

Pb Free Plating Product

## FFB20UP20DN



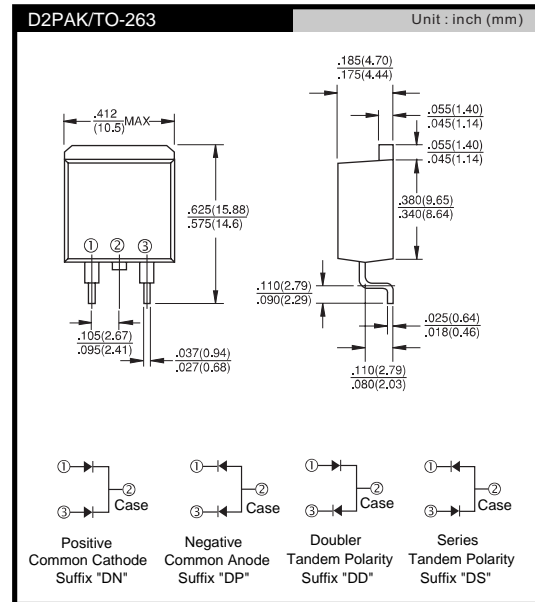
20Ampere, 200Volt Surface Mount Dual Common Cathode Ultra Fast Recovery Epitaxial Diode

### 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



### GENERAL DESCRIPTION

FFB20UP20DN using the latest FRED FAB process (planar passivation pellet) with ultrafast and soft recovery characteristics.

### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{RRM}$	Peak Repetitive Reverse Voltage	200	V
$V_{RWM}$	Working Peak Reverse Voltage	200	V
$V_R$	DC Blocking Voltage	200	V
$I_{f(avg)}$	Average Rectified Forward Current @ $T_C = 155^\circ\text{C}$	10	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	100	A
$T_J, T_{STG}$	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$

### Thermal Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Max	Units
$R_{\theta JC}^1$	Maximum Thermal Resistance, Junction to Case	3.5	$^\circ\text{C}/\text{W}$

### Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max	Units	
$V_F^2$	$I_F = 10\text{A}$	$T_C = 25^\circ\text{C}$	-	-	1.15	V
		$T_C = 150^\circ\text{C}$	-	-	1.0	V
$I_R^2$	$V_R = 200\text{V}$	$T_C = 25^\circ\text{C}$	-	-	10	$\mu\text{A}$
		$T_C = 150^\circ\text{C}$	-	-	250	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 130\text{V}$	$T_C = 25^\circ\text{C}$	-	15	25	ns
		$T_C = 25^\circ\text{C}$	-	27	40	ns
$t_a$ $t_b$ $Q_{rr}$	$I_F = 10\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 130\text{V}$	$T_C = 25^\circ\text{C}$	-	21	-	ns
		$T_C = 25^\circ\text{C}$	-	6	-	ns
		$T_C = 25^\circ\text{C}$	-	50	-	nC
$W_{AVL}$	Avalanche Energy (L = 20mH)	10	-	-	mJ	

#### Notes

- 1:  $R_{th\_jc}$  value is specified for each die
- 2: Pulse: Test Pulse width = 300S, Duty Cycle = 2%

