FAIRCHILD
SEMICONDUCTOR®

IGBT

FGL40N150D

General Description

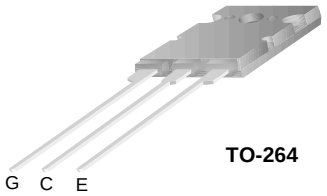
Fairchild's Insulated Gate Bipolar Transistor (IGBT) provides low conduction and switching losses. The FGL40N150D is designed for induction heating applications.

Features

- High speed switching
- Low saturation voltage : $V_{CE(sat)}$ = 3.5 V @ I_C = 40A
- High input impedance
- Built-in fast recovery diode

Applications

Home appliances, induction heaters, IH JAR, and microwave ovens.



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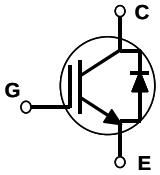

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Description		FGL40N150D	Units
V_{CES}	Collector-Emitter Voltage		1500	V
V_{GES}	Gate-Emitter Voltage		± 25	V
I_C	Collector Current	@ T_C = 25°C	40	A
	Collector Current	@ T_C = 100°C	20	A
$I_{CM\ (1)}$	Pulsed Collector Current		120	A
I_F	Diode Continuous Forward Current	@ T_C = 100°C	10	A
I_{FM}	Diode Maximum Forward Current		100	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	200	W
	Maximum Power Dissipation	@ T_C = 100°C	80	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	--	0.625	°C/W
$R_{\theta JC}$(DIODE)	Thermal Resistance, Junction-to-Case	--	0.83	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	25	°C/W

Electrical Characteristics of the 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 = 3mA	1500	--	--	V
I_{CES}	Collector Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	--	--	3.0	mA
I_{GES}	G-E Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	--	--	± 100	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 40mA, V_{CE} = V_{GE}	3.5	5.0	7.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 40A, V_{GE} = 15V	2.5	3.5	4.5	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	--	2450	--	pF
C_{oes}	Output Capacitance		--	220	--	pF
C_{res}	Reverse Transfer Capacitance		--	75	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 600 V, I_C = 40A, R_G = 51Ω, V_{GE} = 15V, Resistive Load, T_C=25°C	--	100	200	ns
t_r	Rise Time		--	350	700	ns
$t_{d(off)}$	Turn-Off Delay Time		--	200	400	ns
t_f	Fall Time		--	100	300	ns
Q_g	Total Gate Charge	V_{CE} = 600 V, I_C = 40A, V_{GE} = 15V	--	110	170	nC
Q_{ge}	Gate-Emitter Charge		--	15	25	nC
Q_{gc}	Gate-Collector Charge		--	40	60	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 = 10A	--	1.3	1.8	V
t_{rr}	Diode Reverse Recovery Time	I_F = 10A, di/dt = 200A/us	--	170	300	ns