# **NGTD13T65F2**

## **IGBT** Die

Trench Field Stop II IGBT Die for motor drive and inverter applications.

#### Features

- Extremely Efficient Trench with Field Stop Technology
- Low V<sub>CE(sat)</sub> Loss Reduces System Power Dissipation

#### **Typical Applications**

- Industrial Motor Drives
- Solar Inverters
- UPS Systems
- Welding

#### MAXIMUM RATINGS

Parameter	Symbol	Value	Unit	
Collector–Emitter Voltage, $T_J = 25^{\circ}C$	V <sub>CE</sub>	650	V	
DC Collector Current, limited by $T_{J(\text{max})}$	Ι <sub>C</sub>	(Note 1)	A	
Pulsed Collector Current (Note 2)	I <sub>C, pulse</sub>	120	А	
Gate-Emitter Voltage	$V_{GE}$	±20	V	
Maximum Junction Temperature	TJ	-55 to +175	°C	FV
Short Circuit Withstand Time, $V_{GE}$ = 15 V, $V_{CE}$ = 400V, $T_J$ $\leq$ 150°C	T <sub>SC</sub>	5.0	μs	N. R
Stresses exceeding those listed in the M device. If any of these limits are exceed assumed, damage may occur and reliat 1. Depending on thermal properties of 2. T <sub>pulse</sub> limited by T <sub>jmax</sub> , 5.0 µs pulse,	ded, device fu vility may be a assembly.	inctionality sho		

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#### MECHANICAL DATA

Parameter	Value	Unit	
Die Size	3550 x 3550	μm <sup>2</sup>	
Emitter Pad Size	See die layout	μm <sup>2</sup>	
Gate Pad Size	410 x 670	μm <sup>2</sup>	
Die Thickness	3	mils	
Wafer Size	150	mm	
Top Metal	4 μm AISI		
Back Metal	2 μm TiNiAg		
Max possible chips per wafer	996		
Passivation frontside	Oxide-Nitride		
Reject ink dot size	25 mils		
Recommended storage environment: In original container, in dry nitrogen, or temperature of 18–28°C, 30–65%RH		pe in ring–pack e: < 3 months	

#### **ORDERING INFORMATION**

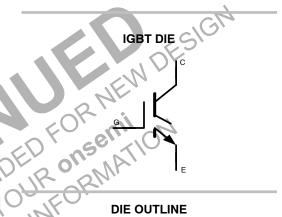
Device	Inking?	Shipping
NGTD13T65F2WP	Yes	Bare Wafer on Tape
NGTD13T65F2SWK	Yes	Sawn Wafer on Tape



### **ON Semiconductor®**

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V<sub>RCE</sub> = 650 V  $I_{C}$  = Limited by  $T_{J(max)}$ 



CC78 2640 µm

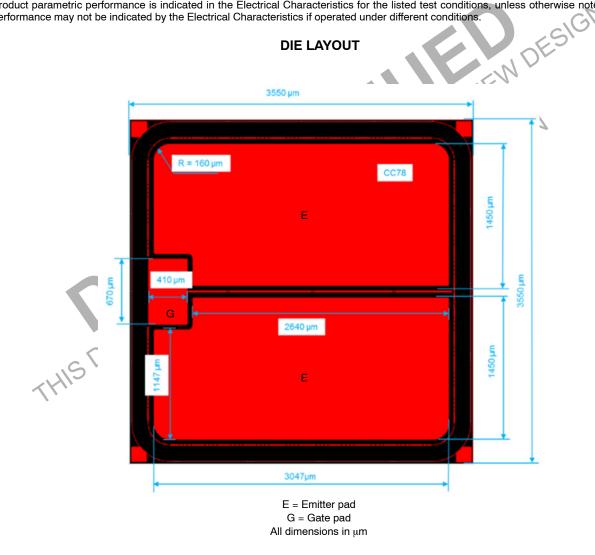
## NGTD13T65F2

#### **ELECTRICAL CHARACTERISTICS** ( $T_J = 25^{\circ}C$ , unless otherwise specified)

Test Conditions	Symbol	Min	Тур	Max	Units
·					
$V_{GE}$ = 0 V, I <sub>C</sub> = 500 $\mu$ A	V <sub>(BR)CES</sub>	650			V
V <sub>GE</sub> = 15 V, I <sub>C</sub> = 30 A	V <sub>CE(sat)</sub>		1.6	2.2	V
$V_{GE} = V_{CE}, I_C = 350 \ \mu A$	V <sub>GE(TH)</sub>	4.5	5.5	6.5	V
$V_{GE}$ = 0 V, $V_{CE}$ = 650 V	I <sub>CES</sub>			0.2	mA
V <sub>GE</sub> = 20 V, V <sub>CE</sub> = 0 V	I <sub>GES</sub>			100	nA
	$V_{GE} = 0 \text{ V}, \text{ I}_{C} = 500 \mu\text{A}$ $V_{GE} = 15 \text{ V}, \text{ I}_{C} = 30 \text{A}$ $V_{GE} = V_{CE}, \text{ I}_{C} = 350 \mu\text{A}$ $V_{GE} = 0 \text{V}, \text{V}_{CE} = 650 \text{V}$	$V_{GE} = 0 \text{ V}, \text{ I}_{C} = 500 \mu\text{A} \qquad \text{V}_{(BR)CES}$ $V_{GE} = 15 \text{ V}, \text{ I}_{C} = 30 \text{ A} \qquad \text{V}_{CE(sat)}$ $V_{GE} = V_{CE}, \text{ I}_{C} = 350 \mu\text{A} \qquad \text{V}_{GE(TH)}$ $V_{GE} = 0 \text{ V}, \text{ V}_{CE} = 650 \text{ V} \qquad \text{I}_{CES}$	$\begin{array}{c c} V_{GE} = 0 \text{ V}, \text{ I}_{C} = 500 \ \mu\text{A} & \text{V}_{(BR)CES} & 650 \\ \hline V_{GE} = 15 \text{ V}, \text{ I}_{C} = 30 \text{ A} & \text{V}_{CE(sat)} \\ \hline V_{GE} = \text{V}_{CE}, \text{ I}_{C} = 350 \ \mu\text{A} & \text{V}_{GE(TH)} & 4.5 \\ \hline V_{GE} = 0 \text{ V}, \text{V}_{CE} = 650 \text{ V} & \text{I}_{CES} \\ \hline \end{array}$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$V_{GE} = 0 \text{ V}, \text{ I}_{C} = 500  \mu\text{A}$ $V_{(BR)CES}$ 650 $V_{GE} = 15 \text{ V}, \text{ I}_{C} = 30 \text{ A}$ $V_{CE(sat)}$ 1.6         2.2 $V_{GE} = V_{CE}, \text{ I}_{C} = 350  \mu\text{A}$ $V_{GE(TH)}$ 4.5         5.5         6.5 $V_{GE} = 0 \text{ V}, \text{ V}_{CE} = 650 \text{ V}$ $\text{I}_{CES}$ 0.2         0.2

Input Capacitance		Cies	3200	pF
Output Capacitance	V <sub>CE</sub> = 20 V, V <sub>GE</sub> = 0 V, f = 1 MHz	C <sub>oes</sub>	130	pF
Reverse Transfer Capacitance		C <sub>res</sub>	85	pF

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.



#### **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.

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