SBRFP20U45CTB

20A FIELD PLATED SBR
FIELD PLATED SUPER BARRIER RECTIFIER

Product Summary (Per Leg)

V_{RRM} (V)	I_O (A)	$V_{F\ Max}$ (V) @ +25°C	$I_{R\ (MAX)}$ (mA) @ +25°C
45	10	0.50	0.18

Features and Benefits

- Reduced Ultra Low Voltage Drop (V_F) Increased Efficiency and Cooler Operation
- Patented Super Barrier Rectifier SBR® Technology
- Superior Avalanche Capability (See Max Ratings)
- Excellent Reverse Leakage (I_R) Stability in High-Temperature Circumstance. Increased Reliability Against Thermal Runaway Failure in High-Temperature Operation.
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

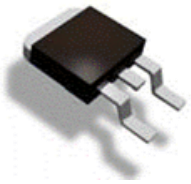
This Super Barrier Rectifier (SBR) diode is ideally suited for applications requiring ultra-low blocking mode. Leading to lower operating temperatures and increased system reliability. Packaged in the robust industry-standard TO263AB (Standard) package. Applications are:

- Polarity Protection Diode
- DC-DC Converters
- AC-DC Adaptors
- Flyback Diode
- Re-Circulating Diode

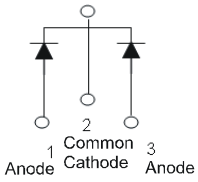
Mechanical Data

- Case: TO263AB
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. (e3)
- Polarity: See Below
- Weight: 1.6 grams (Approximate)

TO263AB (Standard)



Top View



Package Pin-Out Configuration

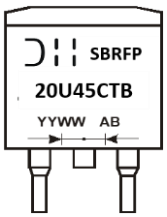
Ordering Information (Note 4)

Part Number	Case	Packaging
SBRFP20U45CTB-13	TO263AB (Standard)	800 Pieces/Reel

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

TO263AB (Standard)



= Manufacturer's Marking
SBRFP20U45CTB = Product Type Marking Code
AB = Foundry and Assembly Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 21 = 2021)
WW = Week (01 to 53)

SBR is a registered trademark of Diodes Incorporated.

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load.
For capacitive load, derate current by 20%.

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_{RM}	45	V
Average Rectified Output Current (Per Leg) (Total)	I_O	10 20	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load (Per Leg)	I_{FSM}	190	A
Non-Repetitive Avalanche Energy (T_J = +25℃, I_{AS} = 4A, L = 50mH)	E_{AS}	590	mJ
Non-Repetitive Avalanche Energy (T_J = +25℃, I_{AS} = 16A, L = 1mH)	E_{AS}	215	mJ
Electrostatic Discharge - Human Body Model	HBM	4000	V
Electrostatic Discharge – Contact Discharge Model	CDM	1	kV

Thermal Characteristics (Per Leg)

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	51	°C/W
Typical Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	10	°C/W
Typical Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	2	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. MRP FR-4 2oz Cu.
6. 50mm x 50mm x 23mm Al heatsink.
The heat generated must be less than the thermal conductivity from junction to case: $dP_D/dT_J < 1/R_{\theta JC}$ or junction to ambient: $dP_D/dT_J < 1/R_{\theta JA}$.

Electrical Characteristics (Per Leg) (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop (Note 6)	V_F	— — — — —	0.32 0.39 0.32 0.44 0.40	— — — 0.50 0.45	V	I_F = 1A, T_J = +25°C I_F = 5A, T_J = +25°C I_F = 5A, T_J = +125°C I_F = 10A, T_J = +25°C I_F = 10A, T_J = +125°C
Leakage Current (Note 7)	I_R	— —	50 15	180 50	μA mA	V_R = 45V, T_J = +25°C V_R = 45V, T_J = +125°C
Junction Capacitance	C_J	—	500	—	pF	V_R = 45V, T_J = +25°C
Reverse Recovery Time	t_{RR}	—	55	—	ns	I_F = 0.5A, I_{RR} = 1A, I_{RR} = 0.25A (RG1)

Notes: 6. 50mm x 50mm x 23mm Al heatsink.
The heat generated must be less than the thermal conductivity from junction to case: $dP_D/dT_J < 1/R_{\theta JC}$ or junction to ambient: $dP_D/dT_J < 1/R_{\theta JA}$.
7. Short duration pulse test used to minimize self-heating effect.

