

Normally – OFF Silicon Carbide Junction Transistor

V_{DS}	=	650 V
$V_{DS(ON)}$	=	1.7 V
I_D	=	10 A
$R_{DS(ON)}$	=	170 mΩ

Features

- 250 °C maximum operating temperature
- Temperature independent switching performance
- Gate oxide free SiC switch
- Suitable for connecting an anti-parallel diode
- Positive temperature coefficient for easy paralleling
- Low gate charge
- Low intrinsic capacitance



Advantages

- Low switching losses
- Higher efficiency
- High temperature operation
- High short circuit withstand capability

Applications

- Down Hole Oil Drilling, Geothermal Instrumentation
- Hybrid Electric Vehicles (HEV)
- Solar Inverters
- Switched-Mode Power Supply (SMPS)
- Power Factor Correction (PFC)
- Induction Heating
- Uninterruptible Power Supply (UPS)
- Motor Drives

Maximum Ratings at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Drain – Source Voltage	V_{DS}	$V_{GS} = 0\text{ V}$	650	V
Continuous Drain Current	I_D	$T_C = 158\text{ °C}$	10	A
Gate Peak Current	I_{GM}		5	A
Reverse Gate – Source Voltage	V_{GS}		200	V
Reverse Drain – Source Voltage	V_{DS}		40	V
Power Dissipation	P_{tot}	$T_C = 25\text{ °C}$	8	W
Operating and Storage Temperature	T_j, T_{stg}		-55 to 250	°C

Electrical Characteristics at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

On Characteristics

Drain – Source On Voltage	$V_{DS(ON)}$	$I_D = 10\text{ A}, I_G = 250\text{ mA}, T_j = 25\text{ °C}$	1.7		V
		$I_D = 10\text{ A}, I_G = 500\text{ mA}, T_j = 175\text{ °C}$	3.3		
		$I_D = 10\text{ A}, I_G = 500\text{ mA}, T_j = 250\text{ °C}$	5.3		
Drain – Source On Resistance	$R_{DS(ON)}$	$I_D = 10\text{ A}, I_G = 250\text{ mA}, T_j = 25\text{ °C}$	170		mΩ
		$I_D = 10\text{ A}, I_G = 500\text{ mA}, T_j = 175\text{ °C}$	330		
		$I_D = 10\text{ A}, I_G = 500\text{ mA}, T_j = 250\text{ °C}$	530		
Gate Forward Voltage	$V_{GS(FWD)}$	$I_G = 500\text{ mA}, T_j = 25\text{ °C}$	3.0		V
		$I_G = 500\text{ mA}, T_j = 250\text{ °C}$	2.7		
DC Current Gain	β	$V_{DS} = 5\text{ V}, I_D = 10\text{ A}, T_j = 25\text{ °C}$	120		
		$V_{DS} = 5\text{ V}, I_D = 10\text{ A}, T_j = 250\text{ °C}$	80		

Off Characteristics

Drain Leakage Current	I_{DSS}	$V_R = 650\text{ V}, V_{GS} = 0\text{ V}, T_j = 25\text{ °C}$	2.5		μA
		$V_R = 650\text{ V}, V_{GS} = 0\text{ V}, T_j = 175\text{ °C}$	4		
		$V_R = 650\text{ V}, V_{GS} = 0\text{ V}, T_j = 250\text{ °C}$	10		

