

650V SiC Schottky Diode

VDC	650 V
Q _C	120 nC
I _F	50 A
T _{j,max}	175 °C

Amp+™ Features

- Unipolar rectifier with surge current
- Zero reverse recovery current
- Fast, temperature-independent switching
- Avalanche tested to 333mJ*
- All parts tested to greater than 715V

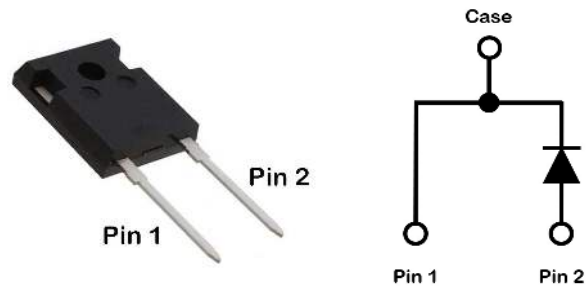
Amp+™ Benefits

- 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
GP3D050A065B	TO-247-2L	3D050A065



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	135	A
		T _C =125 °C, T _J =175 °C	70	
		T _C =150 °C, T _J =175 °C	45	
Surge non-repetitive forward current sine halfwave	I _{FSM}	T _C =25 °C, t _p =8.3 ms	300	A
		T _C =110 °C, t _p =8.3 ms	275	
Non-repetitive peak forward current	I _{F,max}	T _C =25 °C, t _p =10 μs	2000***	A
i ² t value	∫i ² dt	T _C =25 °C, t _p =8.3 ms	374	A ² s
		T _C =110 °C, t _p =8.3 ms	314	
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	434	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 333 mJ is based on starting T_j = 25°C, L = 1.0 mH, I_{AS} = 25.81 A, V = 50 V.

** Typical R_{thJC} used

*** Limited by testing equipment

Electrical Characteristics, at $T_j=25\text{ }^\circ\text{C}$, unless otherwise specified

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
DC blocking voltage	V_{DC}	$T_j=25\text{ }^\circ\text{C}$	650	-	-	V
Breakdown voltage	V_{BR}	$I_R=1.65\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	715	-	-	V
Diode forward voltage	V_F	$I_F=50\text{A}$, $T_j=25\text{ }^\circ\text{C}$	-	1.45	1.60	V
		$I_F=50\text{A}$, $T_j=125\text{ }^\circ\text{C}$	-	1.61	-	
		$I_F=50\text{A}$, $T_j=175\text{ }^\circ\text{C}$	-	1.77	2.00	
Reverse current	I_R	$V_R=650\text{V}$, $T_j=25\text{ }^\circ\text{C}$	-	6	125	μA
		$V_R=715\text{V}$, $T_j=25\text{ }^\circ\text{C}$	-	22	-	
		$V_R=650\text{V}$, $T_j=125\text{ }^\circ\text{C}$	-	41	-	
		$V_R=650\text{V}$, $T_j=175\text{ }^\circ\text{C}$	-	147	500	
Total capacitive charge	Q_C	$V_R=400\text{V}$, $T_j=25\text{ }^\circ\text{C}$	-	120	-	nC
Total capacitance	C	$V_R=1\text{V}$, $f=1\text{ MHz}$	-	1946	-	pF
		$V_R=200\text{V}$, $f=1\text{ MHz}$	-	228	-	
		$V_R=400\text{V}$, $f=1\text{ MHz}$	-	189	-	

Thermal Characteristics

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction-case	R_{thJC}	-	-	0.35	0.45	$^\circ\text{C/W}$

Typical Performance

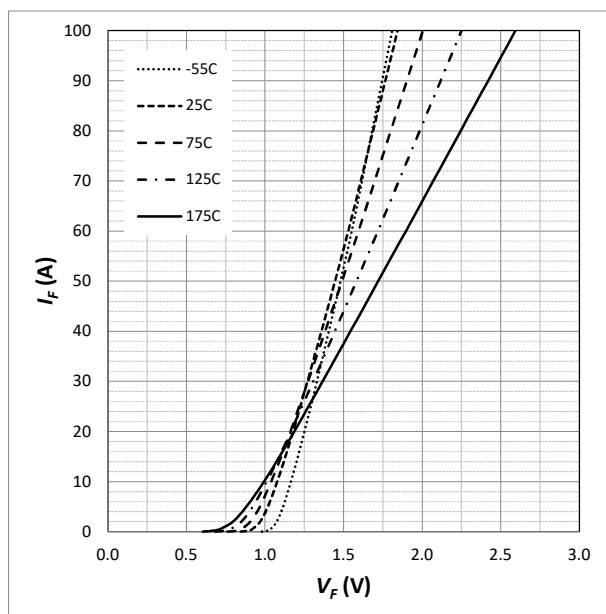


Fig. 1 Forward Characteristics (parameterized on T_j)

