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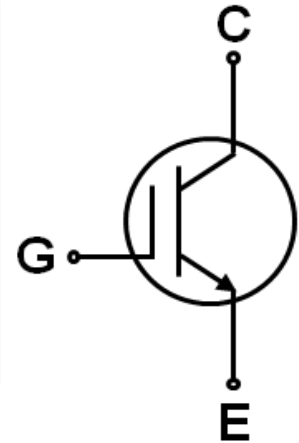
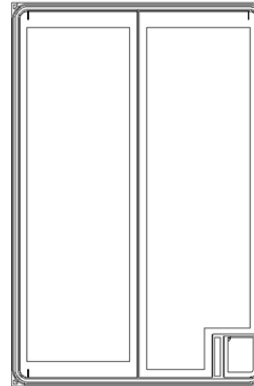


PCGA160T65NF8

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	2,803 x 8,641 (Left)
	111 x 349	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 Polyimide	
Wafer diameter	200mm	
Max. Possible Die Per Wafer	327	

PCGA160T65NF8 650V, 160A Field Stop Trench IGBT

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	480	A
S_{CWT}	Short Circuit Withstand Time, $V_{GE} = 15\text{V}$, $V_{CE} \leq 400\text{V}$, $T_{VJ} \leq 150^{\circ}\text{C}$ (Note 1)	6	μs
T_{VJ}	Junction Temperature Range	-40 to +175	$^{\circ}\text{C}$
	Operating Junction Temperature	-40 to +150	$^{\circ}\text{C}$
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
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
$V_{GE(th)}$	G-E Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 160\text{mA}$	4.3	5.3	6.3	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	$I_C = 100\text{A}$, $V_{GE} = 15\text{V}$	-	1.42	1.85	V

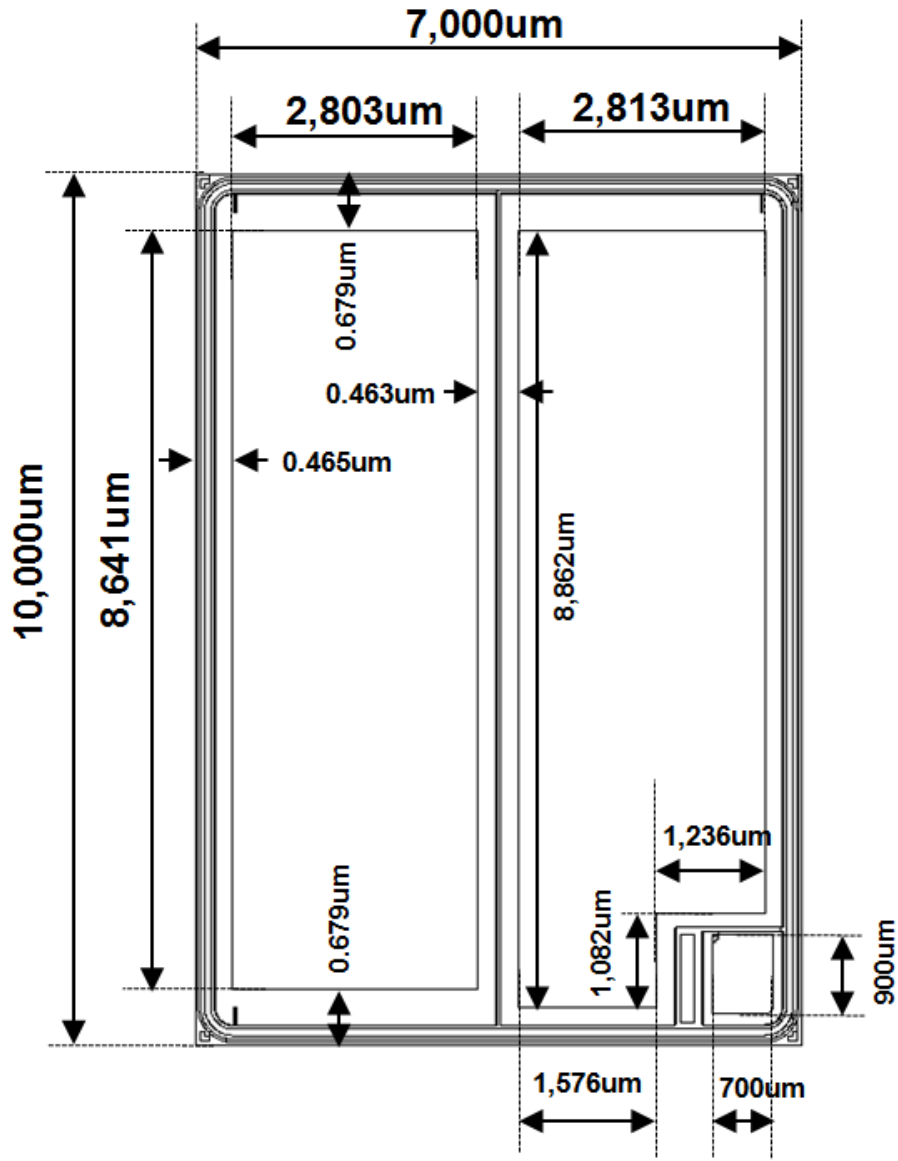
Electrical Characteristics (Not subject to production test, verified by design /characterization)

$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	$I_C = 160\text{A}$, $V_{GE} = 15\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	1.6	2.05	V
			$T_{VJ} = 175^{\circ}\text{C}$	-	2.15	-	V
C_{IES}	Input Capacitance	$V_{CE} = 30\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$	-	6710	-	pF	
C_{OES}	Output Capacitance		-	450	-	pF	
C_{RES}	Reverse Transfer Capacitance		-	55	-	pF	
R_G	Internal Gate Resistance		$f = 1\text{MHz}$	-	3.0	-	Ω
$Q_{G(TOT)}$	Total Gate Charge	$V_{CE} = 400\text{V}$, $I_C = 160\text{A}$, $V_{GE} = 15\text{V}$	-	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	$V_{CE} = 400\text{V}$, $I_C = 160\text{A}$, $R_{GEN} = 5\Omega$, $V_{GE} = 15\text{V}$, Inductive Load $T_{VJ} = 25^{\circ}\text{C}$	-	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	$V_{CE} = 400\text{V}$, $I_C = 160\text{A}$, $R_{GEN} = 5\Omega$, $V_{GE} = 15\text{V}$, Inductive Load $T_{VJ} = 175^{\circ}\text{C}$	-	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



Physical Dimensions Dimensionis in micrometer unless otherwise noted





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