Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Normally – OFF Silicon Carbide Super Junction Transistor

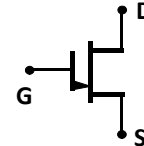|		
V_{DS}	=	1200 V
$V_{DS(ON)}$	=	1.4 V
I_D	=	5 A
$R_{DS(ON)}$	=	280 mΩ

Features

- 175 °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

Package

- RoHS Compliant

G   D   S

TO-247AB

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 unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Drain – Source Voltage	V_{DS}	V_{GS} = 0 V	1200	V
Continuous Drain Current	I_D	$T_{C,MAX}$ = 95 °C	5	A
Gate Peak Current	I_{GM}		5	A
Reverse Gate – Source Voltage	V_{SG}		25	V
Reverse Drain – Source Voltage	V_{SD}		25	V
Power Dissipation	P_{tot}	T_C = 25 °C	5	W
Storage Temperature	T_{stg}		-55 to 175	°C

Electrical Characteristics at T_j = 175 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
On Characteristics						
Drain – Source On Voltage	$V_{DS(ON)}$	I_D = 5 A, I_G = 100 mA, T_j = 25 °C		1.4		V
		I_D = 5 A, I_G = 200 mA, T_j = 125 °C		1.6		
		I_D = 5 A, I_G = 400 mA, T_j = 175 °C		2.2		
Drain – Source On Resistance	$R_{DS(ON)}$	I_D = 5 A, I_G = 100 mA, T_j = 25 °C		280		mΩ
		I_D = 5 A, I_G = 200 mA, T_j = 125 °C		320		
		I_D = 5 A, I_G = 400 mA, T_j = 175 °C		440		
Gate Forward Voltage	$V_{GS(FWD)}$	I_G = 500 mA, T_j = 25 °C		3.3		V
		I_G = 500 mA, T_j = 175 °C		3.1		
DC Current Gain	β	V_{DS} = 5 V, I_D = 5 A, T_j = 25 °C		TBD		
		V_{DS} = 5 V, I_D = 5 A, T_j = 175 °C		TBD		
Off Characteristics						
Drain Leakage Current	I_{DSS}	V_R = 1200 V, V_{GS} = 0 V, T_j = 25 °C		210		nA
		V_R = 1200 V, V_{GS} = 0 V, T_j = 125 °C		310		
		V_R = 1200 V, V_{GS} = 0 V, T_j = 175 °C		420		

Electrical Characteristics at T_j = 175 °C, unless otherwise specified

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Switching Characteristics						
Turn On Delay Time	$t_{d(on)}$	V_{DD} = 800 V, I_D = 5 A, $R_{G(on)}$ = $R_{G(off)}$ = 44 Ω, V_{GS} = -8/15 V, L = 1.1 mH, FWD = GB10SLT12, T_j = 25 ºC Refer to Figure 11 for gate current waveform		tbd		ns
Rise Time	t_r			tbd		ns
Turn Off Delay Time	$t_{d(off)}$			tbd		ns
Fall Time	t_f			tbd		ns
Turn-On Energy Per Pulse	E_{on}			tbd		µJ
Turn-Off Energy Per Pulse	E_{off}			tbd		µJ
Total Switching Energy	E_{ts}			tbd		µJ
Turn On Delay Time	$t_{d(on)}$	V_{DD} = 800 V, I_D = 5 A, $R_{G(on)}$ = $R_{G(off)}$ = 44 Ω, V_{GS} = -8/15 V, L = 1.1 mH, FWD = GB10SLT12, T_j = 175 ºC Refer to Figure 11 for gate current waveform		tbd		
Rise Time	t_r			tbd		ns
Turn Off Delay Time	$t_{d(off)}$			tbd		ns
Fall Time	t_f			tbd		ns
Turn-On Energy Per Pulse	E_{on}			tbd		µJ
Turn-Off Energy Per Pulse	E_{off}			tbd		µJ
Total Switching Energy	E_{ts}			tbd		µJ

Thermal Characteristics

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Thermal resistance, junction - case	R_{thJC}			1.64		°C/W

TBD TBD

Figure 1: Typical Output Characteristics at 25 °C   **Figure 2: Typical Output Characteristics at 125 °C**

