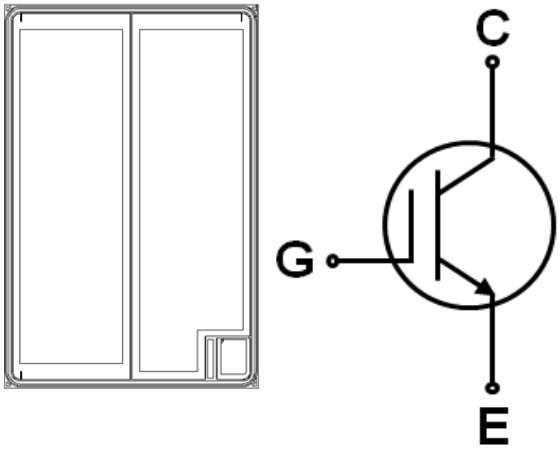
May 2016

PCGA160T65NF8

650 V, 160 A 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: $V_{CE(SAT)}$ = 1.6V (Typ.) @ I_C = 160A
- Optimized for Motor Control Applications



Applications

- Automotive Traction Modules
- General Power Modules

Ordering Information

P/N	PCGA160T65NF8	
Packing	Wafer (Sawn-On-Foil)	
	mils	μm
Die Size	276 X 394	7,000 X 10,000
Emitter Attach Area	110 x 340 111 x 349	2,803 x 8,641 (Left) 2,813 x 8,862 (Right)
Gate pad Attach Area	28 x 35	700 x 900
Die thickness	3	78
Top Metal	Al (0.5% Cu, 0.8% Si)	
Back Metal	Al/VNi/Ag	
Topside Passivation	Silicon Nitride Plus Polymide	
Wafer diameter	200mm	
Max. Possible Die Per Wafer	327	

Absolute Maximum Ratings (T_{VJ}= 25°C unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{CES}	Collector to Emitter Voltage	650	V
V_{GES}	Gate-to-Emmiter Voltage	±20	V
I_C	Collector Current, limited by T_{VJ} max	(Note 1)	A
I_{CM}	Pulsed Collector Current, VGE=15V, limited by T_{VJ} max	480	A
S_{CWT}	Short Circuit Withstand Time, VGE= 15V, VCE≤400V, T_{VJ}≤150ºC (Note 1)	6	μs
T_{VJ}	Junction Temperature Range	-40 to +175	°C
	Operating Junction Temperature	-40 to +150	°C
Tstg	Storage Temperature Range	+17 to +25	°C

Notes:
1: Depends on the thermal properties of assembly

Electrical Characteristics of the IGBT (T_{VJ} = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Static Characteristics (Tested on wafers)						
B_{VCES}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	650	-	-	V
I_{CES}	Collector Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	-	-	40	μA
I_{GES}	G-E Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	-	-	±400	nA
$V_{GE(th)}$	G-E Threshold Voltage	V_{GE} = V_{CE}, I_C = 160mA	4.3	5.3	6.3	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_C = 100A, V_{GE} = 15V	-	1.42	1.85	V

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

$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_C = 160A, V_{GE} = 15V, T_{VJ} = 25°C	-	1.6	2.05	V
		I_C = 160A, V_{GE} = 15V, T_{VJ} = 175°C	-	2.15	-	V
C_{IES}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	-	6710	-	pF
C_{OES}	Output Capacitance		-	450	-	pF
C_{RES}	Reverse Transfer Capacitance		-	55	-	pF
R_G	Internal Gate Resistance	f = 1MHz	-	3.0	-	Ω
$Q_{G(ToT)}$	Total Gate Charge	V_{CE} = 400V, I_C = 160A, V_{GE} = 15V	-	167	-	nC
Q_{GE}	Gate-to-Emitter Charge		-	51.3	-	nC
Q_{GC}	Gate-to-Collector Charge		-	47.9	-	nC
$t_{d(on)}$	Turn-On Delay Time	V_{CE} = 400V, I_C = 160A, R_{GEN} = 5Ω, V_{GE} = 15V, Inductive Load, T_{VJ} = 25°C	-	53	-	ns
t_r	Rise Time		-	197	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	98	-	ns
t_f	Fall Time		-	141	-	ns
$t_{d(on)}$	Turn-On Delay Time	V_{CE} = 400V, I_C = 160A, R_{GEN} = 5Ω, V_{GE} = 15V, Inductive Load, T_{VJ} = 175°C	-	52	-	ns
t_r	Rise Time		-	236	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	104	-	ns
t_f	Fall Time		-	204	-	ns

