Field Stop Trench IGBT Die 750 V, 200 A

PCGLA200T75NF8

V_{CES} = 750 V
I_C = Limited by $T_{j(max)}$

Features

- AEC−Q101 Rev. D Qualified for Enhanced Reliability
- Maximum Junction Temperature 175°C
- Advanced FS4 Trench Technology
- Positive Temperature Coefficient
- Easy Paralleling
- Short Circuit Rated
- Very Low Saturation Voltage: $V_{CE(SAT)}$ = 1.45 V(Typ.) @ I_C = 200 A
- Optimized for Motor Control Applications

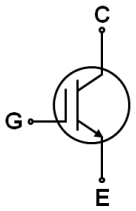
Applications

- Automotive Traction Modules
- General Power Modules

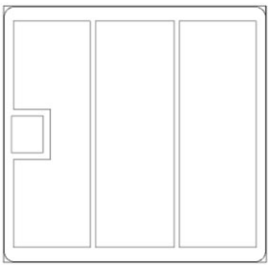
MECHANICAL PARAMETERS

Parameter	Mils	μm
Die Size	394 x 394	10,000 x 10,000
Emitter Pad Size	See chip drawing	See chip drawing
Gate Pad Size	47 x 56	1,200 x 1,430
Scribe Lane Width	3	80
Die Thickness	3.4	86
Top Metal	5 μm AlSiCu	
Back Metal	1.3 μm Al/NiV/Ag	
Topside Passivation	Silicon Nitride plus Polyimide	
Wafer Diameter	200 mm	
Max Possible Die Per Wafer	226	
Recommended Storage Environment	In original container, in dry nitrogen, < 3 months at an ambient temperature of 23°C	

IGBT DIE



DIE OUTLINE



ORDERING INFORMATION

Device	Inking?	Shipping
PCGLA200T75NF8	Yes	Sawn Wafer on Tape

© Semiconductor Components Industries, LLC, 2018

ABSOLUTE MAXIMUM RATINGS (T_{VJ}= 25°C Unless Otherwise Noted)

Parameter	Symbol	Ratings	Unit
Collector−Emitter Voltage	V_{CES}	750	V
Gate−Emitter Voltage	V_{GES}	±20	V
DC Collector Current, limited by T_{VJ} max	I_C	(Note 1)	A
Pulsed Collector Current, V_{GE} = 15 V, tp limited by $T_{VJ\ max}$ (Note 2)	I_{CM}	600	A
Short Circuit Withstand Time, V_{GE} = 15 V, $V_{CE} \le$ 400 V, $T_{VJ} \le$ 175°C	t_{sc}	4	μs
Operating Junction Temperature	T_{VJ}	−40 to +175	°C
Storage Temperature Range	Tstg	−17 to +25	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Depends on the thermal properties of assembly.
2. Not subject to production test − verified by design/characterization.

ELECTRICAL CHARACTERISTICS (T_J= 25°C Unless Otherwise Noted)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
STATIC CHARACTERISTICS (Tested on wafers)							
Collector−Emitter Breakdown Voltage	BV_{CES}	V_{GE} = 0 V, I_C = 1 mA		750	−	−	V
Collector−Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C = 200 A, V_{GE} = 15 V		−	1.45	1.75	V
Gate−Emitter Threshold Voltage	$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 200 mA		4.3	5.5	6.7	V
Collector Cut−off Current	I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0 V		−	−	40	μA
Gate Leakage Current	I_{GES}	V_{GE} = V_{GES}, V_{CE} = 0 V		−	−	±400	nA
ELECTRICAL CHARACTERISTICS (Not subjected to production test − verified by design/characterization)							
Collector−Emitter Breakdown Voltage	BV_{CES}	V_{GE} = 0 V, I_C = 1 mA	T_{VJ}=−40°C	700	820	−	V
Collector Cut−off Current	I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0 V	T_{VJ} = 150°C	−	0.2	−	mA
			T_{VJ} = 175°C	−	1.5	−	
Collector−Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C = 200A, V_{GE} = 15 V	T_{VJ} = 150°C	−	1.65	−	V
			T_{VJ} = 175°C	−	1.7	−	
Input Capacitance	C_{IES}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		−	19900	−	pF
Output Capacitance	C_{OES}			−	374	−	pF
Reverse Transfer Capacitance	C_{RES}			−	64	−	pF
Internal Gate Resistance	R_G	f = 1 MHz		−	10	−	Ω
Total Gate Charge	$Q_{G(Total)}$	V_{CE} = 400 V, I_C = 200 A, V_{GE} = −8 V to +15 V		−	718	−	nC
Gate−Emitter Charge	Q_{GE}			−	385	−	
Gate−Collector Charge	Q_{GC}			−	152	−	
Turn−On Delay Time	$t_{d(on)}$	V_{CE} = 400 V, I_C = 200 A, R_G = 2 Ω, V_{GE} = ±15 / −8 V, Inductive Load, T_{VJ} =25°C		−	257.0	−	nS
Rise Time	t_r			−	202.0	−	
Turn−Off Delay Time	$t_{d(off)}$			−	247.5	−	
Fall Time	t_f			−	163.0	−	
Turn−On Delay Time	$t_{d(on)}$	V_{CE} = 400 V, I_C = 200 A, R_G = 2 Ω, V_{GE} = ±15 / −8 V, Inductive Load, T_{VJ} = 150°C		−	273.5	−	nS
Rise Time	t_r			−	214.5	−	
Turn−Off Delay Time	$t_{d(off)}$			−	280.5	−	
Fall Time	t_f			−	247.5	−	

