SBRT20U50SLPQ

20A TRENCH SBR
TRENCH SUPER BARRIER RECTIFIER
PowerDI5060-8

Product Summary

V_{RRM} (V)	Io (A)	$V_{F(Max)}$ (V) @ +25°C	$I_{R(Max)}$ (mA) @ +25°C
50	20	0.5	0.5

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)**
- **The SBRT20U50SLPQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

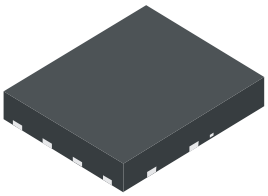
Packaged in the compact thermally efficient PowerDI®5060-8 package, the SBRT20U50SLPQ provides very low V_F and excellent reverse leakage stability at high temperatures. It is ideal for use as a rectifier, freewheel diode or blocking diode in automotive applications.

Mechanical Data

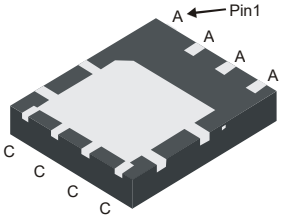
- Package: PowerDI5060-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Polarity: See Below
- Weight: 0.097 grams (Approximate)

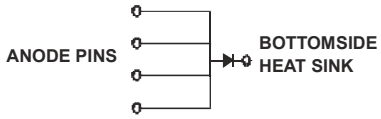
PowerDI5060-8

Top View



Bottom View





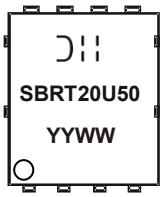
Note: All four anode pins must be electrically connected at the printed circuit board.

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
SBRT20U50SLPQ-13	PowerDI5060-8	2,500	Tape & 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



SBRT20U50 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 25 = 2025)
WW = Week (01 to 53)

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}	50	V
RMS Reverse Voltage	$V_{R(RMS)}$	35	V
Average Rectified Output Current	I_O	20	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine Wave Superimposed on Rated Load	I_{FSM}	200	A
Non-Repetitive Avalanche Energy (T_J = +25°C, I_{AS} = 14.5A, L = 8.5Mh)	E_{AS}	640	mJ
Repetitive Peak Avalanche Energy (1µs, +25°C)	P_{ARM}	40,000	W

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 5)	$R_{\theta JA}$	12	°C/W
Operating Temperature Range	T_J	-55 to +150	°C
Storage Temperature Range	T_{STG}	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop (Note 6)	V_F	— —	0.375 0.445	0.420 0.500	V	I_F = 10A, T_J = +25°C I_F = 20A, T_J = +25°C
Leakage Current (Note 6)	I_R	— —	0.144 —	0.500 100	mA	V_R = 50V, T_J = +25°C V_R = 50V, T_J = +125°C
Total Capacitance	C_T	—	350	—	pF	V_R = 50V, f = 1MHz
Reverse-Recovery Time	t_{rr}	—	48	—	ns	I_F = 0.5A, I_R = 1.0A, I_{rr} = 0.25A, RG1

Notes: 5. Device mounted on Al substrate PCB (30mm*30mm) with additional heat sink (Al 48mm*35mm*80mm).
6. Short duration pulse test used to minimize self-heating effect.

