GP3D040A065U

VDC	650 V
Q_C	106 nC***
I_F	40 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 135mJ*
- All parts tested to greater than 715V

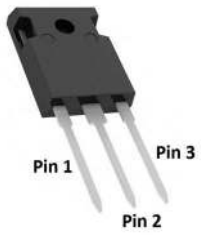
Amp+™ Benefits

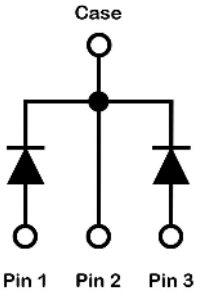
- Near zero switching loss
- Higher efficiency
- Reduced heat sink requirements
- Easy to parallel

Amp+™ Applications

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

Package





Part #	Package	Marking
GP3D040A065U	TO-247-3L	3D040A065

RoHS

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

Characteristics Per Leg	Symbol	Conditions	Values	Unit
Continuous forward current	I_{F**}	T_C=25 °C, T_j=175 °C	55	A
		T_C=125 °C, T_j=175 °C	28	
		T_C=150 °C, T_j=175 °C	18	
Surge non-repetitive forward current sine halfwave	I_{FSM}	T_C=25 °C, t_p=8.3 ms	135	A
		T_C=110 °C, t_p=8.3 ms	125	
Non-repetitive peak forward current	$I_{F,max}$	T_C=25 °C, t_p=10 µs	1100	A
i^2t value	$\int i^2dt$	T_C=25 °C, t_p=8.3 ms	76	A^2s
		T_C=110 °C, t_p=8.3 ms	65	
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	171	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 135 mJ is based on starting Tj = 25°C, L = 1.0 mH, IAS = 16.43 A, V = 50 V.

** Typical Rth_{JC} used

***Per Device

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

Characteristics Per Leg	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
DC blocking voltage	V_{DC}	T_j=25 °C	650	-	-	V
Breakdown voltage	V_{BR}	I_R=660uA, T_j=25 °C	715	-	-	V
Diode forward voltage	V_F	I_F=20A, T_j=25 °C	-	1.40	1.55	V
		I_F=20A, T_j=125 °C	-	1.51	-	
		I_F=20A, T_j=175 °C	-	1.64	1.90	
Reverse current	I_R	V_R=650V, T_j=25 °C	-	2	50	μA
		V_R=715V, T_j=25 °C	-	7	-	
		V_R=650V, T_j=125 °C	-	19	-	
		V_R=650V, T_j=175 °C	-	72	500	
Total capacitive charge	Q_C	V_R=400V, T_j=25 °C	-	53	-	nC
Total capacitance	C	V_R=1V, f=1 MHz	-	866	-	pF
		V_R=200V, f=1 MHz	-	102	-	
		V_R=400V, f=1 MHz	-	78	-	

Thermal Characteristics

Characteristics Per Leg	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction-case	R_{thJC}	-	-	0.88	1.05	°C/W

Typical Performance Per Leg

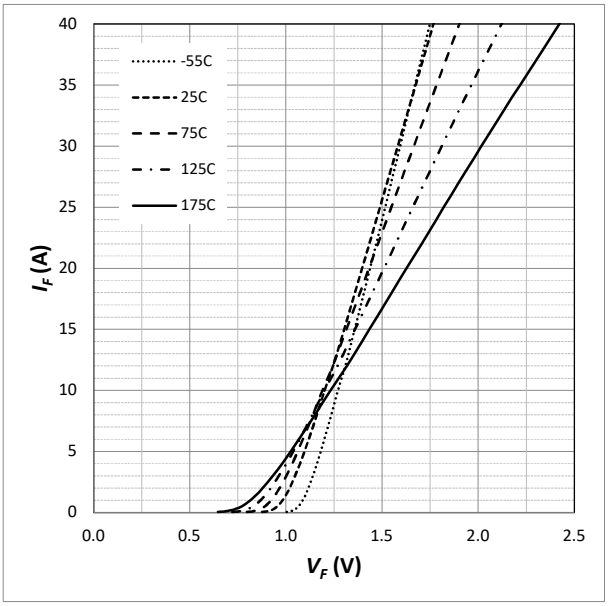


Fig. 1 Forward Characteristics (parameterized on T_j)

