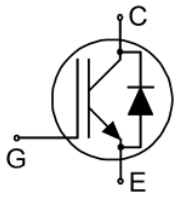
IGBT chip with monolithically integrated diode in packages offering space saving advantage

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
IGC04R60DE	600V	4A	1.98 x 1.85 mm^2	sawn on foil

Mechanical Parameters

Raster size		1.98 x 1.85	mm^2
Emitter pad size		see chip drawing	
Gate pad size		see chip drawing	
Area: total / active IGBT / active Diode		3.663 / 1.464 / 0.339	
Thickness		70	µm
Wafer size		200	mm
Max.possible chips per wafer		7658	
Passivation frontside		Photoimide	
Pad metal		3200 nm AlSiCu	
Backside metal		Ni Ag –system	
Die bond		Electrically conductive epoxy glue and soft solder (temperature budget: 290°C for 1min. or 260°C for 1.5min.)	
Wire bond		Al, <250µm	
Reject ink dot size		∅ 0.65mm ; max 1.2mm	
Storage environment	for original and sealed MBB bags	Ambient atmosphere air, Temperature 17°C – 25°C, < 6 month	
	for open MBB bags	Acc. to IEC62258-3: Atmosphere >99% Nitrogen or inert gas, Humidity <25%RH, Temperature 17°C – 25°C, < 6 month	

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter voltage, T_{vj} =25 °C	V_{CE}	600	V
DC collector current, limited by $T_{vj\,max}$	I_C	1)	A
Pulsed collector current, t_p limited by $T_{vj\,max}$	$I_{c,puls}$	12	A
Gate emitter voltage	V_{GE}	±20	V
Junction temperature range	$T_{vj,max}$	-40 ...+175	°C
Operating junction temperature	$T_{vj,op,max}$	-40 ...+175	°C
Short circuit data 2)3) V_{GE} = 15V, V_{CC} = 400V, T_{vj} = 150°C	t_{SC}	5	µs
Safe operating area IGBT 2)3)	$I_{C,max}$ = 8A, $V_{CE,max}$ = 600V, $T_{vj,op} \leq T_{vj,op,max}$		
Safe operating area Diode 2)	$I_{F,max}$ = 8A, $V_{R,max}$ = 600V, P_{max} =3.7 kW , $T_{vj,op} \leq T_{vj,op,max}$		

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_{vj} =25 °C

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-Emitter breakdown voltage	$V_{(BR)CES}$	V_{GE}=0V , I_C= 0.2 mA	600			V
Collector-Emitter saturation voltage	V_{CEsat}	V_{GE}=15V, I_C=4A		1.65	2.1	
Diode Forward Voltage	V_F	V_{GE}=0V, I_F=4A		1.7	2.1	
Gate-Emitter threshold voltage	$V_{GE(th)}$	I_C=0.07mA , V_{GE}=V_{CE}	4.3	5	5.7	
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_G			none		Ω

Electrical Characteristics (not subject to production test - verified by design / characterization)

