

## Product Summary

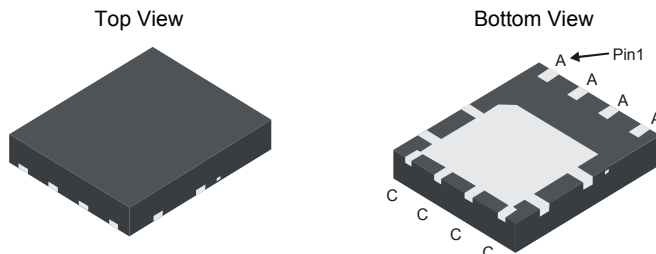
$V_{RRM}$ (V)	$I_o$ (A)	$V_F(MAX)$ (V) @ +25°C	$I_R(MAX)$ (mA) @ +25°C
50	20	0.5	0.5

## Description and Applications

Packaged in the compact thermally efficient POWERDI5060-8 package, the SBRT20U50SLPQ provides very low  $V_F$  and excellent reverse leakage stability at high temperatures. It is ideal for use as a rectifier, freewheel diode or blocking diode in:

- Automotive Applications

POWERDI5060-8

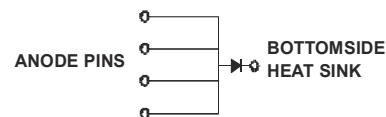


## Features and Benefits

- Patented Trench SBR technology provides superior avalanche capability versus Schottky diodes, ensuring more rugged and reliable end applications.
- Reduced ultra-low forward voltage drop ( $V_F$ ); Better efficiency and cooler operation.
- Reduced high temperature reverse leakage; Increased reliability against thermal runaway failure in high temperature operation.
- Less than 1.1mm package profile – ideal for thin applications.
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free “Green” Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**
- PPAP Capable (Note 4)**

## Mechanical Data

- Case: POWERDI5060-8
- Case Material: Molded Plastic, “Green” Molding compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Polarity: See Below
- Weight: 0.097 grams (approximate)



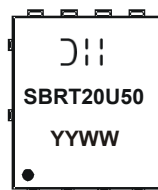
**Note:** All four anode pins must be electrically connected at the printed circuit board.

## Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
SBRT20U50SLPQ-13	Automotive	POWERDI5060-8	2500/Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  - 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.
  - Halogen- and Antimony-free “Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



SBRT20U50 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last two digits of year (ex: 14 = 2014)  
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>	50	V
Working Peak Reverse Voltage	V <sub>RWM</sub>		
DC Blocking Voltage	V <sub>RM</sub>		
RMS Reverse Voltage	V <sub>R(RMS)</sub>	35	V
Average Rectified Output Current	I <sub>O</sub>	20	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	200	A
Non-Repetitive Avalanche Energy (T <sub>J</sub> = +25°C, I <sub>AS</sub> = 14.5A, L = 8.5Mh)	E <sub>AS</sub>	640	mJ
Repetitive Peak Avalanche Energy (1μs, +25°C)	P <sub>ARM</sub>	40000	W

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 6)	R <sub>θJA</sub>	12	°C/W
Operating Temperature Range	T <sub>J</sub>	-55 to +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop (Note 7)	V <sub>F</sub>	—	0.375	0.420	V	I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C
		—	0.445	0.500		I <sub>F</sub> = 20A, T <sub>J</sub> = +25°C
Leakage Current (Note 7)	I <sub>R</sub>	—	0.144	0.500	mA	V <sub>R</sub> = 50V, T <sub>J</sub> = +25°C
		—	—	100		V <sub>R</sub> = 50V, T <sub>J</sub> = +125°C
Total Capacitance	C <sub>T</sub>	—	350	—	pF	V <sub>R</sub> = 50V, f = 1MHz
Reverse Recovery Time	t <sub>rr</sub>	—	48	—	ns	I <sub>F</sub> =0.5A, I <sub>R</sub> =1.0A, I <sub>rr</sub> =0.25A, RG1

Notes: 6. Device mounted on Al substrate PCB (30mm\*30mm) with additional heat sink (Al 48mm\*35mm\*80mm)  
7. Short duration pulse test used to minimize self-heating effect.

