

650V SiC Schottky Diode

GP3D006A065F

VDC	650 V
Q _C	15 nC
I _F	6 A
T _{j,max}	175 °C

Amp+™ Features

- Unipolar rectifier with surge current
- Zero reverse recovery current
- Fast, temperature-independent switching
- Avalanche tested to 29mJ*
- All parts tested to greater than 715V
- Isolated case

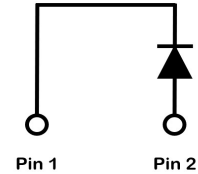
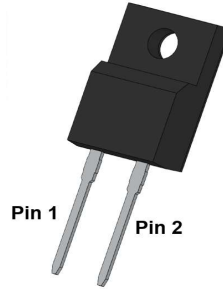
Amp+™ Benefits

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

Amp+™ Applications

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

Package



Part #	Package	Marking
GP3D006A065F	TO-220-2L-FP	3D006A065F



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	12	A
		T _C =125 °C, T _J =175 °C	6	
		T _C =150 °C, T _J =175 °C	4	
Surge non-repetitive forward current sine halfwave	I _{FSM}	T _C =25 °C, t _p =8.3 ms	35	A
		T _C =110 °C, t _p =8.3 ms	31	
Non-repetitive peak forward current	I _{F,max}	T _C =25 °C, t _p =10 μs	400	A
i ² t value	∫i ² dt	T _C =25 °C, t _p =8.3 ms	5	A ² s
		T _C =110 °C, t _p =8.3 ms	4	
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	35	W
Operating junction & storage temperature	T _j , T _{storage}	Continuous	-55...175	°C
Soldering temperature	T _{solder}	Wave soldering leads	260	°C

Notes:

* EAS of 29 mJ is based on starting T_J = 25 °C, L = 1.0 mH, I_{AS} = 7.62 A, V = 50 V.

** Typical R_{th,c} used

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

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
DC blocking voltage	V _{DC}	I _R =15uA, T _j =25 °C	650	-	-	V
Breakdown voltage	V _{BR}	I _R =600uA, T _j =25 °C	715	-	-	V
Diode forward voltage	V _F	I _F =6A, T _j =25 °C	-	1.39	1.65	V
		I _F =6A, T _j =125 °C	-	1.52	-	
		I _F =6A, T _j =175 °C	-	1.65	2.20	
Reverse current	I _R	V _R =650V, T _j =25 °C	-	2	15	μA
		V _R =1,000V, T _j =25 °C	-	6	-	
		V _R =650V, T _j =125 °C	-	10	-	
		V _R =650V, T _j =175 °C	-	32	150	
Total capacitive charge	Q _C	V _R =400V, T _j =25 °C	-	15	-	nC
Total capacitance	C	V _R =1V, f=1 MHz	-	229	-	pF
		V _R =200V, f=1 MHz	-	28	-	
		V _R =400V, f=1 MHz	-	24	-	

Thermal and Package Characteristics

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction-case	R _{thJC}	-	-	4.34	4.95	°C/W
Mounting torque	M _d	M3 Screw	-	0.6	1.0	N-m
Isolation voltage	V _{ISOL}	I _{ISOL} < 1mA, 50/60 Hz, 0.5 sec	3500	-	-	V

Typical Performance

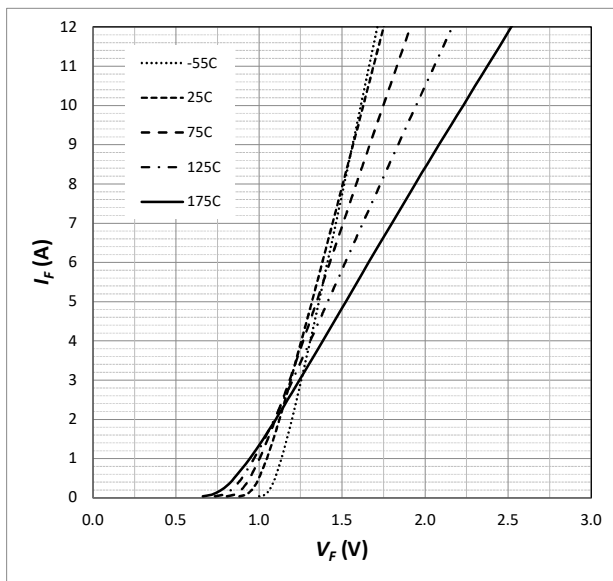


Fig. 1 Forward Characteristics (parameterized on T_j)

