

## 10Amp. Schottky Barrier Rectifiers

# MBR10120FP

$I_{F(AV)}$	$2 \times 5A$
$V_{RRM}$	120V
$T_j$	175°C
$V_F(\text{typ.})$	0.68V

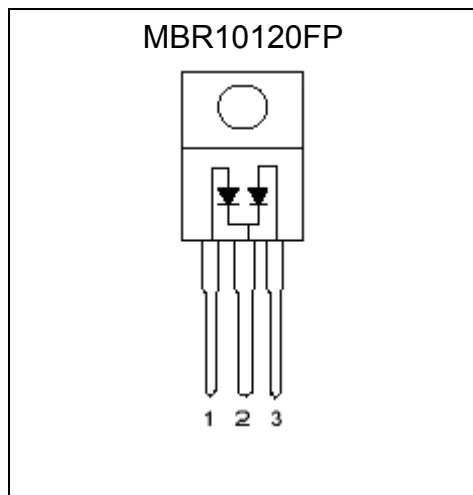
### Features

- 175°C operating junction temperature
- Low  $V_F$  and low  $I_r$  type
- Metal silicon junction, major carrier conduction
- 10A total (5A per diode leg)
- Guardring for over voltage protection
- Low power loss, high efficiency
- High surge capability
- Insulating package, insulating voltage=2500V DC, capacitance=45pF
- For use in low voltage, high frequency inverters, free wheeling, and polarity protection application
- RoHS compliant package

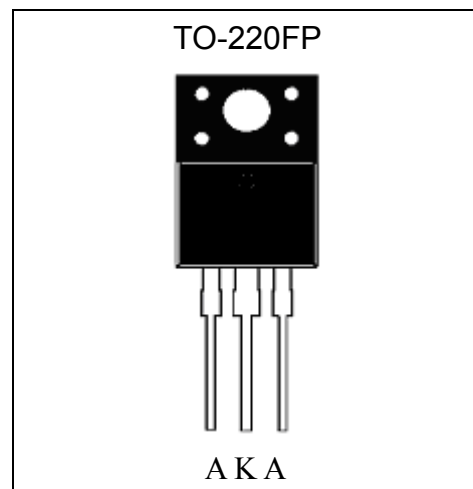
### Mechanical Data

- Case: JEDEC TO-220FP molded plastic
- Mounting Position: Any
- Weight: 2.2 grams, 0.078 ounce approximately
- Terminals: Pure tin plated, lead-free, solderable per MIL-STD-750 method 2026
- Epoxy: UL 94V-0 rate flame retardant
- Mounting Torque : 5 in-lbs max

### Equivalent Circuit



### Outline





**Maximum Ratings and Electrical Characteristics (Per Diode Leg)**

(Rating at 25°C ambient temperature unless otherwise specified. Single phase, half wave, 60Hz, resistive or inductive load. For capacitive load, derate current by 20%.)

Parameter	Symbol	Value	Units
Maximum Recurrent peak reverse voltage	V <sub>RRM</sub>	120	V
Maximum RMS voltage	V <sub>RMS</sub>	84	V
Maximum DC blocking voltage	V <sub>DC</sub>	120	V
Maximum instantaneous forward voltage at (Note 1)	V <sub>F</sub>	I <sub>F</sub> =5A, T <sub>C</sub> =25°C	0.92
		I <sub>F</sub> =5A, T <sub>C</sub> =125°C	0.75
		I <sub>F</sub> =10 A, T <sub>C</sub> =25°C	1.00
		I <sub>F</sub> =10A, T <sub>C</sub> =125°C	0.85
Maximum Average forward rectified current @ T <sub>C</sub> =142°C	Per Diode	5	A
	Per Device	10	
Non-repetitive peak forward surge current @ 8.3ms single half sine wave superimposed on rated load (JEDEC method)	I <sub>FSM</sub>	120	A
Peak repetitive reverse surge current, T <sub>J</sub> <175°C (Note 1)	I <sub>RRM</sub>	2	A
Maximum instantaneous reverse current at	I <sub>R</sub>	V <sub>R</sub> =120 V, T <sub>C</sub> =25°C	5
		V <sub>R</sub> =120 V, T <sub>C</sub> =125°C	5
Voltage rate of change, (rated V <sub>R</sub> )	dV/dt	10,000	V/μs
Typical junction capacitance @ f=1MHz and applied 5V reverse voltage	C <sub>J</sub>	81 (typ.)	pF
ESD susceptibility (Note 2)		8000	V
Storage temperature range	T <sub>stg</sub>	-65~+175	°C
Operating junction temperature range	T <sub>J</sub>	-65~+175	°C

