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IGBT

FGL60N100BNTD

NPT-Trench IGBT

General Description

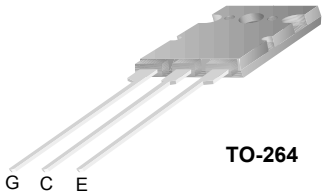
Trench insulated gate bipolar transistors (IGBTs) with NPT technology show outstanding performance in conduction and switching characteristics as well as enhanced avalanche ruggedness. These devices are well suited for Induction Heating (I-H) applications

Features

- High Speed Switching
- Low Saturation Voltage : $V_{CE(sat)}$ = 2.5 V @ I_C = 60A
- High Input Impedance
- Built-in Fast Recovery Diode

Application

Micro- Wave Oven, I-H Cooker, I-H Jar, Induction Heater, Home Appliance



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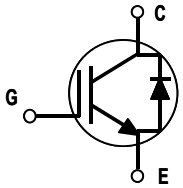

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Description		FGL60N100BNTD	Units
V_{CES}	Collector-Emitter Voltage		1000	V
V_{GES}	Gate-Emitter Voltage		±25	V
I_C	Collector Current	@ T_C = 25°C	60	A
	Collector Current	@ T_C = 100°C	42	A
$I_{CM\ (1)}$	Pulsed Collector Current		200	A
I_F	Diode Continuous Forward Current	@ T_C = 100°C	15	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	180	W
	Maximum Power Dissipation	@ T_C = 100°C	72	W
T_J	Operating Junction Temperature		-55 to +150	°C
T_{stg}	Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds		300	°C

Notes :
(1) Repetitive rating : Pulse width limited by max. junction temperature

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction-to-Case	--	0.69	°C/W
$R_{\theta JC}$(DIODE)	Thermal Resistance, Junction-to-Case	--	2.08	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	25	°C/W

Electrical Characteristics of IGBT T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	1000	--	--	V
I_{CES}	Collector Cut-Off Current	V_{CE} = 1000V, V_{GE} = 0V	--	--	1.0	mA
I_{GES}	G-E Leakage Current	V_{GE} = ± 25, V_{CE} = 0V	--	--	± 500	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 60mA, V_{CE} = V_{GE}	4.0	5.0	7.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 10A, V_{GE} = 15V	--	1.5	1.8	V
		I_C = 60A, V_{GE} = 15V	--	2.5	2.9	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE}=10V, V_{GE} = 0V, f = 1MHz	--	6000	--	pF
C_{oes}	Output Capacitance		--	260	--	pF
C_{res}	Reverse Transfer Capacitance		--	200	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 600 V, I_C = 60A, R_G = 51Ω, V_{GE}=15V, Resistive Load, T_C = 25°C	--	140	--	ns
t_r	Rise Time		--	320	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	630	--	ns
t_f	Fall Time		--	130	250	ns
Q_g	Total Gate Charge	V_{CE} = 600 V, I_C = 60A, V_{GE} = 15V , T_C = 25°C	--	275	350	nC
Q_{ge}	Gate-Emitter Charge		--	45	--	nC
Q_{gc}	Gate-Collector Charge		--	95	--	nC

Electrical Characteristics of DIODE T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	I_F = 15A	--	1.2	1.7	V
		I_F = 60A	--	1.8	2.1	V
t_{rr}	Diode Reverse Recovery Time	I_F = 60A di/dt = 20 A/us	--	1.2	1.5	μs
I_R	Instantaneous Reverse Current	V_{RRM} = 1000V	--	0.05	2	μA

