

NGTD13T120F2

IGBT Die

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

Features

- Extremely Efficient Trench with Field Stop Technology
- Low $V_{CE(sat)}$ Loss Reduces System Power Dissipation

Typical Applications

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

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage, $T_J = 25^\circ\text{C}$	V_{CE}	1200	V
DC Collector Current, limited by $T_{J(max)}$	I_C	(Note 1)	A
Pulsed Collector Current (Note 2)	$I_{C, pulse}$	60	A
Gate-Emitter Voltage	V_{GE}	± 20	V
Maximum Junction Temperature	T_J	-55 to $+175$	$^\circ\text{C}$
Short Circuit Withstand Time, $V_{GE} = 15\text{ V}$, $V_{CE} = 500\text{ V}$, $T_J \leq 150^\circ\text{C}$	T_{SC}	10	μs

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 thermal properties of assembly.
2. T_{pulse} limited by T_{Jmax} , 10 μs pulse, $V_{GE} = 15\text{ V}$.

MECHANICAL DATA

Parameter	Value	Unit
Die Size	3476 x 3580	μm^2
Emitter Pad Size	See die layout	μm^2
Gate Pad Size	405 x 670	μm^2
Die Thickness	5	mils
Wafer Size	150	mm
Top Metal	5 μm AlSi	
Back Metal	2 μm TiNiAg	
Max possible chips per wafer	766	
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	Type: Bare Wafer in Jar Storage time: < 36 months	Type: Die on tape in ring-pack Storage time: < 3 months

ORDERING INFORMATION

Device	Inking?	Shipping
NGTD13T120F2WP	Yes	Bare Wafer in Jar
NGTD13T120F2SWK	Yes	Sawn Wafer on Tape

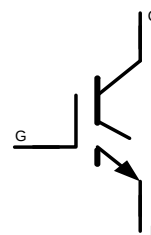


ON Semiconductor®

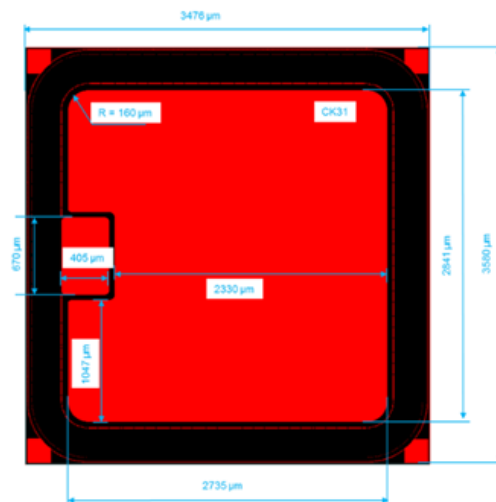
www.onsemi.com

$V_{RCE} = 1200\text{ V}$
 $I_C = \text{Limited by } T_{J(max)}$

IGBT DIE



DIE OUTLINE



NGTD13T120F2

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

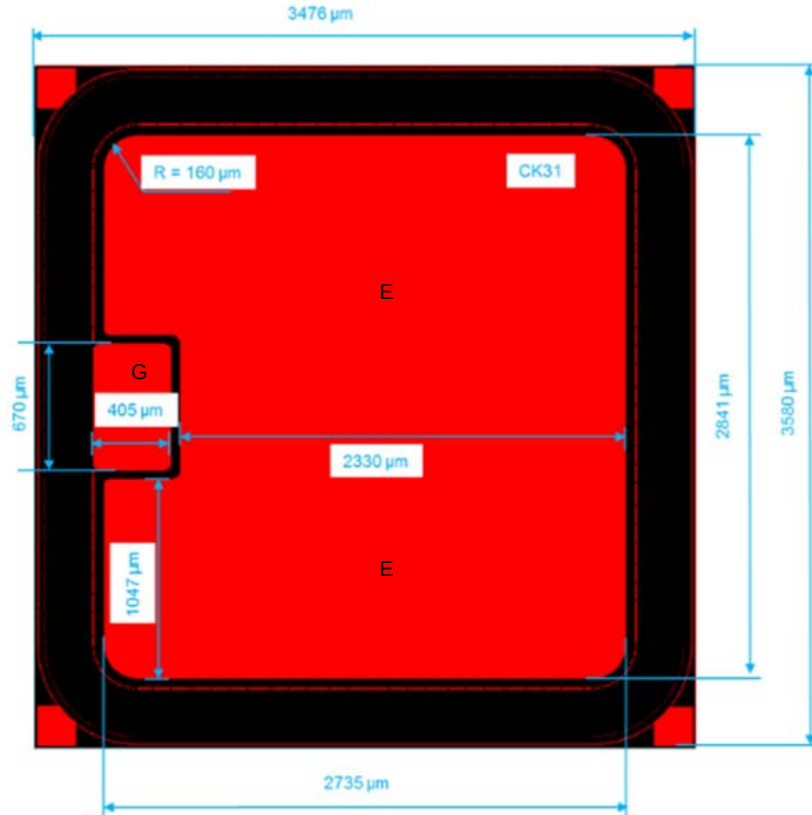
Parameter	Test Conditions	Symbol	Min	Typ	Max	Units
STATIC CHARACTERISTICS						
Collector-Emitter Breakdown Voltage	$V_{GE} = 0\text{ V}$, $I_C = 500\text{ }\mu\text{A}$	$V_{(BR)CES}$	1200			V
Collector-Emitter Saturation Voltage	$V_{GE} = 15\text{ V}$, $I_C = 15\text{ A}$	$V_{CE(sat)}$		2.0	2.4	V
Gate-Emitter Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 400\text{ }\mu\text{A}$	$V_{GE(TH)}$	4.5	5.5	6.5	V
Collector-Emitter Cutoff Current	$V_{GE} = 0\text{ V}$, $V_{CE} = 1200\text{ V}$	I_{CES}			1.0	mA
Gate Leakage Current	$V_{GE} = 20\text{ V}$, $V_{CE} = 0\text{ V}$	I_{GES}			200	mA

DYNAMIC CHARACTERISTICS

Input Capacitance	$V_{CE} = 20\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$	C_{ies}		2640		pF
Output Capacitance		C_{oes}		88		pF
Reverse Transfer Capacitance		C_{res}		50		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.

DIE LAYOUT



E = Emitter pad
G = Gate pad
All dimensions in μm

NGTD13T120F2

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.

ON Semiconductor and the  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries. SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative