FAIRCHILD
SEMICONDUCTOR®

IGBT

FMG2G300LS60E

Molding Type Module

General Description

Fairchild IGBT Power Module provides low conduction as well as short circuit ruggedness. It's designed for the applications such as welder.

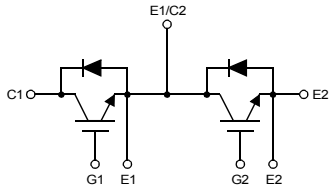
Features

- Short Circuit Rated Time; 10us @ T_C =100°C, V_{GE} = 15V
- Low Saturation Voltage: $V_{CE(sat)}$ = 1.4 V @ I_C = 300A
- High Input Impedance
- Fast & Soft Anti-Parallel FWD
- UL Certified No.E209204

Application

- AC/ DC Welder

Package Code : 7PM-HA



Internal Circuit Diagram

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Description		FMG2G300LS60E	Units
V_{CES}	Collector-Emitter Voltage		600	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Collector Current		300	A
$I_{CM\ (1)}$	Pulsed Collector Current		600	A
I_F	Diode Continuous Forward Current		300	A
I_{FM}	Diode Maximum Forward Current		600	A
P_D	Maximum Power Dissipation		892	W
T_{SC}	Short Circuit Withstand Time	@ T_C = 100°C	10	us
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 Terminal Screw : M5		4.0	N.m
	Mounting Screw : M6		4.0	N.m

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

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}	Gate - Emitter Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	--	--	± 100	nA
On Characteristics						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	I_C = 300mA, V_{CE} = V_{GE}	5.0	6.5	8.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 300A, V_{GE} = 15V	--	1.4	1.8	V
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 300A, R_G = 10Ω, V_{GE} = 15V, Inductive Load, T_C = 25°C	--	0.23	--	us
t_r	Rise Time		--	0.21	--	us
$t_{d(off)}$	Turn-Off Delay Time		--	0.43	--	us
t_f	Fall Time		--	2.43	--	us
E_{on}	Turn-On Switching Loss		--	13	--	mJ
E_{off}	Turn-Off Switching Loss		--	180	--	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 300A, R_G = 10Ω, V_{GE} = 15V, Inductive Load, T_C = 125°C	--	0.3	--	us
t_r	Rise Time		--	0.23	--	us
$t_{d(off)}$	Turn-Off Delay Time		--	0.46	--	us
t_f	Fall Time		--	4.1	--	us
E_{on}	Turn-On Switching Loss		--	15	--	mJ
E_{off}	Turn-Off Switching Loss		--	260	--	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 =300A, V_{GE} = 15V	--	990	--	nC
Q_{ge}	Gate-Emitter Charge		--	210	--	nC
Q_{gc}	Gate-Collector Charge		--	350	--	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 = 300A	T_C = 25°C	--	1.9	2.8	V
			T_C = 100°C	--	1.8	--	
t_{rr}	Diode Reverse Recovery Time	I_F = 300A di / dt = 600 A/us	T_C = 25°C	--	90	130	ns
			T_C = 100°C	--	130	--	
I_{rr}	Diode Peak Reverse Recovery Current		T_C = 25°C	--	32	42	A
			T_C = 100°C	--	63	--	
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25°C	--	1440	2700	nC
			T_C = 100°C	--	4095	--	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (IGBT Part, per 1/2 Module)	--	0.14	°C/W
$R_{\theta JC}$	Junction-to-Case (DIODE Part, per 1/2 Module)	--	0.22	°C/W
$R_{\theta JC}$	Case-to-Sink (Conductive grease applied)	0.035	--	°C/W
Weight	Weight of Module	240	--	g

