NGTB20N120IHRWG

Product Preview

IGBT with Monolithic Free Wheeling Diode

This Insulated Gate Bipolar Transistor (IGBT) features a robust and cost effective Field Stop (FS) Trench construction, and provides superior performance in demanding switching applications, offering both low on−state voltage and minimal switching loss. The IGBT is well suited for resonant or soft switching applications.

Features

- Extremely Efficient Trench with Fieldstop Technology
- Low Switching Loss Reduces System Power Dissipation
- Optimized for Low Case Temperature in IH Cooker Application
- Reliable and Cost Effective Single Die Solution
- These are Pb−Free Devices

Typical Applications

- Inductive Heating
- Consumer Appliances
- Soft Switching

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−emitter voltage	V_{CES}	1200	V
Collector current @ Tc = 25°C @ Tc = 100°C	I_C	 40 20	A
Pulsed collector current, T_{pulse} limited by T_{Jmax}	I_{CM}	120	A
Diode forward current @ Tc = 25°C @ Tc = 100°C	I_F	 40 20	A
Diode pulsed current, T_{pulse} limited by T_{Jmax}	I_{FM}	120	A
Gate−emitter voltage Transient Gate−emitter voltage (T_{pulse} = 5 μs, D < 0.10)	V_{GE}	±20 ±25	V
Power Dissipation @ Tc = 25°C @ Tc = 100°C	P_D	 325 130	W
Operating junction temperature range	T_J	−40 to +150	°C
Storage temperature range	T_{stg}	−55 to +150	°C
Lead temperature for soldering, 1/8” from case for 5 seconds	T_{SLD}	260	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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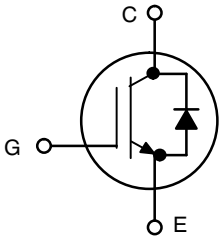
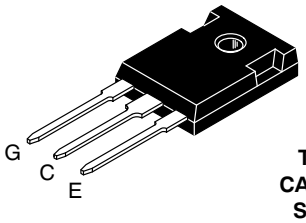
20 A, 1200 V
V_{CEsat} = 2.10 V
E_{off} = 0.45 mJ





TO−247
CASE 340L
STYLE 4

MARKING DIAGRAM

A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
NGTB20N120IHRWG	TO−247 (Pb−Free)	30 Units / Rail

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Thermal resistance junction−to−case, for IGBT	$R_{\theta JC}$	0.384	°C/W
Thermal resistance junction−to−case, for Diode	$R_{\theta JC}$	0.384	°C/W
Thermal resistance junction−to−ambient	$R_{\theta JA}$	40	°C/W

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

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
STATIC CHARACTERISTIC						
Collector−emitter breakdown voltage, gate−emitter short−circuited	V_{GE} = 0 V, I_C = 500 μA	$V_{(BR)CES}$	1200	−	−	V
Collector−emitter saturation voltage	V_{GE} = 15 V, I_C = 20 A V_{GE} = 15 V, I_C = 20 A, T_J = 175°C	V_{CEsat}	− −	2.10 2.30	2.45 −	V
Gate−emitter threshold voltage	V_{GE} = V_{CE}, I_C = 250 μA	$V_{GE(th)}$	4.5	5.5	6.5	V
Collector−emitter cut−off current, gate−emitter short−circuited	V_{GE} = 0 V, V_{CE} = 1200 V V_{GE} = 0 V, V_{CE} = 1200 V, $T_{J\ =}$ 150°C	I_{CES}	− −	− −	0.5 2.0	mA
Gate leakage current, collector−emitter short−circuited	V_{GE} = 20 V, V_{CE} = 0 V	I_{GES}	−	−	100	nA
DYNAMIC CHARACTERISTIC						
Input capacitance	V_{CE} = 20 V, V_{GE} = 0 V, f = 1 MHz	C_{ies}	−	5320	−	pF
Output capacitance		C_{oes}	−	124	−	
Reverse transfer capacitance		C_{res}	−	100	−	
Gate charge total	V_{CE} = 600 V, I_C = 20 A, V_{GE} = 15 V	Q_g		225		nC
Gate to emitter charge		Q_{ge}		36		
Gate to collector charge		Q_{gc}		98		
SWITCHING CHARACTERISTIC, INDUCTIVE LOAD						
Turn−off delay time	T_J = 25°C V_{CC} = 600 V, I_C = 20 A R_g = 10 Ω V_{GE} = 0 V/ 15V	$t_{d(off)}$		235		ns
Fall time		t_f		155		
Turn−off switching loss		E_{off}		0.45		mJ
Turn−off delay time	T_J = 150°C V_{CC} = 600 V, I_C = 20 A R_g = 10 Ω V_{GE} = 0 V/ 15V	$t_{d(off)}$		255		ns
Fall time		t_f		250		
Turn−off switching loss		E_{off}		1.10		mJ
DIODE CHARACTERISTIC						
Forward voltage	V_{GE} = 0 V, I_F = 20 A V_{GE} = 0 V, I_F = 20 A, T_J = 175°C	V_F		1.75 2.50	2.10	V

