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PCGA200T65NF8M1

650 V, 200 A Field Stop Trench IGBT with Solderable Top Metal



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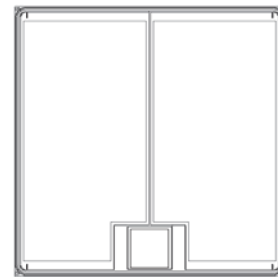
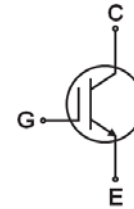
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Features

- AEC-Q101 Qualified
- Maximum Junction Temperature 175°C
- Positive Temperature Coefficient
- Easy Paralleling
- Short Circuit Rated
- Very Low Saturation Voltage: $V_{CE(SAT)} = 1.53 \text{ V(Typ.) @ } I_C = 200 \text{ A}$
- Optimized for Motor Control Applications
- Emitter Pad Covered with Solderable Metal Layer

Applications

- Automotive Traction Modules
- General Power Modules



ORDERING INFORMATION

Part Number	PCGA200T65NF8M1	
Packing	Water (sawn on foil)	
	mils	μm
Die Size	394 × 394	10,000 × 10,000
Emitter Attach Area	2 × (177 × 348)	2 × (4,493.5 × 8,832)
Gate / Sensor Pad Attach Area	55 × 55	1,408 × 1,406
Die Thickness	3	79
Top Metal	5 μm AlSiCu + 1.15 μm Ti/NiV/Ag (STM)	
Back Metal	0.95 μm NiV/Ag	
Topside Passivation	Silicon Nitride plus Polyimide	
Wafer Diameter	200 mm	
Max Possible Die Per Wafer	234	

PCGA200T65NF8M1

ABSOLUTE MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter	Symbol	Ratings	Units
Collector–Emitter Voltage	V _{CES}	650	V
Gate–Emitter Voltage	V _{GES}	±20	V
DC Collector Current, limited by T _J max	I _C	(Note 1)	A
Pulsed Collector Current, V _{GE} =15 V, t _p limited by T _J max (Note 2)	I _{CM}	600	A
Short Circuit Withstand Time, V _{GE} = 15 V, V _{CE} ≤ 400 V, T _J ≤ 150°C	t _{sc}	5	μs
Operating Junction Temperature	T _J	–40 to +175	°C
Storage Temperature Range	T _{stg}	+17 to +25	°C

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 Condition	Min.	Typ.	Max.	Units
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Static Characteristics (Tested on wafers)

Collector–Emitter Breakdown Voltage	BV _{CES}	V _{GE} = 0 V, I _C = 1 mA	650	–	–	V
Collector–Emitter Saturation Voltage	V _{CE(SAT)}	I _C = 100 A, V _{GE} = 15 V	–	1.25	1.75	V
Gate–Emitter Threshold Voltage	V _{GE(th)}	V _{GE} = V _{CE} , I _C = 200 mA	4.5	5.5	6.5	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 to Emitter Saturation Voltage	V _{CE(SAT)}	I _C = 200 A, V _{GE} = 15 V	T _J = 25°C	–	1.53	1.9	V
			T _J = 175°C	–	2.04	–	V
Input Capacitance	C _{IES}	V _{CE} = 30 V, V _{GE} = 0 V f = 1 MHz	–	9.6	–	nF	
Output Capacitance	C _{OES}		–	445	–	pF	
Reverse Transfer Capacitance	C _{RES}		–	78	–	pF	
Internal Gate Resistance	R _G	f = 1 MHz	–	2.0	–	Ω	
Total Gate Charge	Q _{G(Total)}	V _{CE} = 400 V, I _C = 200 A V _{GE} = 15 V	–	229	–	nC	
Gate–to–Emitter Charge	Q _{GE}		–	66	–	nC	
Gate–to–Collector Charge	Q _{GC}		–	64	–	nC	
Turn–On Delay Time	t _{d(on)}	V _{CE} = 400 V, I _C = 200 A R _G = 15 Ω V _{GE} = 15 V Inductive Load T _J = 25°C	–	67	–	ns	
Rise Time	t _r		–	233	–	ns	
Turn–Off Delay Time	t _{d(off)}		–	118	–	ns	
Fall Time	t _f		–	177	–	ns	
Turn–On Delay Time	t _{d(on)}	V _{CE} = 400 V, I _C = 200 A R _G = 15 Ω V _{GE} = 15 V Inductive Load T _J = 175°C	–	64	–	ns	
Rise Time	t _r		–	236	–	ns	
Turn–Off Delay Time	t _{d(off)}		–	124	–	ns	
Fall Time	t _f		–	208	–	ns	

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

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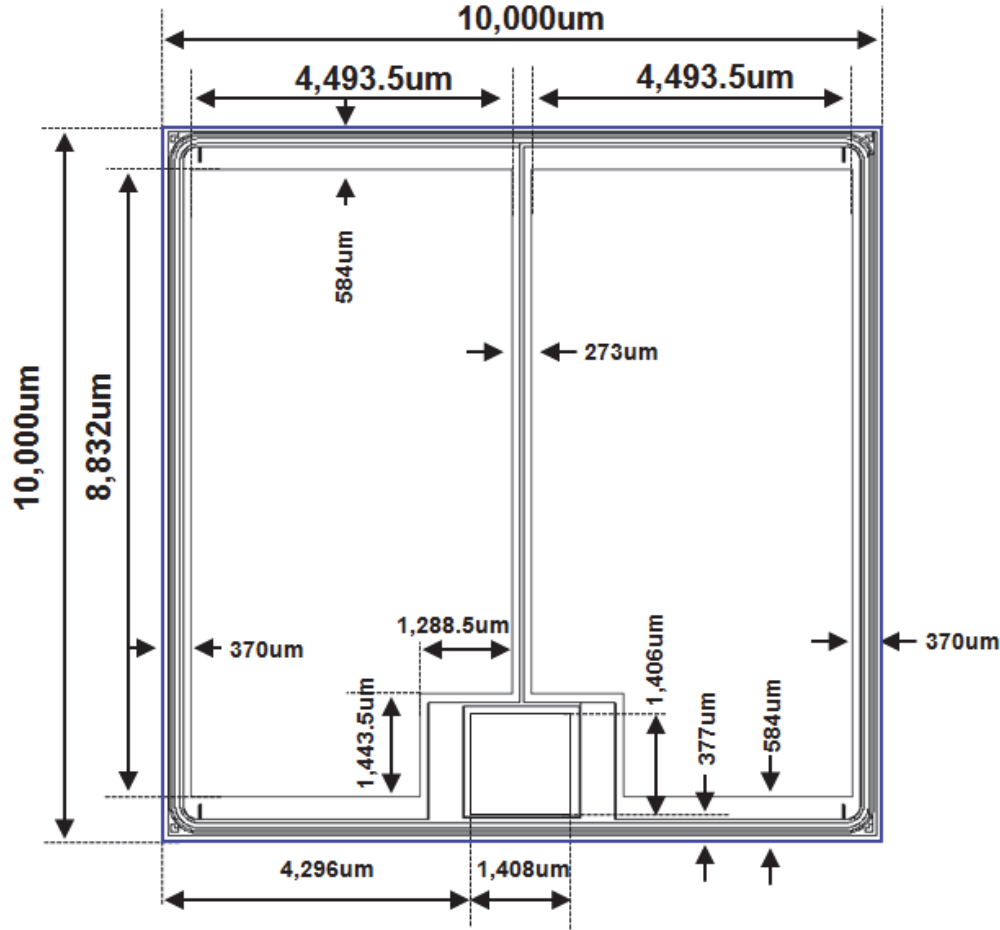



Figure 1. Dimensional Outline and Pad Layout

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