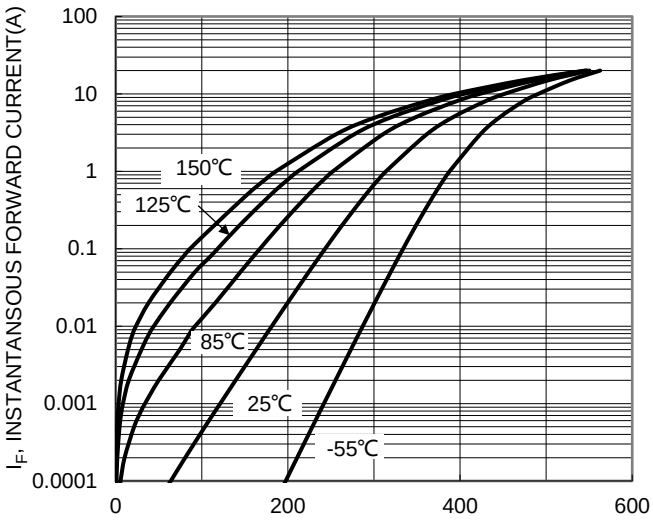


Figure 1. Typical Forward Characteristics

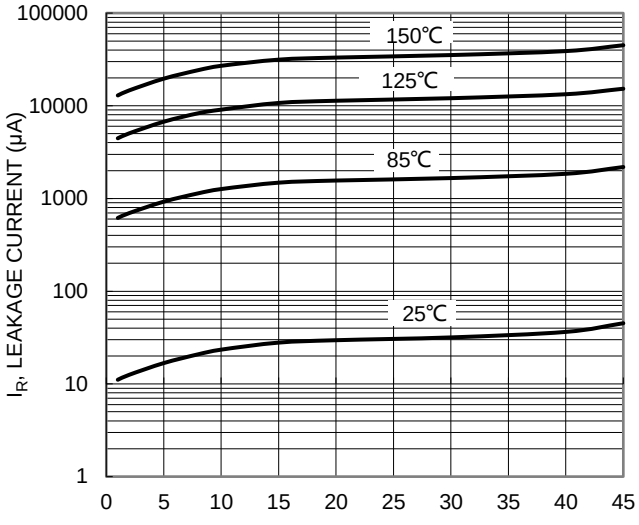


Figure 2. Typical Reverse Characteristics

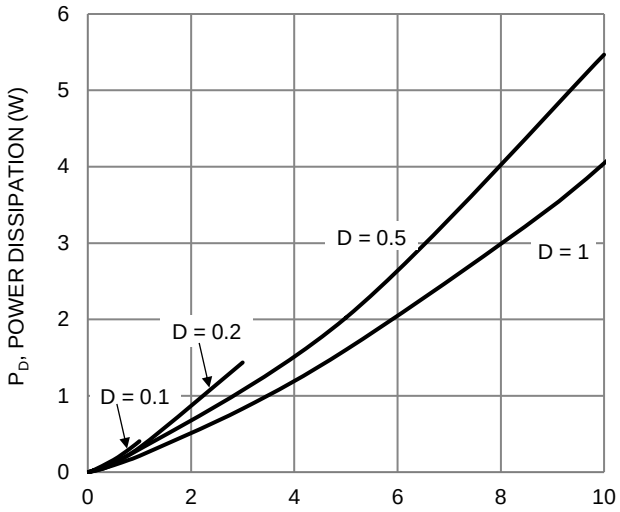


Figure 3. Forward Power Dissipation T_J=125°C

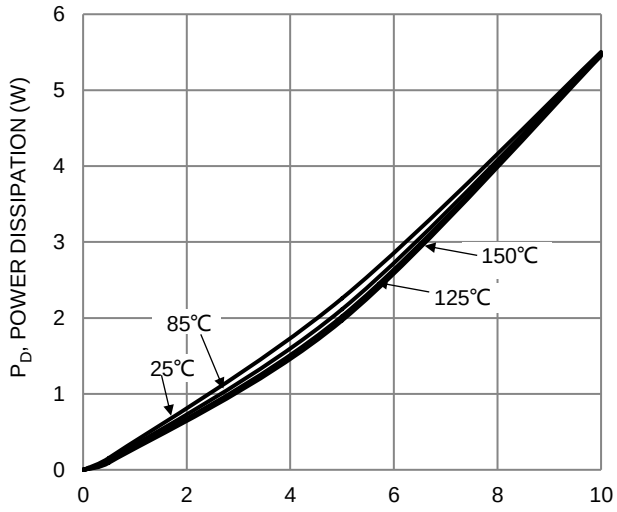


Figure 4. Forward Power Dissipation D=0.5

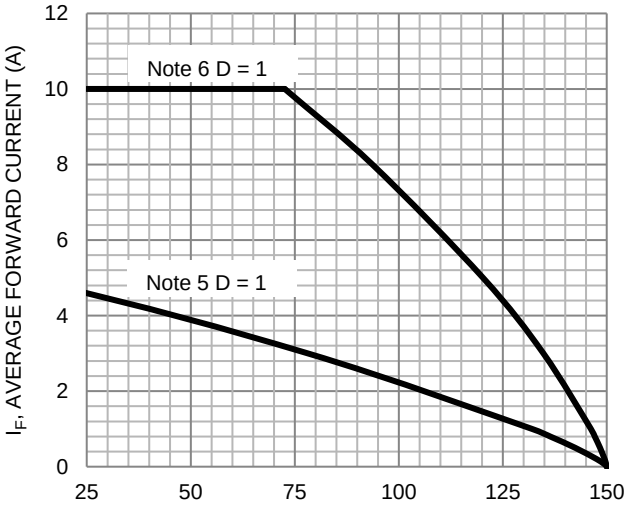


Figure 5. DC Forward Current Derating