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

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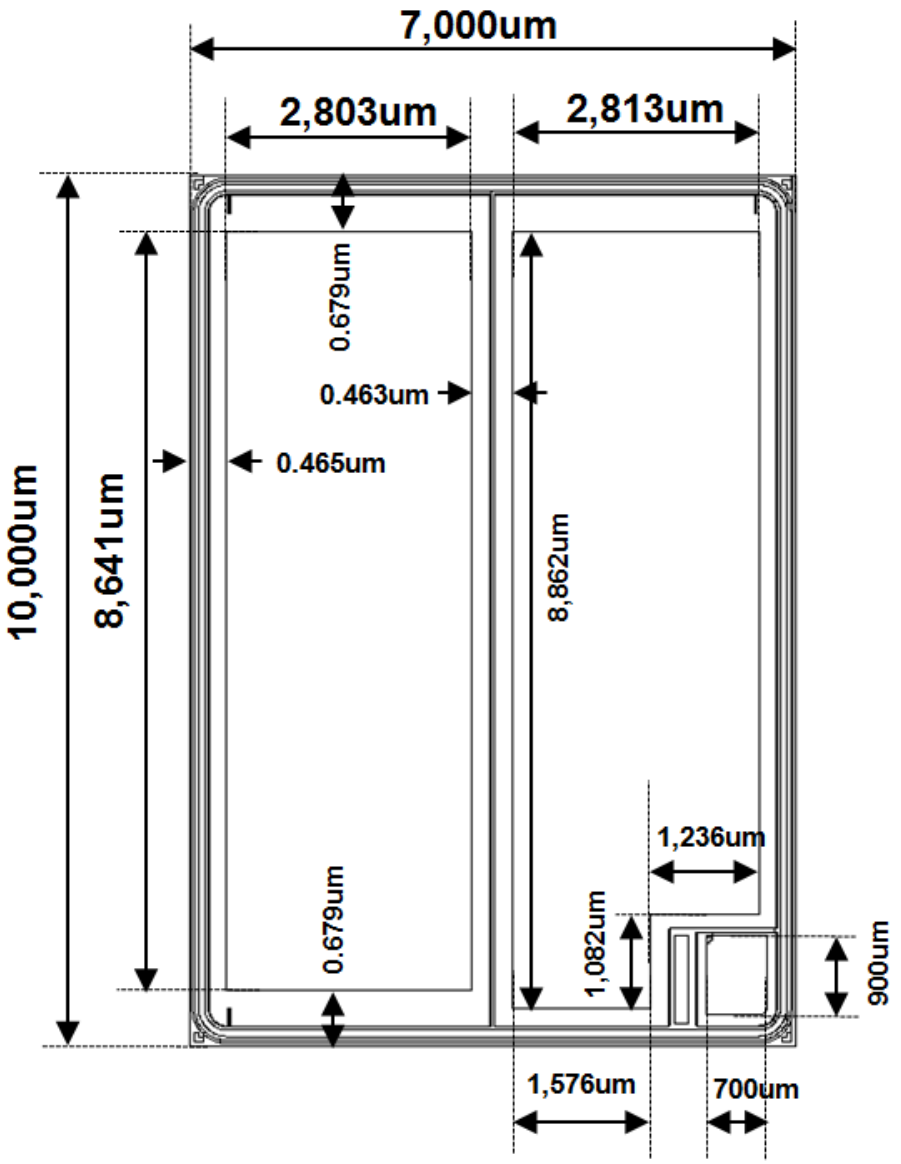
Physical Dimensions Dimensionis in micrometer unless otherwise noted



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