

Pb Free Plating Product

## FFB20UP20S



20Amperes,200Volts Single Surface Mount Ultra Fast Recovery Epitaxial Diode

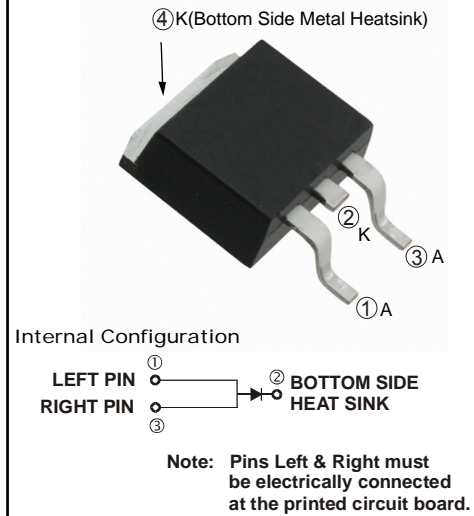
### APPLICATION

- Freewheeling, Snubber, Clamp
- Inversion Welder
- PFC
- Plating Power Supply
- Ultrasonic Cleaner and Welder
- Converter & Chopper
- UPS

### PRODUCT FEATURE

- Ultrafast Recovery Time
- Soft Recovery Characteristics
- Low Recovery Loss
- Low Forward Voltage
- High Surge Current Capability
- Low Leakage Current

TO-263/D2PAK(SMD-220)



### GENERAL DESCRIPTION

FFB20UP20S using the latest FRED FAB process(planar passivation pellet) with ultrafast and soft recovery characteristics.

### Absolute Maximum Ratings T<sub>C</sub> = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V <sub>RRM</sub>	Peak Repetitive Reverse Voltage	200	V
V <sub>RWM</sub>	Working Peak Reverse Voltage	200	V
V <sub>R</sub>	DC Blocking Voltage	200	V
I <sub>F(AV)</sub>	Average Rectified Forward Current @ T <sub>C</sub> = 115°C	20	A
I <sub>FSM</sub>	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	200	A
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature	- 65 to +150	°C

### Thermal Characteristics

Symbol	Parameter	Max	Units
R <sub>θJC</sub>	Maximum Thermal Resistance, Junction to Case	2.0	°C/W

### Electrical Characteristics T<sub>C</sub> = 25°C unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Units	
V <sub>FM</sub> *	I <sub>F</sub> = 20A	T <sub>C</sub> = 25 °C	-	-	1.15	V
		T <sub>C</sub> = 100 °C	-	-	1.0	V
I <sub>RM</sub> *	V <sub>R</sub> = 200V	T <sub>C</sub> = 25 °C	-	-	100	μA
		T <sub>C</sub> = 100 °C	-	-	500	μA
t <sub>rr</sub>	I <sub>F</sub> = 1A, di/dt = 100A/μs, V <sub>CC</sub> = 30V I <sub>F</sub> = 20A, di/dt = 200A/μs, V <sub>CC</sub> = 130V	T <sub>C</sub> = 25 °C	-	-	35	ns
		T <sub>C</sub> = 25 °C	-	-	45	ns
t <sub>a</sub> t <sub>b</sub> Q <sub>rr</sub>	I <sub>F</sub> = 20A, di/dt = 200A/μs, V <sub>CC</sub> = 130V	T <sub>C</sub> = 25 °C	-	11	-	ns
		T <sub>C</sub> = 25 °C	-	13	-	ns
		T <sub>C</sub> = 25 °C	-	21	-	nC
W <sub>AVL</sub>	Avalanche Energy (L = 40mH)	20	-	-	mJ	