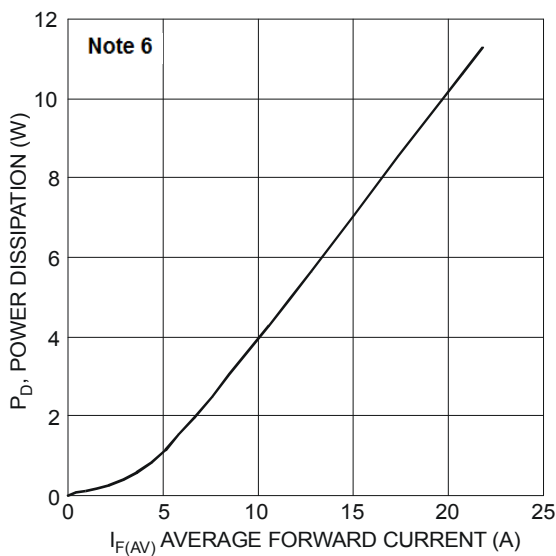


Figure 1 Forward Power Dissipation

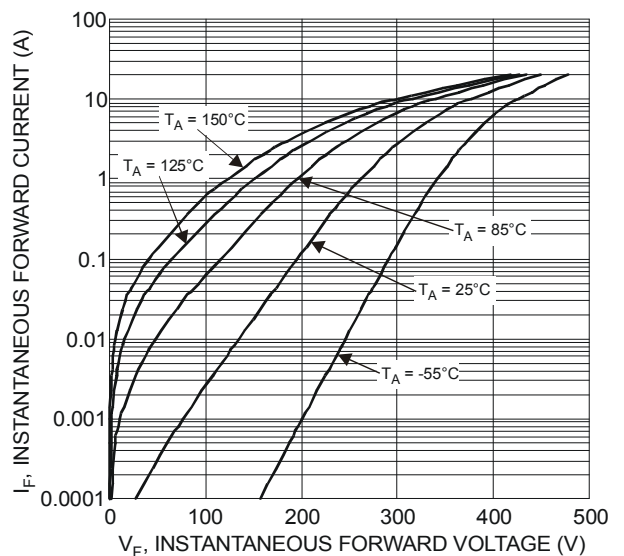


Figure 2 Typical Forward Characteristics

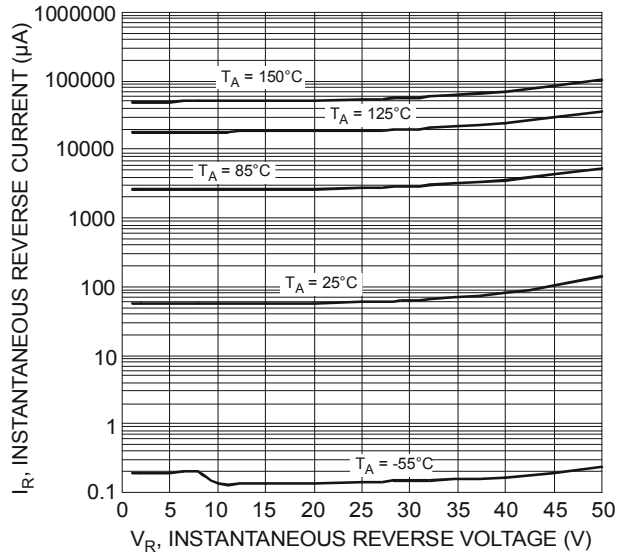


Figure 3 Typical Reverse Characteristics

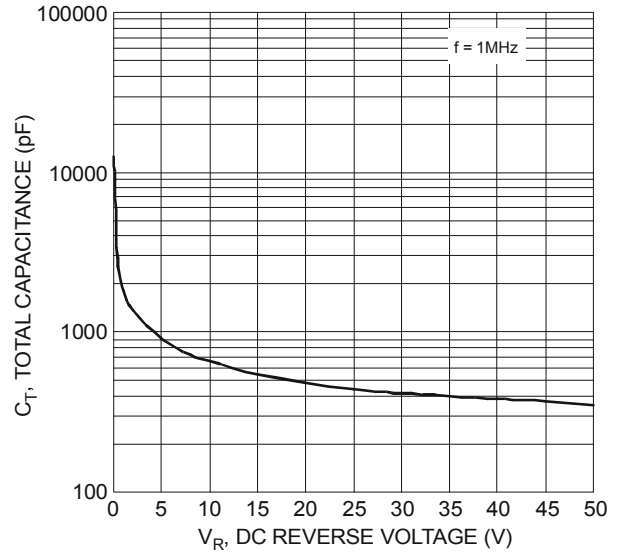


Figure 4 Total Capacitance vs. Reverse Voltage

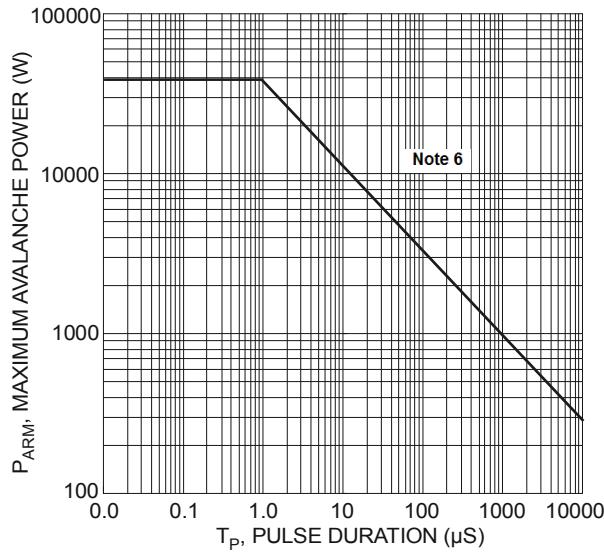


Figure 5 Maximum Avalanche Power Curve

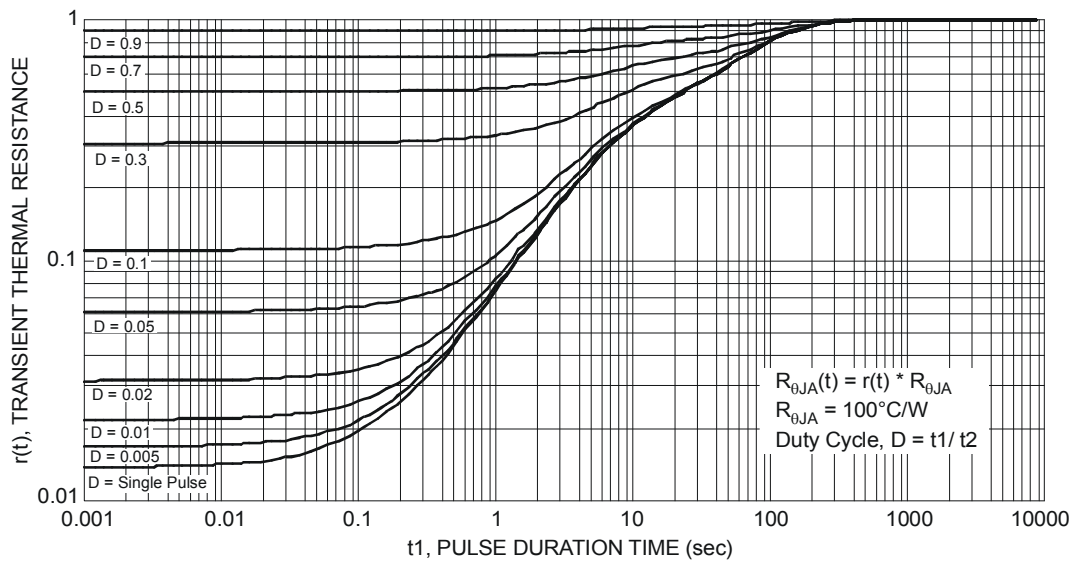
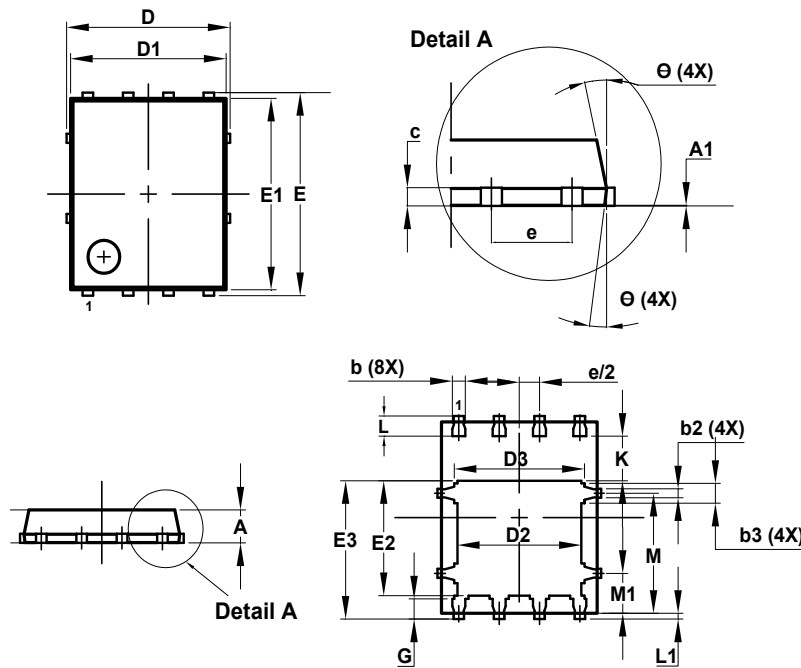


Figure 6 Transient Thermal Resistance

## Package Outline Dimensions

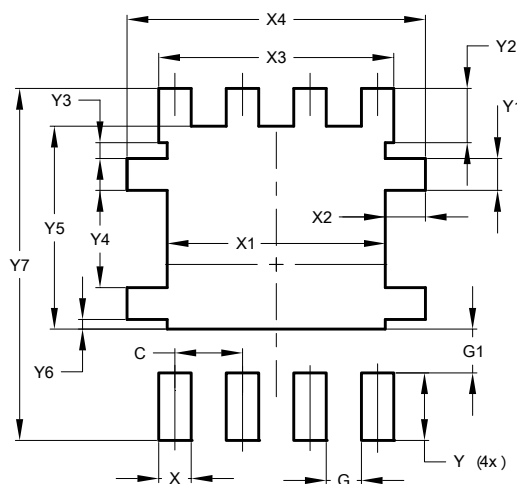
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



POWERDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	—
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51	—	—
L	0.51	0.71	0.61
L1	0.050	0.20	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
$\theta$	10°	12°	11°
$\theta$ 1	6°	8°	7°
All Dimensions in mm			

## Suggested Pad Layout

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



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	0.755
X3	4.420
X4	5.610
Y	1.270
Y1	0.600
Y2	1.020
Y3	0.295
Y4	1.825
Y5	3.810
Y6	0.180
Y7	6.610

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