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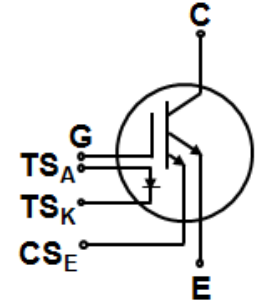
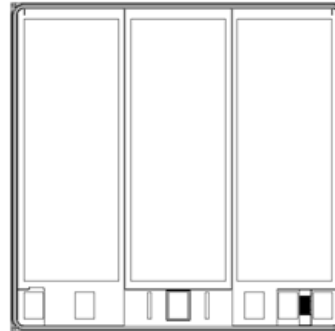


PCGA300T65DF8

650V, 300A Field Stop Trench IGBT

Features

- AEC-Q101 Qualified
- Max Junction Temperature 175°C
- Positive Temperature Co-efficient
- Ease of Paralleling
- Short Circuit Rated
- Very Low Saturation Voltage: $V_{CESAT} = 1.36V$ (Typ.) @ $I_C = 300A$
- Optimized for Motor Control Applications
- Integrated Temp Sensor and Current Sensor



Applications

- Automotive Traction Modules
- General Power Modules

Ordering Information

P/N	PCGA300T65DF8	
Packing	Wafer (Sawn-On-Foil)	
	mils	μm
Die Size	472 x 472	12,000 x 12,000
Emitter Attach Area	3 x (133 x 375)	3 x (3,390 x 9,530)
Gate / Sensor Pad Attach Area	6 x (27 x 39)	6 x (680 x 980)
Scribe Lane	3.14	80
Die Thickness	3	78
Top Metal	Al (0.5% Cu, 0.8% Si)	
Back Metal	Al/VNi/Ag	
Topside Passivation	Silicon Nitride Plus Polyimide	
Wafer Diameter	200mm	
Max Possible Die Per Wafer	136	

Absolute Maximum Ratings ($T_{VJ}=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{CES}	Collector to Emitter Voltage	650	V
V_{GES}	Gate-to-Emitter Voltage	± 20	V
I_C	Collector Current, limited by T_{VJ} max	(Note 1)	A
I_{CM}	Pulsed Collector Current, $V_{GE}=15\text{V}$, limited by T_{VJ} max	900	A
S_{CWT} 1)	Short Circuit Withstand Time, $V_{GE}=15\text{V}$, $V_{CE}\leq 400\text{V}$, $T_{VJ}\leq 150^{\circ}\text{C}$	5	μs
T_{VJ}	Operating Junction Temperature	-40 to +175	$^{\circ}\text{C}$
T_{stg}	Storage Temperature Range	+17 to +25	$^{\circ}\text{C}$

Notes:

1: Depends on the thermal properties of assembly

Electrical Characteristics of the IGBT ($T_{VJ}=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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Static Characteristics (Tested on wafers)

$B_{V_{CES}}$	Collector to Emitter Breakdown Voltage	$V_{GE} = 0\text{V}$, $I_C = 1\text{mA}$	650	-	-	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	$I_C = 100\text{A}$, $V_{GE} = 15\text{V}$	-	1.15	1.55	V
$V_{GE(th)}$	G-E Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 300\text{mA}$	4.5	5.5	6.5	V
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}$, $V_{GE} = 0\text{V}$,	-	-	40	μA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}$, $V_{CE} = 0\text{V}$,	-	-	± 400	nA
V_F	On-chip temperature-sense diode voltage	$I_F = 0.5\text{mA}$	2.0	2.4	2.8	V

Integrated Temp and Current Sensor Characteristics (not subjected to production test - verified by design / characterization)

V_F	On-chip temperature-sense diode voltage	$I_F = 0.5\text{mA}$, $T_{VJ} = 100^{\circ}\text{C}$	-	1.9	-	V
β_{AREA}	Emitter Sense Area Ratio	Sense Area/Total Area		1/10K		-
$\beta_{10\Omega}$	Emitter Current Sense Ratio	$I_{CE} = 300\text{A}$, $V_{GE} = 15\text{V}$, $R_{SENSE} = 10\Omega$	-	18K	-	-