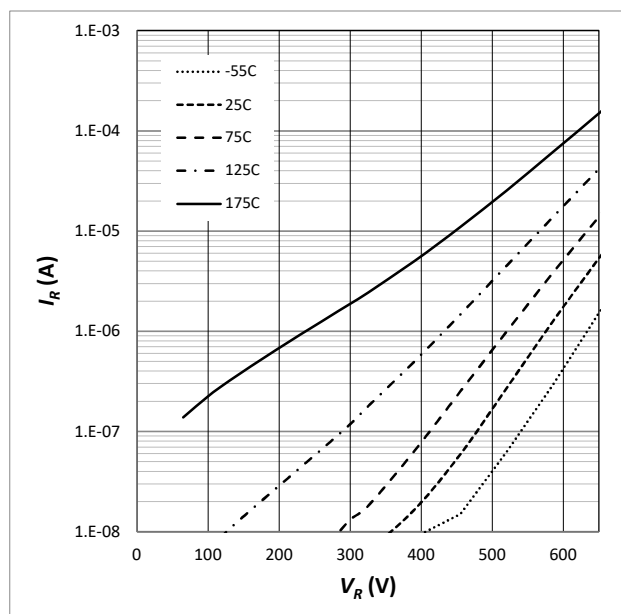


Fig. 2 Reverse Characteristics (parameterized on T_j)

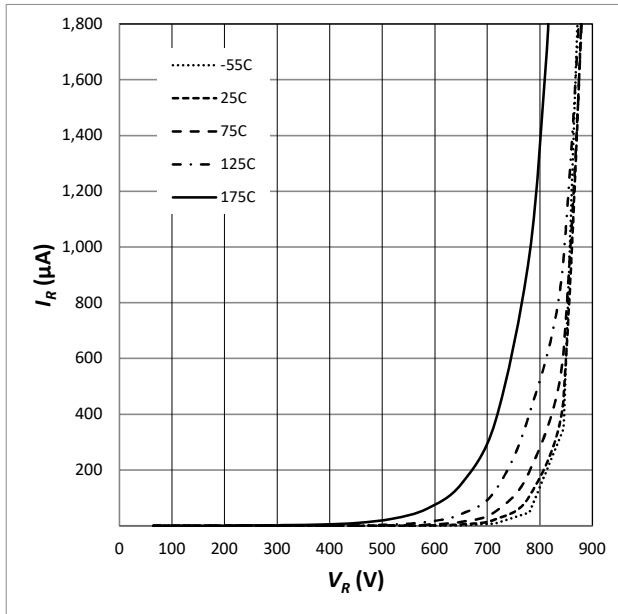


Fig. 3 Reverse Characteristics (parameterized on T_j)