ELECTRICAL CHARACTERISTICS (T_J= 25°C Unless Otherwise Noted) (continued)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
ELECTRICAL CHARACTERISTICS (Not subjected to production test – verified by design/characterization)						
Turn−On Delay Time	$t_{d(on)}$	V_{CE} = 400 V, I_C = 200 A, R_G = 2 Ω, V_{GE} = ±15 / −8 V, Inductive Load, T_{VJ} = 175°C	–	282.0	–	nS
Rise Time	t_r		–	227.0	–	
Turn−Off Delay Time	$t_{d(off)}$		–	289.0	–	
Fall Time	t_f		–	269.0	–	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Switching characteristics and thermal properties are depending strongly on module design and mounting technology.

For ordering, technique and other information on **onsemi** automotive bare die products, please contact automotivebaredie@onsemi.com.

Die Layout

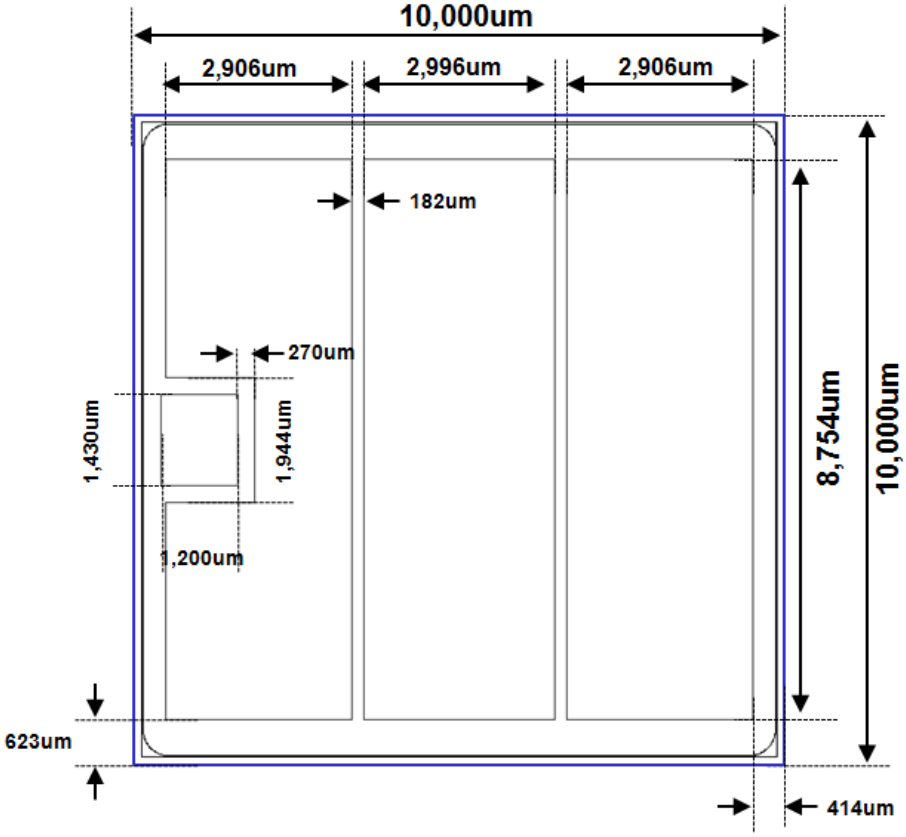


Figure 1. Die Layout

onsemi, ONSEMI , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as−is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales