

GA35XCP12-247

IGBT/SiC Diode Co-pack

V _{CES}	=	1200 V
I _{CM}	=	35 A
V _{CE(SAT)}	=	3.0 V

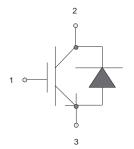
Features

- Optimal Punch Through (OPT) technology
- SiC freewheeling diode
- Positive temperature coefficient for easy paralleling
- Extremely fast switching speeds
- Temperature independent switching behavior of SiC rectifier
- · Best RBSOA/SCSOA capability in the industry
- High junction temperature
- · Industry standard packaging

Package

RoHS Compliant





TO - 247AB

Advantages

- Industry's highest switching speeds
- High temperature operation
- Improved circuit efficiency
- Low switching losses

Applications

- Solar Inverters
- Aerospace Actuators
- Server Power Supplies
- Resonant Inverters > 100 kHz
- Inductive Heating
- Electronic Welders

Maximum Ratings, at T_i = 150 °C, unless otherwise specified

Parameter	Symbol	Conditions		Values		Unit
IGBT						
Collector-Emitter Voltage	V _{CES}			1200		V
DC-Collector Current	I _{CM}	T _c ≤ 105 °C		35		Α
Gate Emitter Peak Voltage	V _{GES}			± 20		V
Operating Temperature	T _{vi}		-	40 to +15	50	٥C
Storage Temperature	T _{stg}			40 to +15	50	°С
Free-wheeling diode						
DC-Forward Current	I _F	T _c ≤ 105 °C	35			Α
Non Repetitive Peak Forward Current	I _{FM}	$T_c = 25 {}^{\circ}\text{C}, t_p = 10 \mu\text{s}$	tbd			Α
Surge Non Repetitive Forward Current	I _{F,SM}	t_p = 10 ms, half sine, T_c = 25 °C		tbd		Α
Thermal Characteristics						
Th. Resistance Junction to Case	R _{thJC}	IGBT	0.34		K/W	
Th. Resistance Junction to Case	R_{thJC}	SiC diode		0.31		K/W
Mechanical Properties				Values		_
mechanical i Toperties			min.	typ.	max.	
Mounting Torque	M _d		1.5		2	Nm



Flectrical	Characteristics

Parameter	Symbol Conditions	Values			Unit	
		Conditions	min.	typ.	max.	Unit
IGBT						
Gate Threshold Voltage	V _{GE(th)}	$V_{GE} = V_{CE}, I_{C} = 0.6 \text{ mA}, T_{i} = 25 ^{\circ}\text{C}$	5.5	6	6.5	V
Collector Emitter Leakers Correct	CES.25	V _{GE} = 0 V, V _{CE} = V _{CES} , T _i = 25 °C		0.02	0.2	mΑ
Collector-Emitter Leakage Current	I _{CES,150}	$V_{GE} = 0 \text{ V}, V_{CE} = V_{CES}, T_j = 150 {}^{\circ}\text{C}$		0.3		mΑ
Gate-Leakage Current	I _{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = 20 \text{ V}, T_{j} = 25 ^{\circ}\text{C}$			500	nA
Collector-Emitter Threshold Voltage	V _{CE(TO)}	T _j = 25°C		1.1		V
Collector-Emitter Slope Resistance	K _{CF.25}	V _{GE} = 15 V, T _j = 25 °C		50		mΩ
Collector-Ethlitter Slope Resistance	R _{CE,150}	$V_{GE} = 15 \text{ V}, T_{j} = 150 ^{\circ}\text{C}$		87.5		mΩ
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	$I_{c} = 35 \text{ A}, V_{GE} = 15 \text{ V}, T_{j} = 25 {}^{\circ}\text{C}(150 {}^{\circ}\text{C})$		3.0(3.9)		V
Input Capacitance	C _{ies}			tbd		nF
Output Capacitance	C _{oes}	$V_{GE} = 0 \text{ V}, V_{CE} = 25 \text{ V}, f = 1 \text{ MHz}$		tbd		nF
Reverse Transfer Capacitance	C_{res}			tbd		nF
Gate Charge	$Q_{_{\mathrm{G}}}$	$V_{CC} = 800 \text{ V}, I_{C} = 35 \text{ A}, V_{GE} = 15 \text{ V}$		50		nC
Reverse Bias Safe Operating Area	RBSOA	T_j =125 °C, R_g =56 Ω , V_{CC} =1200 V, V_{GE} =15 V		45		Α
Short Circuit Current	l _{sc}	$T_{i} = 125 {}^{\circ}\text{C}, R_{g} = 56\Omega,$		60		Α
Short Circuit Duration	t _{sc}	$V_{CC} = 900 \text{ V}, V_{GE} = \pm 15 \text{ V}$			10	μs
Rise Time	t _r			85		ns
Fall Time	t _f	$V_{cc} = 800 \text{ V}, I_{c} = 35 \text{ A},$		205		ns
Turn On Delay Time	t _{d(on)}	$R_{gon} = R_{goff} = 22 \Omega$		40		ns
Turn Off Delay Time	t _{d(off)}	$V_{GE(0n)} = 15 \text{ V}, V_{GE(0ff)} = -8 \text{ V},$ $T_i = 125 \text{ °C}$		232		ns
Turn-On Energy Loss Per Pulse	Eon	T _j = 125 °C		2.66		mJ
Turn-Off Energy Loss Per Pulse	E _{off}			4.35		mJ
Free-wheeling diode						
Forward Voltage	V _F	$I_F = 35 \text{ A}, V_{GE} = 0 \text{ V}, T_j = 25 ^{\circ}\text{C} (150 ^{\circ}\text{C})$		2.6(3.5)		V
Threshold Voltage at Diode	V _{D(TO)}	T _i = 25 °C		0.8		V
Peak Reverse Recovery Current	I	,		3.01		Α
Reverse Recovery Time	t _{rr}	$I_F = 35 \text{ A}, V_{GE} = 0 \text{ V}, V_{R} = 650 \text{ V}$		36		ns
Diode peak rate of fall of reverse recovery current during tb	dl _r /dt	-dI _e /dt = 300 A/μs, T _j = 125 °C		190		Α/μ