TBD

TBD

Figure 3: Typical Output Characteristics at 175 °C

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

TBD

TBD

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

Figure 6: Typical Blocking Characteristics

TBD

TBD

Figure 7: Typical Hard-switched Turn On Waveforms

Figure 8: Typical Hard-switched Turn Off Waveforms

TBD

TBD

Figure 9: Typical Turn On Energy Losses and Switching Times vs. Temperature

**Figure 10: Typical Turn Off Energy Losses and Switching Times vs. Temperature**

TBD

Figure 11: Typical Gate Current Waveform

Gate Drive Technique (Option #1)

To drive the GA05JT12-247 with the lowest gate drive losses, a custom-designed, dual voltage source gate drive configuration is recommended [for example, see Figure 5(a) in J. Rabkowski et al. IEEE Trans. Power Electronics 27(5), 2633-2642 (2012)]. More details on using this optimized gate drive technique will be made available shortly. An effective simple alternative for ultra-fast switching of the GA05JT12-247 is available below.
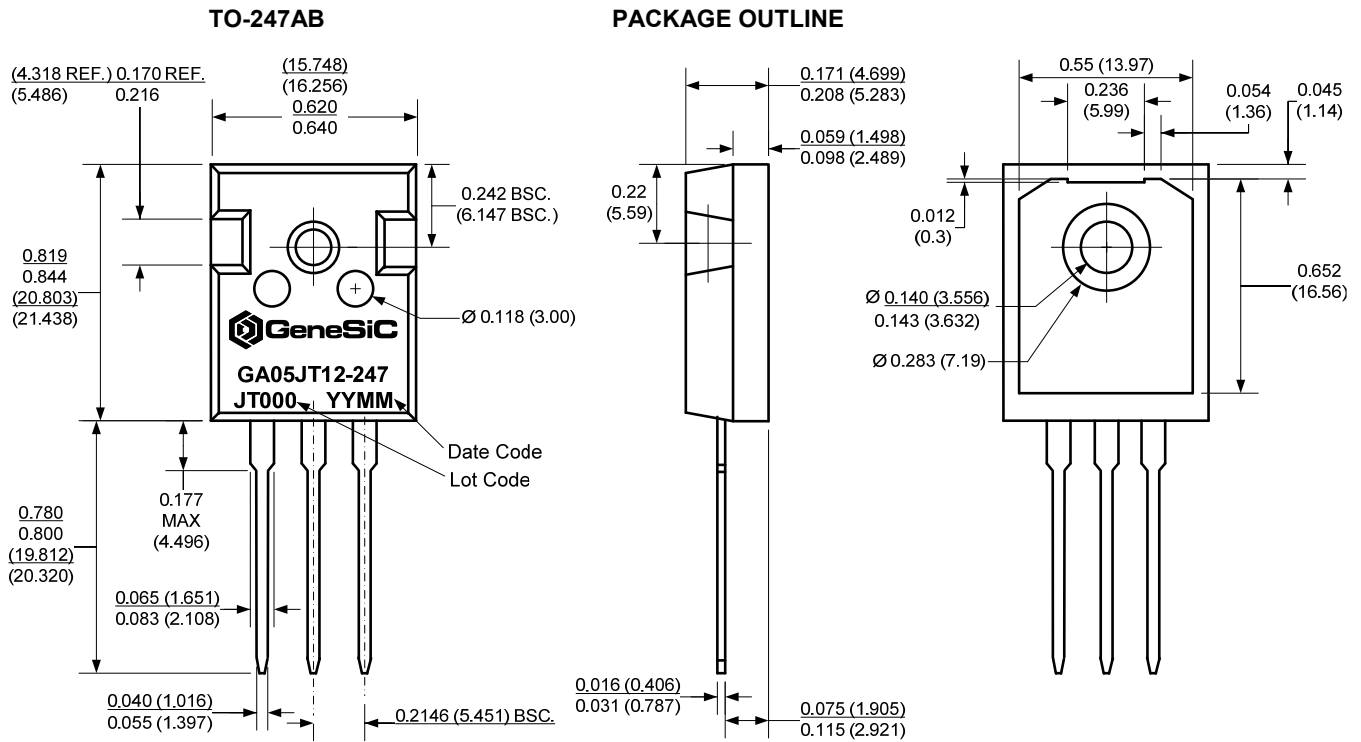
Gate Drive Technique (Option #2)