\* Pulse Test: Pulse Width=300μs, Duty Cycle=2%

## Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop

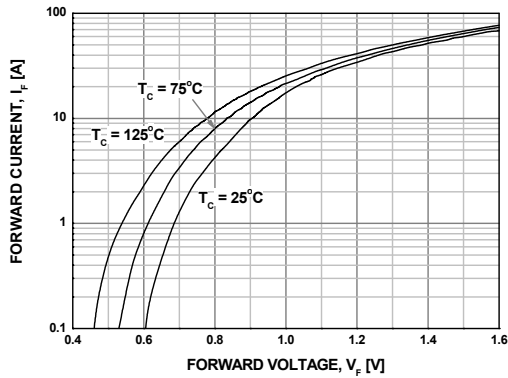


Figure 2. Typical Reverse Current

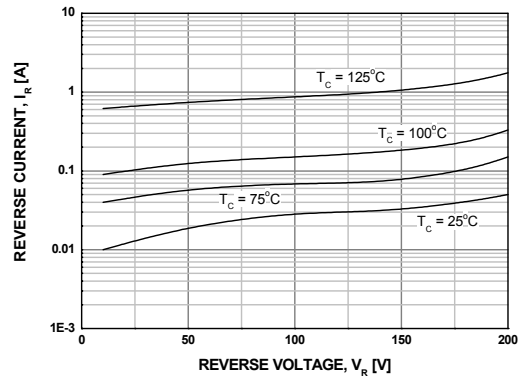


Figure 3. Typical Junction Capacitance

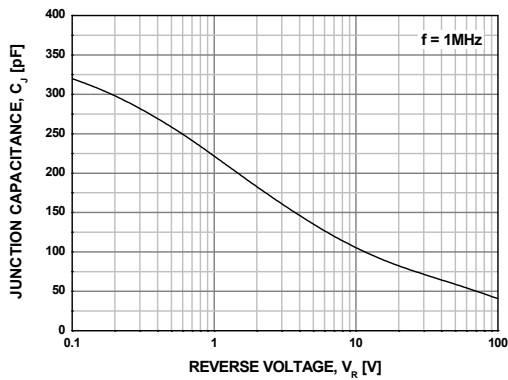


Figure 4. Typical Reverse Recovery Time

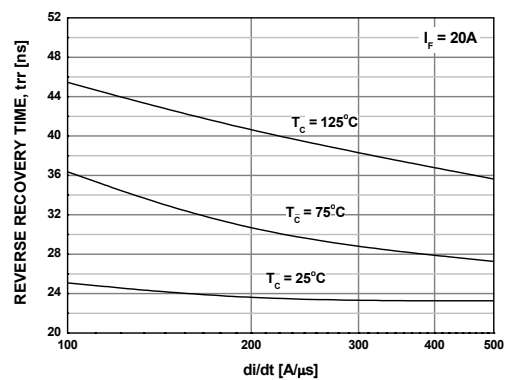


Figure 5. Typical Reverse Recovery Current

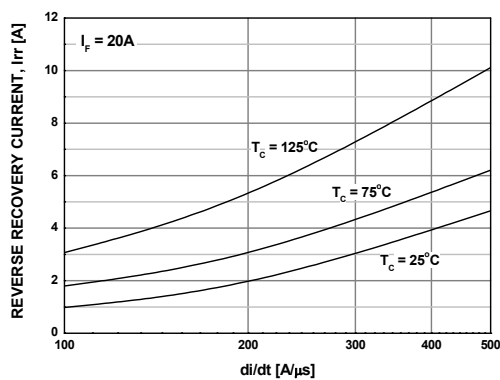
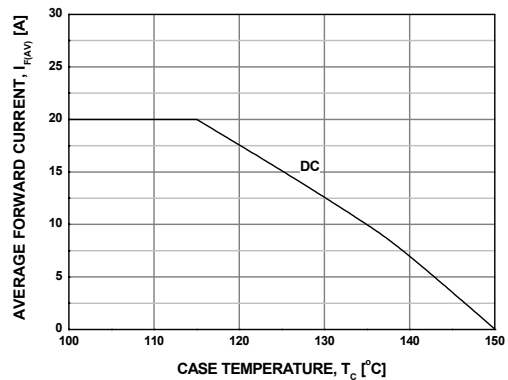
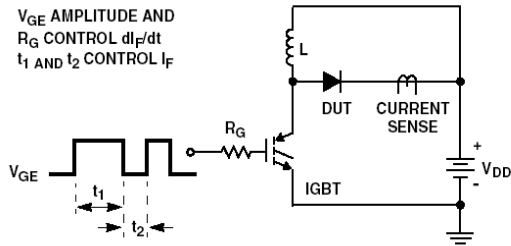


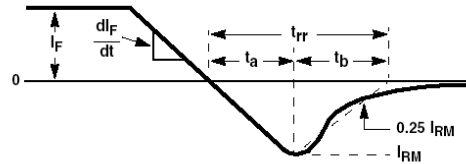
Figure 6. Forward Current Deration Curve



## Test Circuit and Waveforms

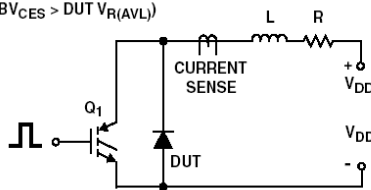


$t_{rr}$  TEST CIRCUIT

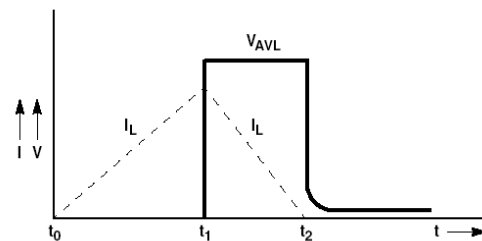


$t_{rr}$  WAVEFORMS AND DEFINITIONS

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

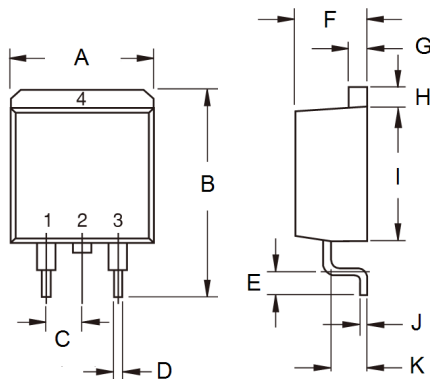


AVALANCHE ENERGY TEST CIRCUIT



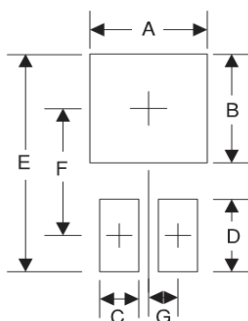
AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## PACKAGE OUTLINE DIMENSIONS TO-263 (D<sup>2</sup>PAK)



DIM.	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	-	10.5	-	0.413
B	14.60	15.88	0.575	0.625
C	2.41	2.67	0.095	0.105
D	0.68	0.94	0.027	0.037
E	2.29	2.79	0.090	0.110
F	4.44	4.70	0.175	0.185
G	1.14	1.40	0.045	0.055
H	1.14	1.40	0.045	0.055
I	8.25	9.25	0.325	0.364
J	0.36	0.53	0.014	0.021
K	2.03	2.79	0.080	0.110

## SUGGESTED PAD LAYOUT



Symbol	Unit (mm)	Unit (inch)
A	10.8	0.425
B	8.3	0.327
C	1.1	0.043
D	3.5	0.138
E	16.9	0.665
F	9.5	0.374
G	2.5	0.098