IGBT Die

PCFG50T65SQF

V_{RCE} = 650 V
I_C = Limited by $T_{j(max)}$

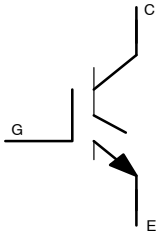
Using novel field stop IGBT technology, **onsemi**'s new series of field stop 4th generation IGBTs offer the optimum performance for solar inverter and UPS applications where low conduction and switching losses are essential.

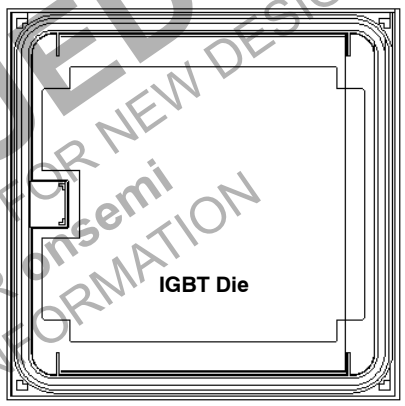
Features

- Maximum Junction Temperature: T_J = 175°C
- Positive Temperature Co−efficient for Easy Parallel Operating
- High Current Capability
- Low Saturation Voltage: $V_{CE(sat)}$ = 1.6 V (Typ.) @ I_C = 50 A
- High Input Impedance
- Fast Switching
- Tighten Parameter Distribution

Typical Applications

- Solar Inverters
- UPS Systems





DIE Outline

MECHANICAL DATA

Parameter	Mils	μm
Die Size	153.94 × 153.94	3910 x 3910
Gate Pad Size	118.9 × 108.58	3020 x 2758
Emitter Pad Size	14.05 × 17.68	357 x 449.2
Die Thickness	2.48	63
Scribe Width	80 μm	
Top Metal	5 μm AlSiCu	
Back Metal	1.05 μm Al/NiV/Ag	
Topside Passivation	Silicon Nitride	
Wafer Diameter	200 mm	
Max Possible Die Per Wafer	1743	
Recommended Storage Environment	In original container, in dry nitrogen, < 3 months at ambient temperature of 23°C	

ORDERING INFORMATION

Device	Inking?	Shipping Method
PCFG50T65SQF	No	Sawn Wafer on Tape

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Collector to Emitter Voltage, T_J = 25°C	V_{CES}	650	V
Gate to Emitter Voltage	V_{GES}	±20	V
Collector Current @T_C = 25°C	I_C	(Note 1)	A
Pulsed Collector Current	I_{CM}	200	A
Operating Junction Temperature	T_J	−40 to +175	°C
Storage Temperature Range	T_{STG}	−17 to +25	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

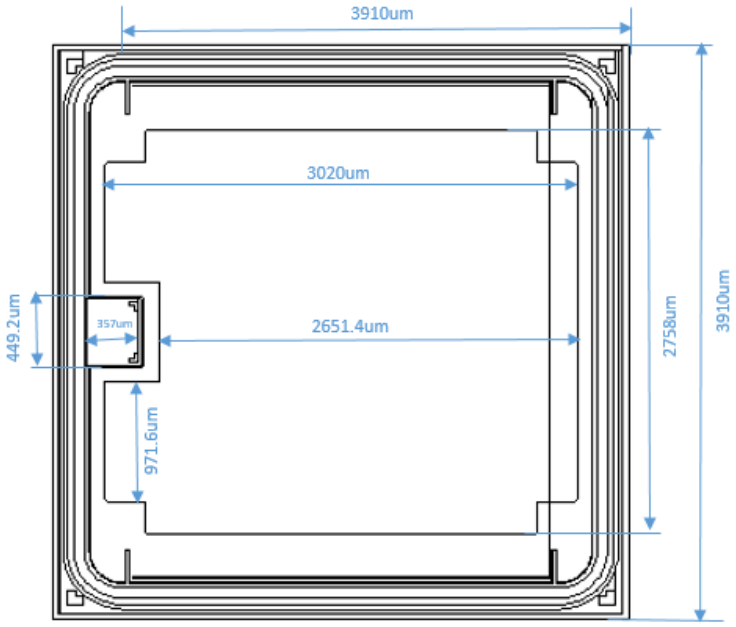
1. Depending on the thermal properties of assembly.
2. Not subject to production test − verified by design/characterization.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−Emitter Breakdown Voltage	V_{GE} = 0 V, I_C = 1 mA	BV_{CES}	650			V
Temperature Coefficient of Breakdown Voltage	I_C = 1 mA, reference to 25°C	$\Delta BV_{CES}/\Delta T_J$		0.6		V/°C
Collector−Emitter Cutoff Current	V_{GE} = 0 V, V_{CE} = V_{CES}	I_{DSS}			250	μA
Gate Leakage Current	V_{CE} = 0 V, V_{GE} = V_{GES}	I_{GSS}			±400	nA
ON CHARACTERISTICS						
G−E Threshold Voltage	V_{GE} = V_{CE}, I_C = 50 mA	$V_{GE(th)}$	2.6	4.5	6.4	V
Collector−Emitter Saturation Voltage	I_C = 50 A, V_{GE} = 15 V	$V_{CE(sat)}$		1.6	2.1	V
	I_C = 50 A, V_{GE} = 15 V, T_C = 175°C			1.92		V
DYNAMIC CHARACTERISTICS						
Input Capacitance	V_{GE} = 0 V, V_{CE} = 30 V, f = 1 MHz	C_{ies}		3275		pF
Output Capacitance		Coes		84		
Reverse Transfer Capacitance		C_{res}		12		
GATE CHARGE CHARACTERISTICS						
Total Gate Charge	V_{CE} = 400 V, I_C = 50 A, V_{GE} = 15 V	Q_g		99		nC
Gate to Emitter Charge		Q_{ge}		17		
Gate to Collector Charge		Q_{gc}		23		

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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



(all dimensions in μm)

Figure 1. Die Layout

Further Electrical Characteristic

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

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales