

1. Synopsis

1-1. General Description

State of the Fast Recovery Rectifiers Specifically
Designed with Optimized Performance of Forward Voltage
Drop and Fast Recovery Time.

The Planar Structure and The Platinum Doped Life Time Control
Guarantee The Best Overall Performance, Ruggedness, and
Reliability Characteristics.

These Devices are Intended for use in PFC, Boost, Lighting,
in the AC/DC Section of SMPS, Freewheeling and Clamp Diodes.

The Extremely Optimized Stored Charge and Low Recovery
Current Minimize the Switching Losses and Reduce Power
Dissipation in The Switching Element.

1-2. Feature List

- Maximum Forward Voltage, $V_F = 1.3V$ ($T_J = 25^\circ C$)
- 300-Volts Reverse
- High Frequency Operation

1-3. Applications

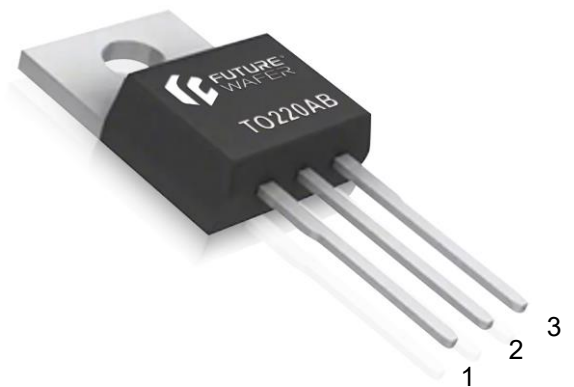
- Switch Mode Power Supply
- Power Factor Correction
- Solar Inverter
- Uninterruptible Power Supply
- High Efficiency DC/DC Converters
- Motor Drivers

1-4. Benefits

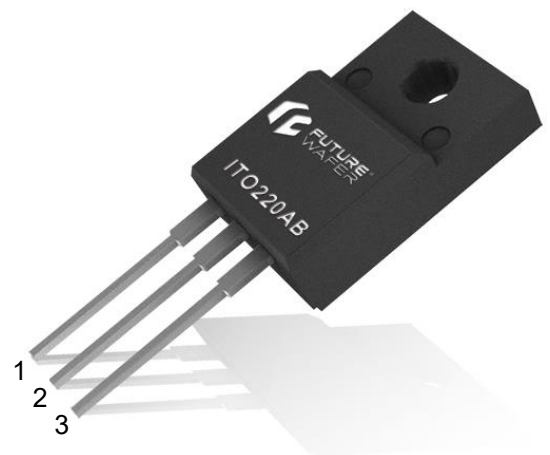
- Essentially No Switching Losses
- Higher Efficiency
- Reduction Of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway
- Higher System Reliability Due To Lower Operating Temperatures

1-5. Mechanical Characteristics

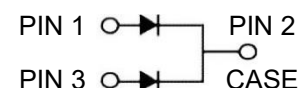
- Molded JEDEC Package: TO-220AB / ITO-220AB
- Packing: Tube
- Flammability rating UL 94V-0
- Halogen Free
- JEDEC MSL Classification: Level 1



FR20S30BFCC
TO-220AB



FR20S30BCTC
ITO-220AB



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3. Electrical Property

3-1. Absolute Maximum Ratings

Maximum Ratings@25°C Unless Otherwise Specified

Parameter	Symbol	Values	Units
Reverse Voltage DC	V_R	300	V
Continuous Forward Current Per Leg	$I_F, T_C \leq 100^\circ\text{C}$	10x2	A
Nonrepetitive Peak Surge Current	$I_{FSM}, 60\text{HZ}$	150	
Operating Temperature	T_J	-55 ~ +175	°C
Storage Temperature	T_{STG}		