## Typical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

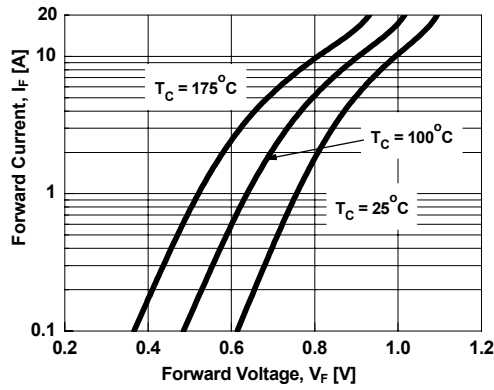


Figure 1. Typical Forward Voltage Drop

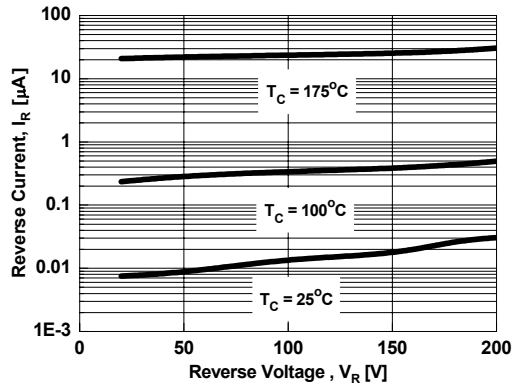


Figure 2. Typical Reverse Current

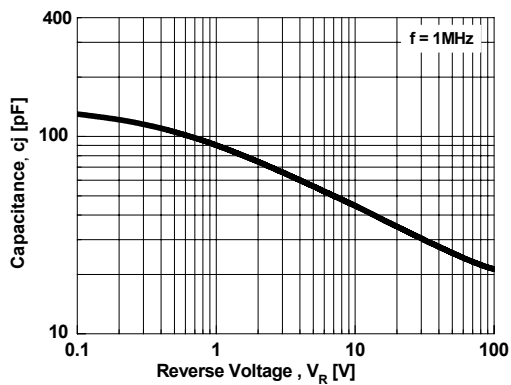


Figure 3. Typical Junction Capacitance

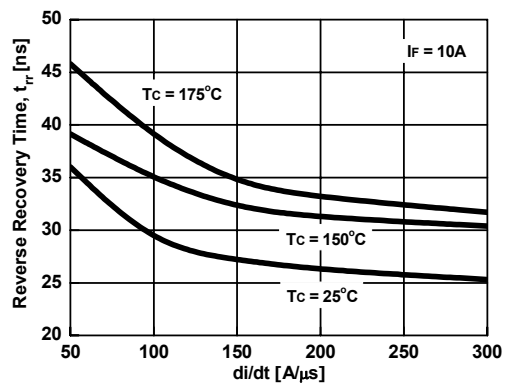


Figure 4. Typical Reverse Recovery Time

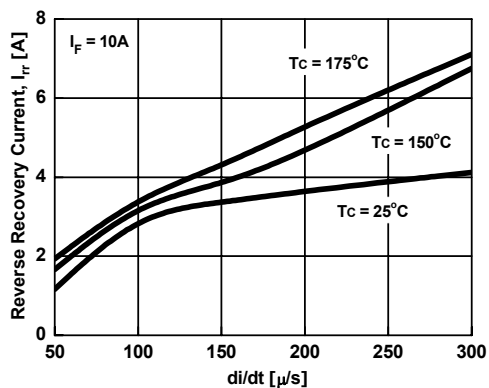


Figure 5. Typical Reverse Recovery Current

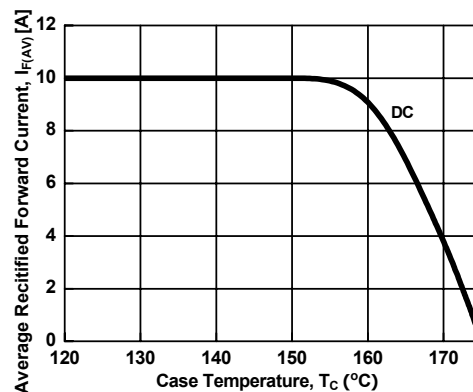
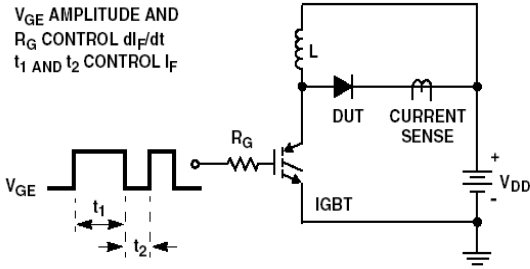
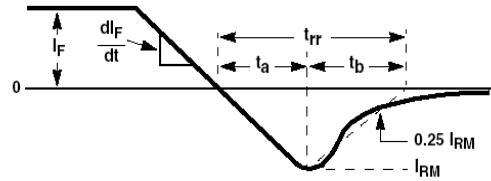


Figure 6. Case Temperature,  $T_C$  [ $^\circ\text{C}$ ]

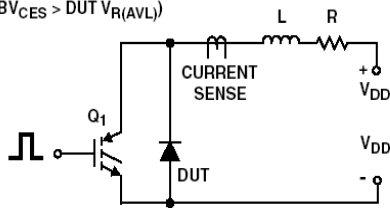


$t_{rr}$  TEST CIRCUIT

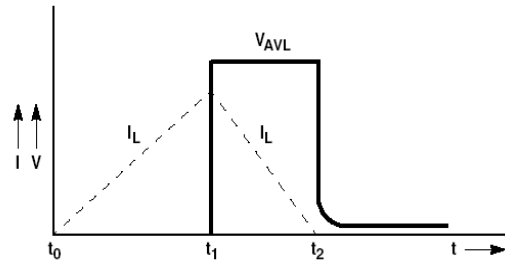


$t_{rr}$  WAVEFORMS AND DEFINITIONS

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



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS