

## 650V SiC Schottky Diode

VDC	650 V
Q <sub>C</sub>	20 nC
I <sub>F</sub>	8 A
T <sub>j,max</sub>	175 °C

### Amp+™ Features

- Unipolar rectifier with surge current
- Zero reverse recovery current
- Fast, temperature-independent switching
- Avalanche tested to 38mJ\*
- All parts tested to greater than 715V

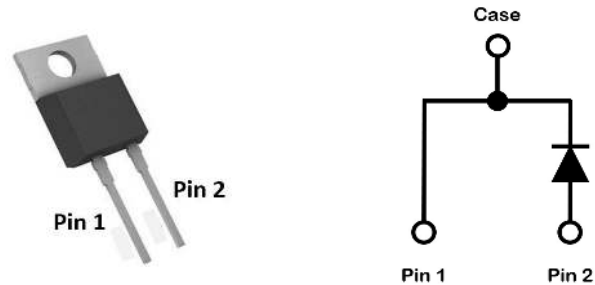
### Amp+™ Benefits

- Near zero switching loss
- Higher efficiency
- Smaller heat sink
- Easy to parallel

### Amp+™ Applications

- Switch mode power supplies, UPS
- Power factor correction
- EV charging stations
- Output rectification

### Package



Part #	Package	Marking
GP3D008A065A	TO-220-2L	3D008A065



### Maximum Ratings, at T<sub>j</sub>=25 °C, unless otherwise specified

Characteristics	Symbol	Conditions	Values	Unit
Continuous forward current	I <sub>F**</sub>	T <sub>C</sub> =25 °C, T <sub>J</sub> =175 °C	27	A
		T <sub>C</sub> =125 °C, T <sub>J</sub> =175 °C	15	
		T <sub>C</sub> =150 °C, T <sub>J</sub> =175 °C	9	
Surge non-repetitive forward current sine halfwave	I <sub>FSM</sub>	T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms	74	A
		T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms	70	
Non-repetitive peak forward current	I <sub>F,max</sub>	T <sub>C</sub> =25 °C, t <sub>p</sub> =10 μs	700	A
i <sup>2</sup> t value	∫i <sup>2</sup> dt	T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms	23	A <sup>2</sup> s
		T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms	20	
Repetitive peak reverse voltage	V <sub>RRM</sub>	T <sub>J</sub> =25 °C	650	V
Diode dv/dt ruggedness	dv/dt	Turn-on slew rate, repetitive	200	V/ns
Power dissipation	P <sub>tot**</sub>	T <sub>C</sub> =25 °C	107	W
Operating junction & storage temperature	T <sub>j</sub> , T <sub>storage</sub>	Continuous	-55...175	°C
Soldering temperature	T <sub>solder</sub>	Wave soldering leads	260	°C
Mounting torque		M3 Screw	1	N-m

**Notes:**

\* EAS of 38 mJ is based on starting T<sub>J</sub> = 25°C, L = 1.0 mH, IAS = 8.72 A, V = 50 V.

\*\* Typical R<sub>thJC</sub> used

Electrical Characteristics, at T<sub>j</sub>=25 °C, unless otherwise specified

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
DC blocking voltage	V <sub>DC</sub>	T <sub>j</sub> =25 °C	650	-	-	V
Breakdown voltage	V <sub>BR</sub>	I <sub>R</sub> =264μA, T <sub>j</sub> =25 °C	715	-	-	V
Diode forward voltage	V <sub>F</sub>	I <sub>F</sub> =8A, T <sub>j</sub> =25 °C	-	1.38	1.50	V
		I <sub>F</sub> =8A, T <sub>j</sub> =125 °C	-	1.49	-	
		I <sub>F</sub> =8A, T <sub>j</sub> =175 °C	-	1.61	1.80	
Reverse current	I <sub>R</sub>	V <sub>R</sub> =650V, T <sub>j</sub> =25 °C	-	3	20	μA
		V <sub>R</sub> =715V, T <sub>j</sub> =25 °C	-	9	-	
		V <sub>R</sub> =650V, T <sub>j</sub> =125 °C	-	15	-	
		V <sub>R</sub> =650V, T <sub>j</sub> =175 °C	-	46	200	
Total capacitive charge	Q <sub>C</sub>	V <sub>R</sub> =400V, T <sub>j</sub> =25 °C	-	20	-	nC
Total capacitance	C	V <sub>R</sub> =1V, f=1 MHz	-	321	-	pF
		V <sub>R</sub> =200V, f=1 MHz	-	38	-	
		V <sub>R</sub> =400V, f=1 MHz	-	31	-	

