

650V SiC Schottky Diode

VDC	650 V
Q _C	36 nC
I _F	12 A
T _{j,max}	175 °C

Amp+™ Features

- Unipolar rectifier with surge current
- Zero reverse recovery current
- Fast, temperature-independent switching
- Avalanche tested to 80mJ*

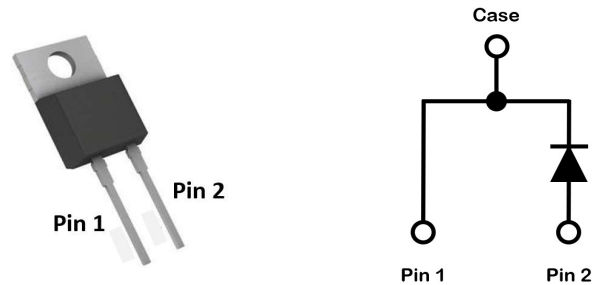
Amp+™ Benefits

- 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
GP3D012A065A	TO-220-2L	3D012A065



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	39	A
		T _C =125 °C, T _J =175 °C	20	
		T _C =150 °C, T _J =175 °C	13	
Surge non-repetitive forward current sine halfwave	I _{FSM}	T _C =25 °C, t _p =8.3 ms	120	A
		T _C =110 °C, t _p =8.3 ms	96	
Non-repetitive peak forward current	I _{F,max}	T _C =25 °C, t _p =10 μs	720	A
i ² t value	∫i ² dt	T _C =25 °C, t _p =8.3 ms	60	A ² s
		T _C =110 °C, t _p =8.3 ms	38	
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	134	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 80 mJ is based on starting T_j = 25°C, L = 1.0 mH, IAS = 12.65 A, V = 50 V.

** Typical R_{thJC} used

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
Diode forward voltage	V_F	$I_F=12\text{A}, T_j=25\text{ }^\circ\text{C}$	-	1.42	1.50	V
		$I_F=12\text{A}, T_j=125\text{ }^\circ\text{C}$	-	1.49	-	
		$I_F=12\text{A}, T_j=175\text{ }^\circ\text{C}$	-	1.60	1.90	
Reverse current	I_R	$V_R=650\text{V}, T_j=25\text{ }^\circ\text{C}$	-	2	30	μA
		$V_R=650\text{V}, T_j=125\text{ }^\circ\text{C}$	-	14	-	
		$V_R=650\text{V}, T_j=175\text{ }^\circ\text{C}$	-	47	300	
Total capacitive charge	Q_C	$V_R=400\text{V}, T_j=25\text{ }^\circ\text{C}$	-	36	-	nC
Total capacitance	C	$V_R=1\text{V}, f=1\text{ MHz}$	-	572	-	pF
		$V_R=200\text{V}, f=1\text{ MHz}$	-	68	-	
		$V_R=400\text{V}, f=1\text{ MHz}$	-	57	-	

Thermal Characteristics

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction-case	R_{thJC}	-	-	1.12	1.43	$^\circ\text{C/W}$

Typical Performance

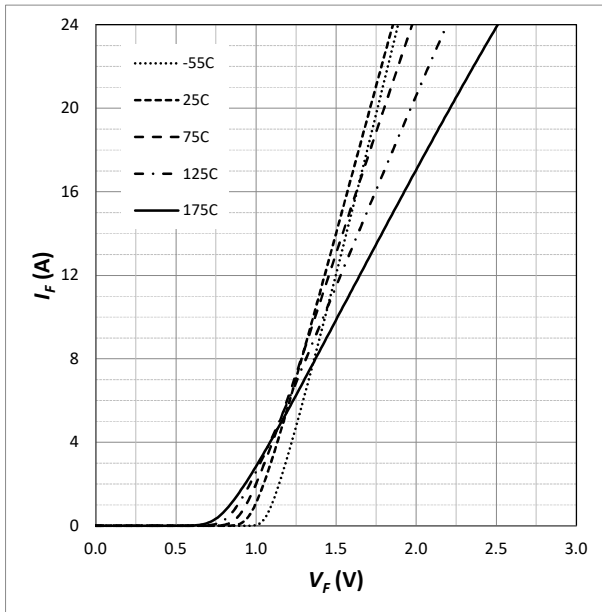


Fig. 1 Forward Characteristics (parameterized on T_j)