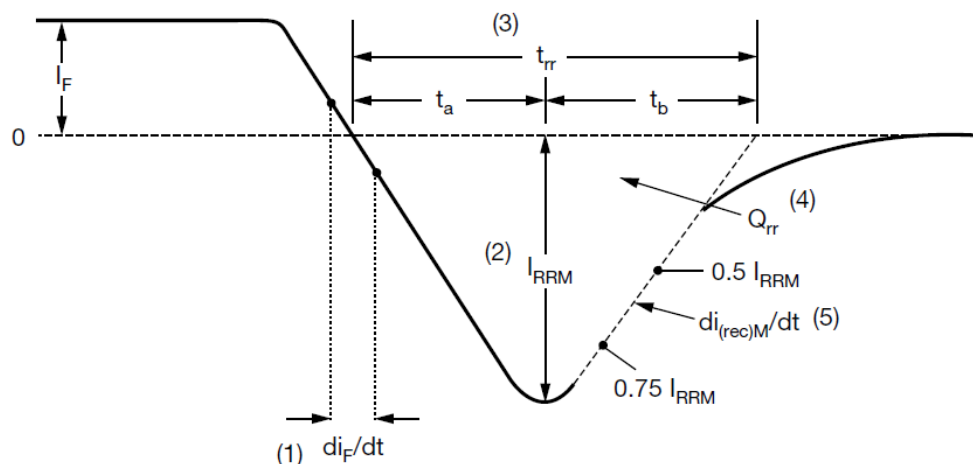
3-2. Electrical Characteristics

Parameter	Symbol	Condition	Values			Units
			Min.	Typ.	Max.	
DC Blocking Voltage	V_{DC}	$I_R = 0.18\text{mA}$ $T_J = 25^\circ\text{C}$	300	-	-	V
Diode Forward Voltage	V_F	$I_F = 10\text{A}$ $T_J = 25^\circ\text{C}$	-	1.1	1.3	
			-	1.6	2.0	
Reverse Current	I_R	$V_R = 300\text{V}$ $T_J = 25^\circ\text{C}$	-	-	10	μA
			-	-	50	mA
Reverse Recovery Time	t_{rr}	$I_F = 0.5\text{A}, I_R = 1\text{A}, I_{rr} = 0.25\text{A}$ -	-	18	25	nS

3-3. Thermal Characteristics

Parameter	Symbol	Package	Values			Units
			Min.	Typ.	Max.	
Thermal Resistance, Junction-Case	R_{thJC}	TO-220AB	-	2.7	3.0	°C/W
		ITO-220AB	-	3.5	3.8	
Thermal Resistance, Junction-Ambient	R_{thJA}	TO-220AB	-	55	60	
		ITO-220AB	-	68	72	

3-4. Reverse Recovery Waveform and Definitions



Symbol	Units
di_F / dt	Rate of change of current through zero crossing
I_{RRM}	Peak reverse recovery current
t_{rr}	Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.
Q_{rr}	Area under curve defined by t_{rr} and I_{RRM}
$di_{(rec)M} / dt$	Peak rate of change of current during t_b portion of t_{rr}