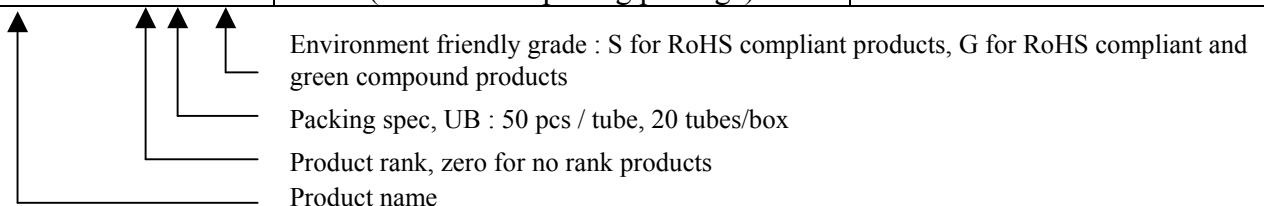
Notes : 1. 2.0μs pulse width, f=1.0kHz  
 2. Human body model, 1.5kΩ in series with 100pF

**Thermal Data**

Parameter	Symbol	Value	Unit
Maximum Thermal Resistance, Junction-to-case	R <sub>th,j-c</sub>	2.5	°C/W
Lead Temperature for Soldering Purposes : 1/8" from Case for 5 seconds	T <sub>L</sub>	300	°C

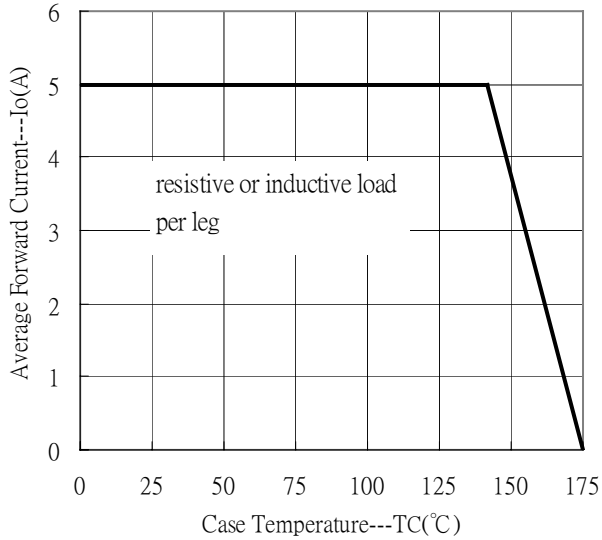
**Ordering Information**

Device	Package	Shipping
MBR10120FP-0-UB-S	TO-220FP (Pb-free lead plating package)	50 pcs / Tube, 40 Tubes/Box

