



# 20Amp. Schottky Barrier Rectifiers MBR20200E3

$I_{F(AV)}$	2 × 10A
$V_{RRM}$	200V
$T_j$	175°C
$V_F(\text{typ.})$	0.68V

## Features

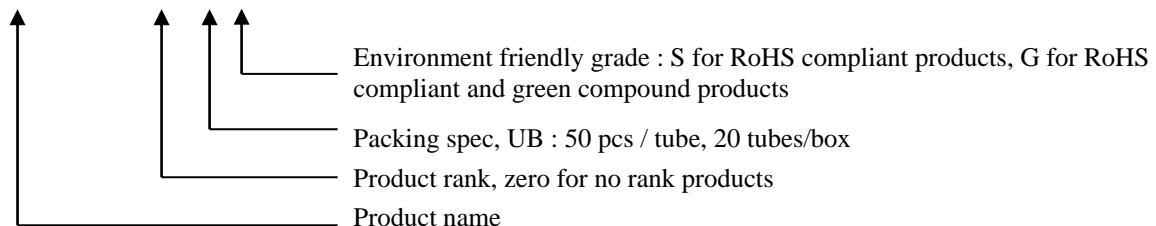
- 175°C operating junction temperature
- Low  $V_F$  and low  $I_r$  type
- Metal silicon junction, major carrier conduction
- 20A total (10A per diode leg)
- Guardring for over voltage protection
- Low power loss, high efficiency
- High surge capability
- High temperature soldering guaranteed : 260°C/10s, 0.25”(6.35mm) from case
- For use in low voltage, high frequency inverters, free wheeling, and polarity protection application
- RoHS compliant package

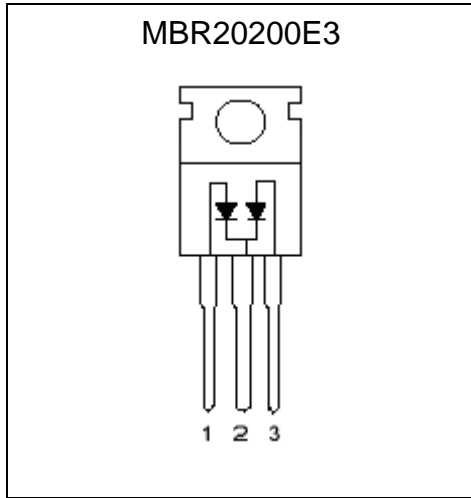
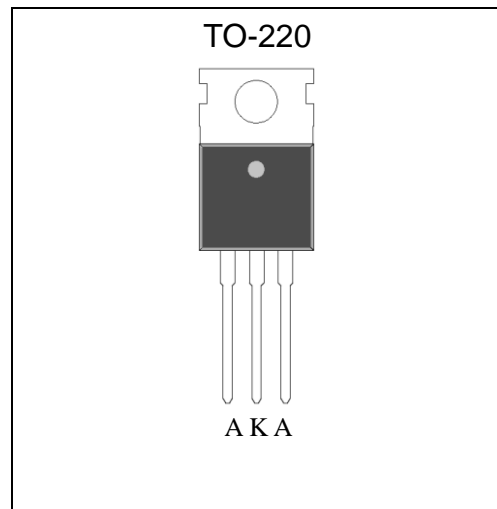
## Mechanical Data

- Case: JEDEC TO-220AB molded plastic
- Mounting Position: Any
- Weight: 0.08 ounce, 2.24 grams
- 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

## Ordering Information

Device	Package	Shipping
MBR20200E3-0-UB-X	TO-220 (Pb-free lead plating package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton



**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	$V_{RRM}$	200	V
Maximum RMS voltage	$V_{RMS}$	140	V
Maximum DC blocking voltage	$V_{DC}$	200	V
Maximum instantaneous forward voltage at (Note 1)	$V_F$	$I_F=10A, T_C=25^\circ C$	0.90
		$I_F=10A, T_C=125^\circ C$	0.80
		$I_F=20A, T_C=25^\circ C$	1.00
		$I_F=20A, T_C=125^\circ C$	0.90
Maximum Average forward rectified current @ $T_C=161^\circ C$	Per Diode	10	A
	Per Device	20	
Peak repetitive forward current (square wave, 20kHz, $T_C=158^\circ C$ )	$I_{FRM}$	20	A
Non-repetitive peak forward surge current @ 8.3ms single half sine wave superimposed on rated load (JEDEC method)	$I_{FSM}$	150	A
Peak repetitive reverse surge current (Note 1), $T_J < 175^\circ C$	$I_{RRM}$	2.5	A
Maximum instantaneous reverse current at	$I_R$	$V_R=200V, T_C=25^\circ C$	10 $\mu A$
		$V_R=200V, T_C=125^\circ C$	5 mA
Voltage rate of change, (rated $V_R$ )	$dV/dt$	10,000	V/ $\mu s$
Typical junction capacitance @ $f=1MHz$ and applied 5V reverse voltage	$C_J$	130 (typ.)	pF
ESD susceptibility (Note 2)		8000	V
Storage temperature range	$T_{stg}$	-65 ~ +175	$^\circ C$
Operating junction temperature range	$T_J$	-65 ~ +175	$^\circ C$

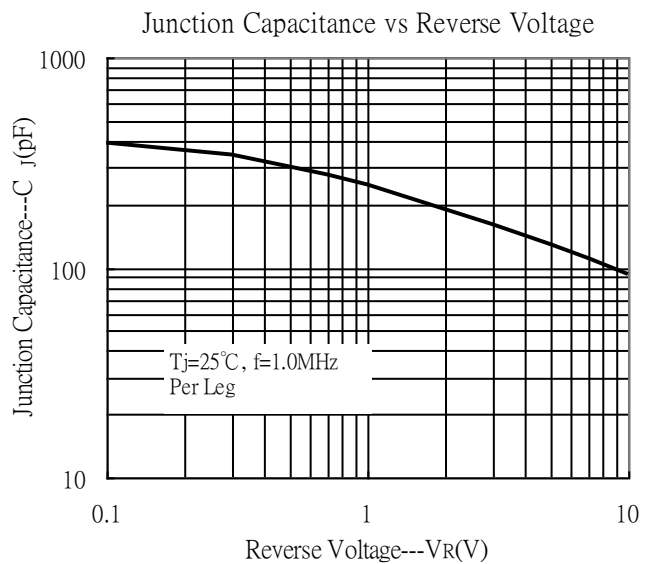
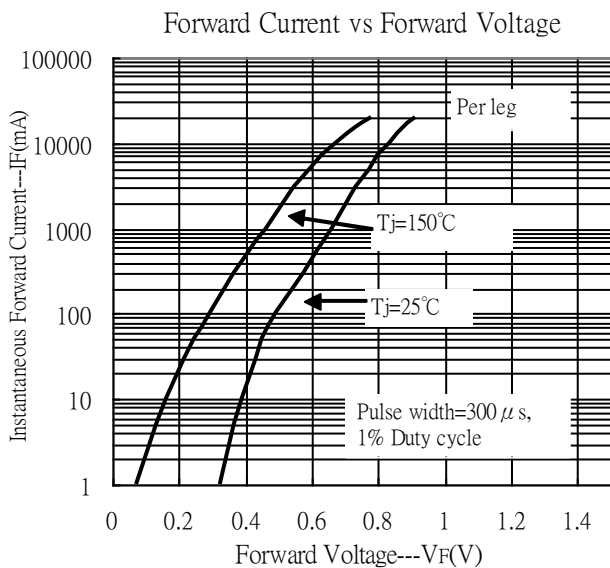
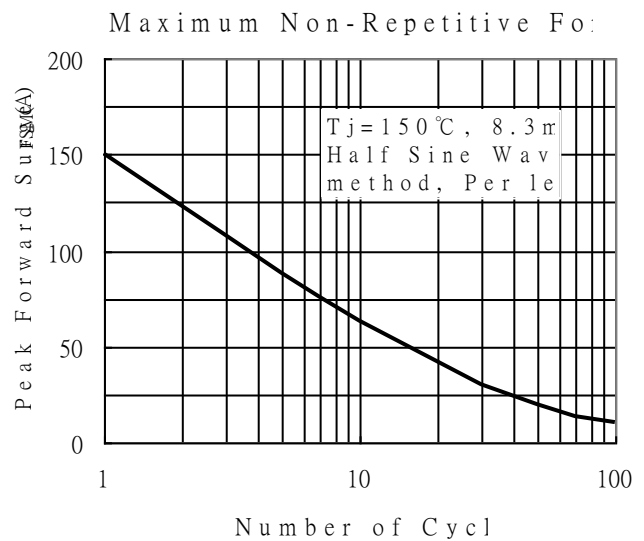
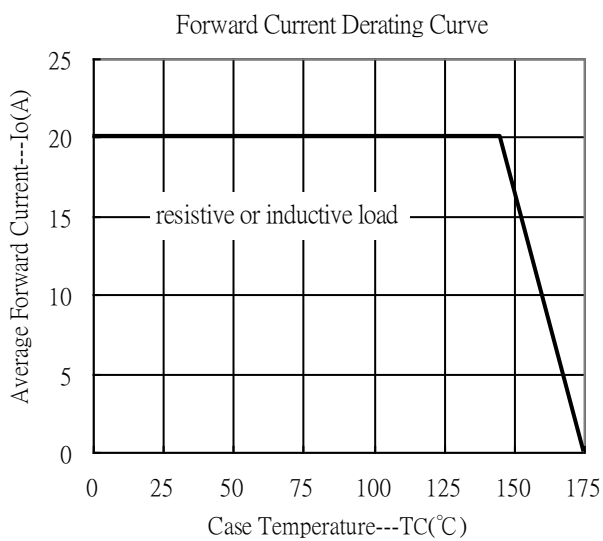
Notes : 1. 2.0 $\mu s$  pulse width,  $f=1.0kHz$