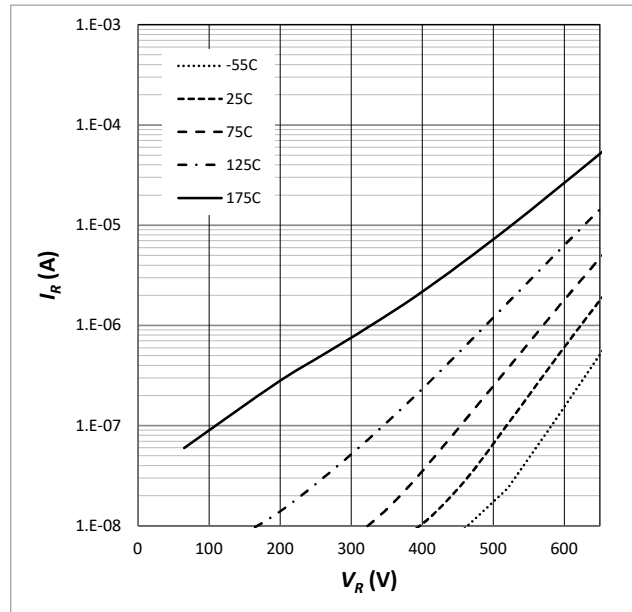


Fig. 2 Reverse Characteristics (parameterized on T_j)

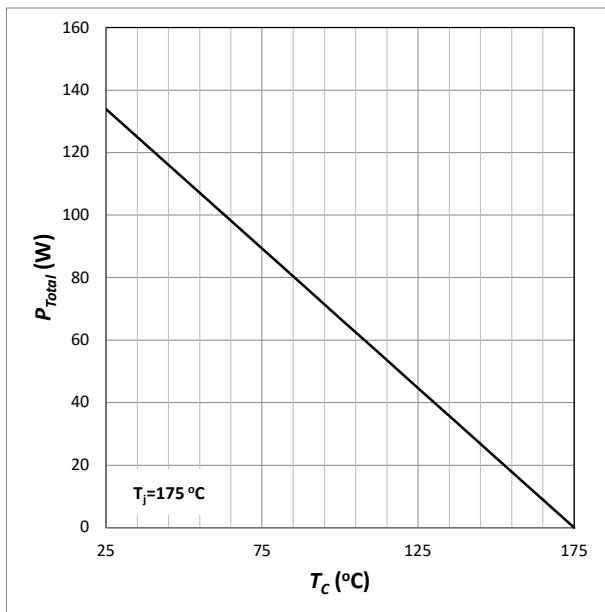


Fig. 3 Power Derating

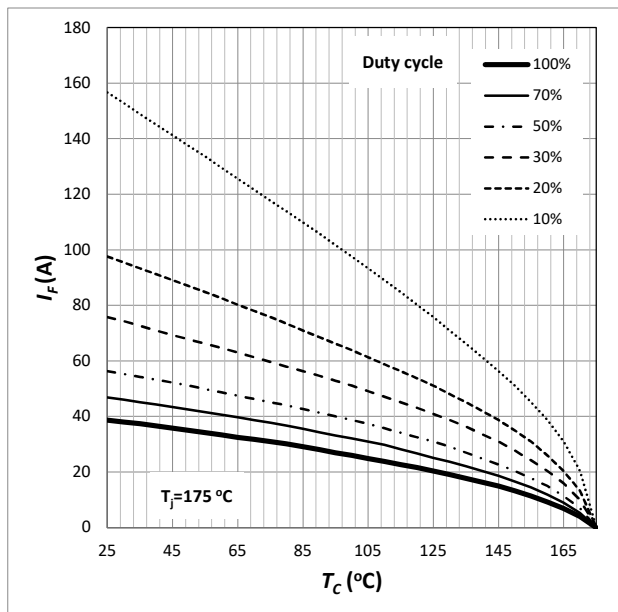


Fig. 4 Current Derating

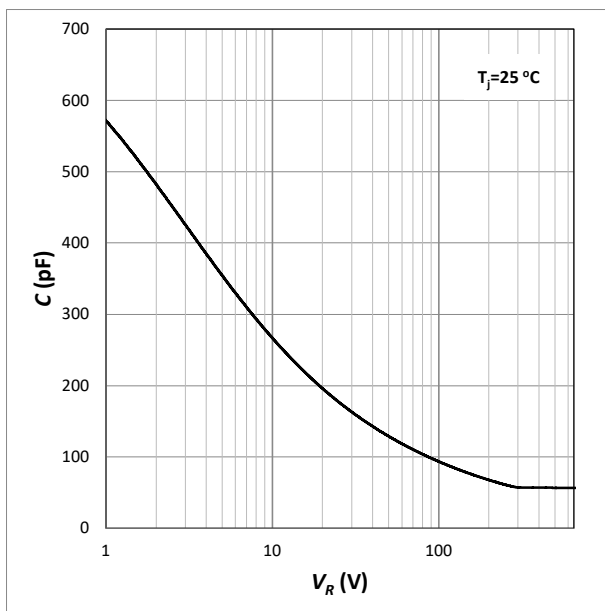


Fig. 5 Capacitance

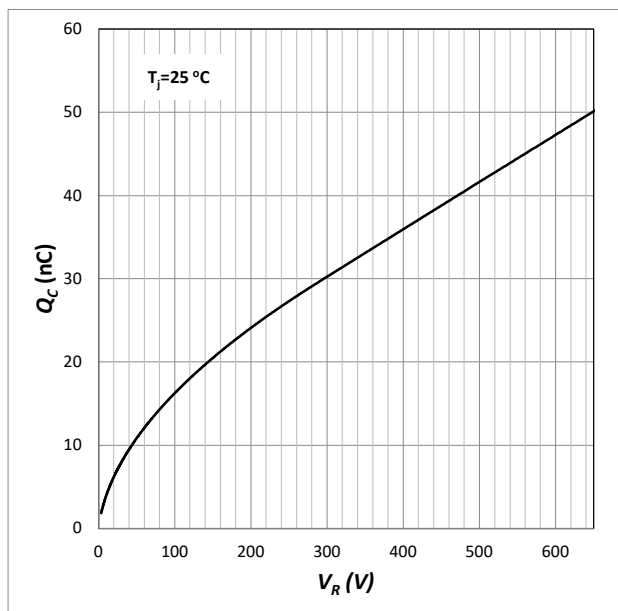


Fig. 6 Capacitive Charge

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Amp+™

GP3D012A065A

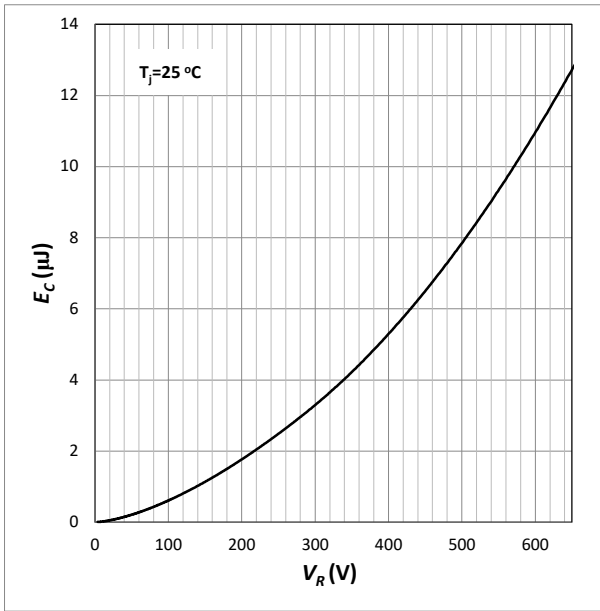


Fig. 7 Typical Capacitance Stored Energy

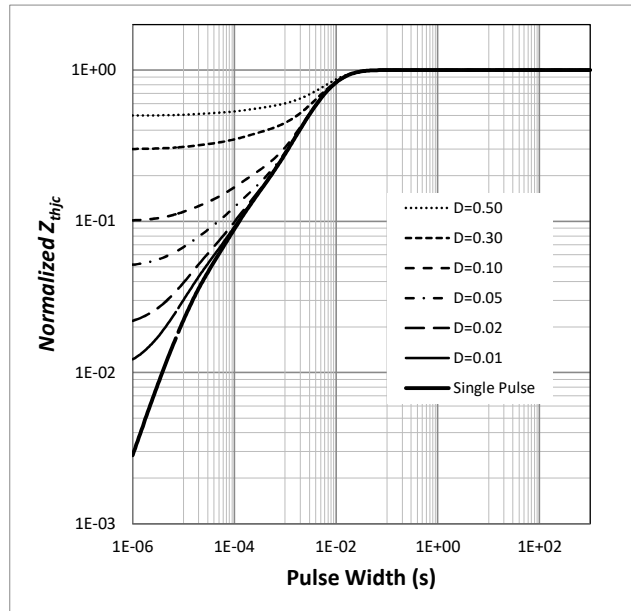
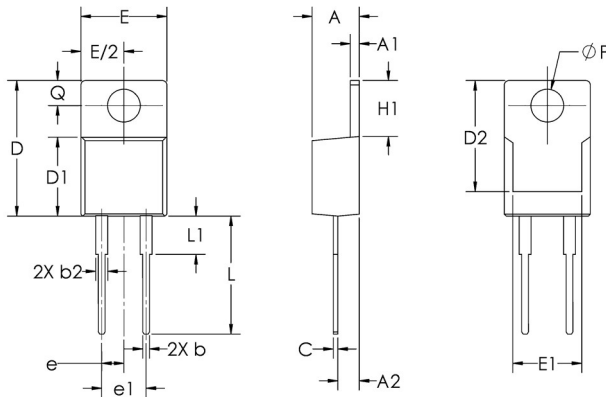


Fig. 8 Transient Thermal Impedance

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