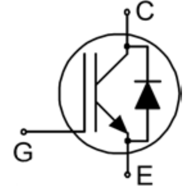
IGBT chip with monolithically integrated diode in packages offering space saving advantage

Features:
TRENCHSTOP™ Reverse Conducting (RC) technology for 600V applications offering:
- Optimised V_{CEsat} and V_F for low conduction losses
- Smooth switching performance leading to low EMI levels
- Very tight parameter distribution
- Operating range of 1 to 20kHz
- Maximum junction temperature 175°C
- Short circuit capability of 5µs
- Best in class current versus package size performance
- Qualified according to JEDEC for target applications
- Complete product spectrum and PSpice Models: http://www.infineon.com/igbt/



Applications:
Motor drives

Used for:
Discrete components and molded modules

Chip Type	V_{CE}	I_{Cn}	Die Size	Package
IGC10R60D	600V	15A	2.70 x 3.73 mm²	sawn on foil

Mechanical Parameter

Raster size	2.70 x 3.73	mm²
Emitter pad size	see chip drawing	
Gate pad size	see chip drawing	
Area: total / active IGBT / active Diode	10.071 / 5.544 / 1.317	
Thickness	70	µm
Wafer size	150	mm
Max.possible chips per wafer	1450	
Passivation frontside	Photoimide	
Pad metal	3200 nm AlSiCu	
Backside metal	Ni Ag –system suitable for epoxy and soft solder die bonding	
Die bond	Electrically conductive glue or solder	
Wire bond	Al, <500µm	
Reject ink dot size	∅ 0.65mm ; max 1.2mm	
Recommended storage environment	Store in original container, in dry nitrogen, in dark environment, < 6 month at an ambient temperature of 23°C	

Edited by INFINEON Technologies, IFAG IMM PSD, Edition 2.0, 12.01.2010

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter voltage, T_j=25 °C	V_{CE}	600	V
DC collector current, limited by $T_{j\,max}$	I_C	[1]	A
Pulsed collector current, t_p limited by $T_{j\,max}$	$I_{c,puls}$	45	A
Gate emitter voltage	V_{GE}	±20	V
Junction temperature	$T_{vj,max}$	-40 .. +175	°C
Operating junction temperature	$T_{vj,op,max}$	-40 .. +175	°C
Short circuit data [2] V_{GE} = 15V, V_{CC} = 400V, T_{vj} = 150°C	$t_{p,max}$	5	µs
Safe operating area IGBT [2][3]	$I_{C,max}$ = 30A, $V_{CE,max}$ = 600V, $T_{vj,op} \le T_{vj,op,max}$		
Safe operating area Diode [2]	$I_{F,max}$ = 30A, $V_{R,max}$ = 600V, P_{max} =12 kW , $T_{vj,op} \le T_{vj,op,max}$		

[1] depending on thermal properties of assembly
[2] not subject to production test - verified by design/characterization
[3] allowed number of short circuits: <1000; time between short circuits: >1s

Static Characteristics (tested on wafer), T_j=25 °C

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-Emitter breakdown voltage	$V_{(BR)CES}$	V_{GE}=0V , I_C= 0.2mA	600			V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=15A		1.65	2.1	V
Diode Forward Voltage	V_F	V_{GE}=0V, I_F=15A		1.7	2.1	V
Gate-Emitter threshold voltage	$V_{GE(th)}$	I_C=0.25mA , V_{GE}=V_{CE}	4.3	5	5.7	V
Zero gate voltage collector current	I_{CES}	V_{CE}=600V , V_{GE}=0V			40	µA
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V , V_{GE}=20V			100	nA
Integrated gate resistor	R_{Gint}			0		Ω