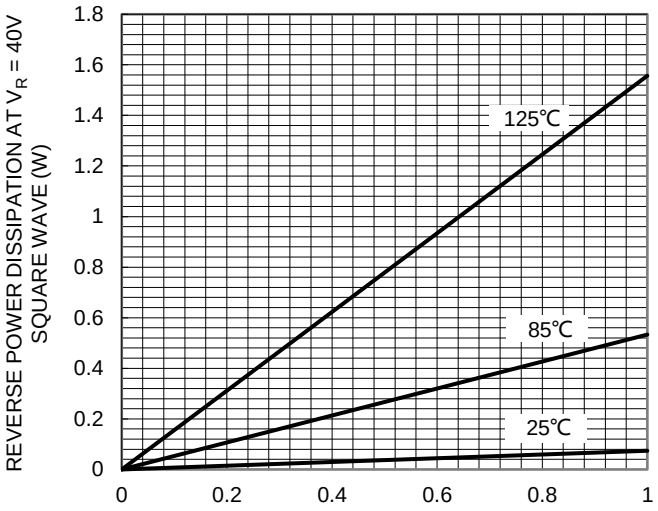


Figure 6. Typical Reverse Characteristics

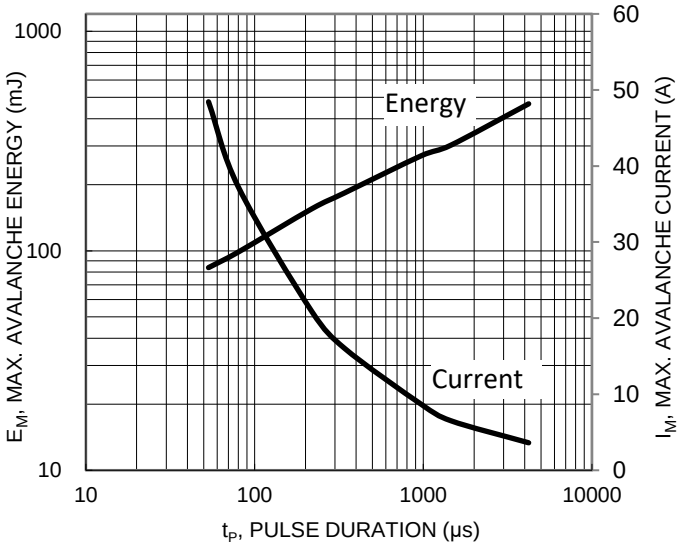


Figure 7. Single Pulse Max. Avalanche Energy and Current

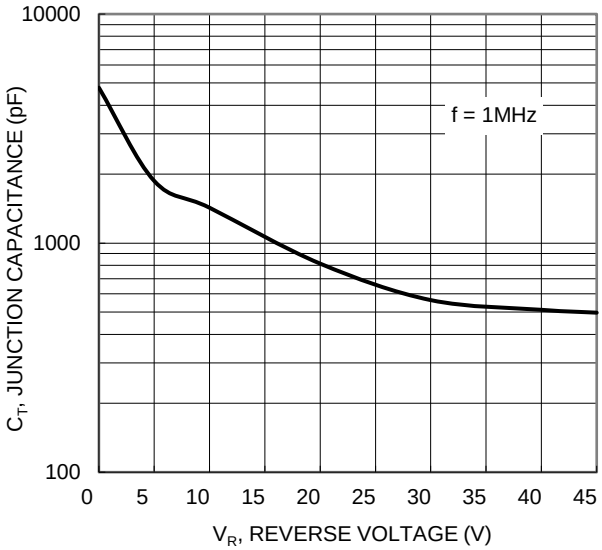
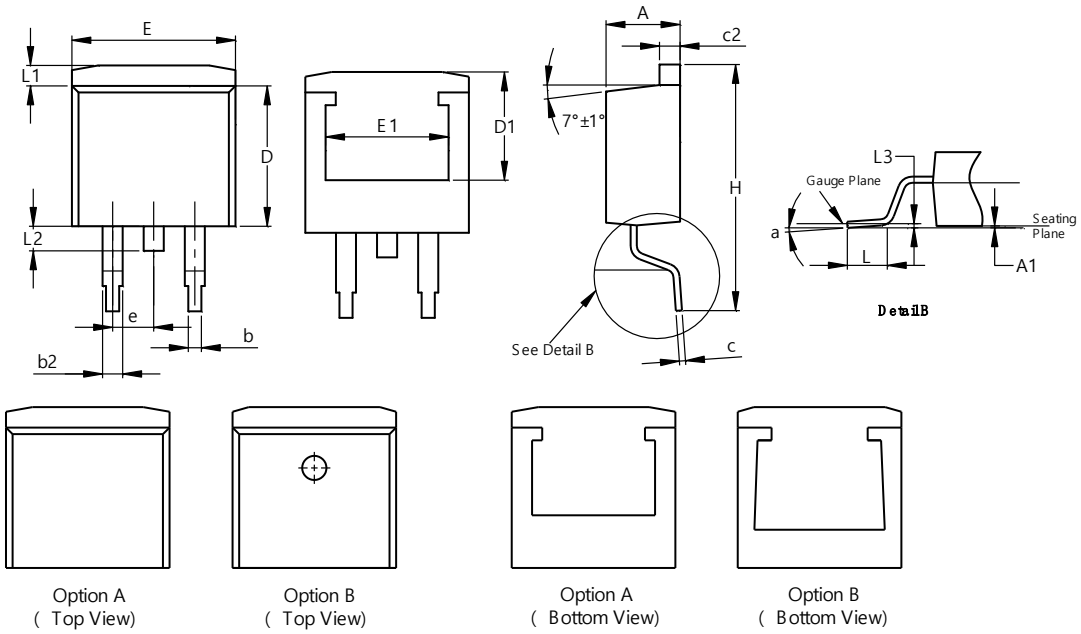


Figure 8. Typical Junction Capacitance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

TO263AB (Standard)

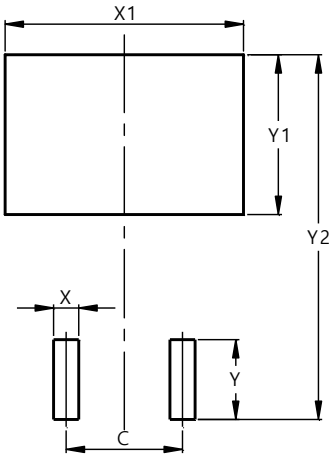


TO263AB (Standard)			
Dim	**Min**	**Max**	**Typ**
A	4.07	4.82	-
A1	0.00	0.25	-
b	0.51	0.99	-
b2	1.15	1.77	-
c	0.356	0.73	-
c2	1.143	1.65	-
D	8.39	9.65	-
D1	6.55	7.80	-
e	2.54 TYP		
E	9.66	10.66	-
E1	6.23	8.23	-
H	14.61	15.87	-
L	1.78	2.79	-
L1	-	1.67	-
L2	-	1.77	-
L3	-	-	0.254
a	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

TO263AB (Standard)



Dimensions	Value (in mm)
C	5.08
X	1.10
X1	10.41
Y	3.50
Y1	7.01
Y2	15.99

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