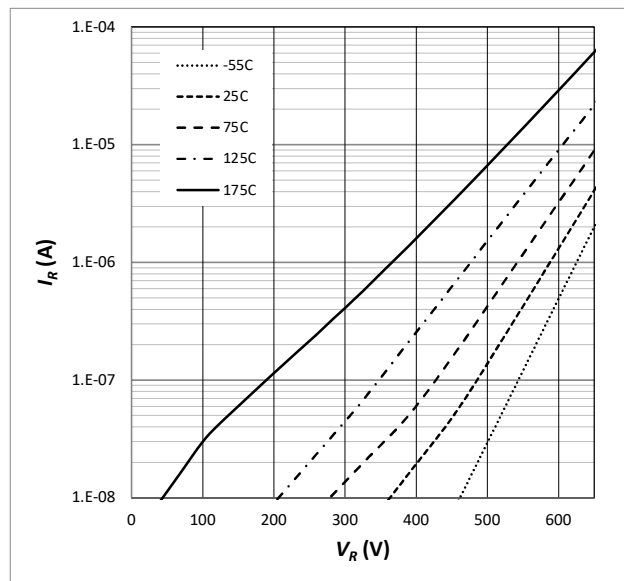


Fig. 2 Reverse Characteristics (parameterized on T_j)

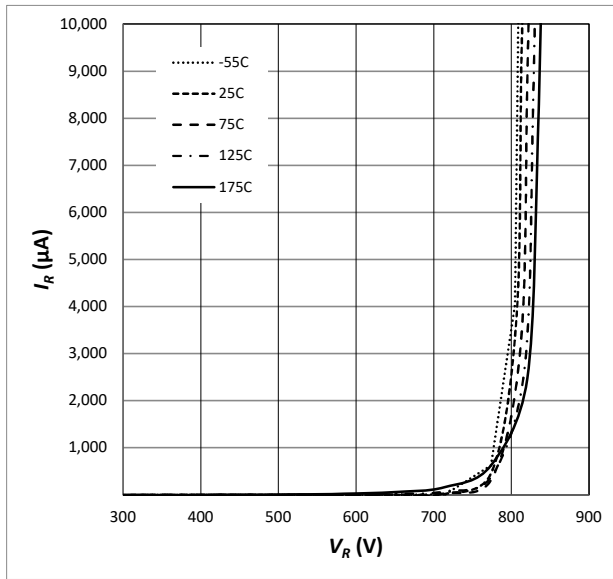


Fig. 3 Reverse Characteristics (parameterized on T_j)