3-5. Ratings and Characteristics Curve

Fig 1. DC Current Derating Curve

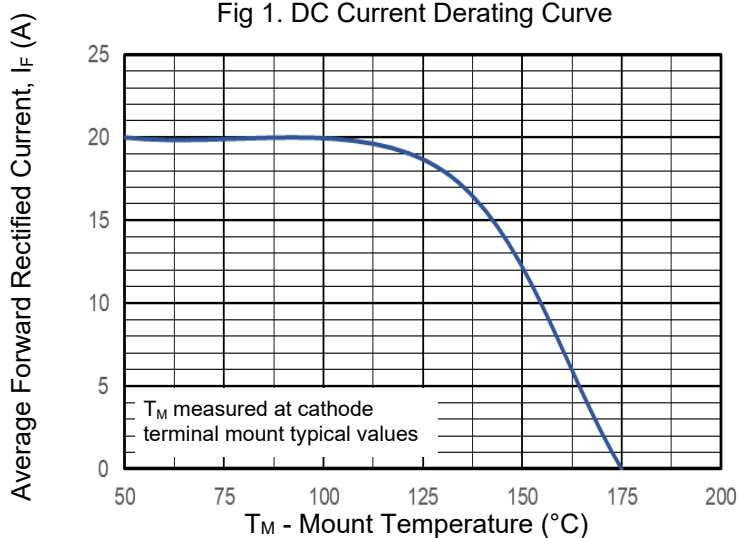


Fig 2. Typical Instantaneous Forward Characteristics

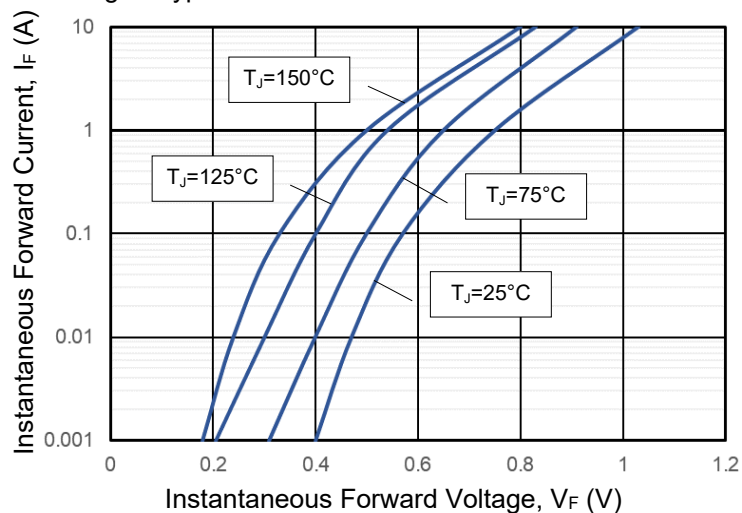