2. Human body model, 1.5k $\Omega$  in series with 100pF

## Thermal Data

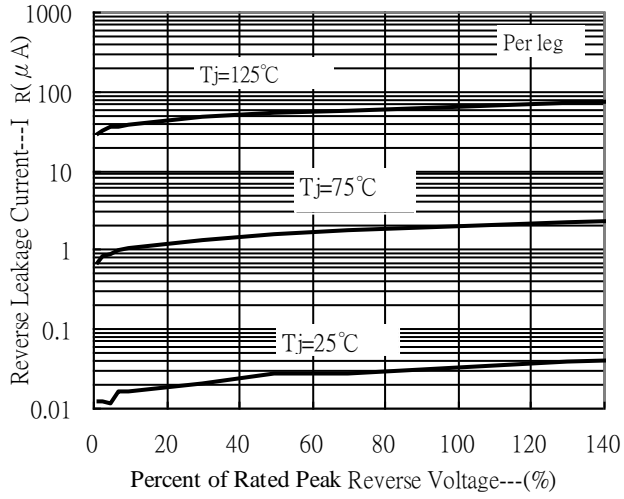
Parameter	Symbol	Value	Unit
Maximum Thermal Resistance, Junction-to-case	$R_{th,j-c}$	2	$^{\circ}C/W$
Maximum Thermal Resistance, Junction-to-ambient	$R_{th,j-a}$	60	$^{\circ}C/W$

