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November 2013

RURG5060_F085 50A, 600V Ultrafast Rectifier

Features

- High Speed Switching (t_{rr}=70ns(Typ.) @ I_F=50A)
- Low Forward Voltage(V_F=1.6V(Max.) @ I_F=50A)
- · Avalanche Energy Rated
- · AEC-Q101 Qualified

Applications

- · Automotive DCDC converter
- · Automotive On Board Charger
- · Switching Power Supply
- · Power Switching Circuits

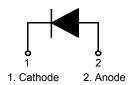
50A, 600V Ultrafast Rectifier

The RURG5060_F085 is an ultrafast diode with soft recovery characteristics (trr< 90ns). It has low forward voltage drop and is silicon nitride passivated ionimplanted epitaxial planar construction.

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

Pin Assignments





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	50	А	
I _{FSM}	Non-repetitive Peak Surge Current (Halfwave 1 Phase 50Hz)	150	А	
E _{AVL}	Avalanche Energy (1.4A, 40mH)	40	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	0.4	°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	
RURG5060	RURG5060_F085 TO-247		1	30	

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions		Min.	Тур.	Max	Units
I _R	Instantaneous Reverse Current	V _R = 600V	T _C = 25 °C	-	-	250	uA
			T _C = 175 °C	-	-	2	mA
V _{FM} ¹	Instantaneous Forward Voltage	I _F = 50A	T _C = 25 °C T _C = 175 °C	-	1.28 1.09	1.6 1.4	V
t _{rr} ²	Reverse Recovery Time	I_F =1A, di/dt = 100A/ μ s, V_{CC} = 390V	T _C = 25 °C	-	42	65	ns
		I_F =50A, di/dt = 100A/ μ s, V_{CC} = 390V	T _C = 25 °C T _C = 175 °C	-	70 285	90 -	ns ns
t _a t _b Q _{rr}	Reverse Recovery Time Reverse Recovery Charge	I_F =50A, di/dt = 100A/ μ s, V _{CC} = 390V	T _C = 25 °C	- - -	36 34 112	- - -	ns ns nC
E _{AVL}	Avalanche Energy	I _{AV} =1.4A,L = 40mH		40	-	-	mJ

Notes:

- 1. Pulse : Test Pulse width = $300\mu s$, Duty Cycle = 2%
- 2. Guaranteed by design

Test Circuit and Waveforms

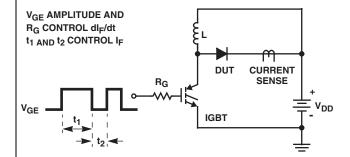


FIGURE 5. t_{rr} TEST CIRCUIT

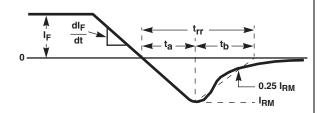


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

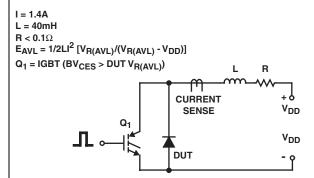


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

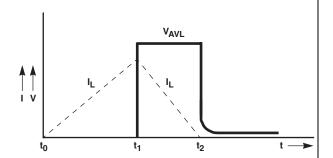


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

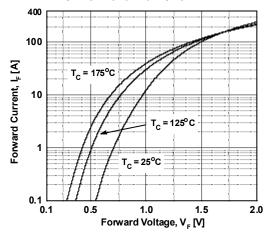


Figure 3. Typical Junction Capacitance

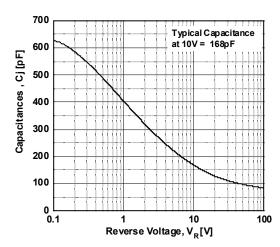


Figure 5. Typical Reverse Recovery Current vs. di/dt

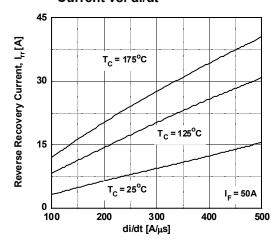


Figure 2. Typical Reverse Current vs.

Reverse Voltage

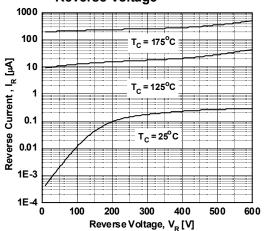


Figure 4. Typical Reverse Recovery Time vs. di/dt

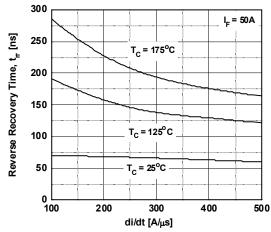
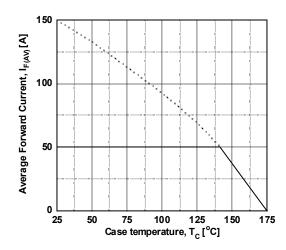


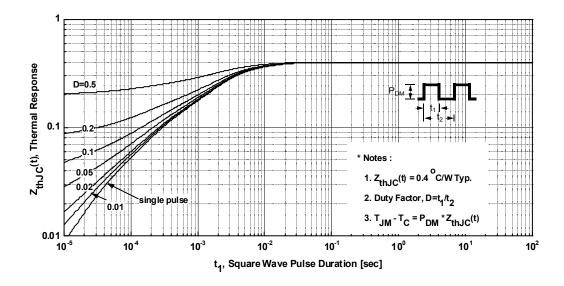
Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

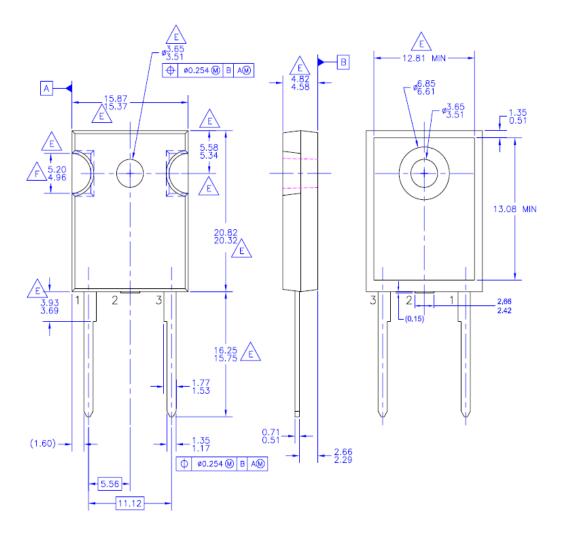
Figure 7. Reverse Recovery Charge 3500 T_C = 175°C I_E = 50A Reverse Recovery Charge, Q_{rr}[nC] 3000 2500 2000 T_C = 125°C 1500 1000 T_C = 25°C 500 200 300 400 500 di/dt [A/μs]

Figure 8. Transient Thermal Response Curve



Mechanical Dimensions

TO-247-2L



NOTES: UNLESS OTHERWISE SPECIFIED

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- D. DRAWING CONFORMS TO ASME Y14,5 1994

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F. NOTCH MAY BE SQUARE

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Dimensions in Millimeters





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