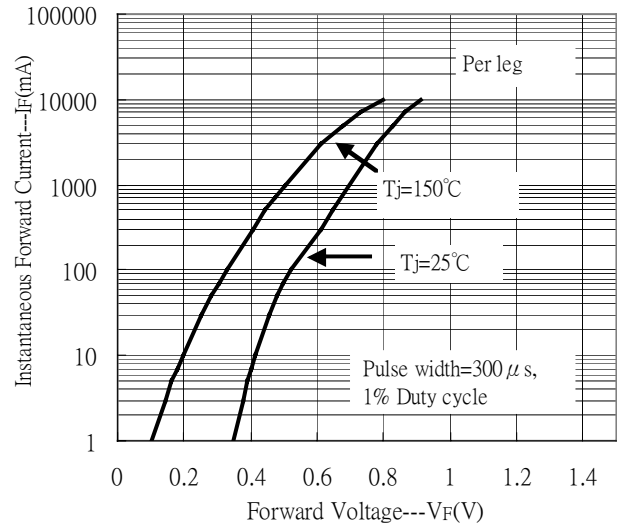


## Typical Characteristics

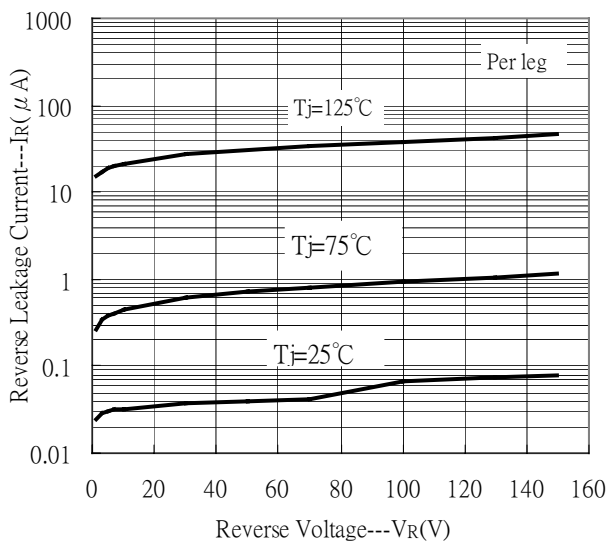
Forward Current Derating Curve



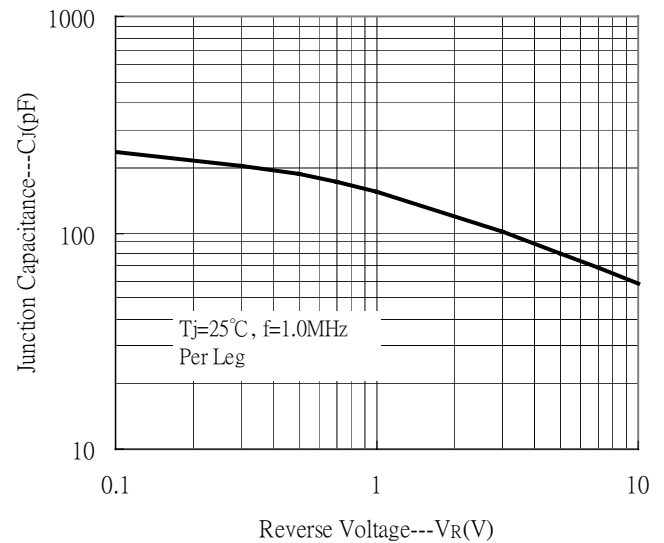
Forward Current vs Forward Voltage



Reverse Leakage Current vs Reverse Voltage

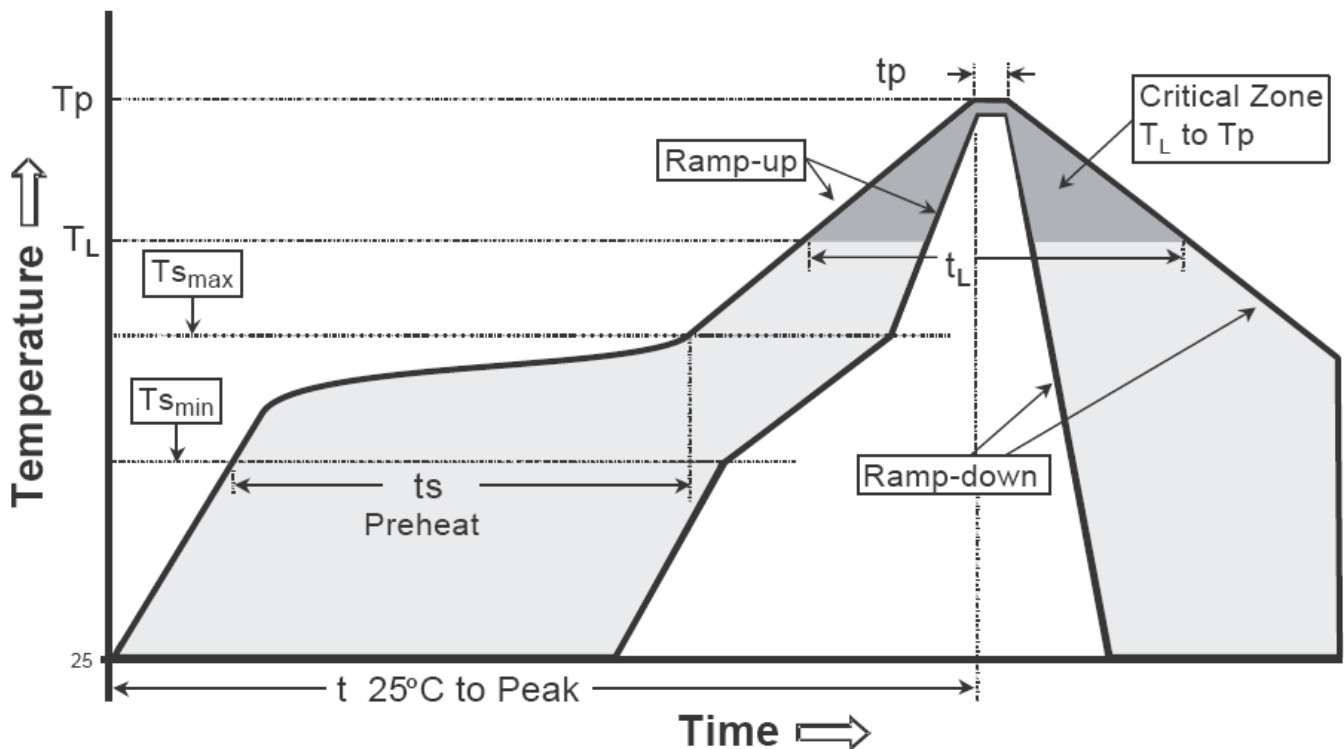


Junction Capacitance vs Reverse Voltage



**Recommended wave soldering condition**

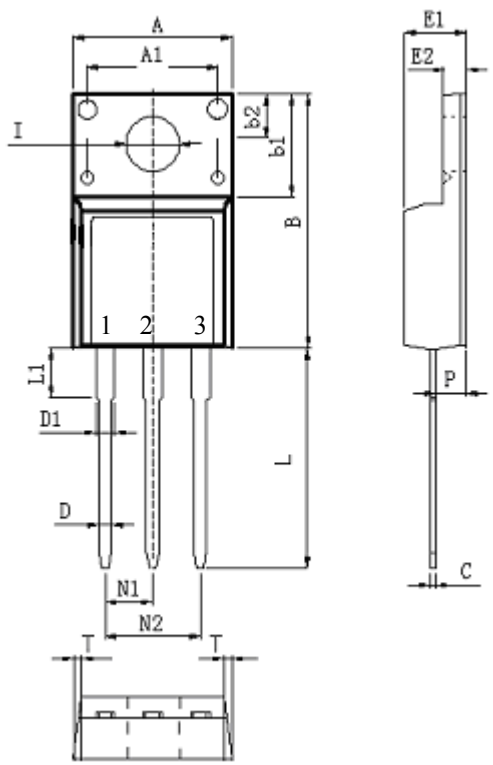
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**Recommended temperature profile for IR reflow**


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (TL)	183°C	217°C
- Time (tL)	60-150 seconds	60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

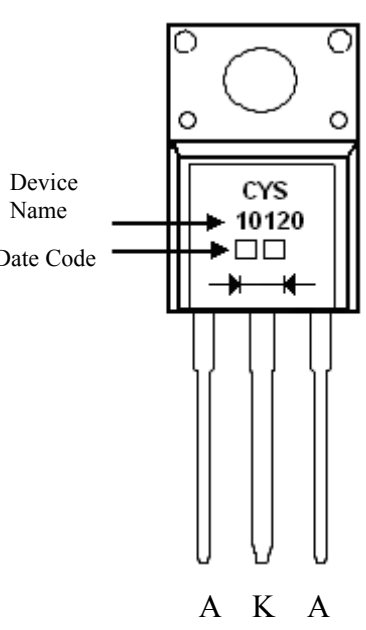
Note : All temperatures refer to topside of the package, measured on the package body surface.

