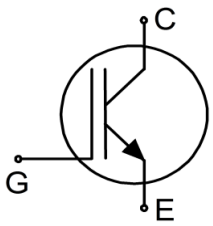
EDT3 1200V IGBT for Automotive Applications

IGBT

Quality Requirement Category: Automotive

Features

- 1200V micro pattern trench technology
- Low $V_{CE(sat)}$
- Low switching losses
- Short tail current
- Positive temperature coefficient
- Integrated gate resistor
- Easy paralleling
- 185°C maximum junction temperature



Applications

- Drives

Description

- Recommended for power modules

Product Validation

- Technology qualified for Automotive Applications. Product validation according to AEC-Q101.

Key Performance Parameters

Chip Type	V_{CE}	I_{Cn}	Die Size	Package
IGC100T120Y12RA	1200V	230A	99.6mm^2	Sawn on foil

Table of Contents

1 Parameters and Characteristics

Table 1 Mechanical Parameters

Raster size		9.96 x 10.00	mm^2
Area total		99.6	mm^2
Emitter pad size		See chip drawing	
Gate pad size		See chip drawing	
Silicon thickness		115	µm
Wafer size		300	mm
Maximum possible chips per wafer		612	
Passivation frontside		Photoimide	
Pad metal		AlCu	
Backside metal		Ni – Ag system	
Die bond[1]		Soft solder	
Frontside interconnect[1]		Wire bond: Al, ≤500µm	
Reject ink dot size		Inkless	
Storage environment (<6 months)	For original and sealed MBB bags	Ambient atmosphere air, temperature 17°C – 25°C	
	For open MBB bags	Acc. IEC 62258-3 Section 9.4 Storage Environment	

[1] Depending on customer specific assembly process

Table 2 Maximum Ratings[1]

Parameter	Symbol	Conditions	Value	Unit
Collector-emitter voltage	V_{CES}	-40°C ≤ T_{vj} ≤ 185°C	1200	V
DC collector current, limited by $T_{vj\,max}$	I_C		-[2]	A
Pulsed collector current, t_p limited by $T_{vj\,max}$	$I_{C,pulse}$		690	A
Gate-emitter voltage	V_{GE}		±20	V
Virtual junction temperature	T_{vj}		-40 ... +185	°C
Short circuit withstand time [3/4]	t_{sc}	V_{GE} ≤ 15V, V_{CC} ≤ 830V, T_{vj} ≤ 175°C	2.2	µs
		V_{GE} ≤ 15V, V_{CC} ≤ 925V, T_{vj} ≤ 185°C	tbd	µs
Reverse bias safe operating area	*RBSOA*	$I_{C,max}$ = 460A, $V_{CE,max}$ = V_{CES}, -40°C ≤ T_{vj} ≤ 185°C		

Table 3 Static Characteristics (Tested on Wafer), T_{vj}=25°C

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter saturation voltage	V_{CEsat}	V_{GE} = 15V, I_C = 69A	-	1.10	tbd	V
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C = 3.06mA, V_{GE} = V_{CE}	5.0	5.8	6.5	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V	-	-	100	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = 20V	-	-	600	nA
Integrated gate resistor	r_G		-	1.9	-	Ω

[1] Not subject to production test - verified by design/characterization.

[2] Depending on thermal properties of assembly.

[3] Allowed number of short circuits: <1000; time between short circuits: >1s.

[4] Depending on electrical design of assembly.

Table 4 Electrical Characteristics[1]