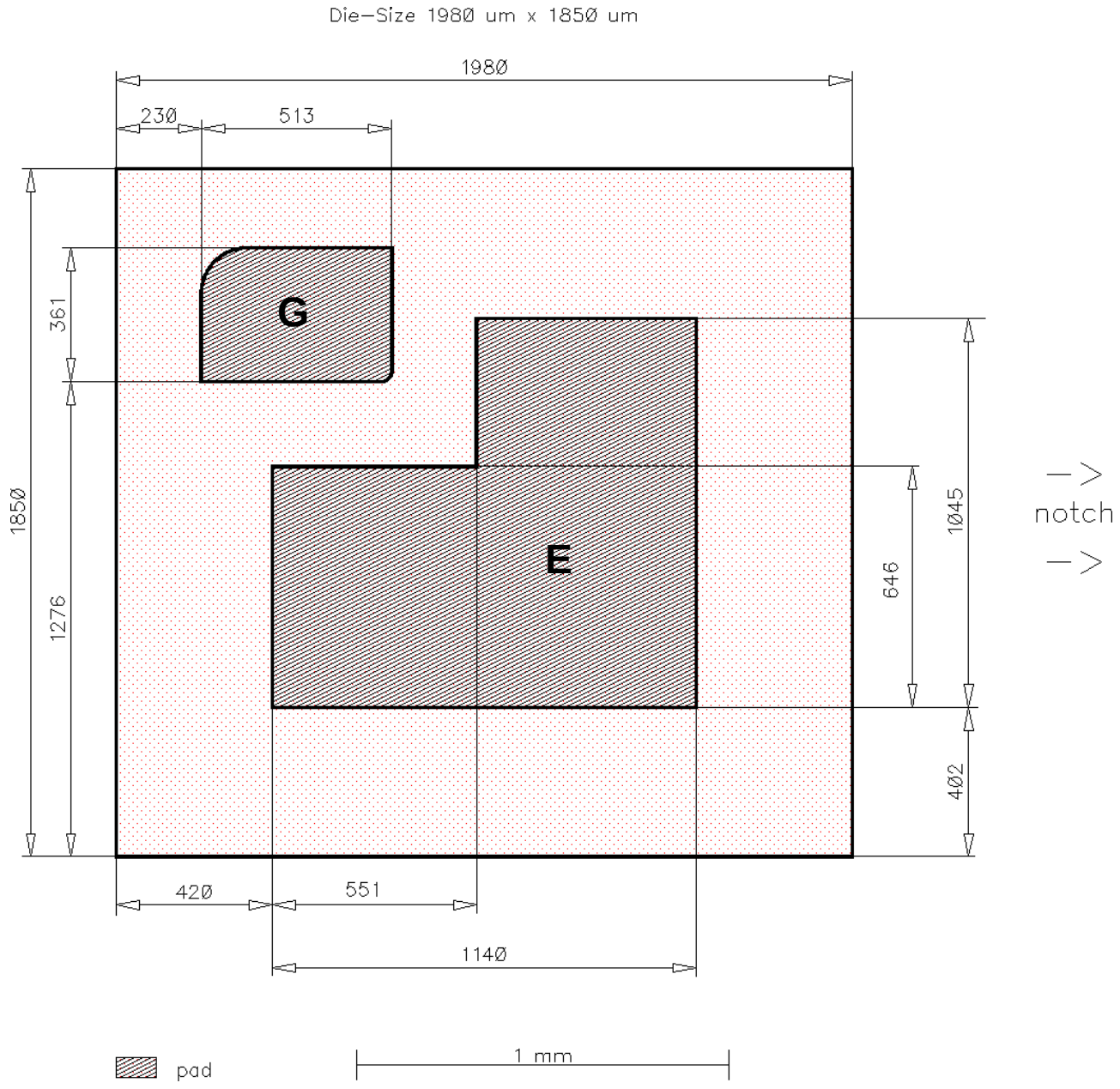
Parameter		Symbol	Conditions	Value			Unit
				min.	typ.	max.	
Collector-Emitter saturation voltage	T_{vj} =175 °C	V_{CEsat}	V_{GE}=15V, I_C=4A		1.85		V
Input capacitance		C_{ies}	V_{CE}=25V, V_{GE}=0V, f=1MHz, T_{vj} =25 °C		305		pF
Output capacitance		C_{oes}			18		
Reverse transfer capacitance		C_{res}			9		

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 PG-TO252-3. is given exemplarily at www.infineon.com/igbt. The chip qualification is independent of the qualification which is performed for the Discretes.