The GA05JT12-247 can be effectively driven using the IXYS IXDN614 / IXDD614 non-inverting gate driver IC or a comparable product. A typical gate driver configuration along with component values using this driver is offered below. Additional information is available from the manufacturer at www.ixys.com.
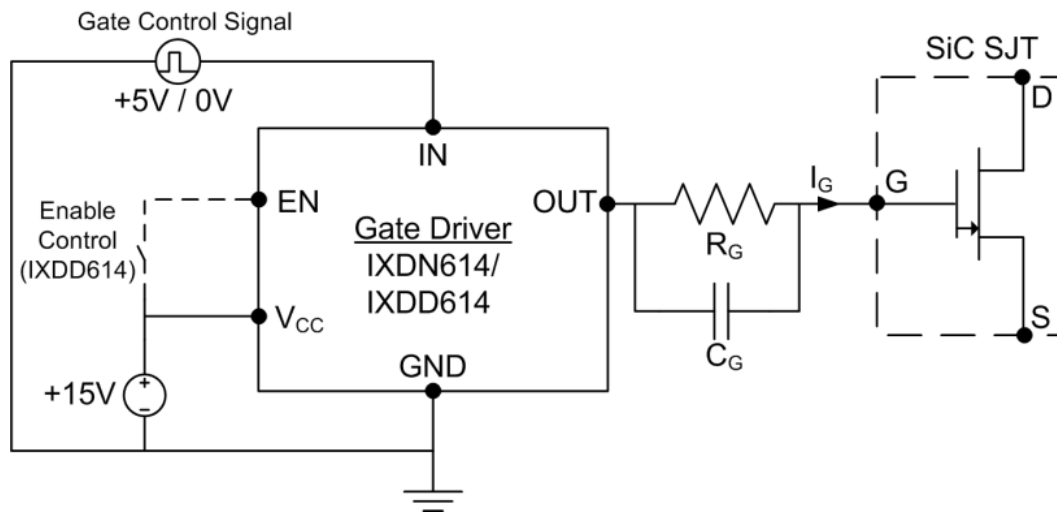
Figure 14: Recommended Gate Diver Configuration (Option #2)

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Gate Driver Pins (IXDD614/IXDN614)						
Supply Voltage	V_{CC}		-0.3	15	40	V
Gate Control Input Signal, Low	IN		-5.0	0	0.8	V
Gate Control Input Signal, High	IN		3.0	5.0	V_{CC}+0.3	V
Enable, Low	EN	IXDD614 Only			$1/3*V_{CC}$	V
Enable, High	EN	IXDD614 Only	$2/3*V_{CC}$			V
Output Voltage, Low	V_{OUT}				0.025	V
Output Voltage, High	V_{OUT}		V_{CC}-0.025			V
Output Current, Peak	I_{OUT}	Package Limited		4.5	14	A
Output Current, Continuous	I_{OUT}			0.5	4.0	A
Passive Gate Components						
Gate Resistance	R_G	$I_G \approx 0.5$ A	5	22		Ω
Gate Capacitance	C_G	$I_G \approx 0.5$ A		100		nF

GeneSiC
SEMICONDUCTOR

Package Dimensions:

TO-247AB

(4.318 REF.) 0.170 REF.
(5.486)   0.216

(15.748)
(16.256)
0.620
0.640

0.242 BSC.
(6.147 BSC.)

0.819
0.844
(20.803)
(21.438)

Ø 0.118 (3.00)

GA05JT12-247
JT000 YYMM

Date Code
Lot Code

0.780
0.800
(19.812)
(20.320)

0.177
MAX
(4.496)

0.065 (1.651)
0.083 (2.108)

0.040 (1.016)
0.055 (1.397)

0.2146 (5.451) BSC.

PACKAGE OUTLINE

0.171 (4.699)
0.208 (5.283)

0.059 (1.498)
0.098 (2.489)

0.22
(5.59)

0.012
(0.3)

Ø 0.140 (3.556)
0.143 (3.632)

Ø 0.283 (7.19)

0.016 (0.406)
0.031 (0.787)

0.075 (1.905)
0.115 (2.921)

0.55 (13.97)
0.236
(5.99)

0.054
(1.36)

0.045
(1.14)

0.652
(16.56)

NOTE
1. CONTROLLED DIMENSION IS INCH. DIMENSION IN BRACKET IS MILLIMETER.
2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH, MATERIAL PROTRUSIONS

Revision History			
Date	Revision	Comments	Supersedes
2013/01/15	0	Initial release	