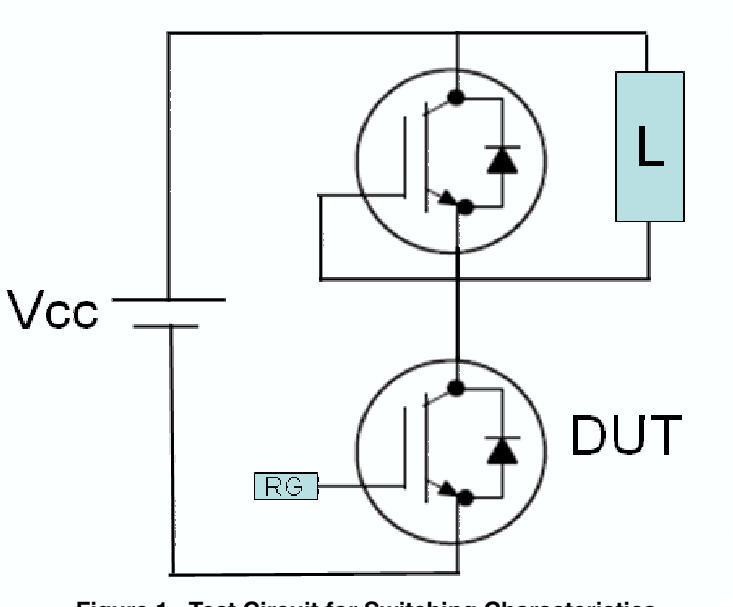


Figure 1. Test Circuit for Switching Characteristics

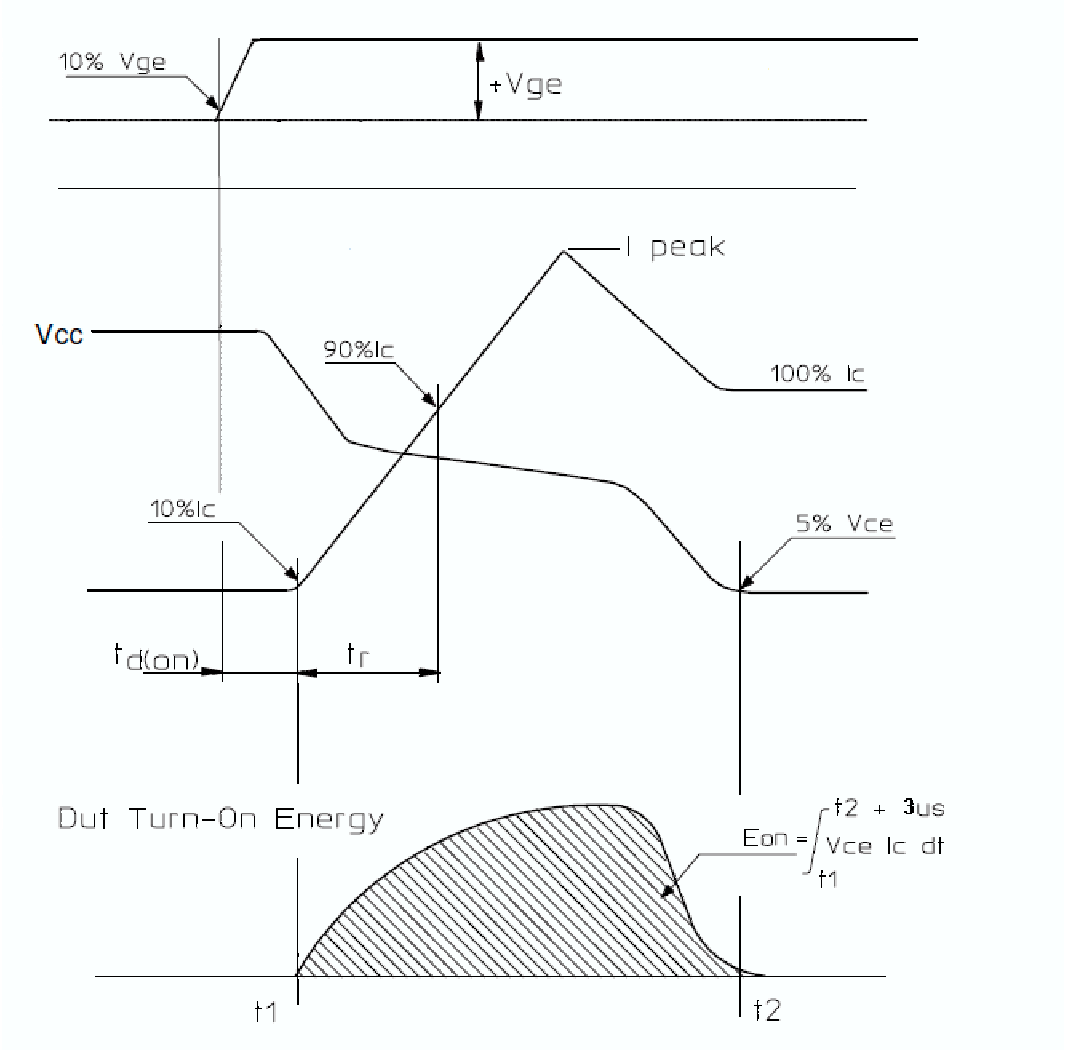


Figure 2. Definition of Turn On Waveform

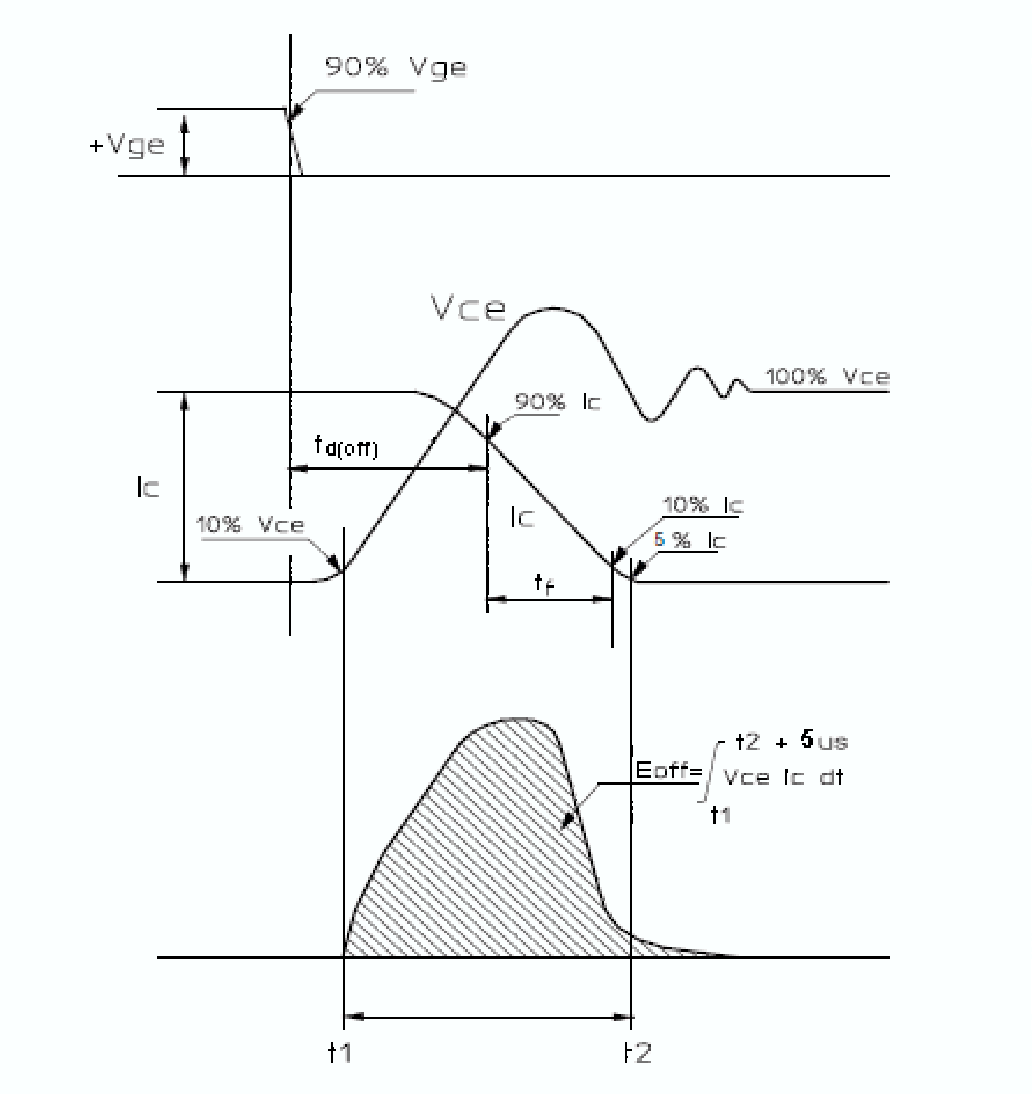
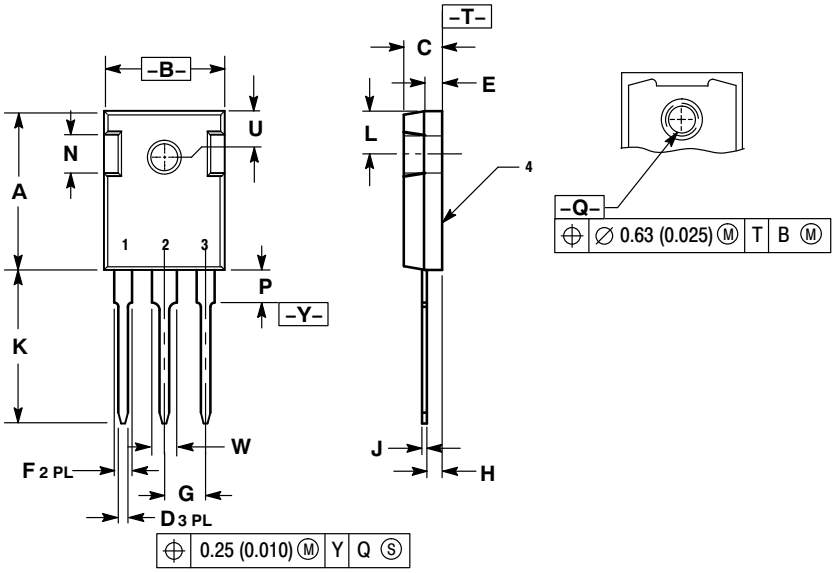


Figure 3. Definition of Turn Off Waveform

NGTB20N120IHRWG

PACKAGE DIMENSIONS

TO−247
CASE 340L−02
ISSUE F



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	20.32	21.08	0.800	8.30
B	15.75	16.26	0.620	0.640
C	4.70	5.30	0.185	0.209
D	1.00	1.40	0.040	0.055
E	1.90	2.60	0.075	0.102
F	1.65	2.13	0.065	0.084
G	5.45 BSC		0.215 BSC	
H	1.50	2.49	0.059	0.098
J	0.40	0.80	0.016	0.031
K	19.81	20.83	0.780	0.820
L	5.40	6.20	0.212	0.244
N	4.32	5.49	0.170	0.216
P	---	4.50	---	0.177
Q	3.55	3.65	0.140	0.144
U	6.15 BSC		0.242 BSC	
W	2.87	3.12	0.113	0.123

STYLE 4:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

PUBLICATION ORDERING INFORMATION

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