**TO-220FP (K Forming) Dimension**



Style: Pin 1.Anode 2.Cathode 3.Anode

Marking:



Device Name →

Date Code →

A K A

3-Lead TO-220FP Plastic Package  
 CYStek Package Code: FP

\*: Typical

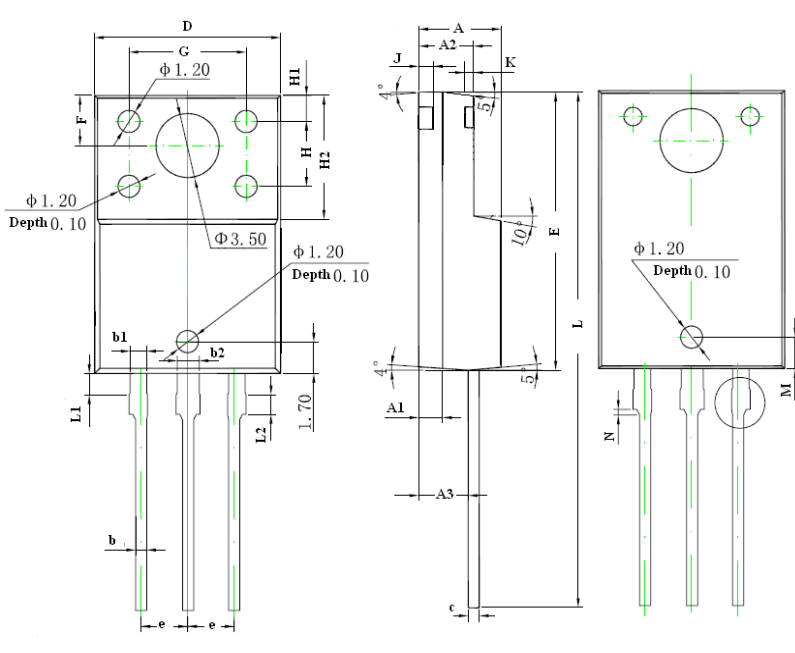
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.3740	0.4134	9.50	10.50	E2	0.0984	0.1063	2.50	2.70
A1	*0.2756		*7.00		N1	0.0961	0.1039	2.44	2.64
B	0.6063	0.6299	15.40	16.00	N2	0.1921	0.2079	4.88	5.28
b1	0.2480	0.2717	6.30	6.90	P	0.0984	0.1142	2.50	2.90
b2	0.0984	0.1181	2.50	3.00	L	0.5276	0.5354	13.40	13.60
C	0.0138	0.0295	0.35	0.75	L1	0.1378	0.1772	3.50	4.50
D	0.0276	0.0354	0.70	0.90	I	0.1181	0.1339	3.00	3.40
D1	0.0394	0.0551	1.00	1.40	T	0.0059	0.0138	0.15	0.35
E1	0.1693	0.1850	4.30	4.70					

Notes: 1.Controlling dimension: millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: KFC ; tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

## TO-220FP (S Forming) Dimension



**3-Lead TO-220FP Plastic Package**  
 CYStek Package Code: FP

**Marking:**

Device Name → CYS  
 10120  
 Date Code → □ □

Style: Pin 1.Anode 2.Cathode 3.Anode

\*Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.171	0.183	4.35	4.65	G	0.246	0.258	6.25	6.55
A1	0.051 REF		1.300 REF		H	0.138	REF	3.50	REF
A2	0.112	0.124	2.85	3.15	H1	0.055	REF	1.40	REF
A3	0.102	0.110	2.60	2.80	H2	0.256	0.272	6.50	6.90
b	0.020	0.030	0.50	0.75	J	0.031 REF		0.80	REF
b1	0.031	0.041	0.80	1.05	K	0.020		0.50	REF
b2	0.047 REF		1.20 REF		L	1.102	1.118	28.00	28.40
c	0.020	0.030	0.500	0.750	L1	0.043	0.051	1.10	1.30
D	0.396	0.404	10.06	10.26	L2	0.036	0.043	0.92	1.08
E	0.583	0.598	14.80	15.20	M	0.067 REF		1.70	REF
e	0.100 *		2.54*		N	0.012	REF	0.30	REF
F	0.106 REF		2.70 REF						

- Notes:** 1.Controlling dimension: millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

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