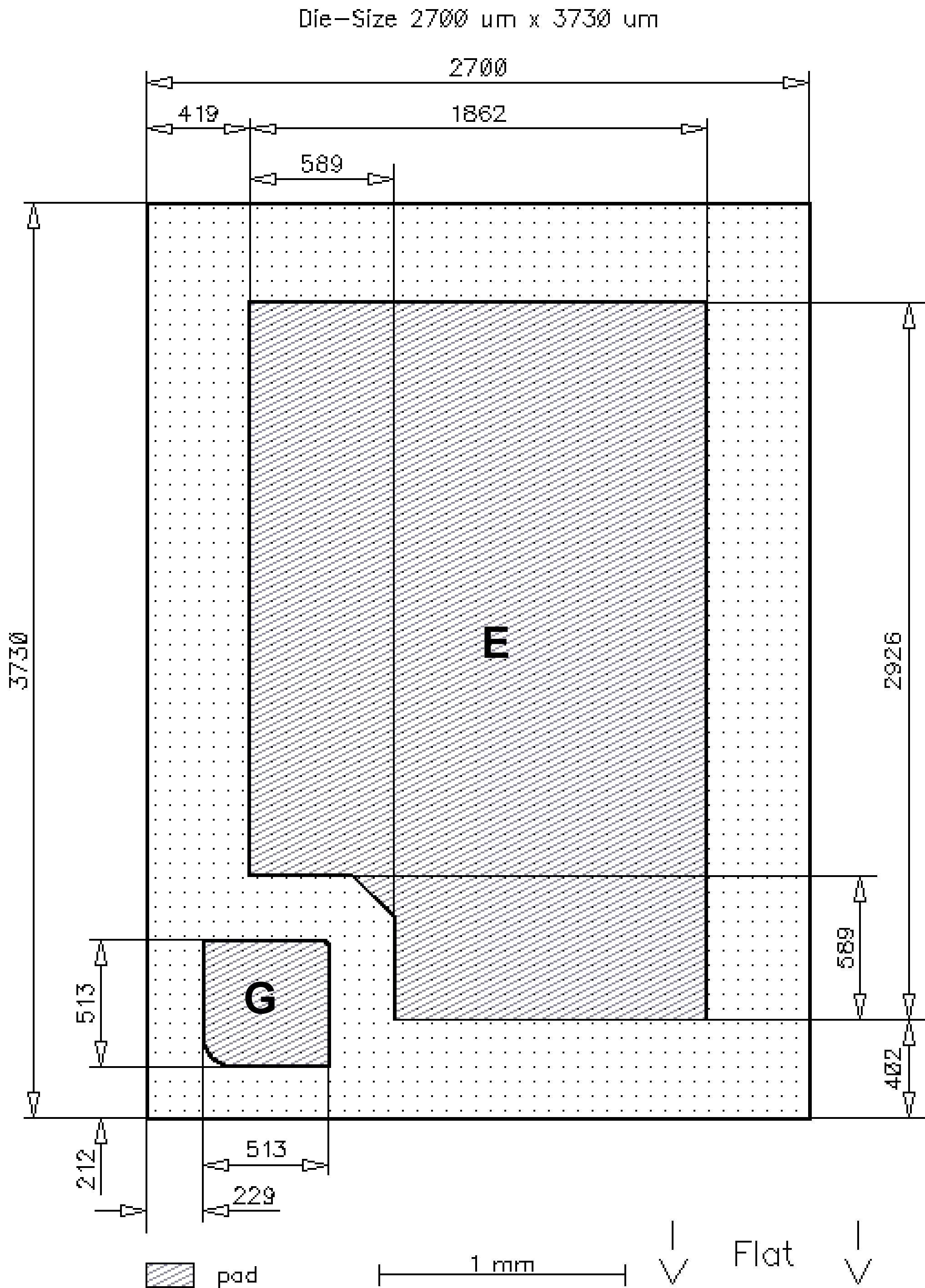
Dynamic Characteristics (not subject to production test - verified by design / characterization), T_j=25 °C

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Input capacitance	C_{iss}	V_{CE}=25V, V_{GE}=0V, f=1MHz		961		pF
Output capacitance	C_{oss}			53		pF
Reverse transfer capacitance	C_{rss}			33		pF