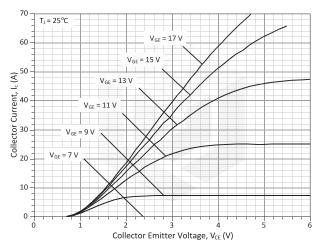


Figure 1: Typical Output Characteristics at 25 °C

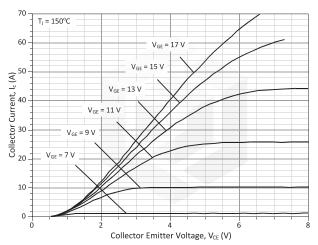


Figure 2: Typical Output Characteristics at 150 °C



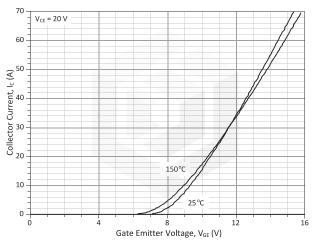


Figure 3: Typical Transfer Characteristics

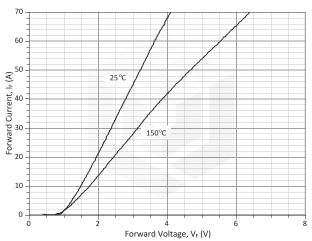


Figure 5: Typical FWD Forward Characteristics

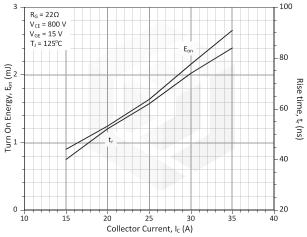


Figure 7: Typical Turn On Energy Losses and Switching Times

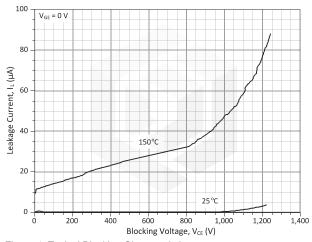


Figure 4: Typical Blocking Characteristics

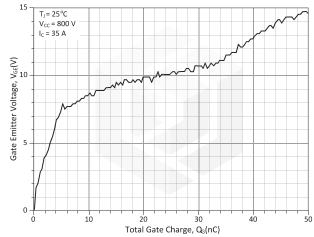


Figure 6: Typical Turn On Gate Charge

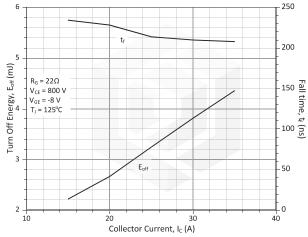


Figure 8: Typical Turn Off Energy Losses and Switching Times



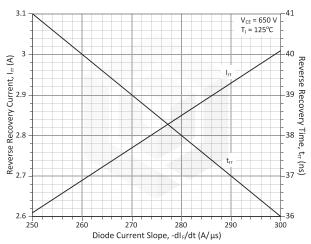
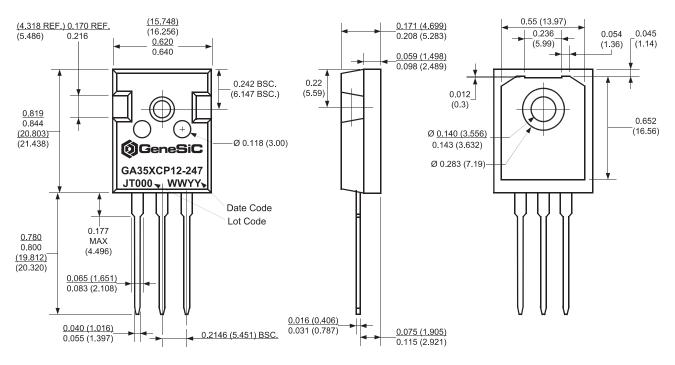


Figure 9: Typical Reverse Recovery Currents and Times

Package Dimensions:

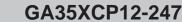
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PACKAGE OUTLINE



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	
2011/01/06	1	First generation release		

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Page 5 of 5