

## Product Summary

V <sub>RRM</sub> (V)	I <sub>O</sub> (A)	V <sub>F</sub> MAX (V) @+25°C	I <sub>R</sub> MAX (mA) @+25°C
45	10	0.58	0.3

## Description and Applications

This Super Barrier Rectifier (SBR) diode has been designed to meet the stringent requirements of Automotive Applications. It is ideally suited to use as :

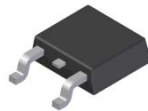
- Polarity Protection Diode
- Re-circulating Diode
- Switching Diode

## Features

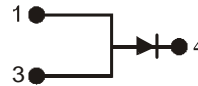
- 100% Avalanche Tested.
- Patented SBR technology provides a superior avalanche capability than schottky diodes ensuring more rugged and reliable end applications.
- Reduced ultra-low forward voltage drop (VF); better efficiency and cooler operation.
- Reduced high temperature reverse leakage; increased reliability against thermal runaway failure at high temperature
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Weight: 0.33 grams (approximate)



Top View



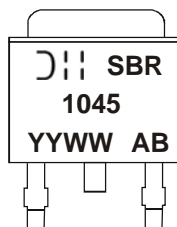
Polarity

## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
SBR1045D1Q-13	Automotive	TO252 (DPAK)	2500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

## Marking Information



SBR1045 = Product Type Marking Code  
 AB = Foundry and Assembly Code  
 YYWW = Date Code Marking  
 YY = Last two digits of year (ex: 13 = 2013)  
 WW = Week (01 - 53)

### Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>	45	V
Working Peak Reverse Voltage	V <sub>RWM</sub>		
DC Blocking Voltage	V <sub>RM</sub>		
RMS Reverse Voltage	V <sub>R(RMS)</sub>	32	V
Average Rectified Output Current	I <sub>O</sub>	10	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	90	A
Repetitive Peak Avalanche Power (1μs, +25°C)	P <sub>ARM</sub>	5000	W
Non-Repetitive Avalanche Energy (T <sub>J</sub> = +25°C, I <sub>AS</sub> = 12A, L = 10mH)	E <sub>AS</sub>	200	mJ

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance			
Thermal Resistance Junction to Ambient (Note 5)	R <sub>θJA</sub>	29	°C/W
Thermal Resistance Junction to Case (Note 5)	R <sub>θJC</sub>	3	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 6)	V <sub>(BR)R</sub>	45	–	–	V	I <sub>R</sub> = 0.5mA
Forward Voltage Drop	V <sub>F</sub>	–	0.42	–	V	I <sub>F</sub> = 5A, T <sub>J</sub> = +25°C
		–	0.37	–		I <sub>F</sub> = 5A, T <sub>J</sub> = +125°C
		–	0.53	0.58		I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C
		–	0.50	–		I <sub>F</sub> = 10A, T <sub>J</sub> = +125°C
Leakage Current (Note 6)	I <sub>R</sub>	–	150	300	μA	V <sub>R</sub> = 45V, T <sub>J</sub> = +25°C
		–	50	–		mA
Total Capacitance	C <sub>T</sub>	–	400	–	pF	V <sub>R</sub> = 5V, f = 1MHz T <sub>J</sub> = +25°C

Notes: 5. Device mounted on polyimide substrate, 240mm<sup>2</sup> Copper pad, double-sided PC Board.  
6. Short duration pulse test used to minimize self-heating effect.

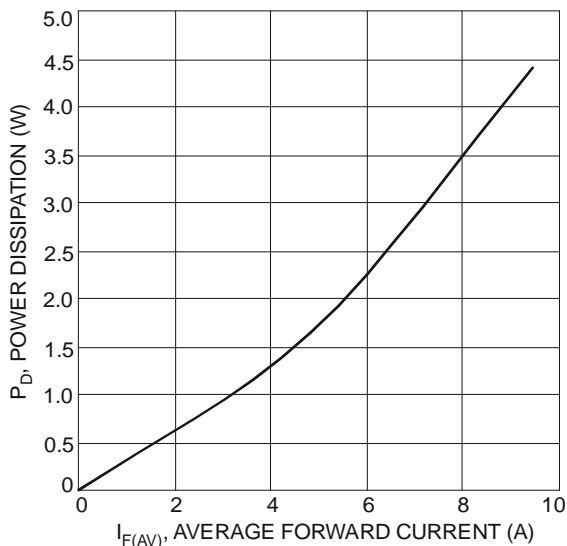


Fig. 1 Forward Power Dissipation

Notes: 7. Polyimide, 2oz. Copper 16x minimum recommended pad layout per <http://www.diodes.com>

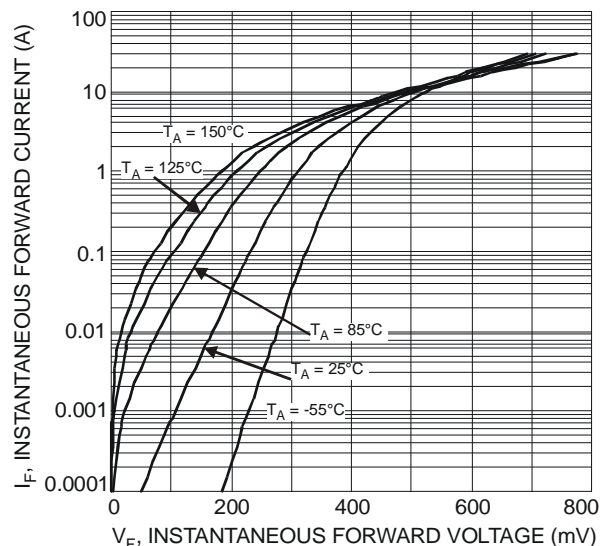


Fig. 2 Typical Forward Characteristics

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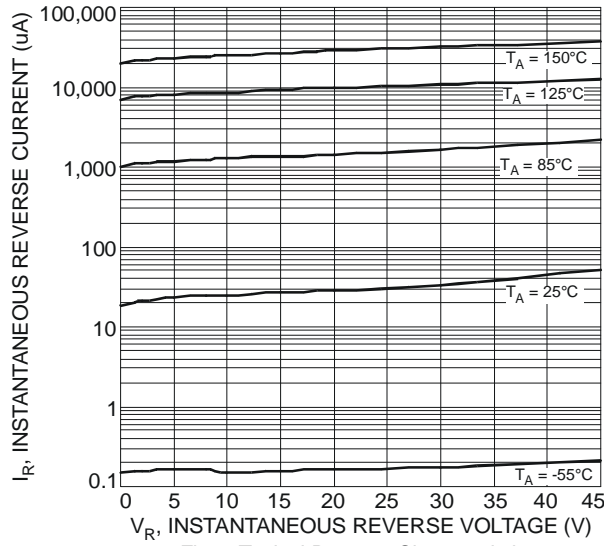