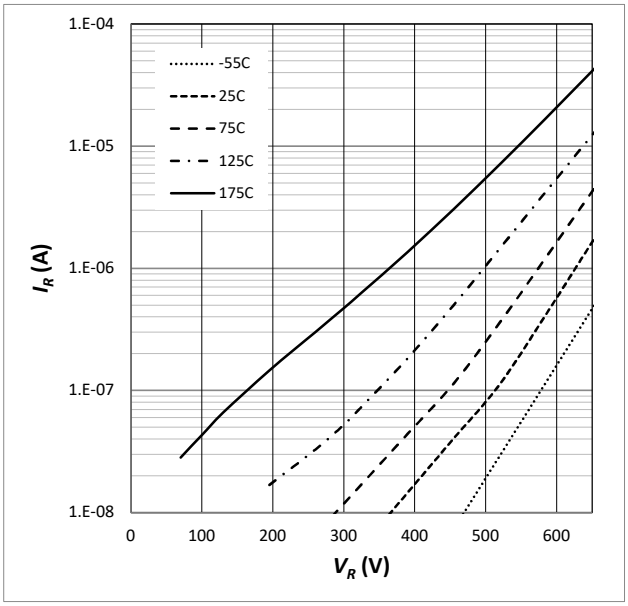


Fig. 2 Reverse Characteristics (parameterized on T_j)

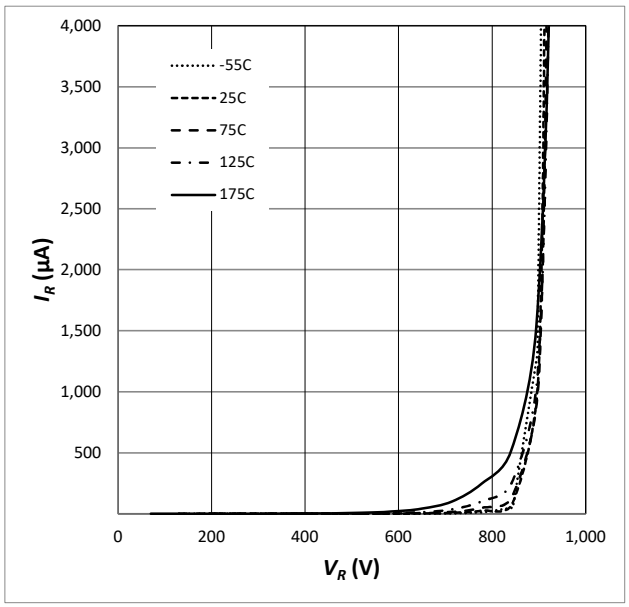


Fig. 3 Reverse Characteristics (parameterized on Tj)