Fig 3. Typical Reverse Current Characteristics

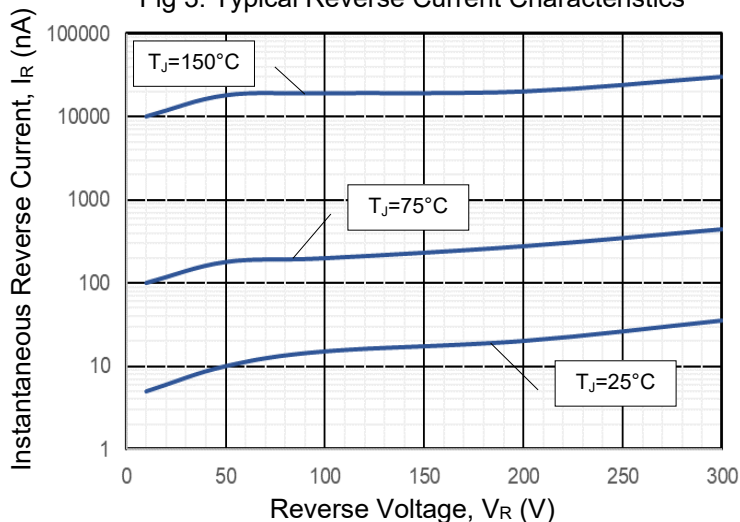


Fig 4. Maximum Non-repetitive Forward Surge Current

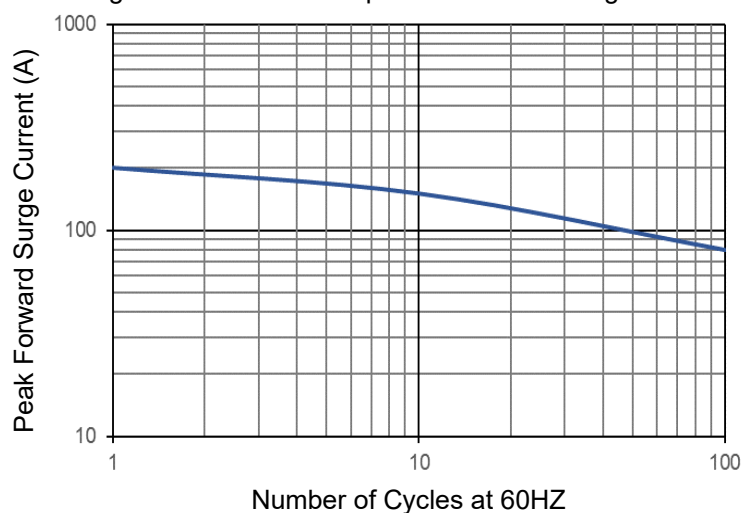
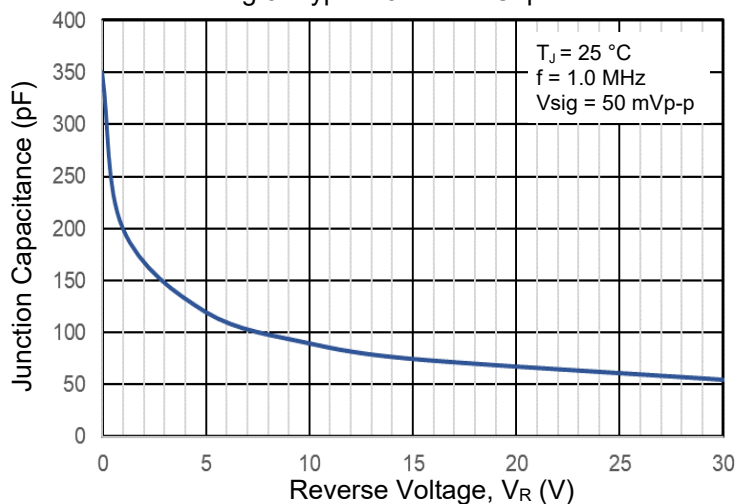


