GP3D010A065A

V_{DC}	650 V
Q_C	27 nC
I_F	10 A
T_j,max	175 °C

650V SiC Schottky Diode

Amp+™ Features

- Unipolar rectifier with surge current
- Zero reverse recovery current
- Fast, temperature-independent switching
- Avalanche tested to 67mJ*
- All parts tested to greater than 715V

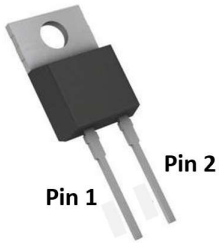
Amp+™ Benefits

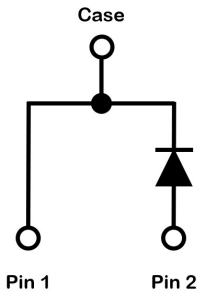
- Near zero switching loss
- Higher efficiency
- Reduced heat sink requirements
- Easy to parallel

Amp+™ Applications

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

Package





Part #	Package	Marking
GP3D010A065A	TO-220-2L	3D010A065

RoHS

Maximum Ratings, at T_j=25 °C, unless otherwise specified

Characteristics	Symbol	Conditions	Values	Unit
Continuous forward current	I_{F**}	T_C=25 °C, T_j=175 °C	31	A
		T_C=125 °C, T_j=175 °C	16	
		T_C=150 °C, T_j=175 °C	10	
Surge non-repetitive forward current sine halfwave	I_{FSM}	T_C=25 °C, t_p=8.3 ms	75	A
		T_C=110 °C, t_p=8.3 ms	65	
Non-repetitive peak forward current	$I_{F,max}$	T_C=25 °C, t_p=10 µs	900	A
i^2t value	$\int i^2dt$	T_C=25 °C, t_p=8.3 ms	23	A^2s
		T_C=110 °C, t_p=8.3 ms	18	
Repetitive peak reverse voltage	V_{RRM}	T_j=25 °C	650	V
Diode *dv/dt* ruggedness	*dv/dt*	Turn-on slew rate, repetitive	200	V/ns
Power dissipation	P_{tot**}	T_C=25 °C	108	W
Operating junction & storage temperature	T_j, $T_{storage}$	Continuous	-55…175	°C
Soldering temperature	T_{solder}	Wave soldering leads	260	°C
Mounting torque		M3 Screw	1	N-m

Notes:

* EAS of 67 mJ is based on starting Tj = 25°C, L = 1.0 mH, IAS = 11.58 A, V = 50 V.

** Typical Rth_{JC} used

Electrical Characteristics, at T_j=25 °C, unless otherwise specified

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
DC blocking voltage	V_{DC}	T_j=25 °C	650	-	-	V
Breakdown voltage	V_{BR}	I_R=330uA, T_j=25 °C	715	-	-	V
Diode forward voltage	V_F	I_F=10A, T_j=25 °C	-	1.41	1.50	V
		I_F=10A, T_j=125 °C	-	1.53	-	
		I_F=10A, T_j=175 °C	-	1.65	1.90	
Reverse current	I_R	V_R=650V, T_j=25 °C	-	1	25	µA
		V_R=715V, T_j=25 °C	-	3	-	
		V_R=650V, T_j=125 °C	-	9	-	
		V_R=650V, T_j=175 °C	-	30	250	
Total capacitive charge	Q_C	V_R=400V, T_j=25 °C	-	27	-	nC
Total capacitance	C	V_R=1V, f=1 MHz	-	440	-	pF
		V_R=200V, f=1 MHz	-	53	-	
		V_R=400V, f=1 MHz	-	43	-	

Thermal Characteristics

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction-case	R_{thJC}	-	-	1.39	1.80	°C/W