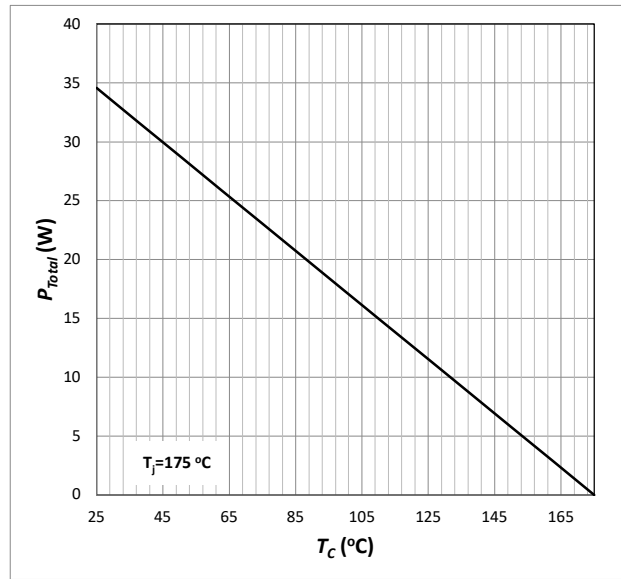


Fig. 4 Power Derating

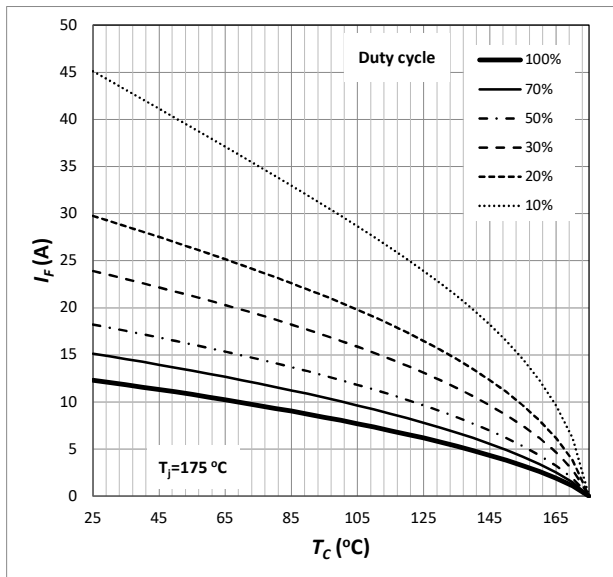


Fig. 5 Current Derating

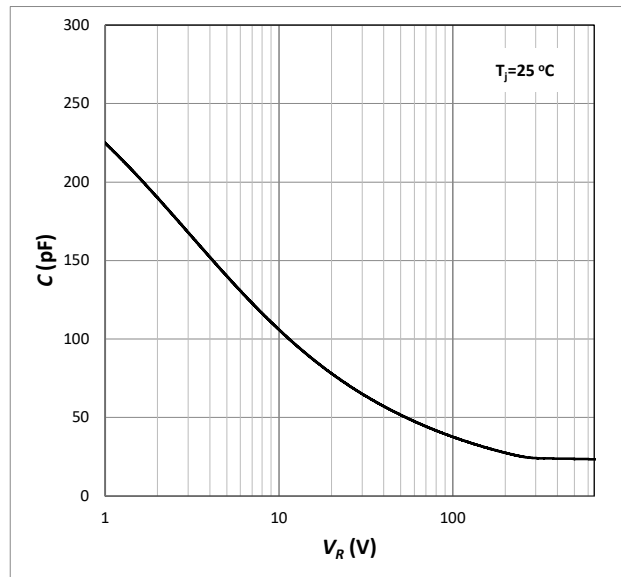


Fig. 6 Capacitance

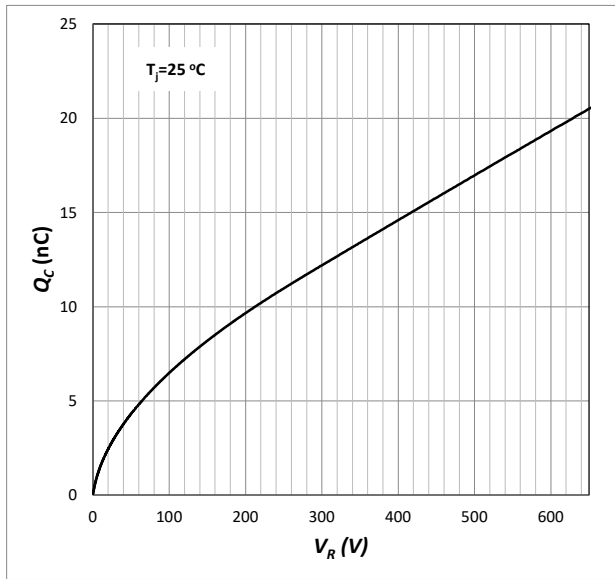


Fig. 7 Capacitive Charge

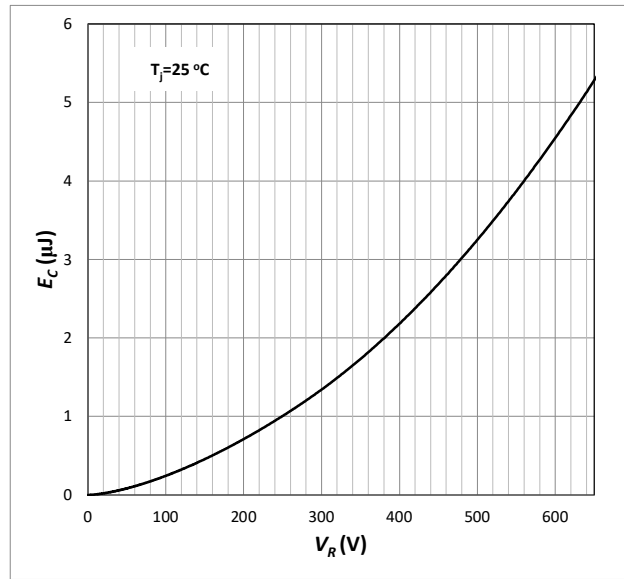


Fig. 8 Typical Capacitance Stored Energy

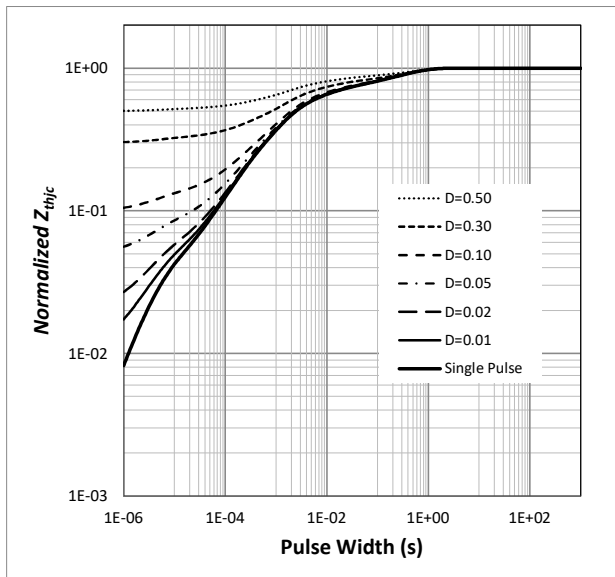


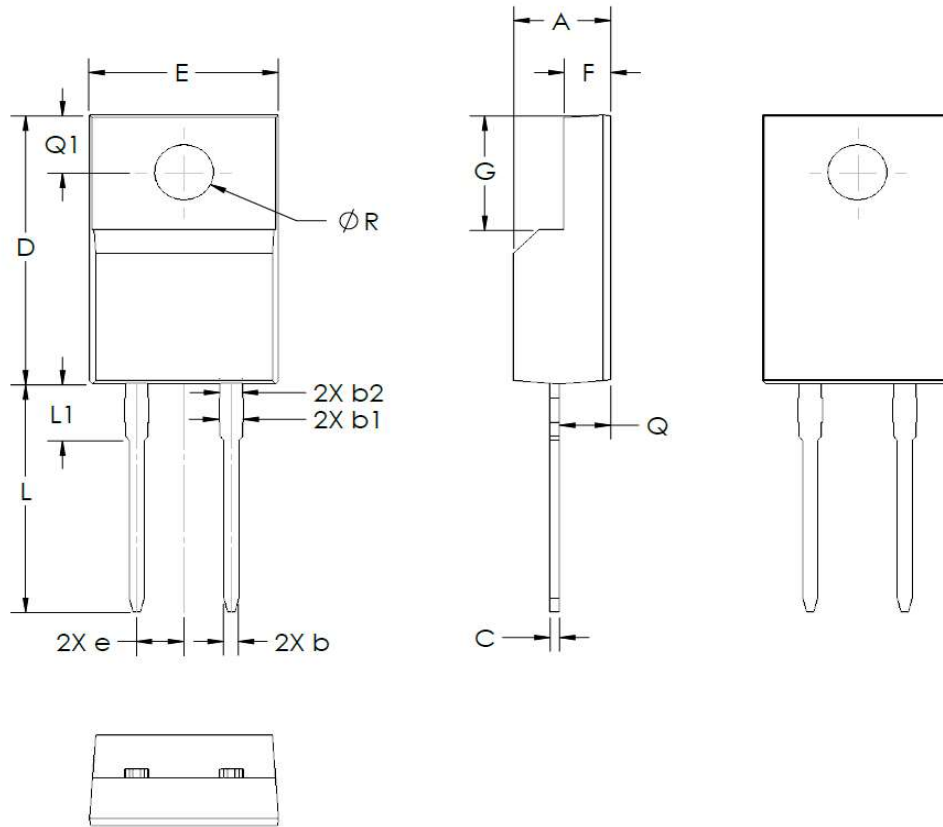
Fig. 9 Transient Thermal Impedance

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Amp+™

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Package Dimensions TO-220-2L-FP



Sym	Millimeters		Inches	
	Min	Max	Min	Max
A	4.60	4.70	0.181	0.185
b	0.70	0.91	0.045	0.036
b1	1.20	1.47	0.047	0.058
b2	1.10	1.30	0.043	0.051
C	0.45	0.63	0.018	0.025
D	15.80	15.97	0.622	0.629
e	2.54 BSC		.100 BSC	
E	10.00	10.30	0.394	0.406
F	2.44	2.64	0.096	0.104
G	6.50	6.90	0.256	0.272
L	12.90	13.30	0.508	0.524
L1	3.13	3.33	0.123	0.131
Q	2.65	2.85	0.104	0.112
Q1	3.20	3.40	0.126	0.134
ϕR	3.08	3.28	0.121	0.129

Revision History

Date	Revision	Notes
8/12/2022	0.1	Preliminary datasheet release
8/19/2022	0.2	Added package characteristics
2/15/2023	1.0	Initial Release

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.

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