Fig. 3 Typical Reverse Characteristics

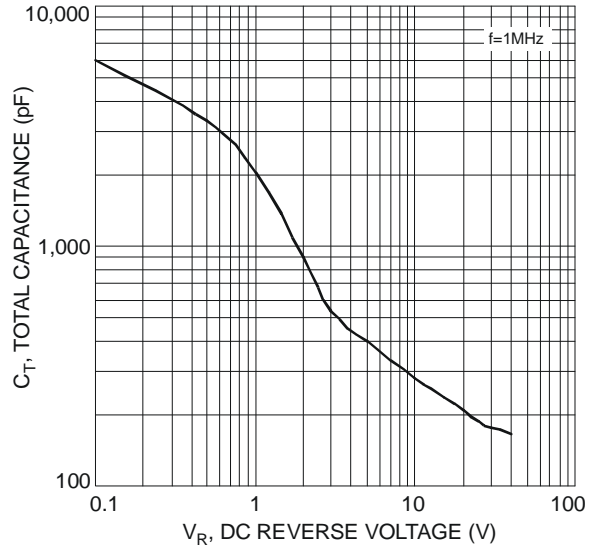


Fig. 4 Total Capacitance vs. Reverse Voltage

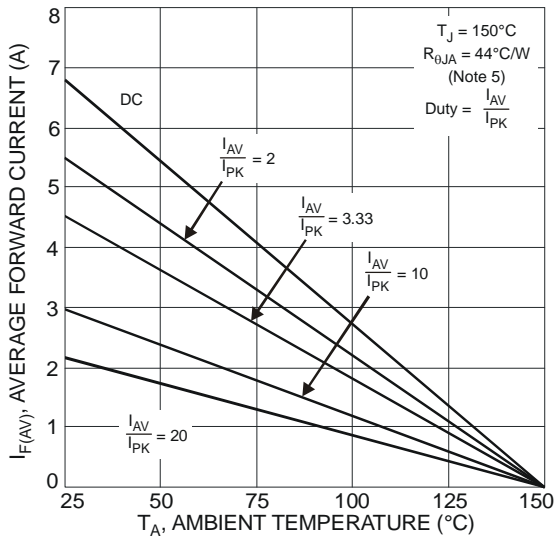


Fig. 5 Forward Current Derating Curve

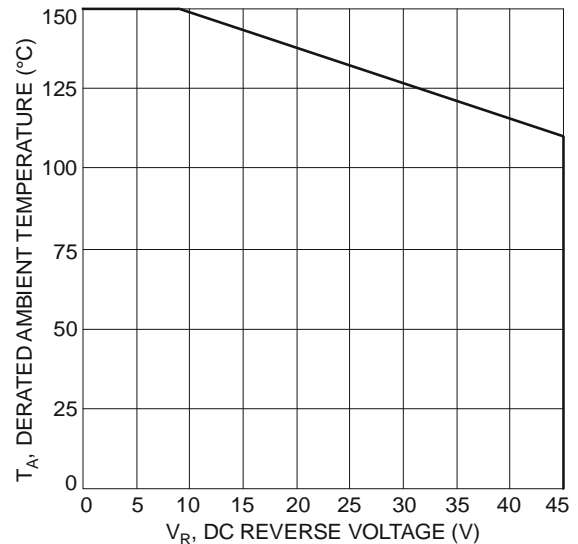


Fig. 6 Operating Temperature Derating

Notes:8. Polyimide, 2oz. Copper 16x minimum recommended pad layout per <http://www.diodes.com>