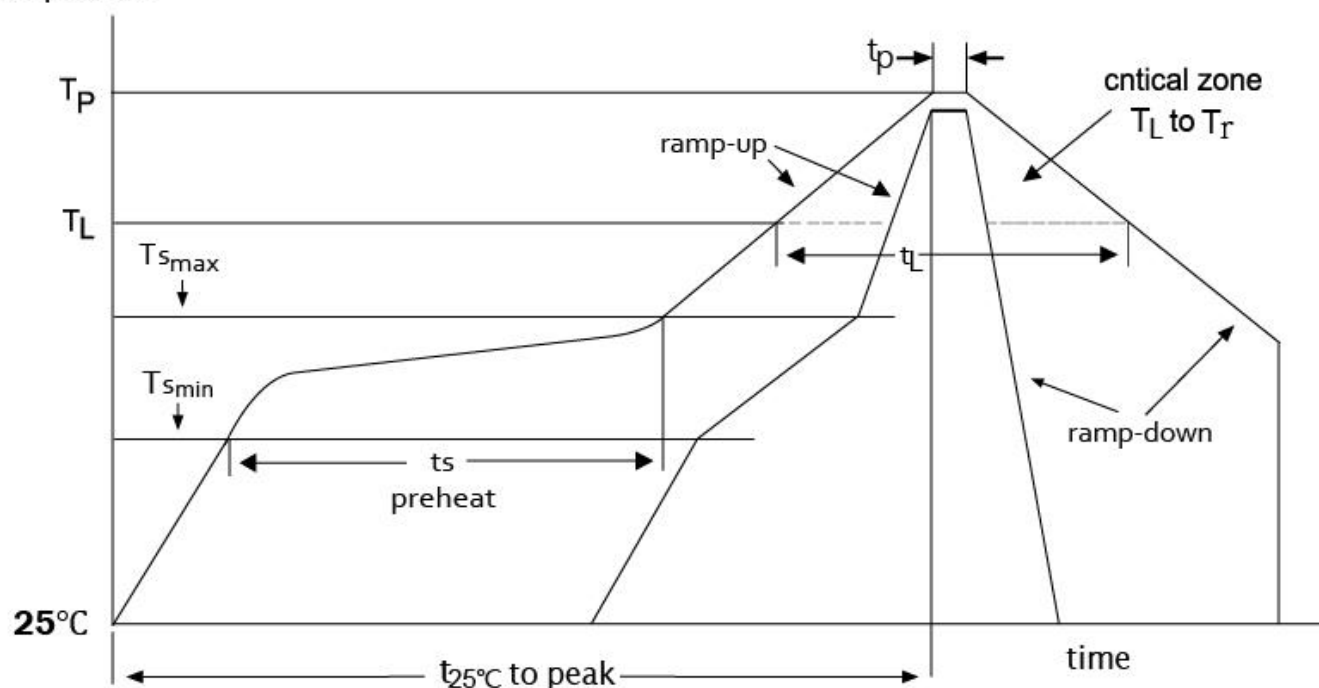
Fig 5. Typical Junction Capacitance



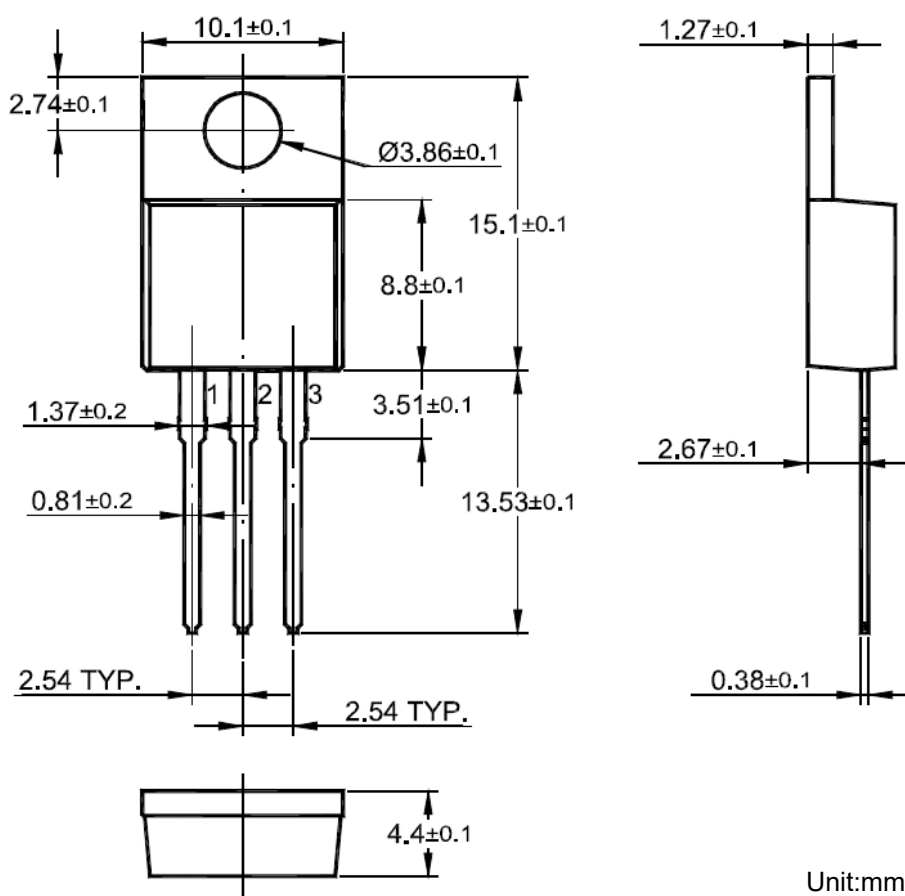
4. Soldering Parameters

Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (T _{smax} to T _p)	3 °C/s maximum	3 °C/s maximum
Preheat		
Temperature minimum (T _{smin})	100 °C	150 °C
Temperature maximum (T _{smax})	150 °C	200 °C
Time (t _{smin} to t _{smax})	60 s to 120 s	60 s to 180 s
Time maintained above		
Temperature (T _L)	183 °C	217 °C
Time (t _L)	60 s to 150 s	60 s to 150 s
Peak/classification temperature (T)	235 °C	260 °C
Number of allowed reflow cycles	3	3
Time within 5 °C of actual peak temperature (t _p)	10 s to 30 s	20 s to 40 s
Ramp-down rate	6 °C/s maximum	6 °C/s maximum
Time 25 °C to peak temperature	6 minutes maximum	8 minutes maximum

