

$V_{DC}$	650 V
$Q_C$	36 nC
$I_F$	12 A
$T_{j,max}$	175 °C

## 650V/12A SiC Schottky Diode Bare Die

### Amp+™ Features

- Unipolar rectifier with surge current
- Zero reverse recovery current
- Fast, temperature-independent switching
- Reduced temperature dependence of  $V_F$

### Chip Outline



Part #	Die Size	Anode	Cathode
GP3D012A065X	1.5 x 2.9 mm	Al	Ni/Ag

### Maximum Ratings, at $T_j=25\text{ °C}$ , unless otherwise specified

Characteristics	Symbol	Conditions	Values	Unit
Continuous forward current	$I_F$	$T_C=25\text{ °C}, T_j=175\text{ °C}$	39*	A
		$T_C=125\text{ °C}, T_j=175\text{ °C}$	20*	
		$T_C=150\text{ °C}, T_j=175\text{ °C}$	13*	
Surge non-repetitive forward current sine halfwave	$I_{FSM}$	$T_C=25\text{ °C}, t_p=8.3\text{ ms}$	120*	A
		$T_C=110\text{ °C}, t_p=8.3\text{ ms}$	96*	
Non-repetitive peak forward current	$I_{F,max}$	$T_C=25\text{ °C}, t_p=10\text{ }\mu\text{s}$	720	A
Repetitive peak reverse voltage	$V_{RRM}$	$T_j=25\text{ °C}$	650**	V
Operating junction & storage temperature	$T_j, T_{storage}$	Continuous	-55...175	°C

Values have been verified on TO-220 packaged devices

\*Assumes  $R_{thJC}$  thermal resistance of 1.12°C/W with recommended wire bond

\*\* Verified by 100% wafer test

**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	-	

Values have been verified on TO-220 packaged devices

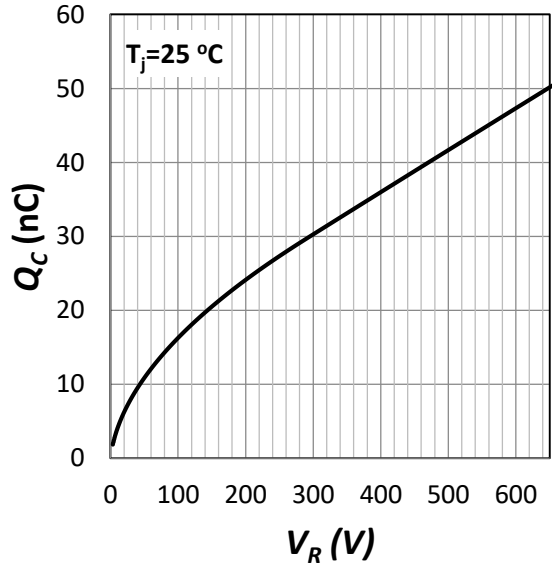
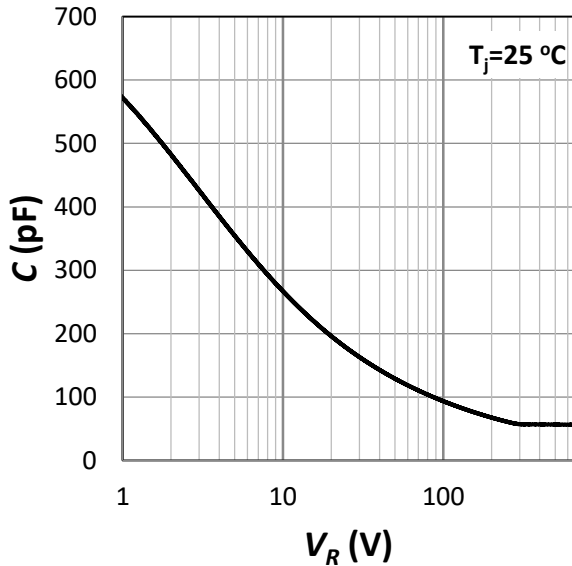
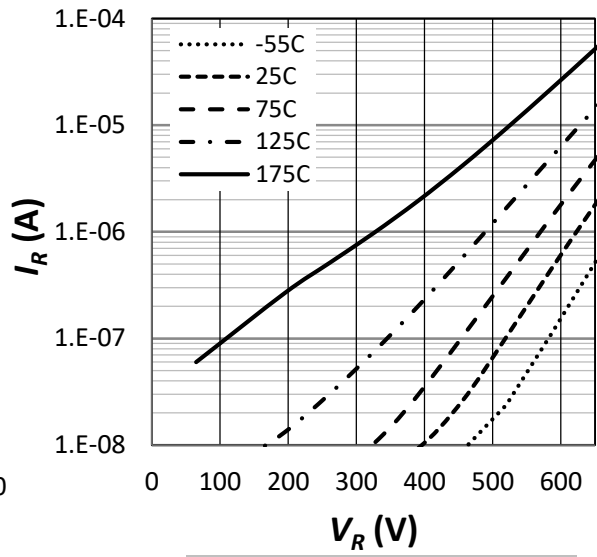
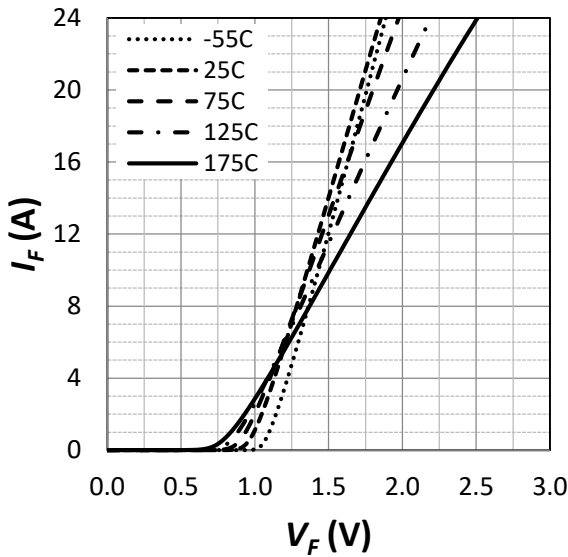
\*Assumes  $R_{thJC}$  thermal resistance of  $1.12\text{ }^\circ\text{C/W}$  with recommended wire bond

\*\* Verified by 100% wafer test

**Mechanical Parameters**

Parameter	Typ.	Unit
Die Size	1.5 x 2.9	mm
Anode Pad Opening	1.07 x 2.5	mm
Recommended Wire Bond (TO-220)	12 mil x 2	mil
Die Thickness	$355 \pm 25$	$\mu\text{m}$
Wafer Size	150	mm
Anode Metalization (Al)	4	$\mu\text{m}$
Cathode Metalization (Ni/Ag)		$\mu\text{m}$
Frontside Passivation	Polyimide on Silicon Nitride	

Typical Performance in packaged device



**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](http://www.SemiQ.com).

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