

## 650V SiC Schottky Diode

VDC	650 V
Q <sub>C</sub>	36 nC
I <sub>F</sub>	12 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 80mJ\*

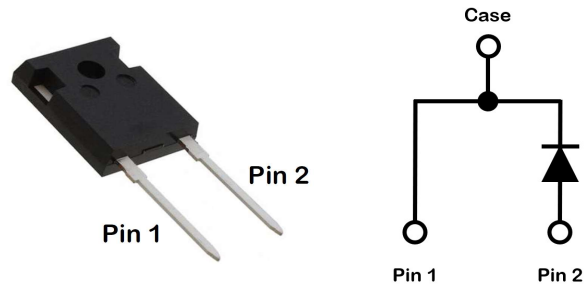
### Amp+™ Benefits

- 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
GP3D012A065B	TO-247-2L	3D012A065



### 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	37	A
		T <sub>C</sub> =125 °C, T <sub>J</sub> =175 °C	19	
		T <sub>C</sub> =150 °C, T <sub>J</sub> =175 °C	12	
Surge non-repetitive forward current sine halfwave	I <sub>FSM</sub>	T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms	120	A
		T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms	96	
Non-repetitive peak forward current	I <sub>F,max</sub>	T <sub>C</sub> =25 °C, t <sub>p</sub> =10 μs	720	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	60	A <sup>2</sup> s
		T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms	38	
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	124	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 80 mJ is based on starting T<sub>J</sub> = 25°C, L = 1.0 mH, IAS = 12.65 A, V = 50 V.

\*\* Typical R<sub>thJC</sub> 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	$\mu\text{A}$
		$V_R=650\text{V}, T_j=125\text{ }^\circ\text{C}$	-	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	$R_{thJC}$	-	-	1.21	1.48	$^\circ\text{C/W}$

Typical Performance

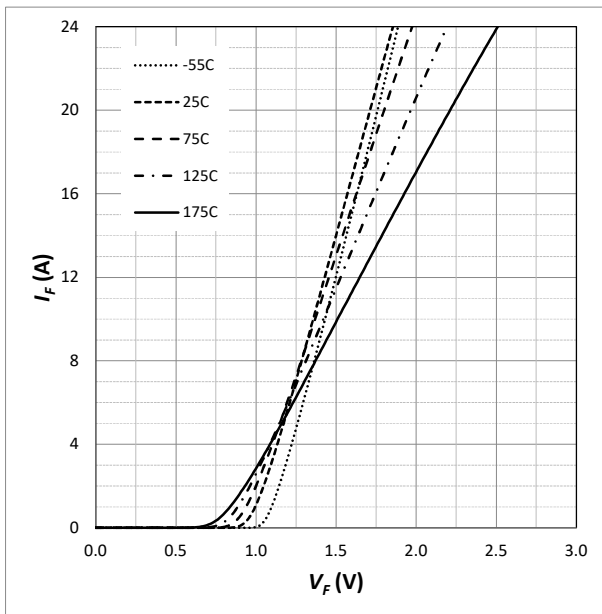


Fig. 1 Forward Characteristics (parameterized on  $T_j$ )

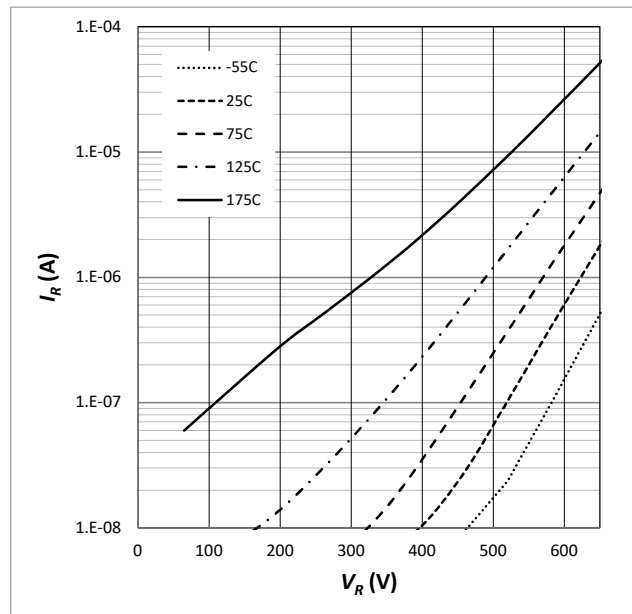


Fig. 2 Reverse Characteristics (parameterized on  $T_j$ )