Typical Performance

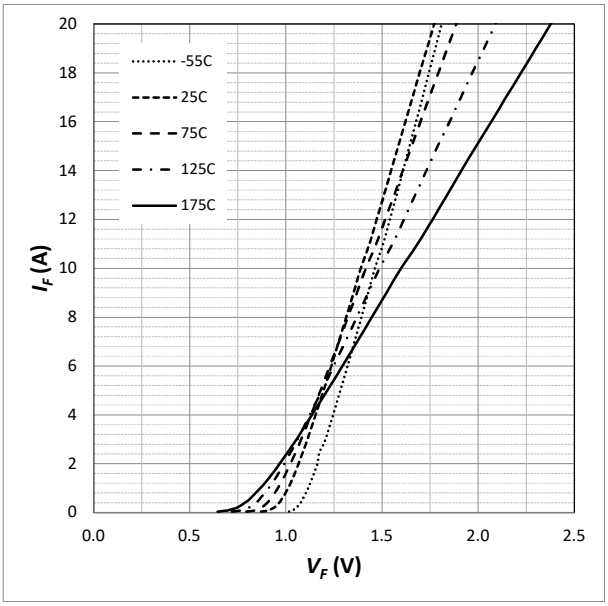


Fig. 1 Forward Characteristics (parameterized on T_j)

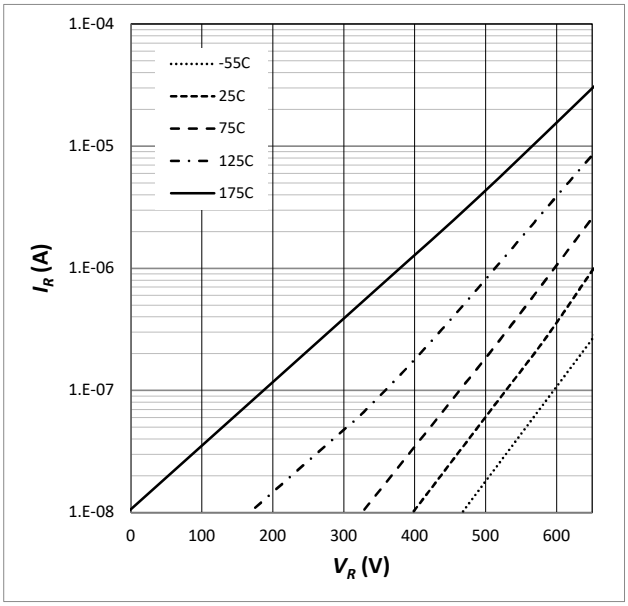


Fig. 2 Reverse Characteristics (parameterized on T_j)

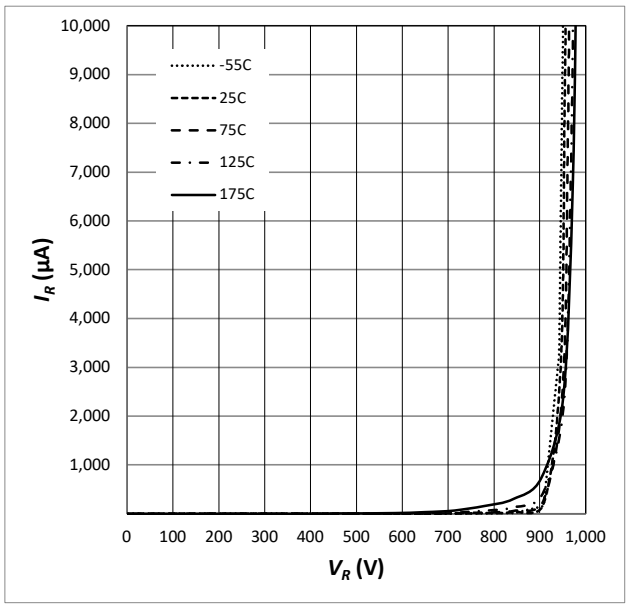


Fig. 3 Reverse Characteristics (parameterized on Tj)