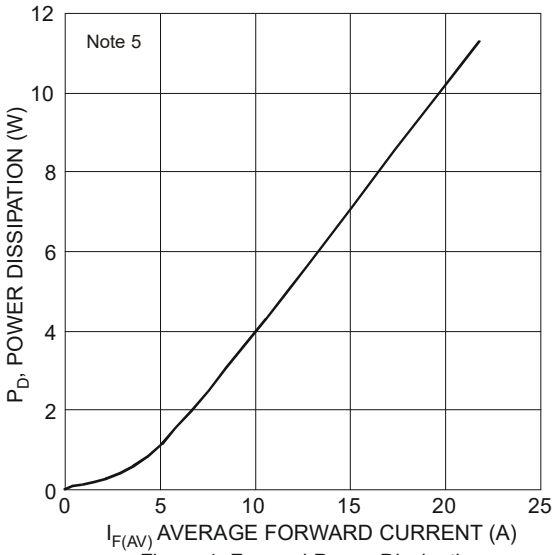


Figure 1 Forward Power Dissipation

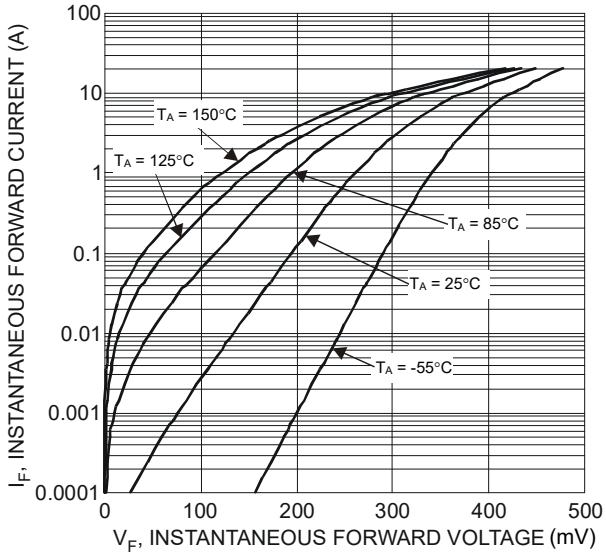


Figure 2 Typical Forward Characteristics

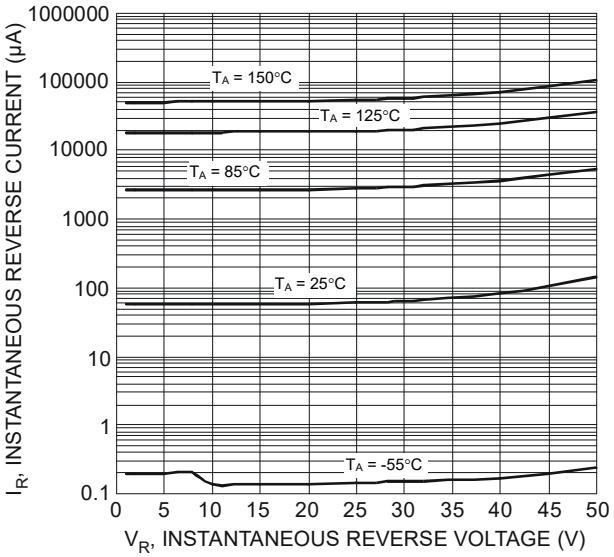


Figure 3 Typical Reverse Characteristics

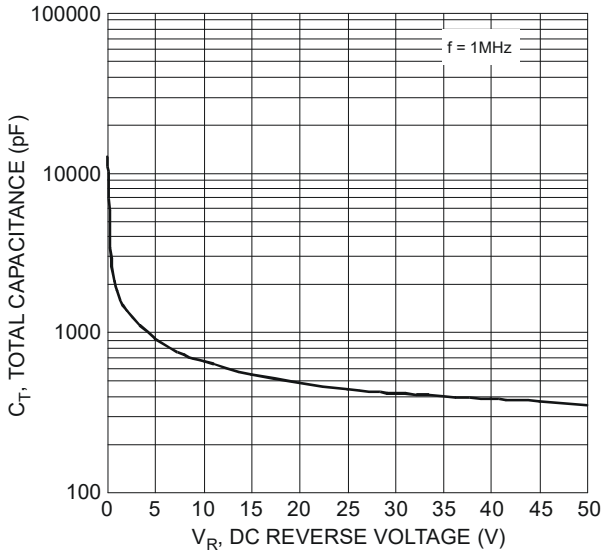


Figure 4 Total Capacitance vs. Reverse Voltage

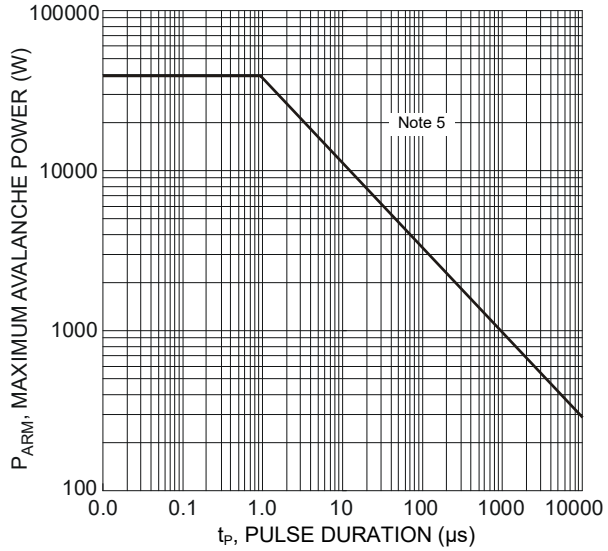


Figure 5 Maximum Avalanche Power Curve

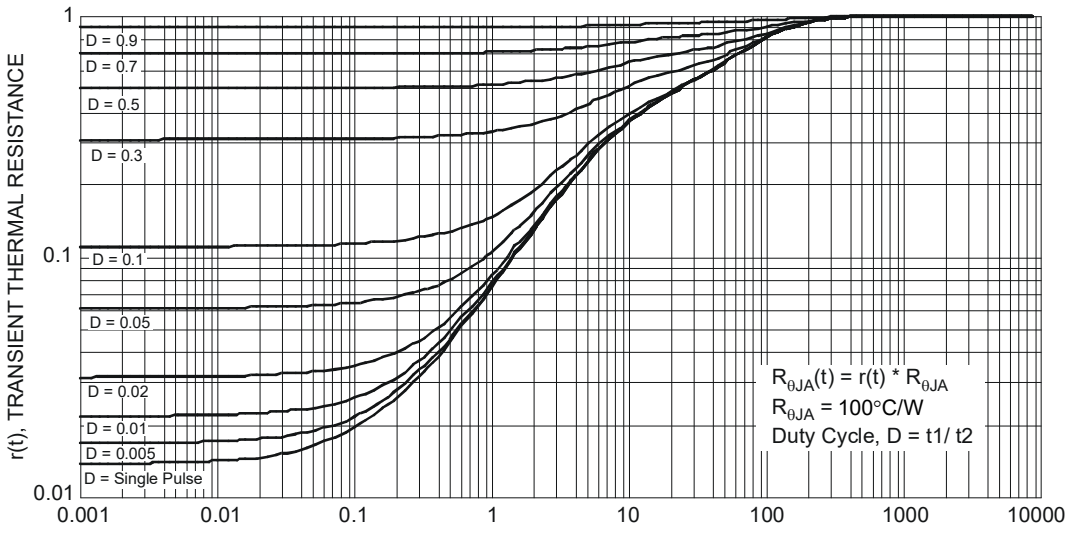


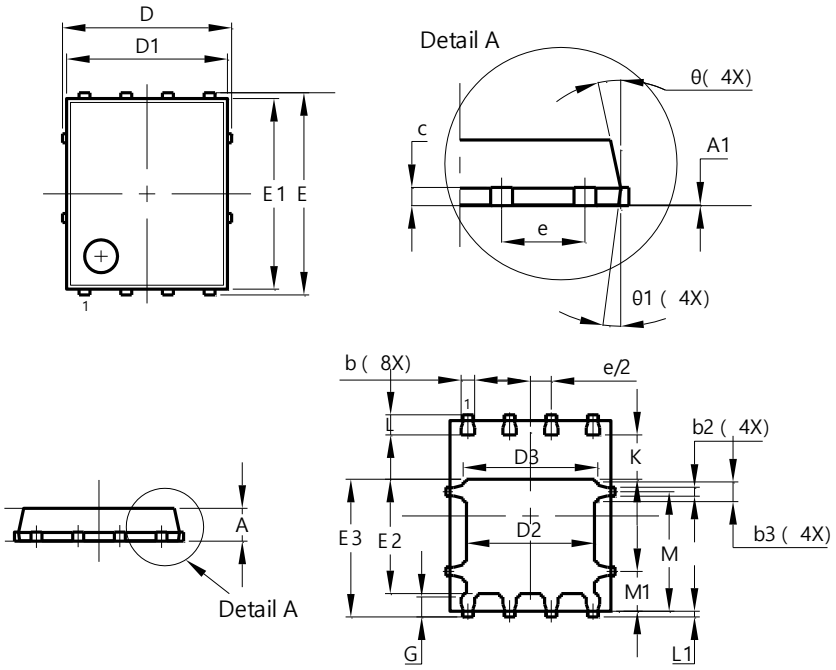
Figure 6 Transient Thermal Resistance

Note: 5. Device mounted on Al substrate PCB (30mm*30mm) with additional heat sink (Al 48mm*35mm*80mm).