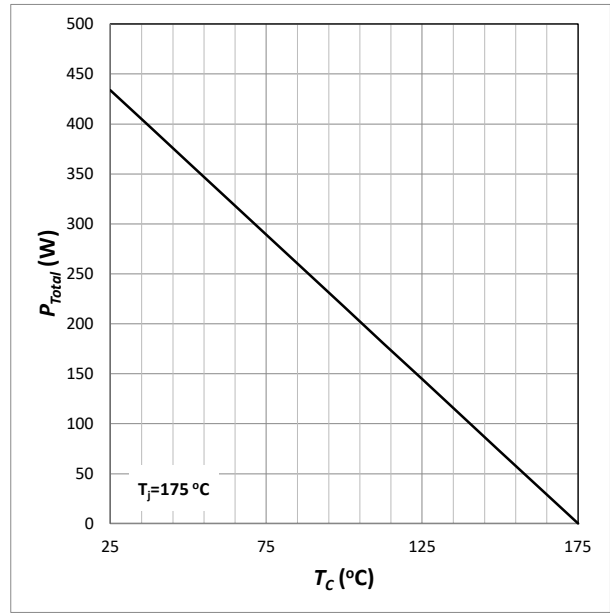


Fig. 4 Power Derating

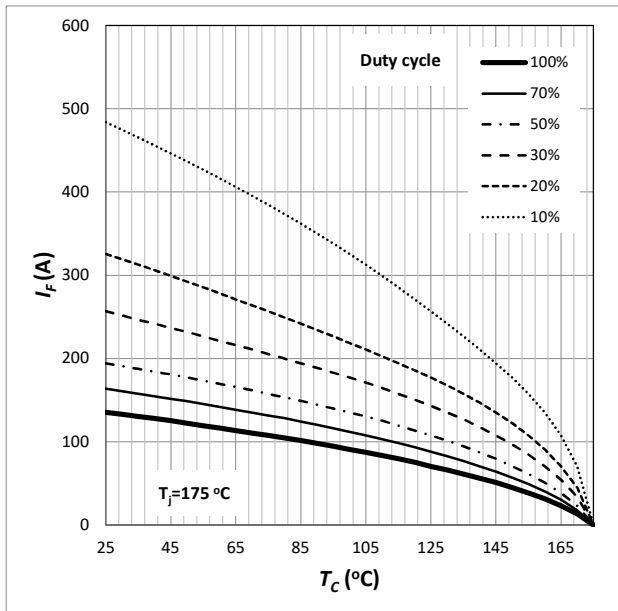


Fig. 5 Capacitance

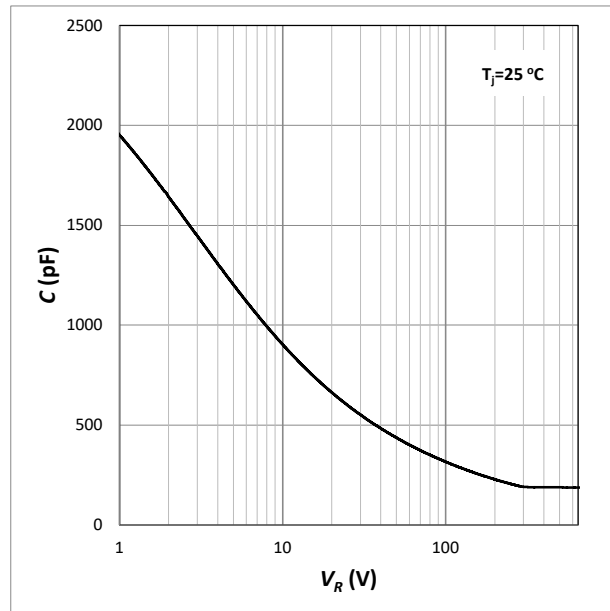


Fig. 6 Capacitance

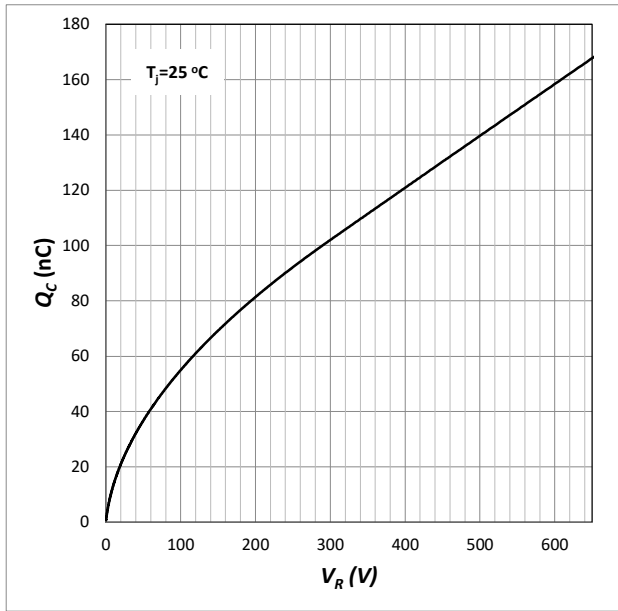


Fig. 7 Capacitive Charge

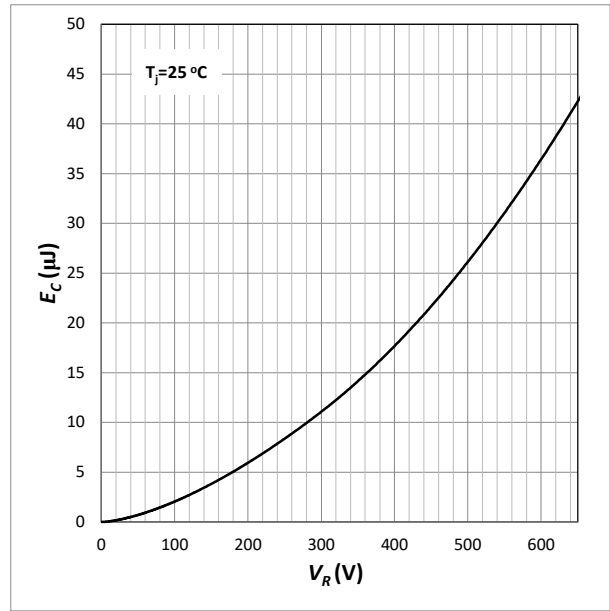


Fig. 8 Typical Capacitance Stored Energy

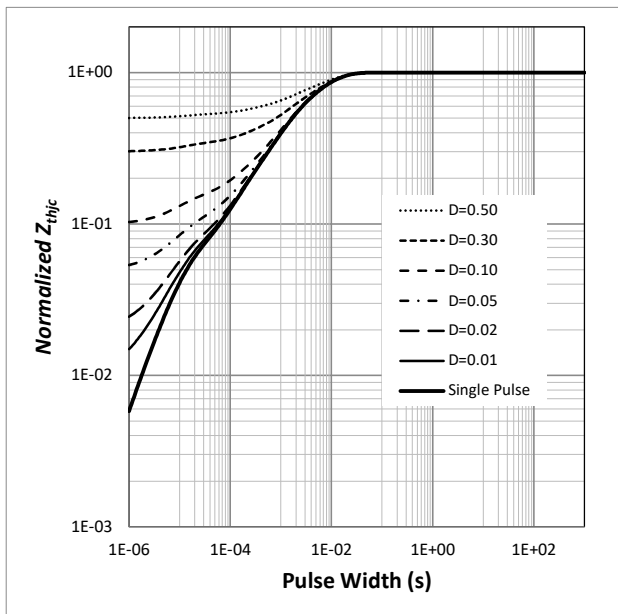


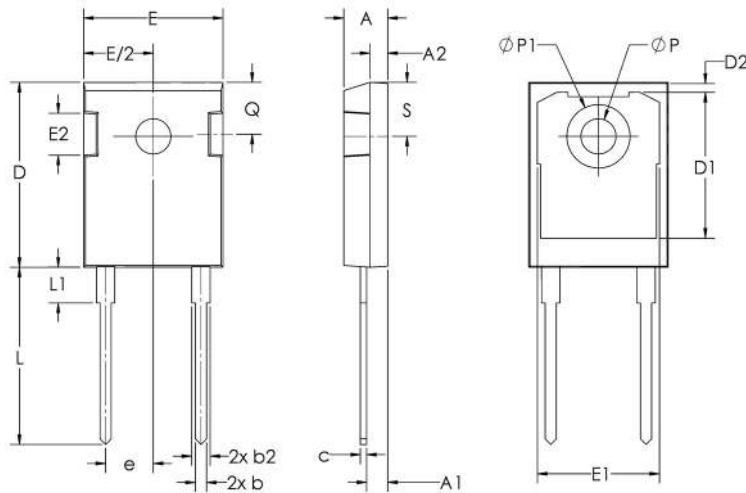
Fig. 9 Transient Thermal Impedance

650V SiC Schottky Diode

Amp+™

GP3D050A065B

Package Dimensions TO-247-2L



Sym	Millimeters		Inches	
	Min	Max	Min	Max
A	4.70	5.31	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
c	0.38	0.89	0.015	0.035
D	20.80	21.46	0.819	0.845
D1	13.08	17.65	0.515	0.695
D2	0.51	1.35	0.020	0.053
E	15.49	16.26	0.610	0.640
E1	13.46	14.16	0.530	0.557
E2	3.43	5.49	0.135	0.216
e	5.44 BSC		.214 BSC	
L	19.81	20.32	0.780	0.800
L1	4.10	4.50	0.161	0.177
ØP	3.56	3.66	0.140	0.144
ØP1	7.06	7.39	0.278	0.291
Q	5.38	6.20	0.212	0.244
S	6.04	6.30	0.238	0.248

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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