FAIRCHILD SEMICONDUCTOR®

September 2001

IGBT

FMG2G75US60

Molding Type Module

General Description

Fairchild's Insulated Gate Bipolar Transistor (IGBT) power modules provide low conduction and switching losses as well as short circuit ruggedness. They are designed for applications such as motor control, uninterrupted power supplies (UPS) and general inverters where short circuit ruggedness is a required feature.

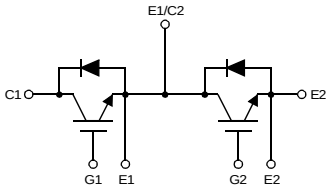
Features

- UL Certified No. E209204
- Short Circuit rated 10us @ T_C = 100°C, V_{GE} = 15V
- High Speed Switching
- Low Saturation Voltage : $V_{CE(sat)}$ = 2.2 V @ I_C = 75A
- High Input Impedance
- Fast & Soft Anti-Parallel FWD

Application

- AC & DC Motor Controls
- General Purpose Inverters
- Robotics
- Servo Controls
- UPS

Package Code : 7PM-GA



Internal Circuit Diagram

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Description		FMG2G75US60	Units
V_{CES}	Collector-Emitter Voltage		600	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Collector Curent	@ T_C = 25°C	75	A
$I_{CM\ (1)}$	Pulsed Collector Current		150	A
I_F	Diode Continuous Forward Current	@ T_C = 100°C	75	A
I_{FM}	Diode Maximum Forward Current		150	A
T_{SC}	Short Circuit Withstand Time	@ T_C = 100°C	10	us
P_D	Maximum Power Dissipation	@ T_C = 25°C	310	W
T_J	Operating Junction Temperature		-40 to +150	°C
T_{stg}	Storage Temperature Range		-40 to +125	°C
V_{iso}	Isolation Voltage	@ AC 1minute	2500	V
Mounting Torque	Power Terminals Screw : M5		2.0	N.m
	Mounting Screw : M5		2.0	N.m

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

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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 = 250uA	600	--	--	V
$\Delta B_{VCES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	--	0.6	--	V/°C
I_{CES}	Collector Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	--	--	250	uA
I_{GES}	G-E Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	--	--	± 100	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	V_{GE} = 0V, I_C = 75mA	5.0	6.0	8.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 75A, V_{GE} = 15V	--	2.2	2.8	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	--	7056	--	pF
C_{oes}	Output Capacitance		--	672	--	pF
C_{res}	Reverse Transfer Capacitance		--	180	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 75A, R_G = 3.3Ω, V_{GE} = 15V Inductive Load, T_C = 25°C	--	20	--	ns
t_r	Rise Time		--	40	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	70	--	ns
t_f	Fall Time		--	110	200	ns
E_{on}	Turn-On Switching Loss		--	1.4	--	mJ
E_{off}	Turn-Off Switching Loss		--	1.7	--	mJ
E_{ts}	Total Switching Loss		--	3.1	--	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 75A, R_G = 3.3Ω, V_{GE} = 15V Inductive Load, T_C = 125°C	--	20	--	ns
t_r	Rise Time		--	50	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	80	--	ns
t_f	Fall Time		--	250	--	ns
E_{on}	Turn-On Switching Loss		--	1.6	--	mJ
E_{off}	Turn-Off Switching Loss		--	3.0	--	mJ
E_{ts}	Total Switching Loss		--	4.6	--	mJ
T_{sc}	Short Circuit Withstand Time	V_{CC} = 300 V, V_{GE} = 15V @ T_C = 100°C	10	--	--	us
Q_g	Total Gate Charge	V_{CE} = 300 V, I_C = 75A, V_{GE} = 15V	--	310	350	nC
Q_{ge}	Gate-Emitter Charge		--	62	--	nC
Q_{gc}	Gate-Collector Charge		--	130	--	nC

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