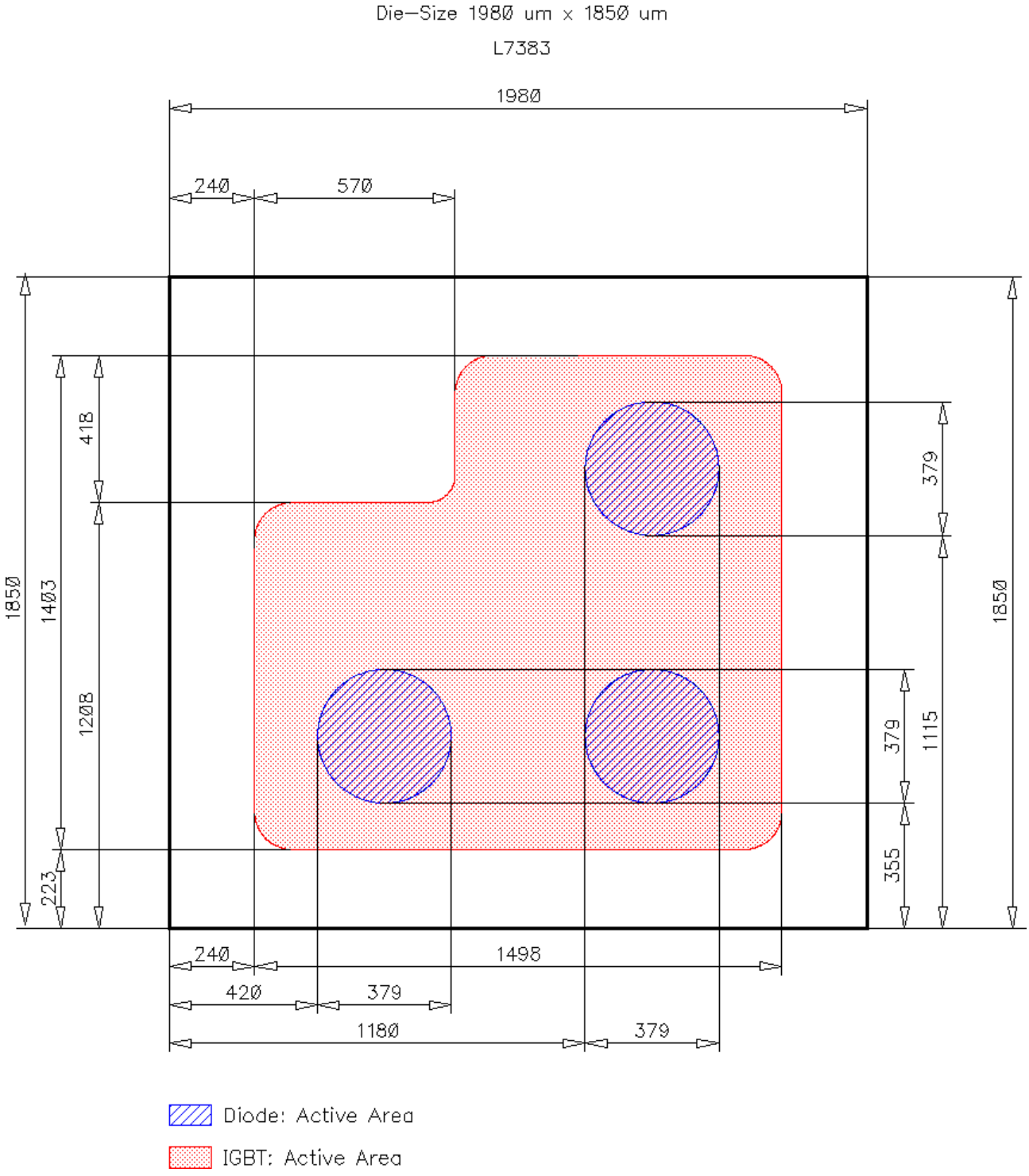
This chip data sheet refers to the device data sheet	IKD04N60R	Rev. 2.2

Chip Drawing



E = Emitter
G = Gate

Chip Drawing active areas



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

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