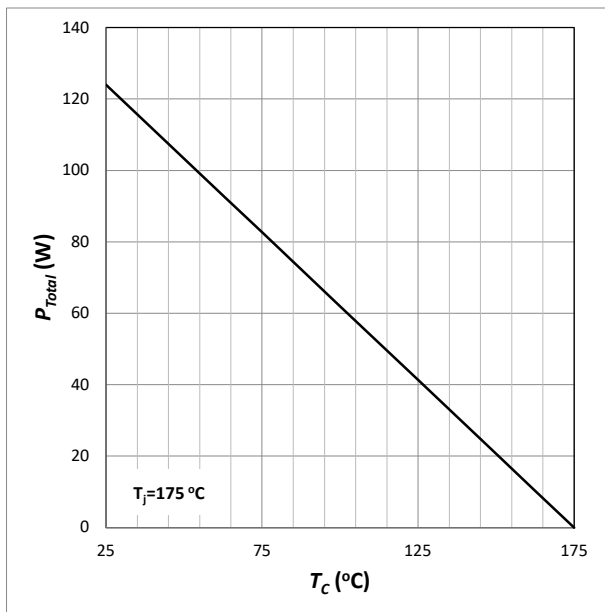


Fig. 3 Power Derating

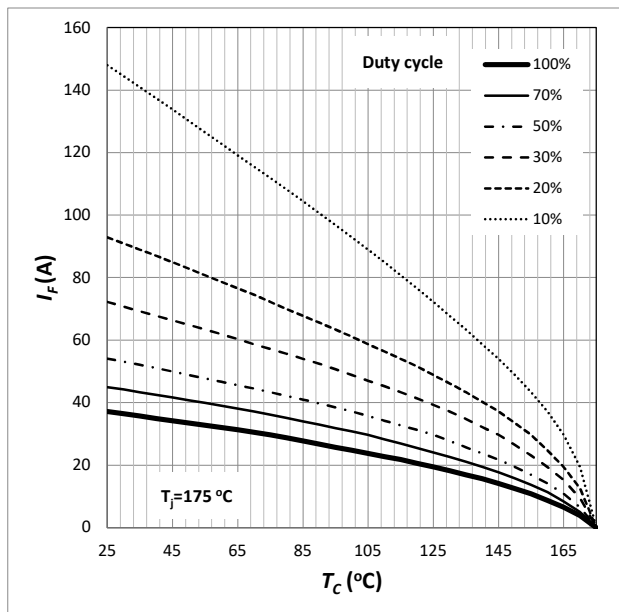


Fig. 4 Current Derating

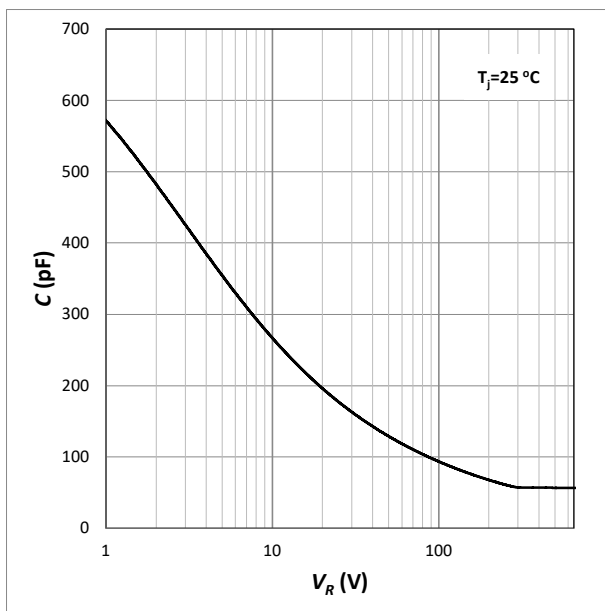


Fig. 5 Capacitance

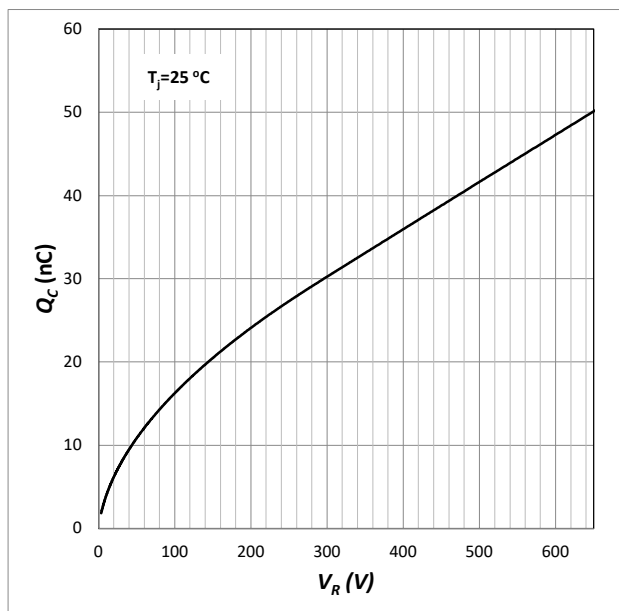


Fig. 6 Capacitive Charge

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Amp+™

