

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

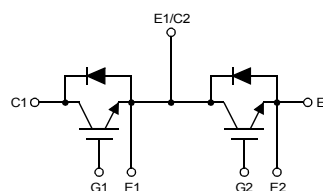
- Short Circuit Rated Time; 10us @ $T_C = 100^\circ\text{C}$, $V_{GE} = 15\text{V}$
- Low Saturation Voltage: $V_{CE(\text{sat})} = 1.4\text{V}$ @ $I_C = 300\text{A}$
- High Input Impedance
- Fast & Soft Anti-Parallel FWD
- UL Certified No.E209204

Application

- AC/ DC Welder



Package Code : 7PM-HA



Internal Circuit Diagram

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ 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 | 10 | us |
| T_J | Operating Junction Temperature | -40 to +150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -40 to +125 | $^\circ\text{C}$ |
| V_{ISO} | Isolation Voltage | 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 |
| ΔBV _{CES} /ΔT _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 | I _F = 300A di / dt = 600 A/us | T _C = 25°C | -- | 32 | 42 | A |
| | | | T _C = 100°C | -- | 63 | -- | |
| Q _{rr} | Diode Reverse Recovery Charge | I _F = 300A di / dt = 600 A/us | T _C = 25°C | -- | 1440 | 2700 | nC |
| | | | T _C = 100°C | -- | 4095 | -- | |