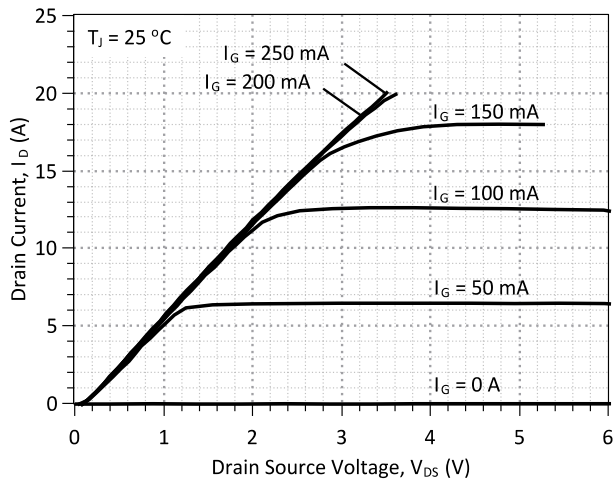


Figure 1: Typical Output Characteristics at 25 °C

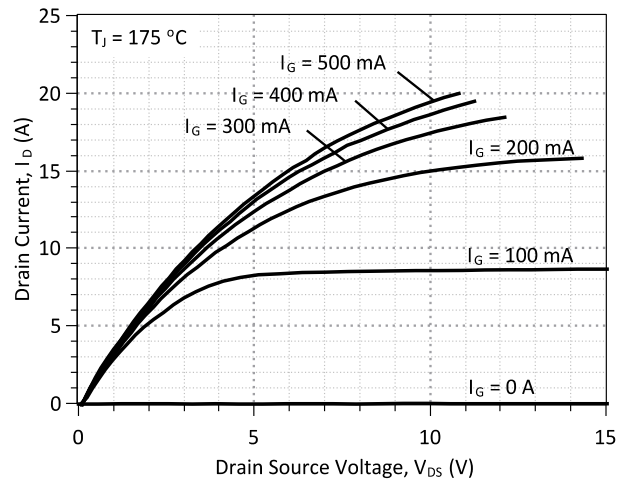


Figure 2: Typical Output Characteristics at 175 °C

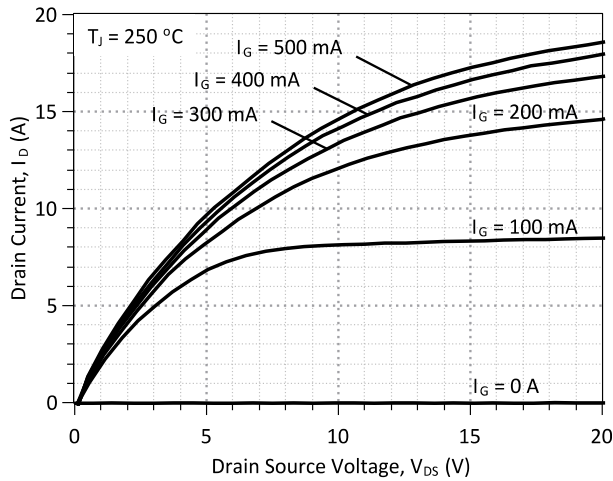


Figure 3: Typical Output Characteristics at 250 °C

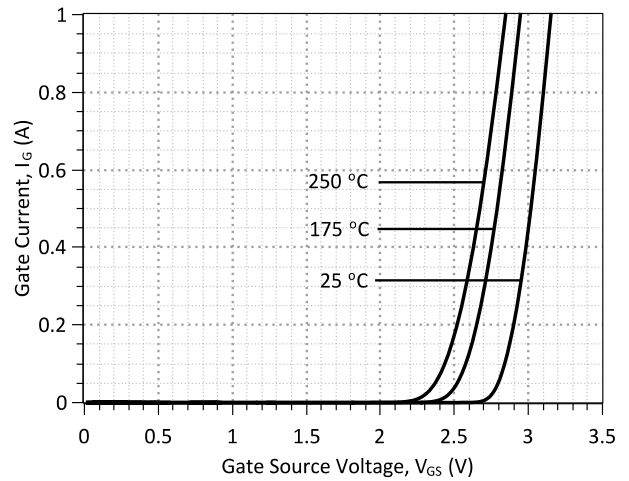


Figure 4: Typical Gate Source I-V Characteristics vs. Temperature

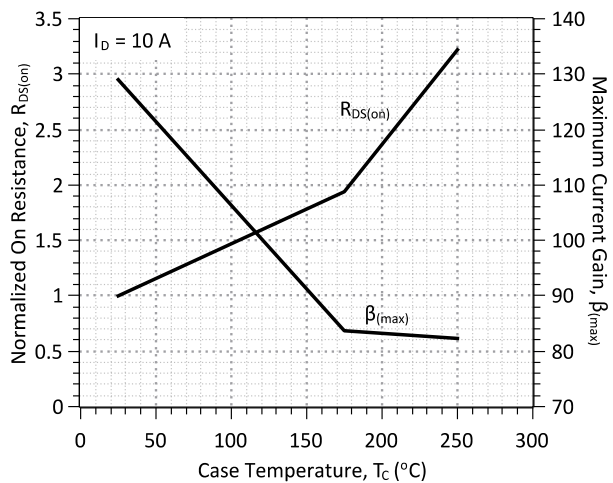


Figure 5: Normalized On-Resistance and Current Gain vs. Temperature

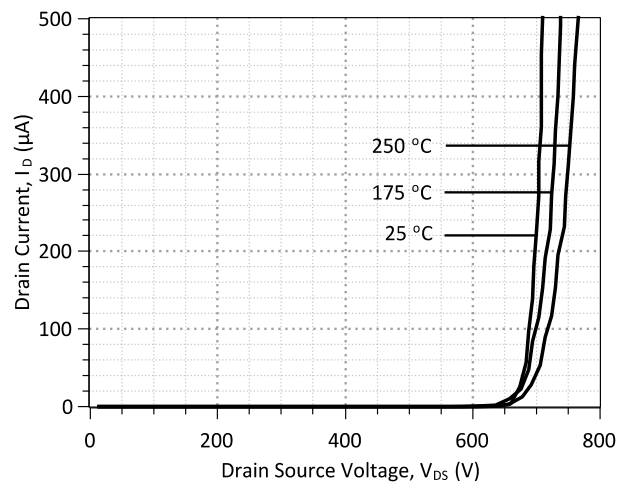


Figure 6: Typical Blocking Characteristics

Revision History

Date	Revision	Comments	Supersedes
2013/02/01	0	Initial release	

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SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GA10JT065-CAL device.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      06-SEP-2013   $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*      http://www.genesicsemi.com/index.php/sic-products/sjt
*
*      COPYRIGHT (C) 2013 GeneSiC Semiconductor Inc.
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*
*      These models are provided "AS IS, WHERE IS, AND WITH NO WARRANTY
*      OF ANY KIND EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED
*      TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A
*      PARTICULAR PURPOSE."
*      Models accurate up to 2 times rated drain current.
*
.model GA10JT065 NPN
+ IS      3.73E-46
+ ISE     5.50E-28
+ EG      3.2
+ BF      103
+ BR      0.55
+ IKF     900
+ NF      1
+ NE      2.021
+ RB      0.26
+ RE      0.1
+ RC      0.09
+ CJC     2.77E-10
+ VJC     3.023103628
+ MJC     0.460762158
+ CJE     8.23E-10
+ VJE     2.945448229
+ MJE     0.498044294
+ XTI     3
+ XTB     -0.35
+ TRC1    1.20E-02
+ VCEO    800
+ ICRATING 8
+ MFG     GeneSiC_Semiconductor
*
*      End of GA10JT065-CAL SPICE Model
```