# GP3D012A065B

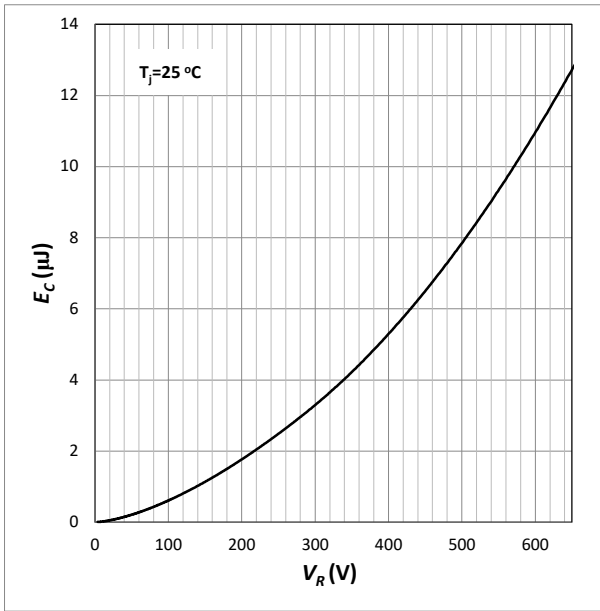


Fig. 7 Typical Capacitance Stored Energy

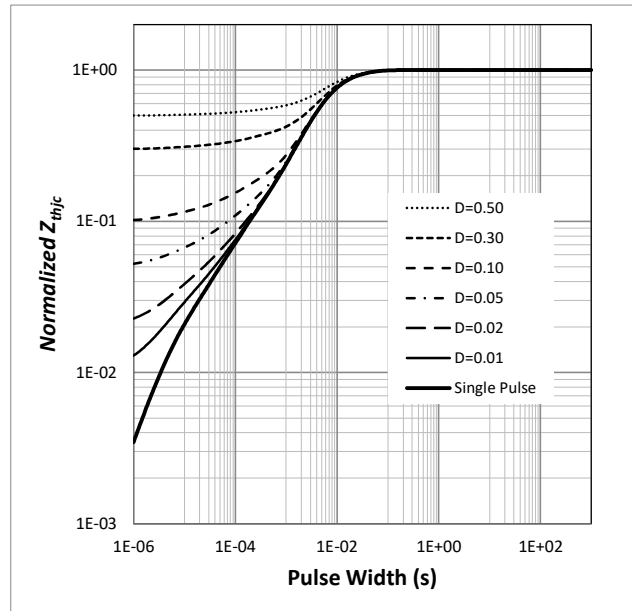
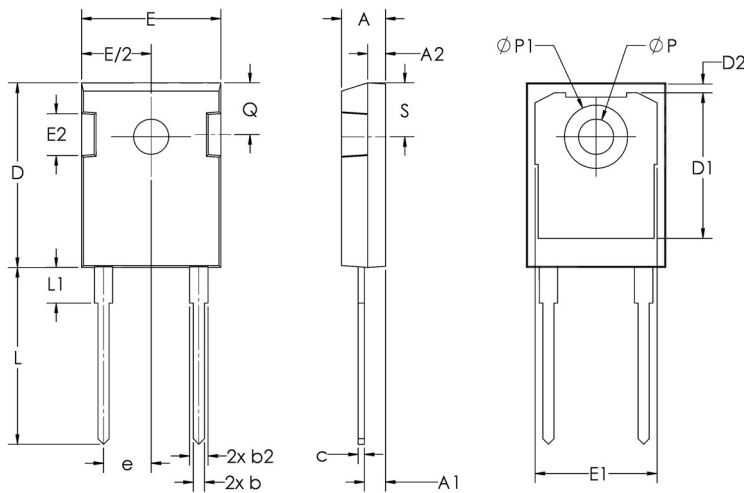


Fig. 8 Transient Thermal Impedance

## 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