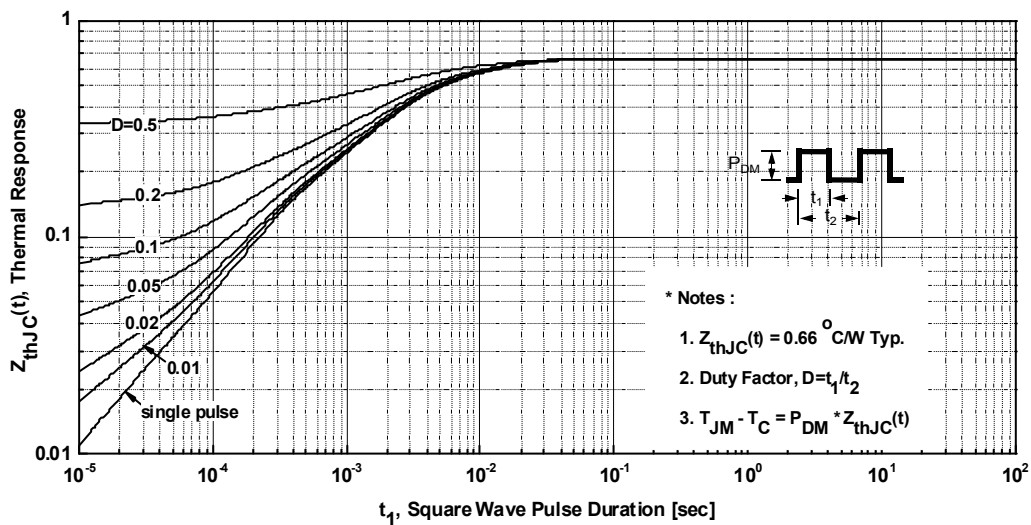
Mechanical Dimensions

TO-247-2L
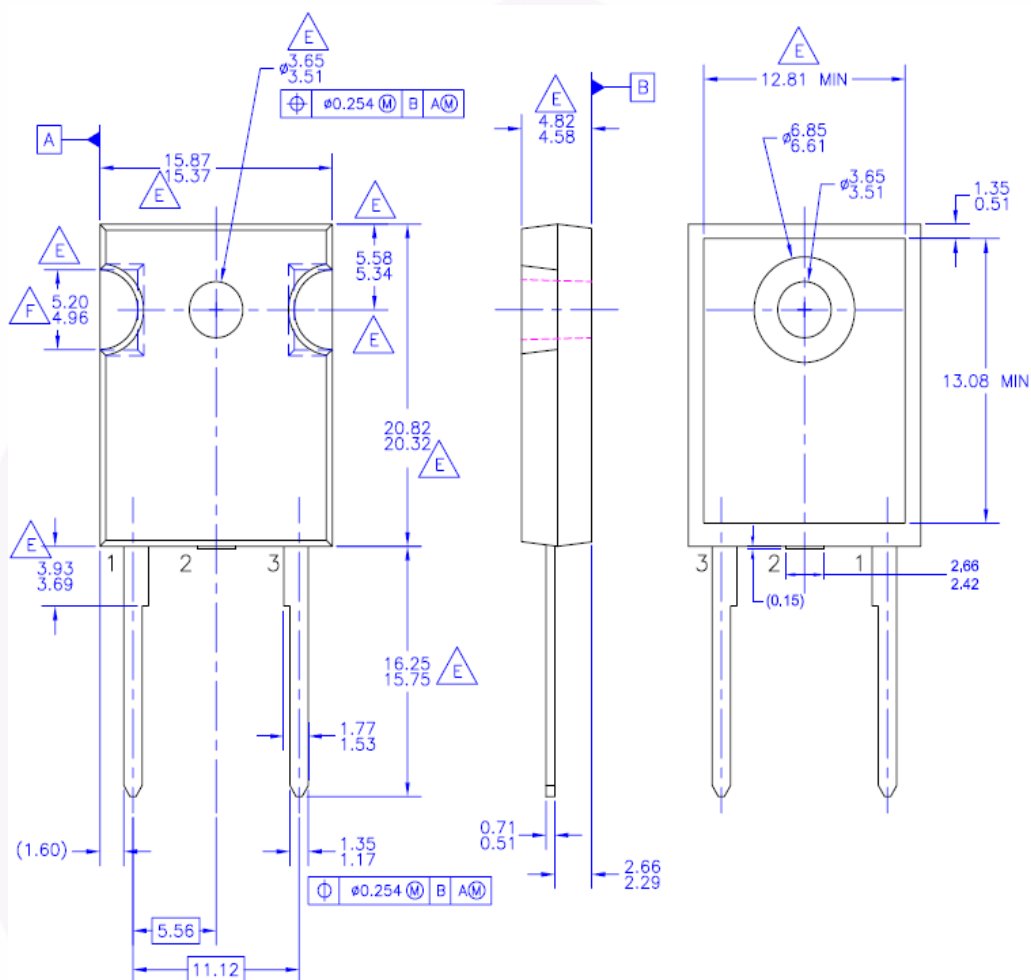
NOTES: UNLESS OTHERWISE SPECIFIED
   A. PACKAGE REFERENCE: JEDEC TO-247,
      ISSUE E, VARIATION AB, DATED JUNE, 2004.
   B. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD
      FLASH, AND TIE BAR EXTRUSIONS.
   C. ALL DIMENSIONS ARE IN MILLIMETERS.
   D. DRAWING CONFORMS TO ASME Y14.5 – 1994

/E\ DOES NOT COMPLY JEDEC STANDARD VALUE

/F\ NOTCH MAY BE SQUARE
   G. DRAWING FILENAME: MKT-TO247B02_REV02

Dimensions in Millimeters

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Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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Rev. I68

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  RHRG3060_F085 RHRG3060-F085

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