temperature

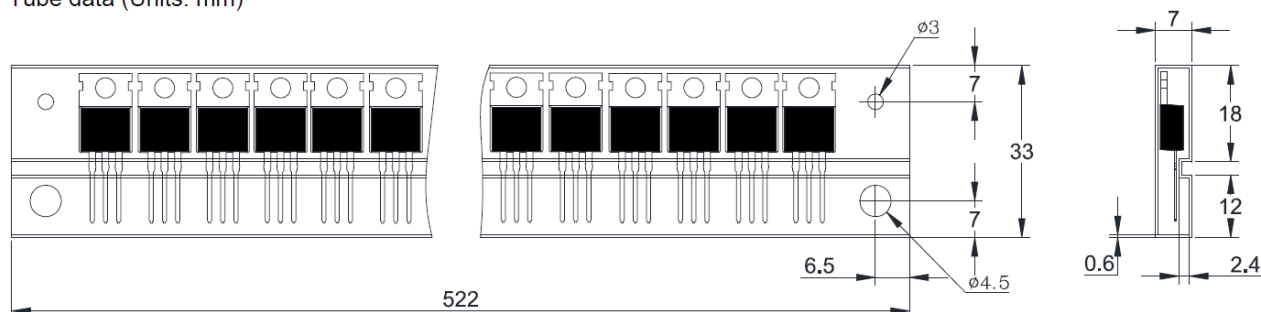


5. Package Information-TO-220AB

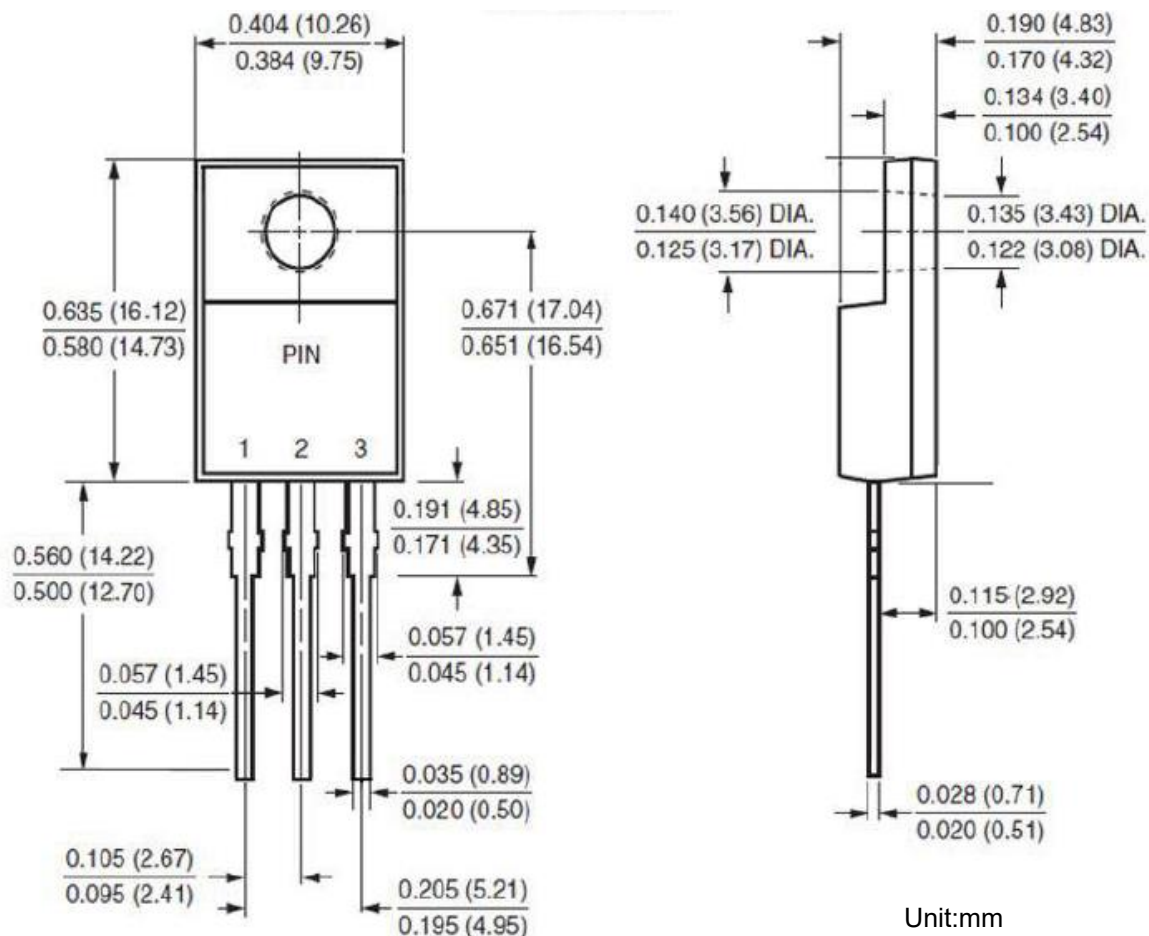


6. Packing Information-TO-220AB

Tube data (Units: mm)

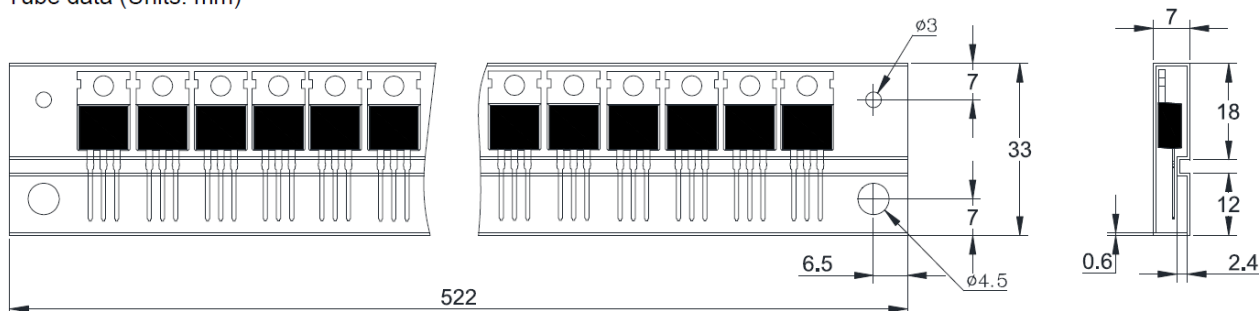


7. Package Information-ITO-220AB



8. Packing Information-ITO-220AB

Tube data (Units: mm)



9. Ordering Information

Part Number	Marking Code	Quantity	Component Package	Packaging Option
FR20S30BFCC	20S30B	50PCS	TO-220AB	Tube
FR20S30BCTC			ITO-220AB	

10. Version

10-1. History

Version	Date	File No.	Recording	Basis
A	05-Dec-2018	F21837L	New Create	Market
B	15-May-2019		Update Company Info.	System
2.0	14-Oct-2021		Update Version	System