Further Electrical Characteristic

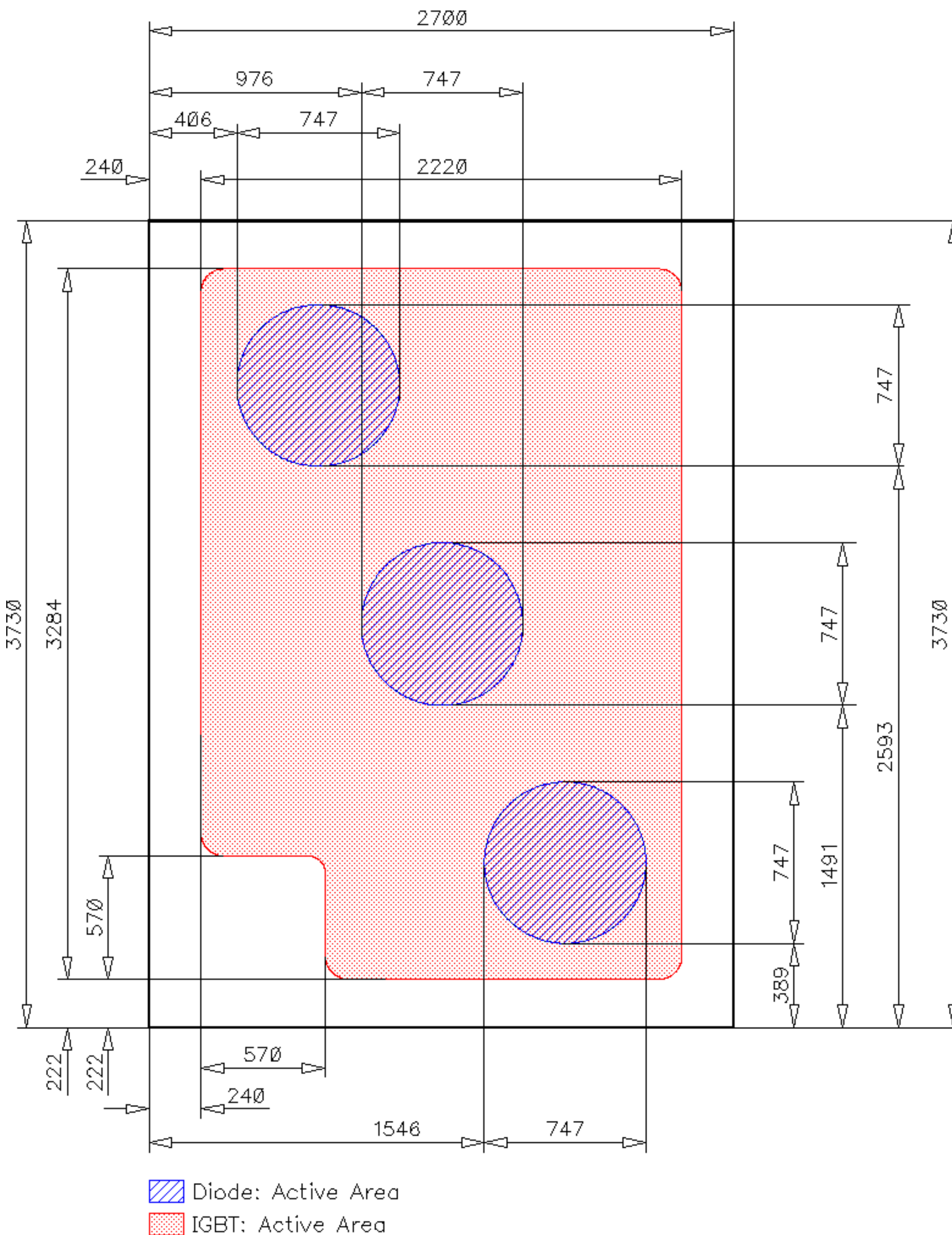
Switching characteristics and thermal properties are depending strongly on package design and mounting technology and can therefore not be specified for a bare die.
Further technical information about the performance of this chip in package t.b.d. is given exemplarily at www.infineon.com/igbt. The chip qualification is independent of the qualification which is performed for the Discretes.

Chip Drawing



E = Emitter
G = Gate

Chip Drawing active areas



Edited by INFINEON Technologies, IFAG IMM PSD, Edition 2.0, 12.01.2010

Description

AQL 0,65 for visual inspection according to failure catalogue
Electrostatic Discharge Sensitive Device according to MIL-STD 883

Revision History

Version	Subjects (major changes since last revision)	Date
2.0	Release of final datasheet	12.01.2010

Published by
Infineon Technologies AG
81726 Munich, Germany
© 2010 Infineon Technologies AG
All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office. Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.