## Typical Characteristics





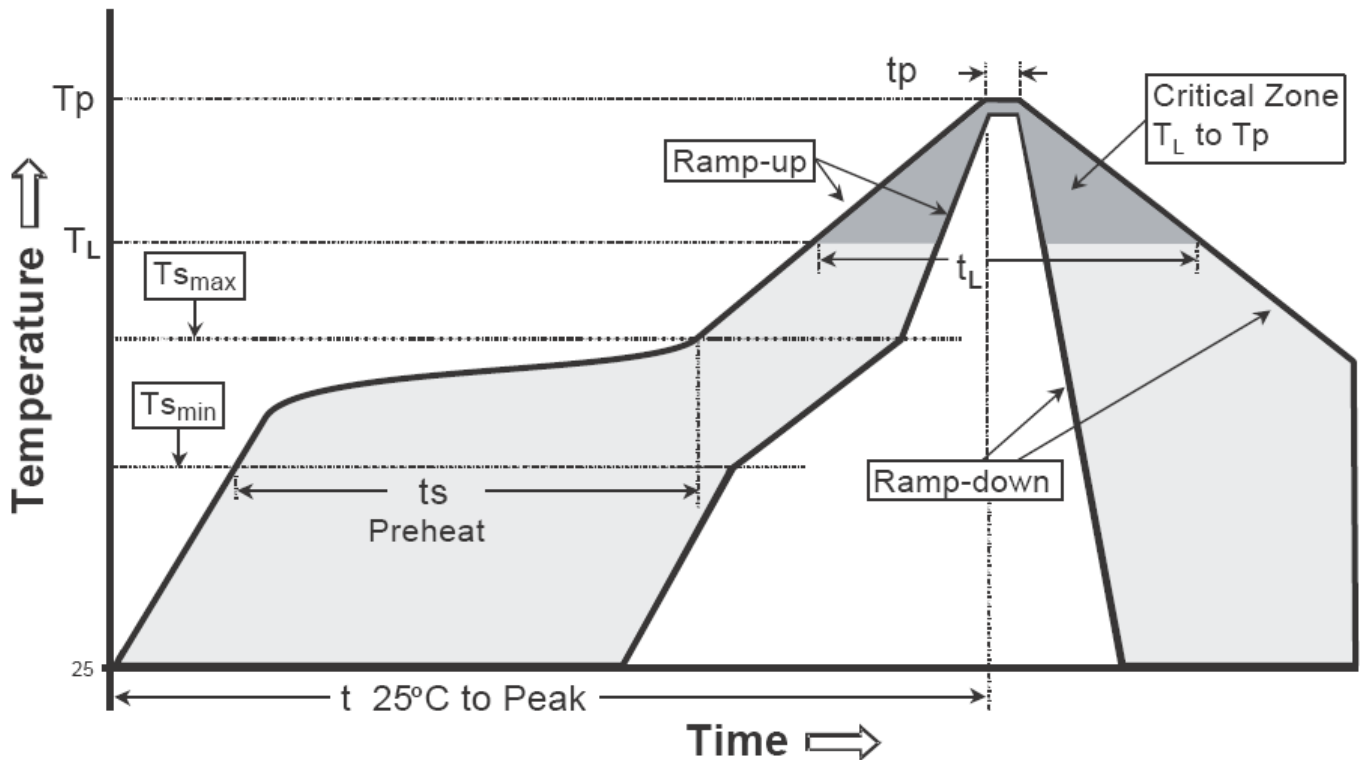
Reverse Leakage Current vs Reverse Voltage



**Recommended wave soldering condition**

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

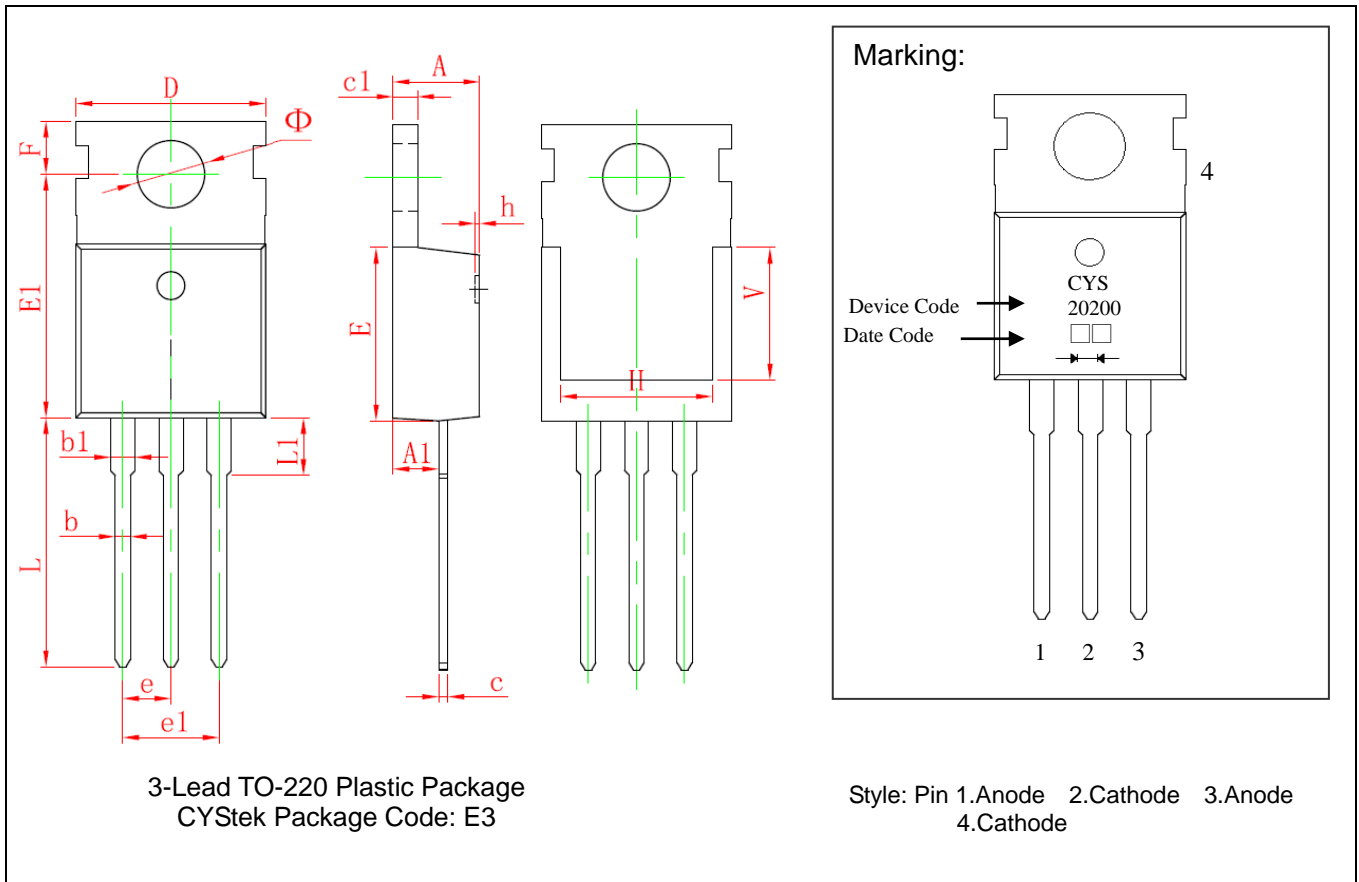
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	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-220 Dimension



\*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181	e	2.540*		0.100*	
A1	2.250	2.550	0.089	0.100	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	F	2.650	2.950	0.104	0.116
b1	1.170	1.370	0.046	0.054	H	7.900	8.100	0.311	0.319
c	0.330	0.650	0.013	0.026	h	0.000	0.300	0.000	0.012
c1	1.200	1.400	0.047	0.055	L	12.900	13.400	0.508	0.528
D	9.910	10.250	0.390	0.404	L1	2.850	3.250	0.112	0.128
E	8.950	9.750	0.352	0.384	V	7.500	REF	0.295	REF
E1	12.650	12.950	0.498	0.510	Φ	3.400	3.800	0.134	0.150

- 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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