Thermal Characteristics

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction-case	R <sub>thJC</sub>	-	-	1.40	2.00	°C/W

Typical Performance

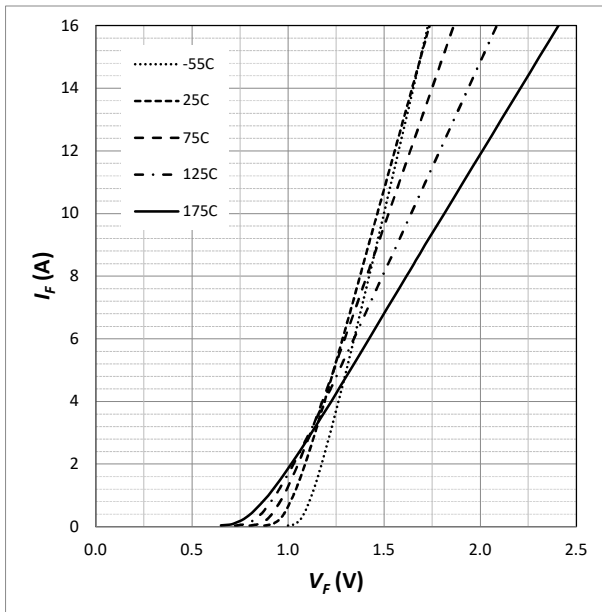


Fig. 1 Forward Characteristics (parameterized on T<sub>j</sub>)

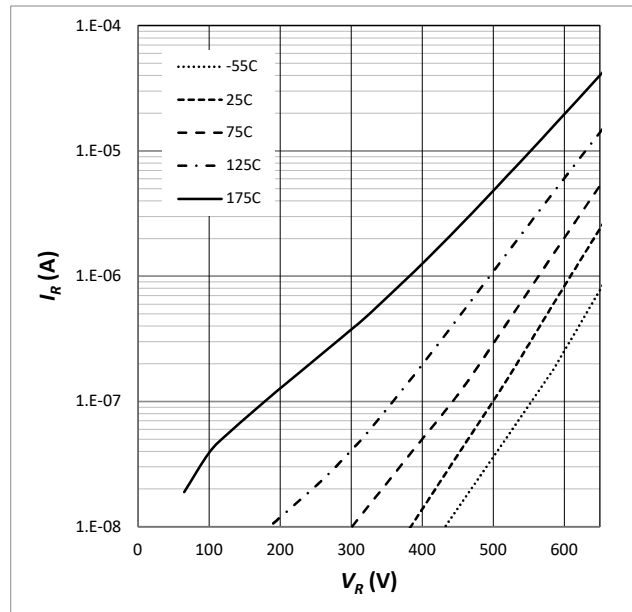


Fig. 2 Reverse Characteristics (parameterized on T<sub>j</sub>)

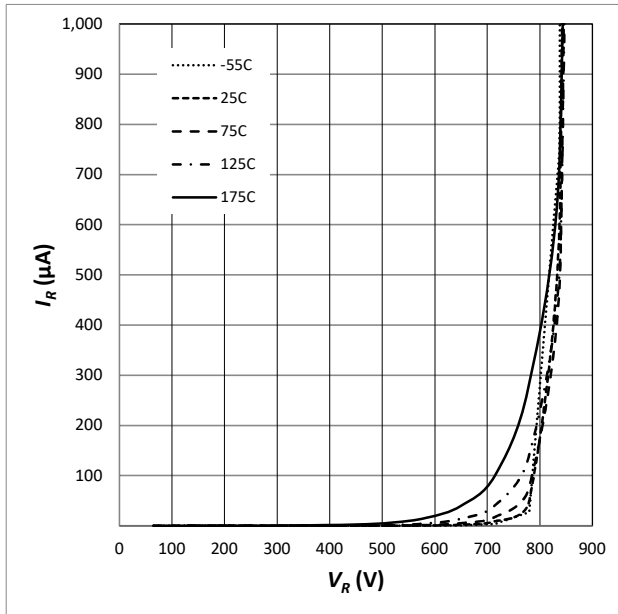


Fig. 3 Reverse Characteristics (parameterized on  $T_j$ )