Thermal Characteristics

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

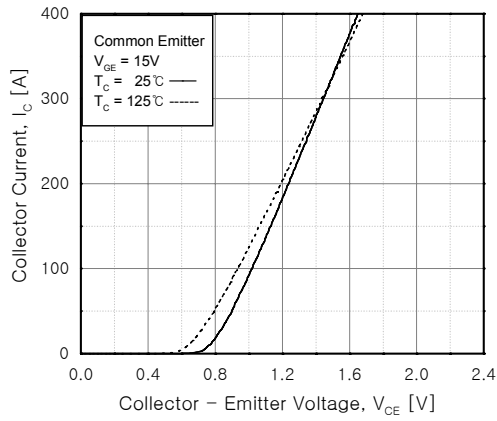


Fig 1. Typical Output Characteristics

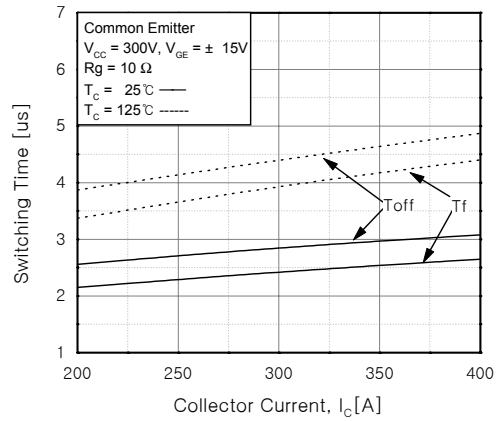


Fig 2. Turn-Off Characteristics vs. Collector Current

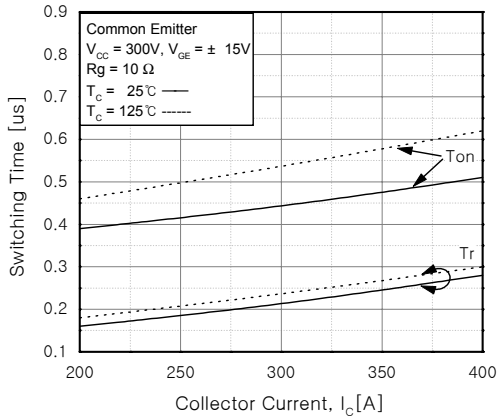


Fig 3. Turn-On Characteristics vs. Collector Current

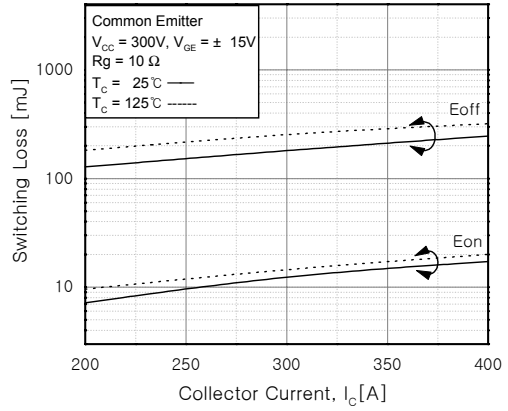


Fig 4. Switching Loss vs. Collector Current

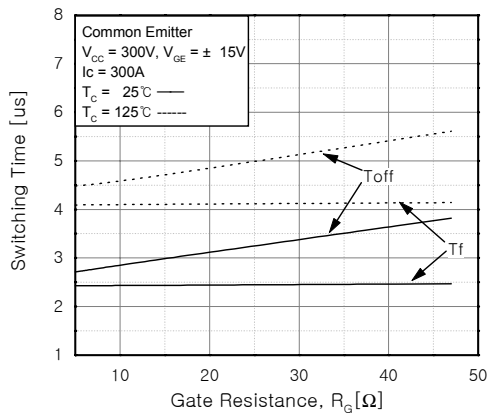


Fig 5. Turn-Off Characteristics vs. Gate Resistance

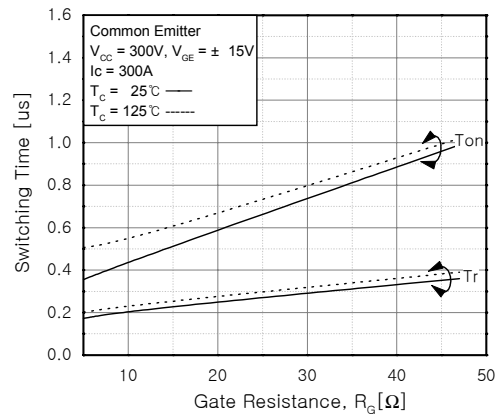


Fig 6. Turn-On Characteristics vs. Gate Resistance

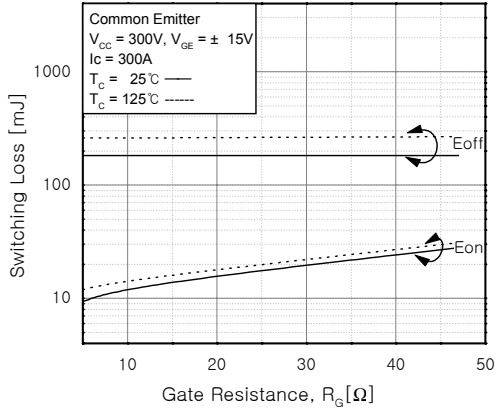


Fig 7. Switching Loss vs. Gate Resistance

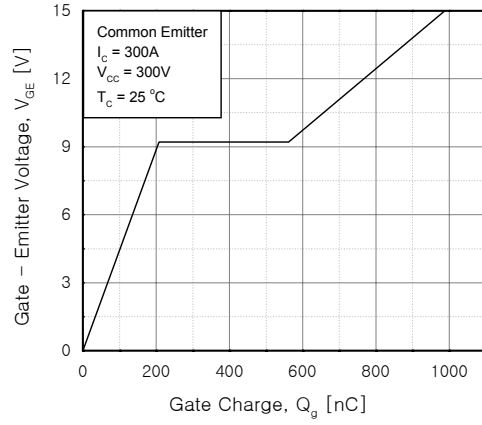


Fig 8. Gate Charge Characteristics

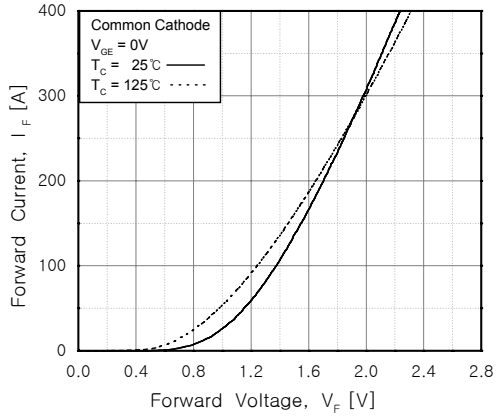


Fig 9. Forward Characteristics (diode)