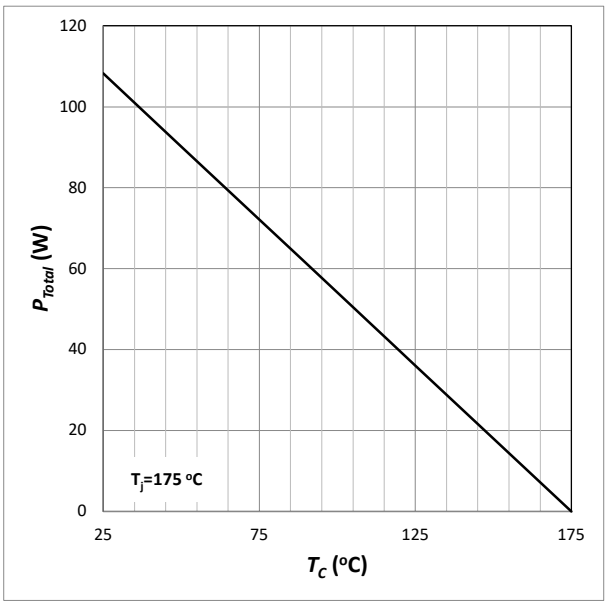


Fig. 4 Power Derating

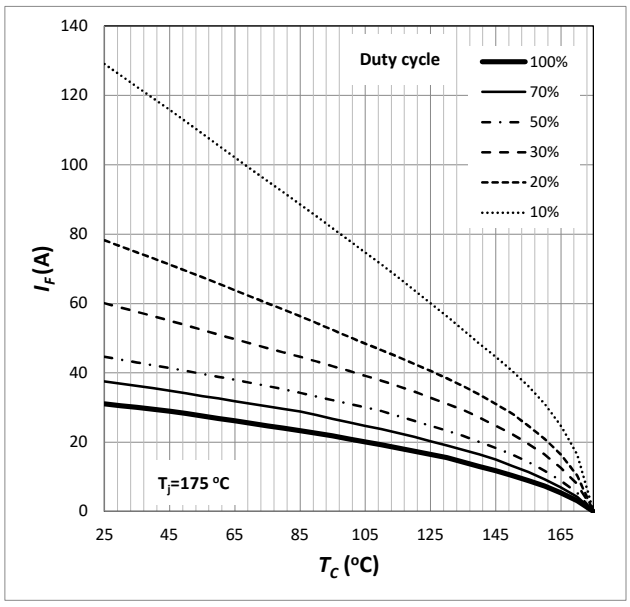


Fig. 5 Current Derating

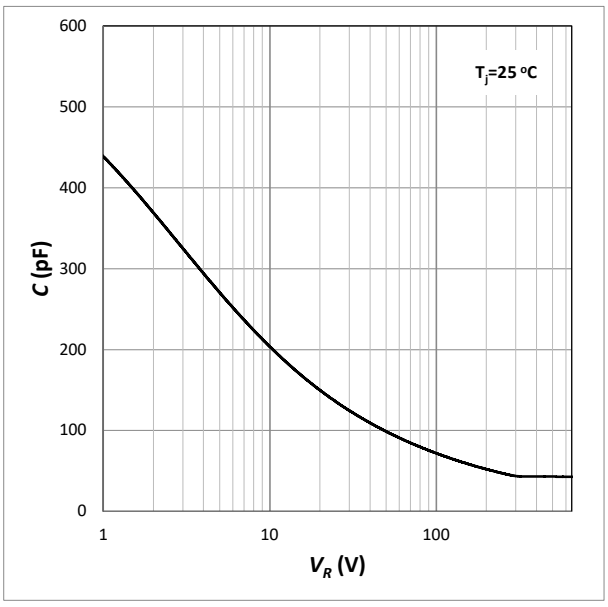


Fig. 6 Capacitance

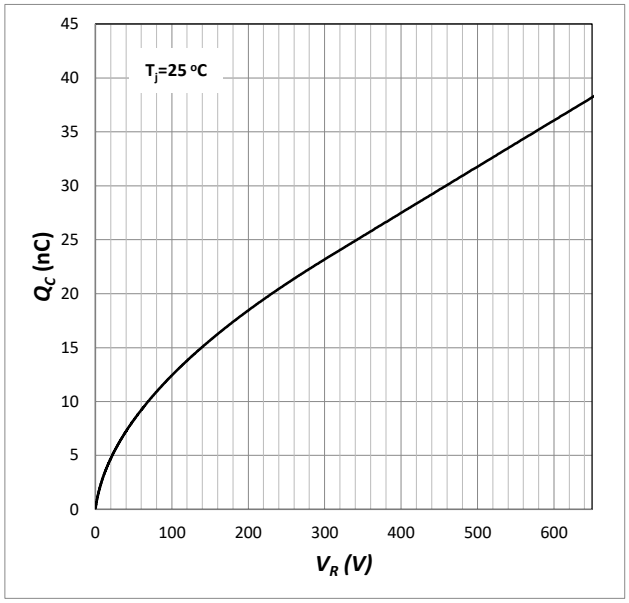


Fig. 7 Capacitive Charge

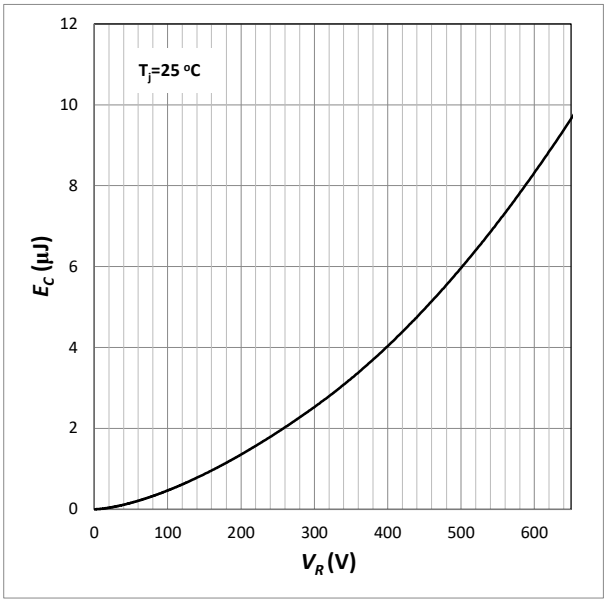


Fig. 8 Typical Capacitance Stored Energy

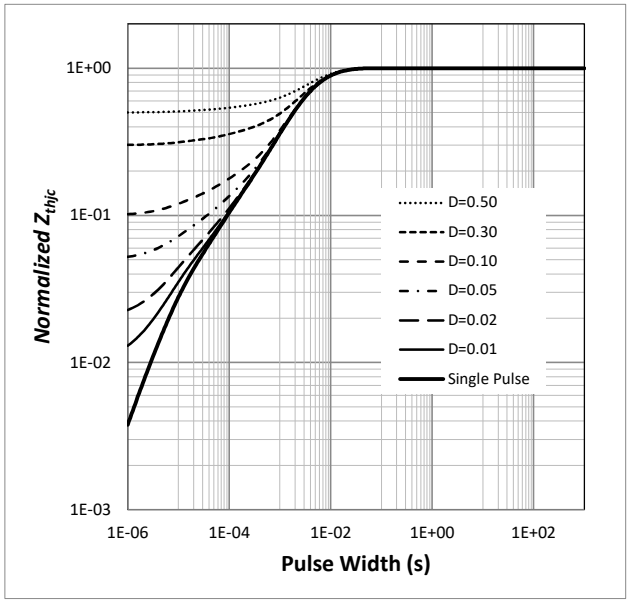
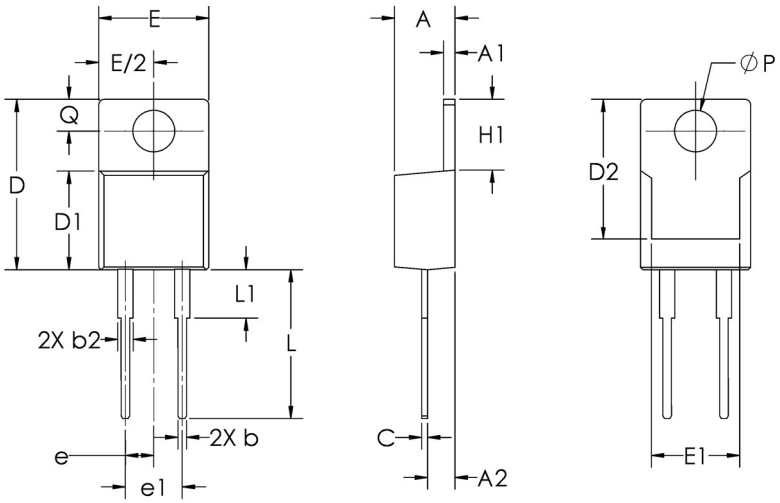


Fig. 9 Transient Thermal Impedance

Package Dimensions TO-220-2L



Sym	Millimeters		Inches	
	Min	Max	Min	Max
A	4.20	4.70	0.165	0.185
A1	1.14	1.40	0.045	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
φP	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

Revision History

Date	Revision	Notes
10/31/2019	1.0	Initial release of datasheet
12/19/2019	1.1	Company name and style change, updated Rthjc spec
2/13/2020	1.2	Using Rthjc typical for I_F and P_{tot}
4/30/2021	1.3	Updated forward voltage spec, surge, Rthjc - valid for date codes after 2101 (YYWW format)

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.

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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