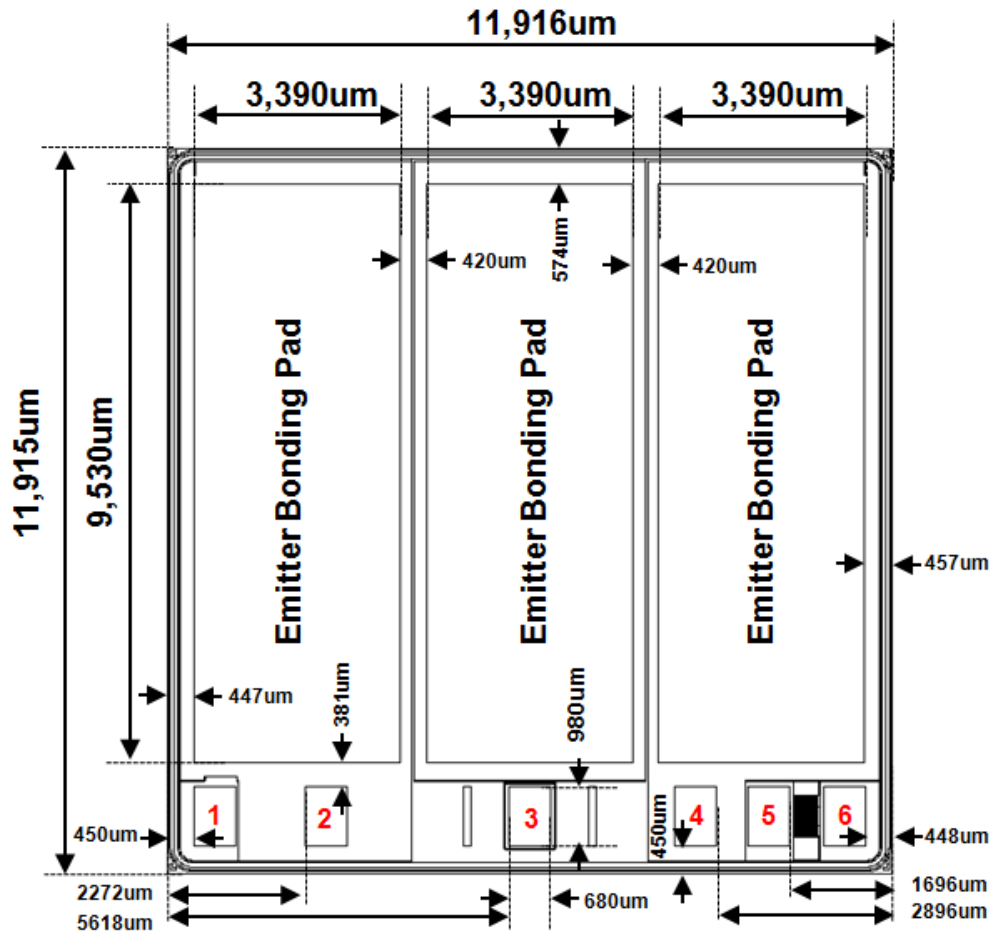
Electrical Characteristics (Not subject to production test, verified by design /characterization)

$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	$I_C = 300A, V_{GE} = 15V$	$T_{VJ} = 25^{\circ}C$	-	1.36	1.9	V
			$T_{VJ} = 175^{\circ}C$	-	1.65	-	V
C_{IES}	Input Capacitance	$V_{CE} = 30V, V_{GE} = 0V,$ $f = 1MHz$		-	13.6	-	nF
C_{OES}	Output Capacitance			-	690	-	pF
C_{RES}	Reverse Transfer Capacitance			-	115	-	pF
R_G	Internal Gate Resistance	$f = 1MHz$		-	2.2	-	Ω
$Q_{G(ToT)}$	Total Gate Charge	$V_{CE} = 400V, I_C = 300A$ $V_{GE} = 15V$		-	312	-	nC
Q_{GE}	Gate-to-Emitter Charge			-	112	-	nC
Q_{GC}	Gate-to-Collector Charge			-	101	-	nC
$t_{d(on)}$	Turn-On Delay Time	$V_{CE} = 300V, I_C = 300A,$ $R_G = 15\Omega$ $V_{GE} = 15V,$ Inductive Load $T_{VJ} = 25^{\circ}C$		-	128	-	ns
t_r	Rise Time			-	95	-	ns
$t_{d(off)}$	Turn-Off Delay Time			-	514	-	ns
t_f	Fall Time			-	67	-	ns
$t_{d(on)}$	Turn-On Delay Time	$V_{CE} = 300V, I_C = 300A,$ $R_G = 15\Omega$ $V_{GE} = 15V,$ Inductive Load $T_{VJ} = 150^{\circ}C$		-	117	-	ns
t_r	Rise Time			-	108	-	ns
$t_{d(off)}$	Turn-Off Delay Time			-	560	-	ns
t_f	Fall Time			-	78	-	ns

For ordering, technique and other information on Fairchild automotive bare die products, please contact automotivedie@fairchildsemi.com



Physical Dimensions Dimension in micrometer unless otherwise noted








- 1. Current Sense Bonding Pad
- 2. Emitter Sense Bonding Pad
- 3. Gate Bonding Pad
- 4. Emitter Sense Bonding Pad
- 5. Temp Sense Anode Bonding Pad
- 6. Temp Sense Cathode Bonding Pad



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