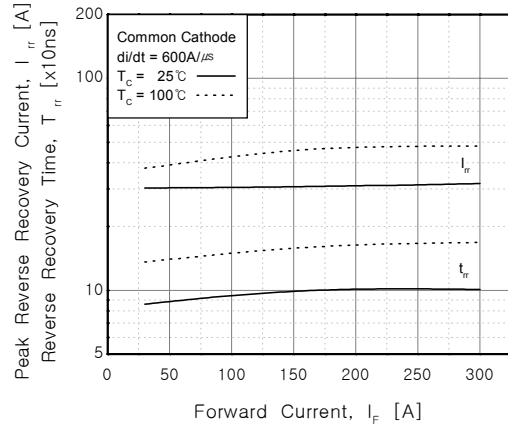
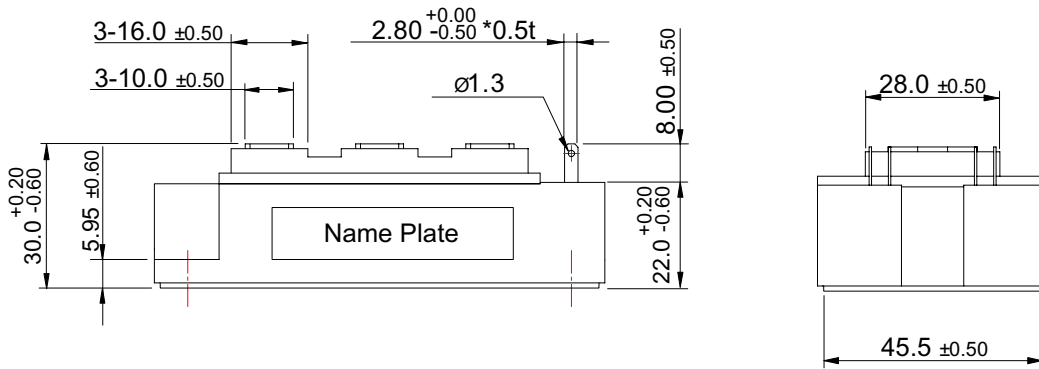
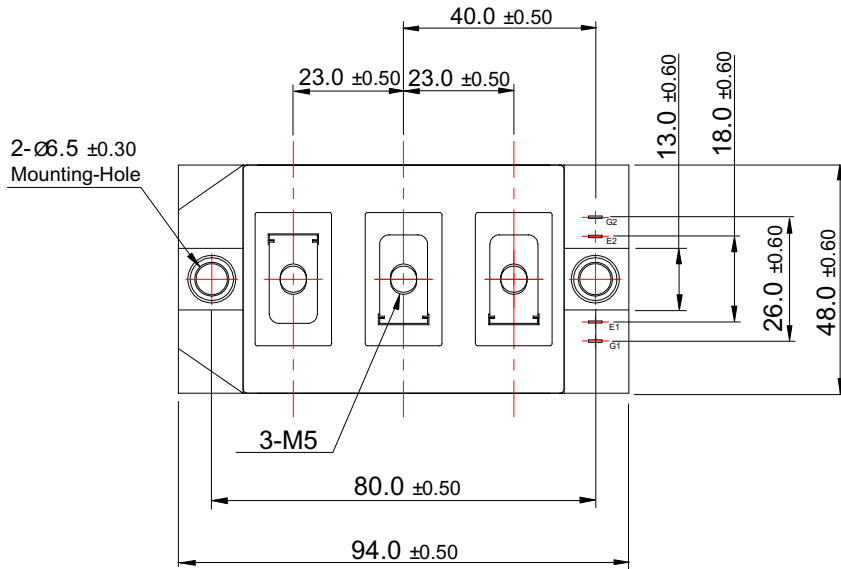


Fig 10. Reverse Recovery Characteristics (diode)

Package Dimension

7PM-HA



FMG2G300LS60E

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| CoolFET™ | FRFET™ | MicroFET™ | QFET® | SuperSOT™-8 |
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| FACT™ | ImpliedDisconnect™ | OCXPro™ | μSerDes™ | UltraFET® |
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