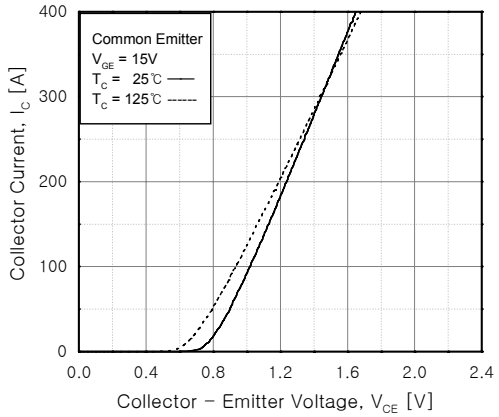


Fig 1. Typical Output Characteristics

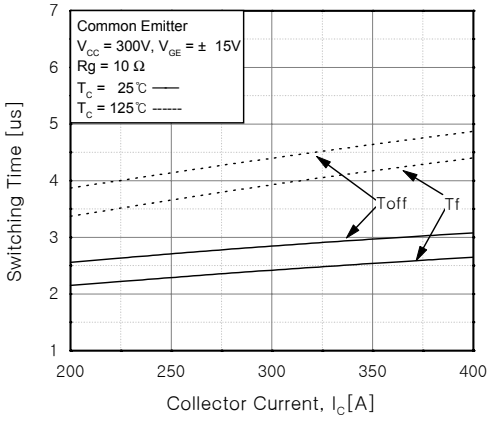


Fig 2. Turn-Off Characteristics vs. Collector Current

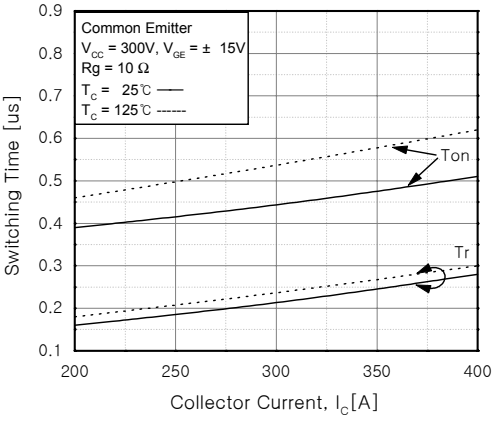


Fig 3. Turn-On Characteristics vs. Collector Current

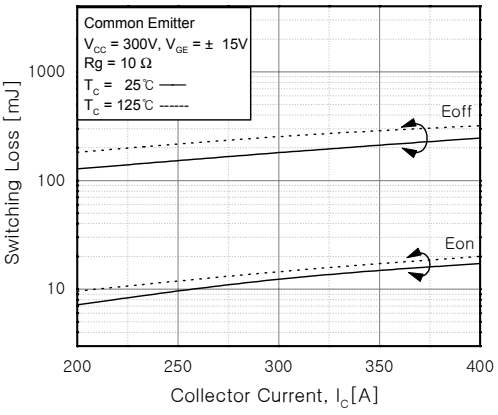


Fig 4. Switching Loss vs. Collector Current

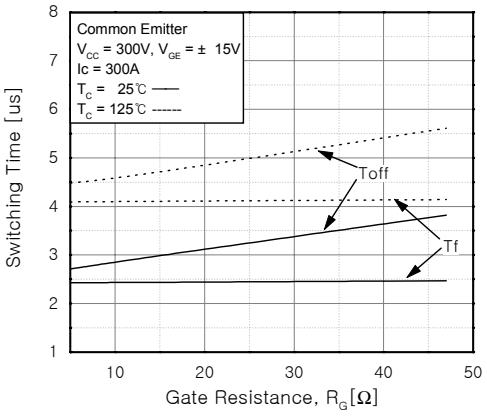


Fig 5. Turn-Off Characteristics vs. Gate Resistance

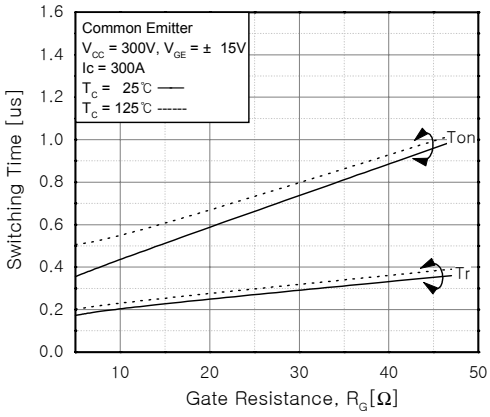


Fig 6. Turn-On Characteristics vs. Gate Resistance

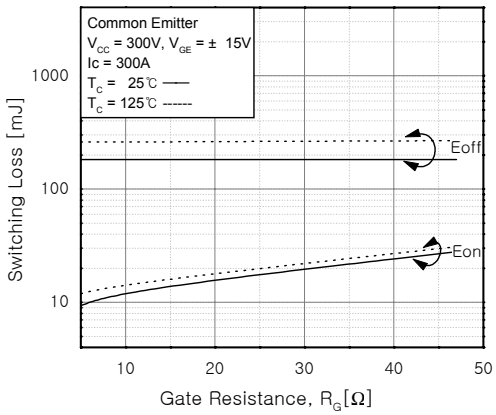


Fig 7. Switching Loss vs. Gate Resistance

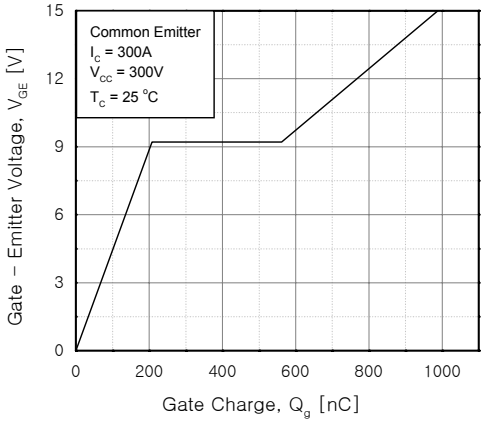


Fig 8. Gate Charge Characteristics

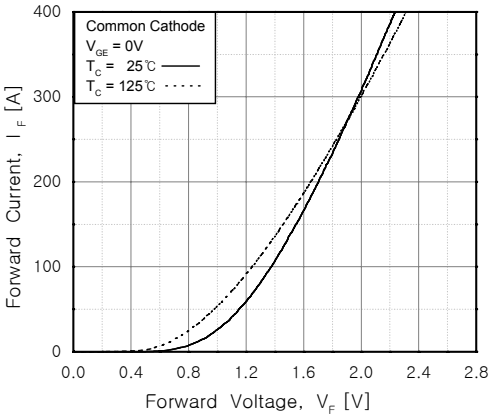


Fig 9. Forward Characteristics (diode)

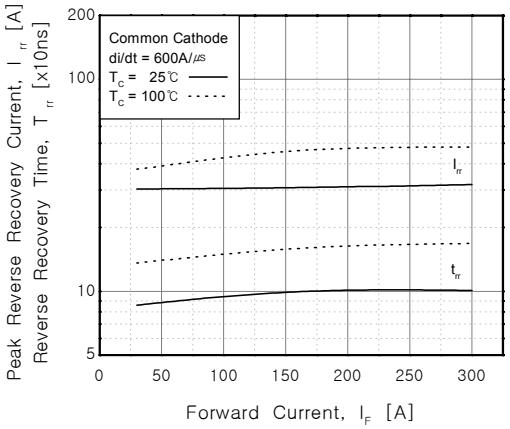
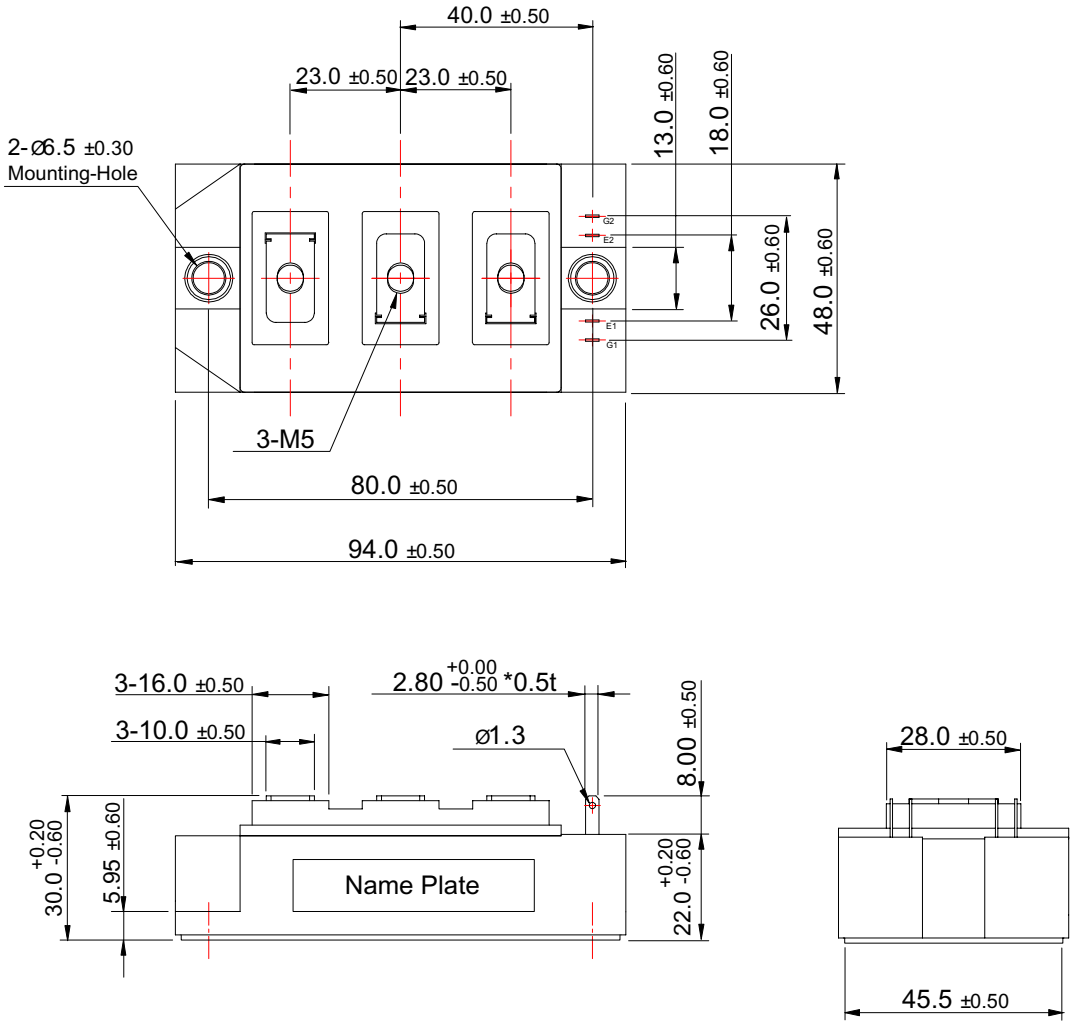


Fig 10. Reverse Recovery Characteristics(diode)

Package Dimension

7PM-HA



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