Package Outline Dimensions

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

PowerDI5060-8

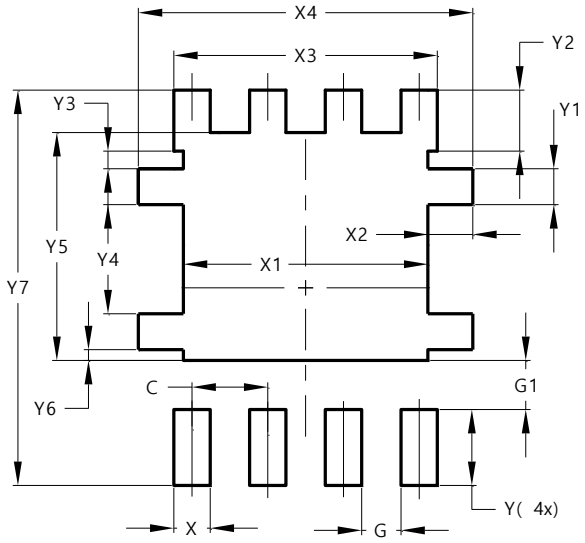


PowerDI5060-8			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.10	1.00
A1	0.00	0.05	–
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51	–	–
L	0.51	0.71	0.61
L1	0.100	0.200	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
Θ	10°	12°	11°
Θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI5060-8



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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