FAIRCHILD
SEMICONDUCTOR®

IGBT

FGA15N120AND

General Description

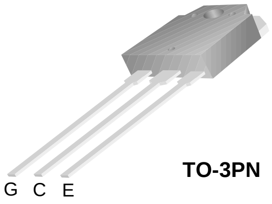
Employing NPT technology, Fairchild's AND series of IGBTs provides low conduction and switching losses. The AND series offers solutions for applications such as induction heating (IH), motor control, general purpose inverters and uninterruptible power supplies (UPS).

Features

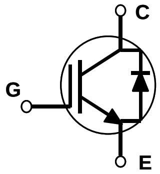
- High speed switching
- Low saturation voltage : $V_{CE(sat)}$ = 2.4 V @ I_C = 15A
- High input impedance
- CO-PAK, IGBT with FRD : t_{rr} = 210ns (typ.)

Applications

Induction Heating, UPS, AC & DC motor controls and general purpose inverters.



TO-3PN



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Description	FGA15N120AND	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ T_C = 25°C	24	A
	Collector Current @ T_C = 100°C	15	A
$I_{CM\ (1)}$	Pulsed Collector Current	45	A
I_F	Diode Continuous Forward Current @ T_C = 100°C	15	A
I_{FM}	Diode Maximum Forward Current	45	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	--	0.63	°C/W
$R_{\theta JC}$(DIODE)	Thermal Resistance, Junction-to-Case	--	2.88	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	40	°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	1200	--	--	V
ΔB_{VCES}/ ΔT_J	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0V, I_C = 3mA	--	0.6	--	V/°C
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}$, V_{GE} = 0V	--	--	3	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 = 15mA, $V_{CE} = V_{GE}$	3.5	5.5	7.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 15A, V_{GE} = 15V	--	2.4	3.2	V
		I_C = 15A, V_{GE} = 15V, T_C = 125°C	--	2.9	--	V
		I_C = 24A, V_{GE} = 15V	--	3.0	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	--	1150	--	pF
C_{oes}	Output Capacitance		--	120	--	pF
C_{res}	Reverse Transfer Capacitance		--	56	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 600 V, I_C = 15A, R_G = 20Ω, V_{GE} = 15V, Inductive Load, T_C = 25°C	--	90	--	ns
t_r	Rise Time		--	70	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	310	--	ns
t_f	Fall Time		--	60	120	ns
E_{on}	Turn-On Switching Loss		--	3.27	4.9	mJ
E_{off}	Turn-Off Switching Loss		--	0.6	0.9	mJ
E_{ts}	Total Switching Loss		--	3.68	5.8	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 600 V, I_C = 15A, R_G = 20Ω, V_{GE} = 15V, Inductive Load, T_C = 125°C	--	80	--	ns
t_r	Rise Time		--	60	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	310	--	ns
t_f	Fall Time		--	50	--	ns
E_{on}	Turn-On Switching Loss		--	3.41	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.84	--	mJ
E_{ts}	Total Switching Loss		--	4.25	--	mJ
Q_g	Total Gate Charge	V_{CE} = 600 V, I_C = 15A, V_{GE} = 15V	--	120	180	nC
Q_{ge}	Gate-Emitter Charge		--	9	14	nC
Q_{gc}	Gate-Collector Charge		--	63	95	nC
L_e	Internal Emitter Inductance	Measured 5mm from PKG	--	14	--	nH

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	T_C = 25°C	--	1.7	2.7	V
			T_C = 125°C	--	1.8	--	
t_{rr}	Diode Reverse Recovery Time	I_F = 15A dI/dt = 200 A/µs	T_C = 25°C	--	210	330	ns
			T_C = 125°C	--	280	--	
I_{rr}	Diode Peak Reverse Recovery Current		T_C = 25°C	--	27	40	A
			T_C = 125°C	--	31	--	
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25°C	--	2835	6600	nC
			T_C = 125°C	--	4340	--	