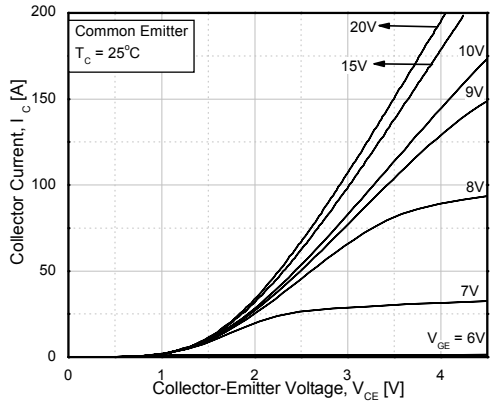

Fig 1. Typical Output Characteristics

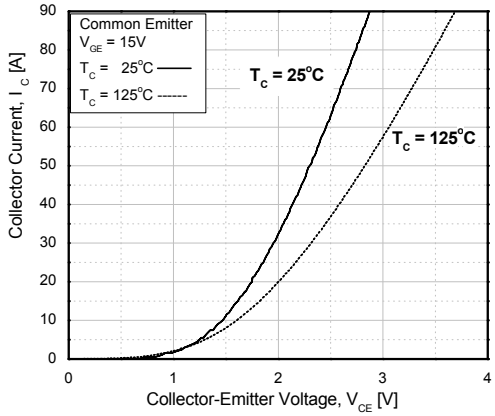

Fig 2. Typical Saturation Voltage Characteristics

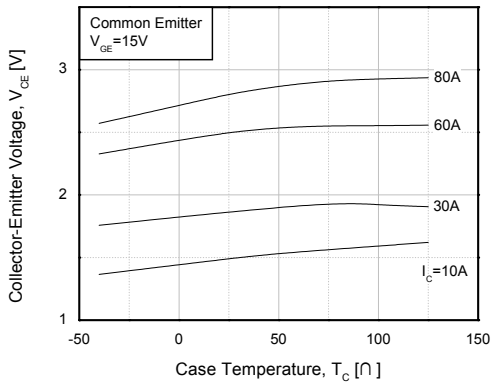

Fig 3. Saturation Voltage vs. Case Temperature at Varient Current Level

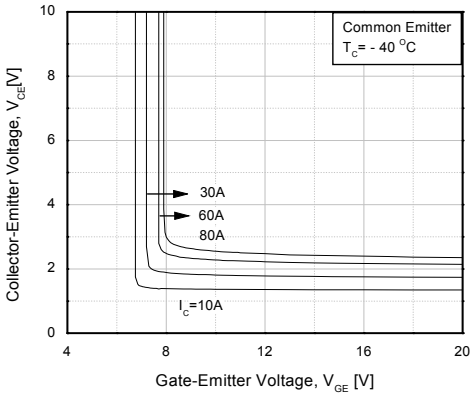

Fig 4. Saturation Voltage vs. V_{GE}

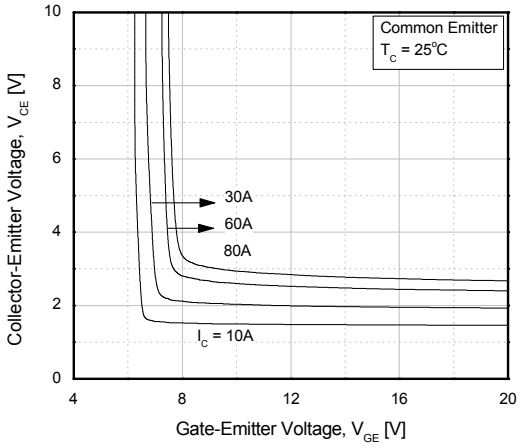

Fig 5. Saturation Voltage vs. V_{GE}

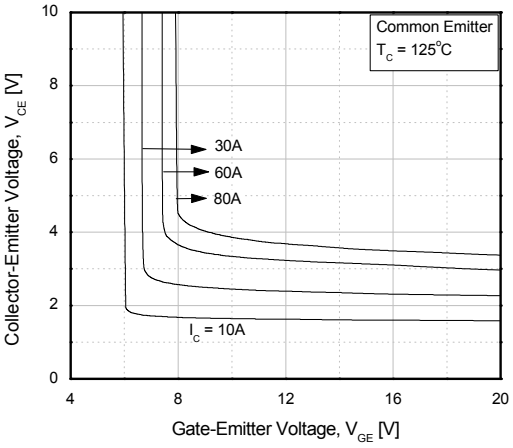

Fig 6. Saturation Voltage vs. V_{GE}

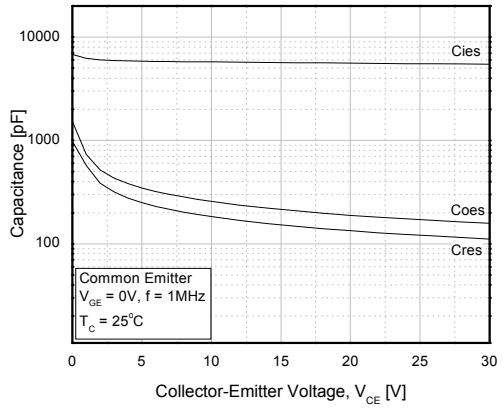

Fig 7. Capacitance Characteristics

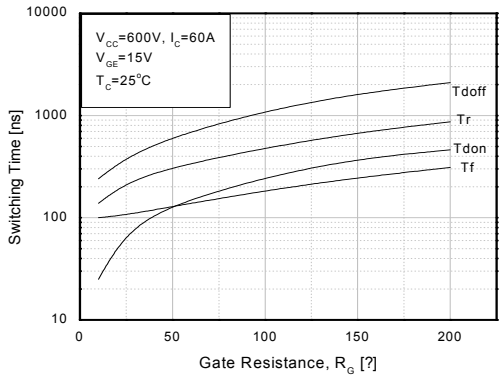

Fig 8. Switching Characteristics vs. Gate Resistance

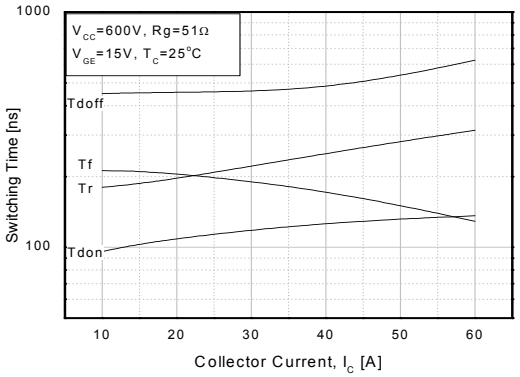