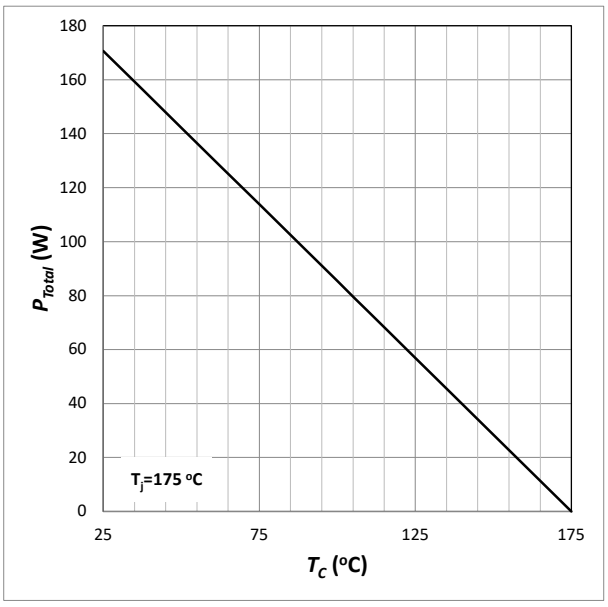


Fig. 4 Power Derating

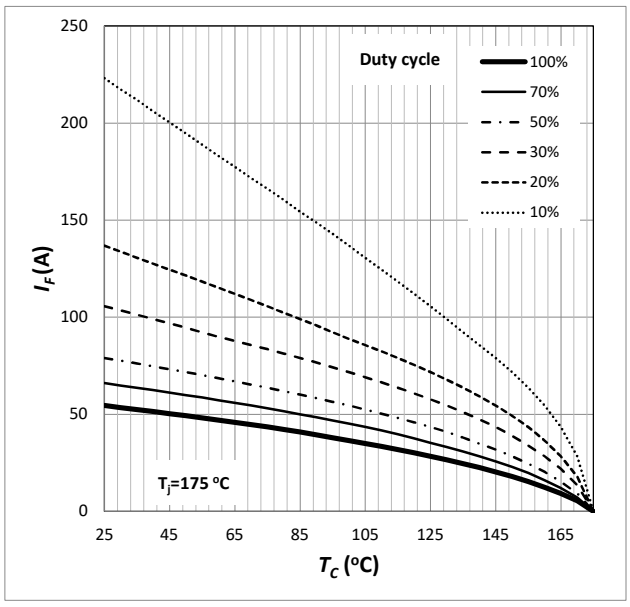


Fig. 5 Current Derating

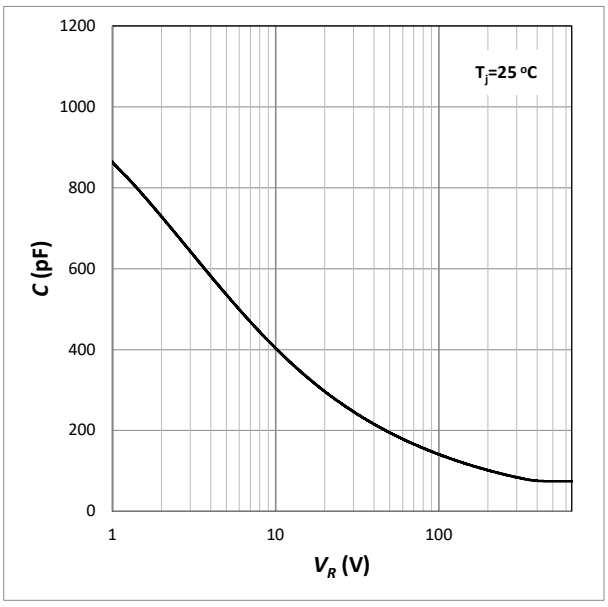


Fig. 6 Capacitance

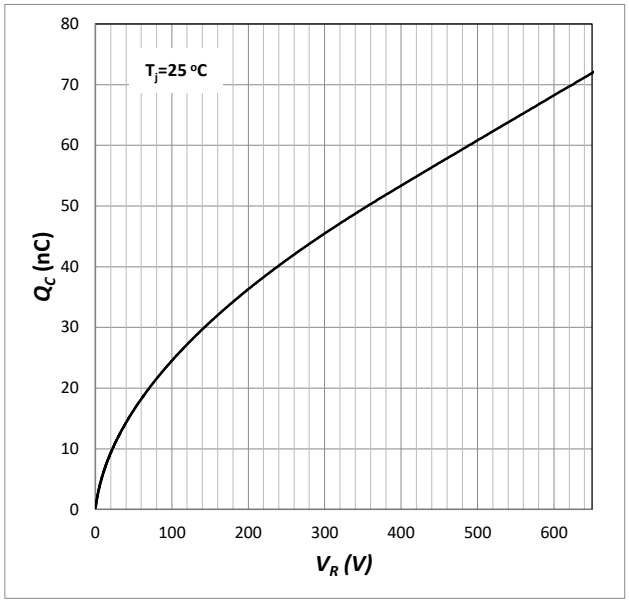


Fig. 7 Capacitive Charge

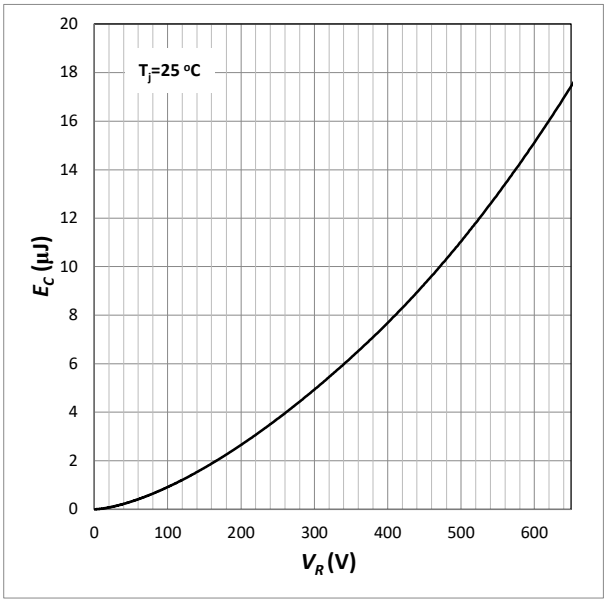


Fig. 8 Typical Capacitance Stored Energy

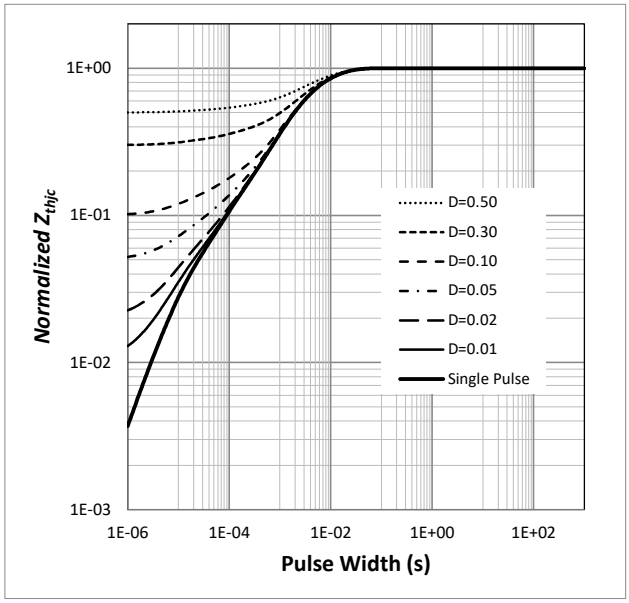
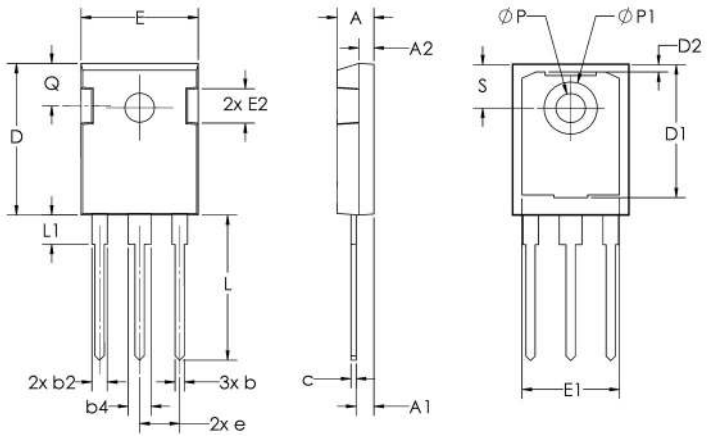


Fig. 9 Transient Thermal Impedance

Package Dimensions TO-247-3L



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
b4	2.59	3.43	0.102	0.135
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		0.214 BSC	
L	19.81	20.32	0.780	0.800
L1	4.10	4.50	0.161	0.177
φP	3.56	3.66	0.140	0.144
φP1	7.06	7.39	0.278	0.291
Q	5.39	6.20	0.212	0.244
S	6.04	6.30	0.238	0.248

Revision History

Date	Revision	Notes
12/20/2019	1.0	Initial release of datasheet
2/20/2020	1.1	Using Rthjc typical for I_F and P_{tot}
4/20/2021	1.2	Updated forward voltage spec - 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.

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