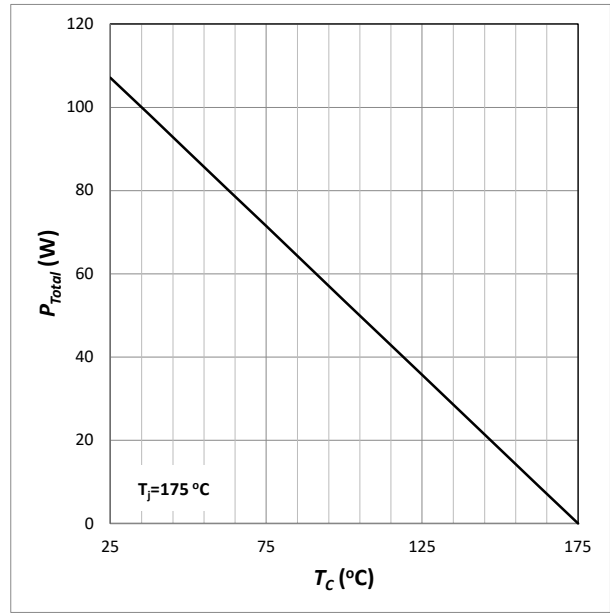


Fig. 4 Power Derating

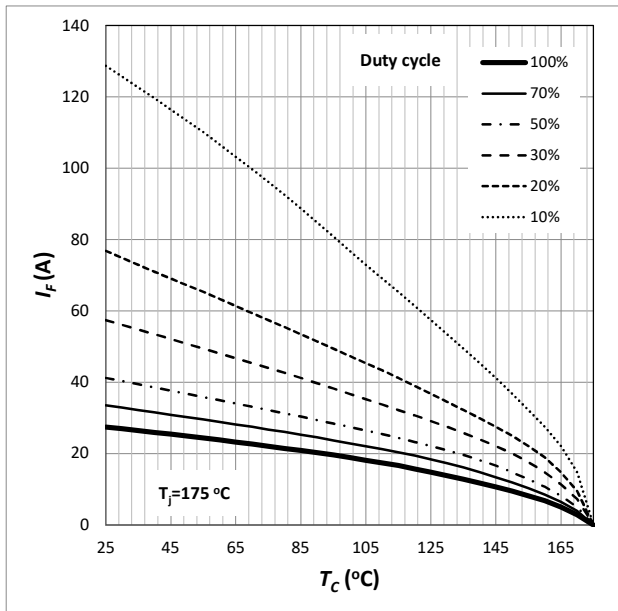


Fig. 5 Capacitance

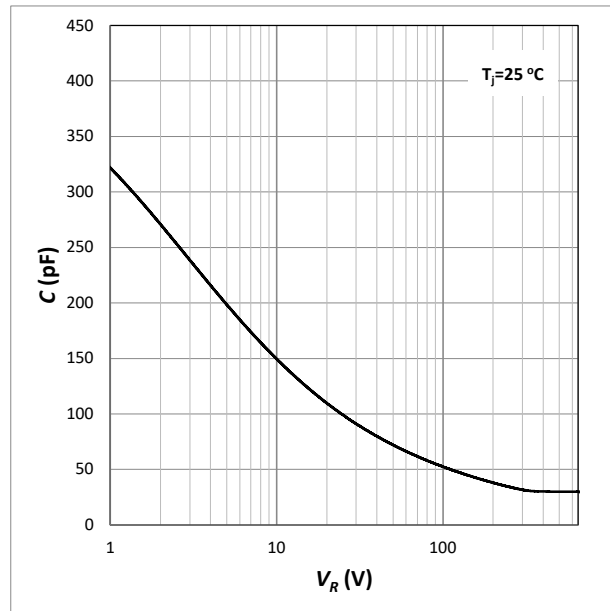


Fig. 6 Capacitance

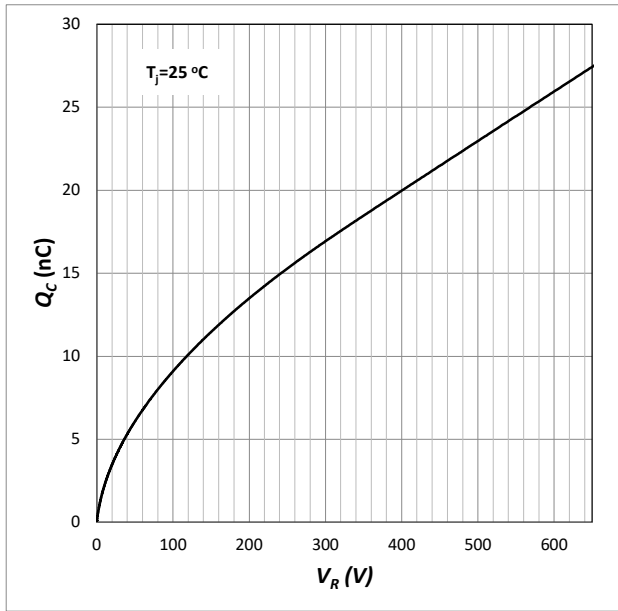


Fig. 7 Capacitive Charge

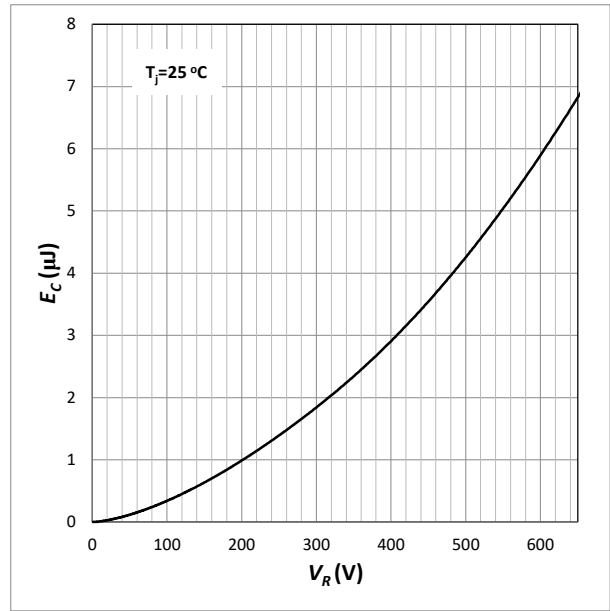


Fig. 8 Typical Capacitance Stored Energy

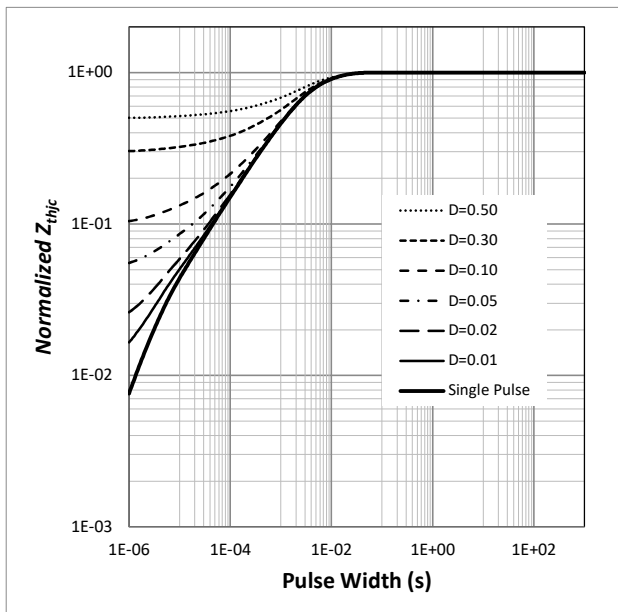


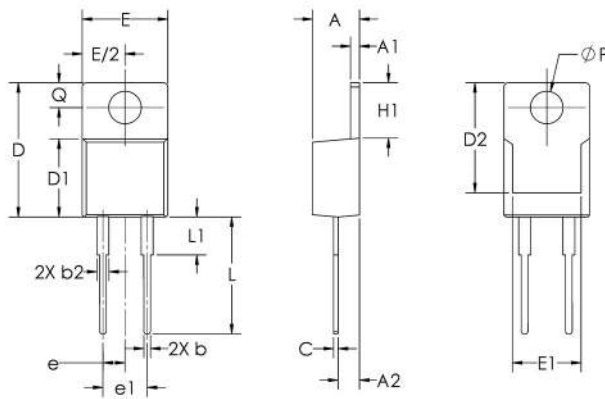
Fig. 9 Transient Thermal Impedance

# 650V SiC Schottky Diode

Amp+™

GP3D008A065A

## Package Dimensions TO-220-2L



Sym	Millimeters		Inches	
	Min	Max	Min	Max
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.02	1.78	0.040	0.070
c	0.36	0.76	0.014	0.030
D	14.22	16.51	0.560	0.650
D1	8.38	9.40	0.330	0.370
D2	12.19	13.13	0.480	0.517
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		.100 BSC	
e1	5.08 BSC		.200 BSC	
H1	5.84	6.86	0.230	0.270
L	12.57	14.73	0.495	0.580
L1	3.60	6.35	0.142	0.250
ØP	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

### Notes

#### RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of [www.SemiQ.com](http://www.SemiQ.com).

#### REACH Compliance

REACH substances of high concern (SVHC) information is available for this product. Since the European Chemicals Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact our office at SemiQ Headquarters in Lake Forest, California to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

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