Fig 9. Switching Characteristics vs. Collector Current

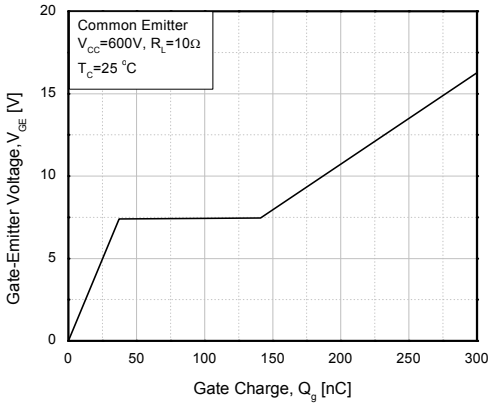

Fig 10. Gate Charge Characteristics

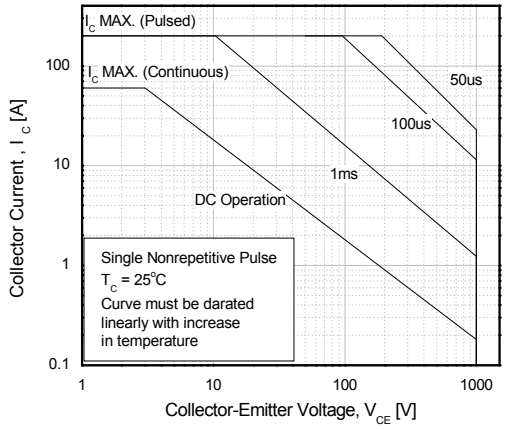

Fig 11. SOA Characteristics

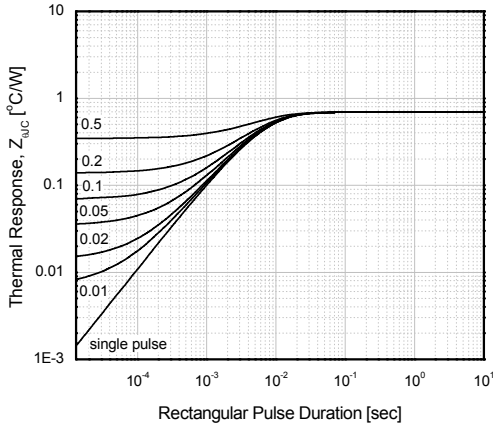

Fig 12. Transient Thermal Impedance of IGBT

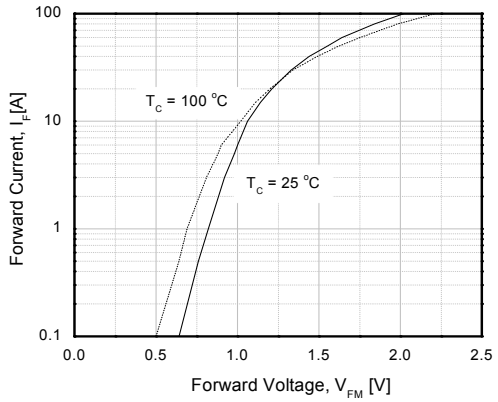

Fig 13. Forward Characteristics

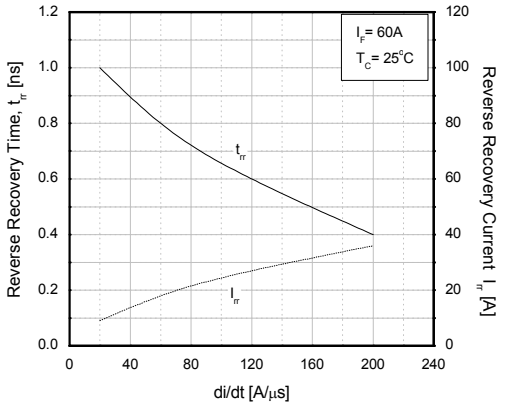

Fig 14. Reverse Recovery Characteristics vs. di/dt

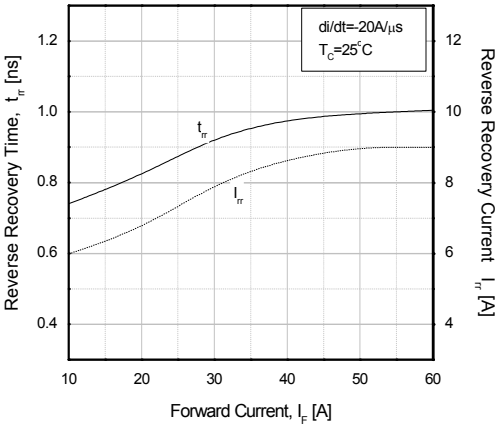

Fig 15. Reverse Recovery Characteristics vs. Forward Current

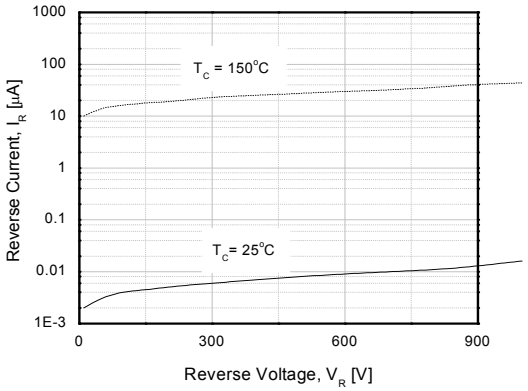

Fig 16. Reverse Current vs. Reverse Voltage

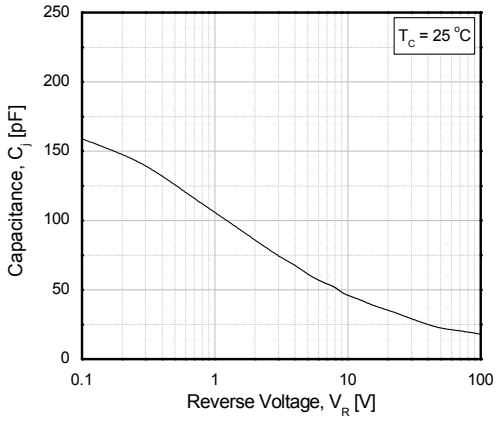

Fig 17. Junction capacitance

Package Dimension

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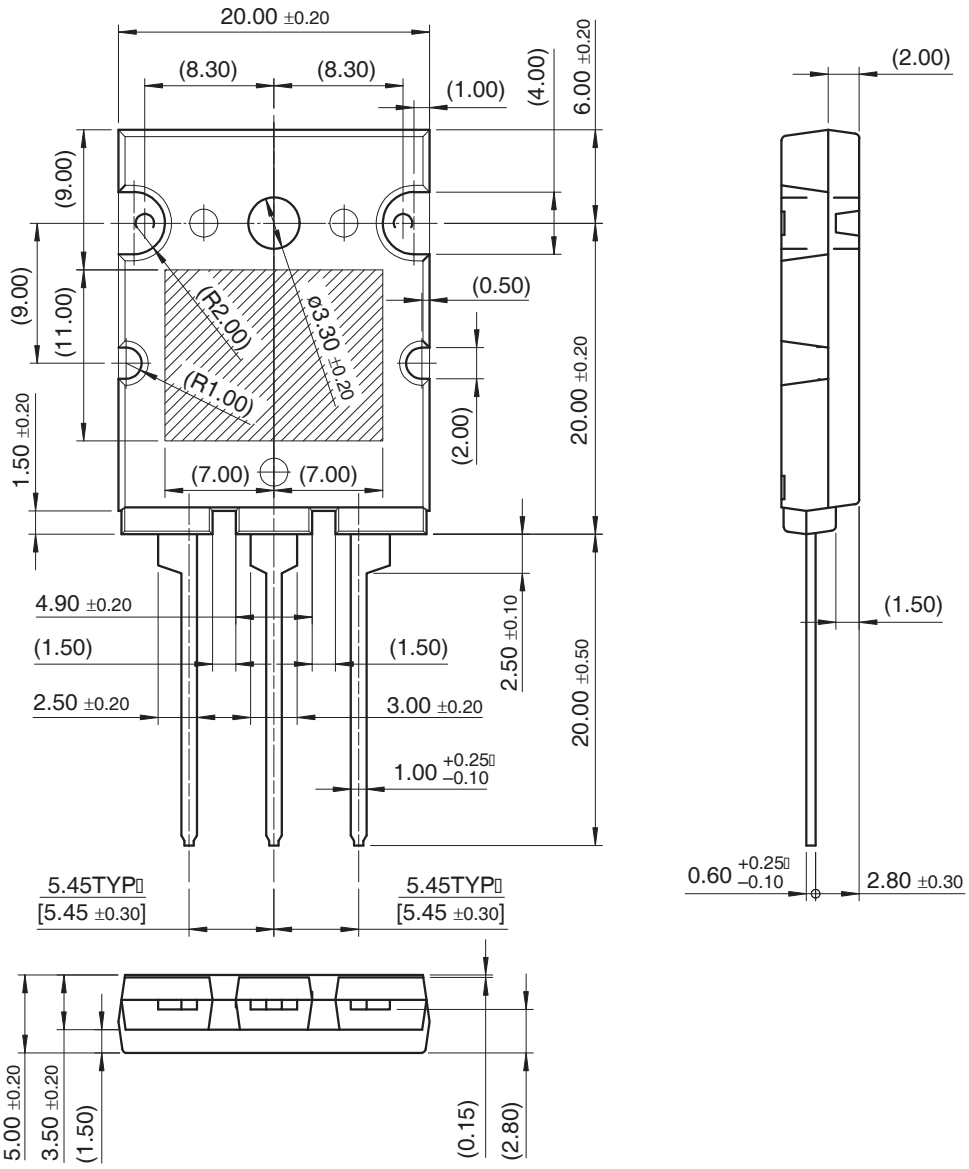

Dimensions in Millimeters

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

FGL60N100BNTD

1000V, 60A NPT-Trench IGBT

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Applications

Micro- Wave Oven, I-H Cooker, I-H Jar, Induction Heater, Home Appliance

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Product status/pricing/packaging

BUY

Product	Product status	Pb-free Status	Pricing*	Package type	Leads	Packing method	Package Marking Convention**

FGL60N100BNTD	Full Production	Full Production	$4.90	TO-264	3	RAIL	Line 1: **$Y** (Fairchild logo)
FGL60N100BNTDTU	Full Production	Full Production	$4.97	TO-264	3	RAIL	Line 1: **$Y** (Fairchild logo)

* Fairchild 1,000 piece Budgetary Pricing
** A sample button will appear if the part is available through Fairchild's on-line samples program. If there is no sample button, please contact a Fairchild distributor to obtain samples

Indicates product with Pb-free second-level interconnect. For more information click here.

Package marking information for product FGL60N100BNTD is available. Click here for more information .

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Models

Package & leads	Condition	Temperature range	Vcc range	Software version	Revision date
PSPICE					
TO-264-3	Electrical	25°C	0V to 5V	9.2	May 28, 2004

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Qualification Support

Click on a product for detailed qualification data

Product
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