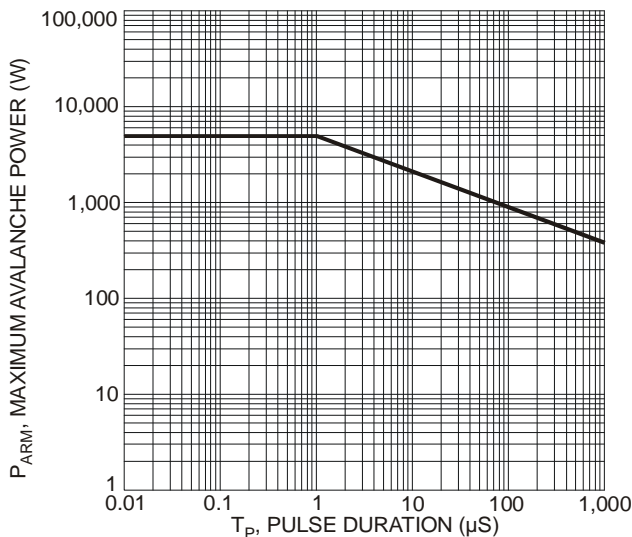


Fig. 7 Maximum Avalanche Power Curve

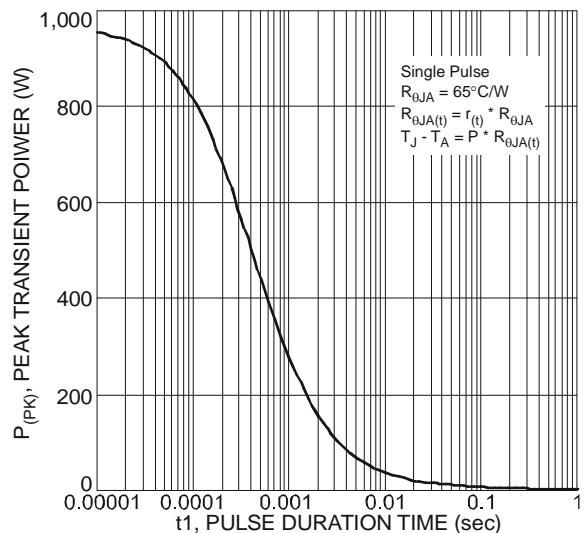
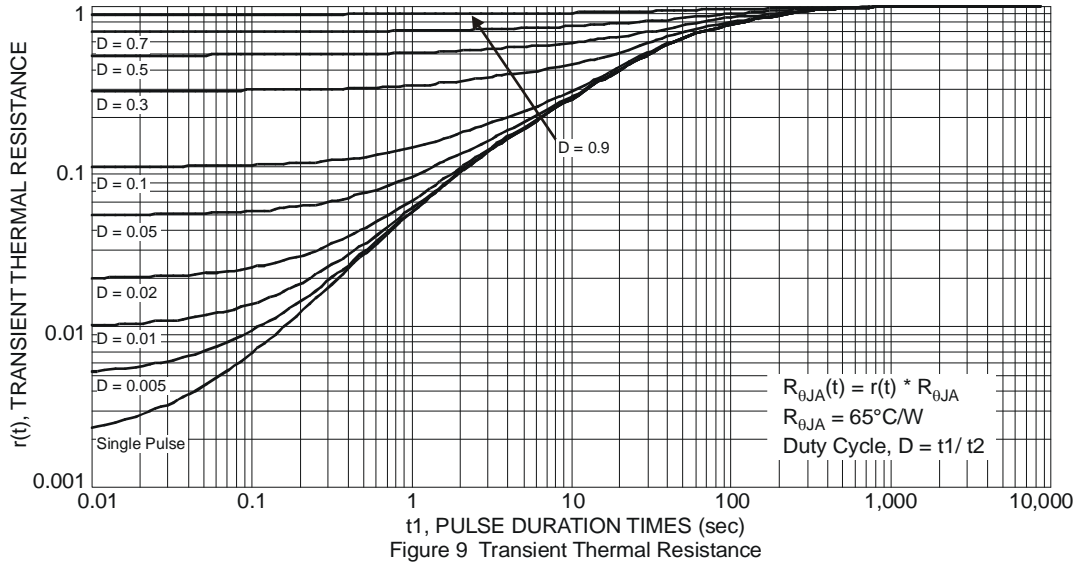
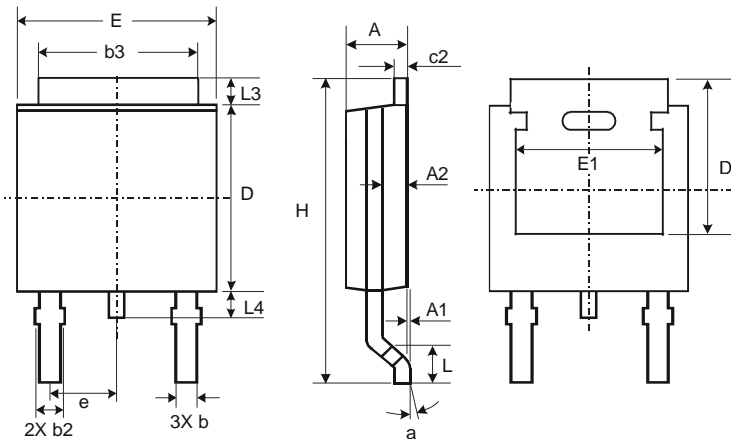


Figure 8 Single Pulse Maximum Power Dissipation



**Package Outline Dimensions**

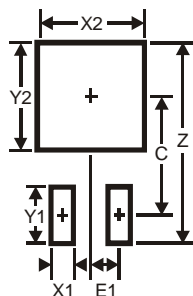
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



TO252			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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