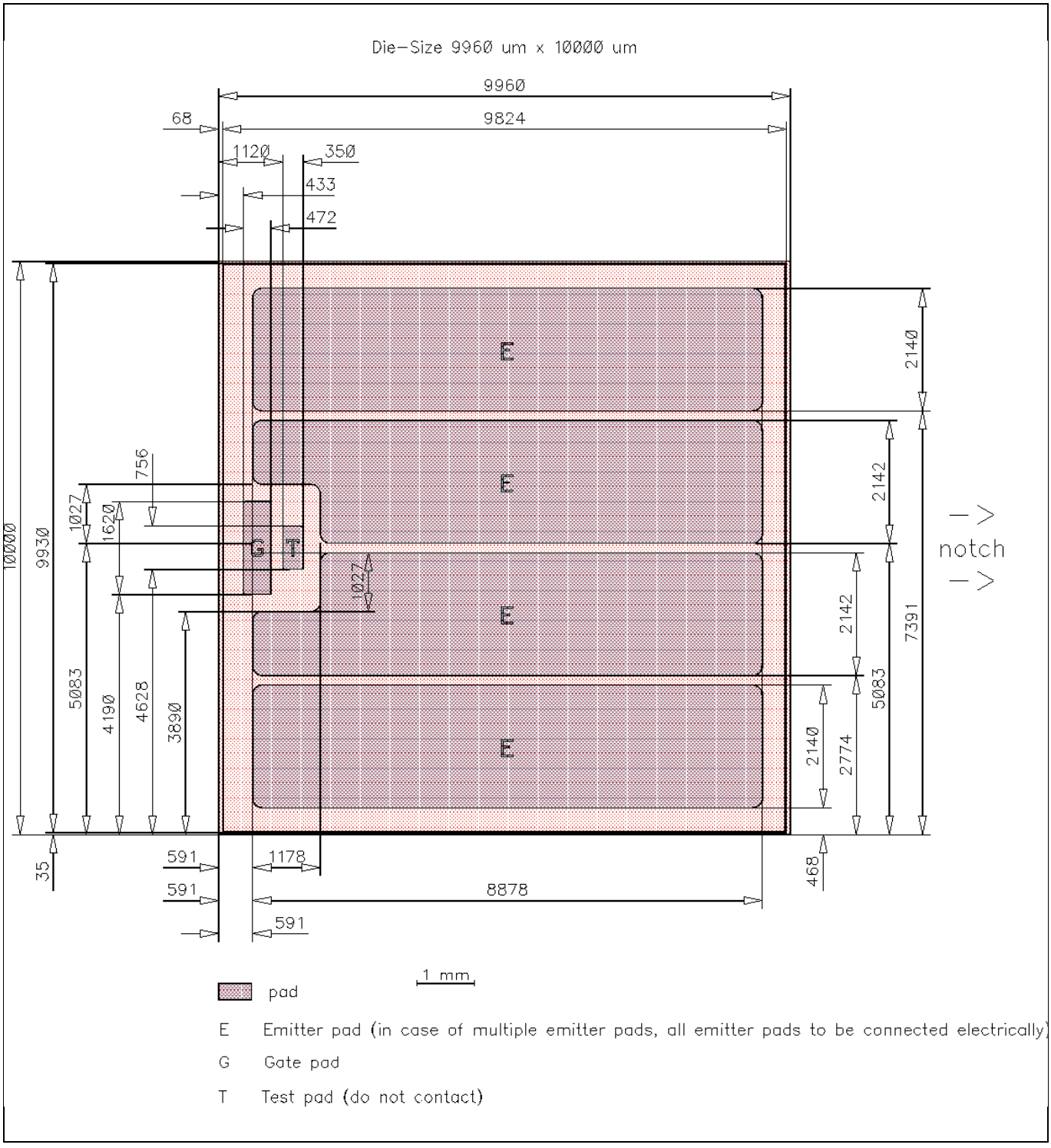
Parameter	Symbol	Conditions		Value			Unit
				min.	typ.	max.	
Collector-emitter saturation voltage	V_{CEsat}	V_{GE} = 15V, I_C = 230A	T_{vj} = 25°C	-	1.45	tbd	V
			T_{vj} = 185°C	-	1.68	-	
Input capacitance	C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 100kHz T_{vj} = 25°C			tbd		pF
Output capacitance	C_{oes}				tbd		
Reverse transfer capacitance	C_{res}				tbd		
Gate charge	Q_G	V_{CE} = 960V, I_C = 230A V_{GE} = -8V...+15V		-	1400	-	nC

2 Further Electrical Characteristics

Note: Switching characteristics and thermal properties are dependent on module design and mounting technology and can therefore not be specified for a bare die.

[1] Not subject to production test - verified by design/characterization.

3 Chip Drawing



4 Bare Die Product Specifics

Note: Test coverage at wafer level for IGBTs cannot cover the full range of customer application conditions. Therefore it is the responsibility of the customer to test all performance characteristics, which are relevant for their specific application, at the package level, including RBSOA and SCSOA.

Description

- AQL 0.1 for visual inspection according to failure catalogue

Revision History

Document version	Date of release	Description of changes
V0.10	2024-NOV-18	Initial Target Datasheet
V0.90	2025-SEPT-19	Preliminary Datasheet

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Email: erratum@infineon.com

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