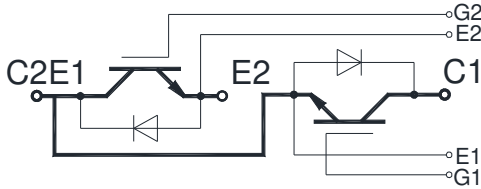




MRI300.17

2 in 1 IGBT Modules



Features:

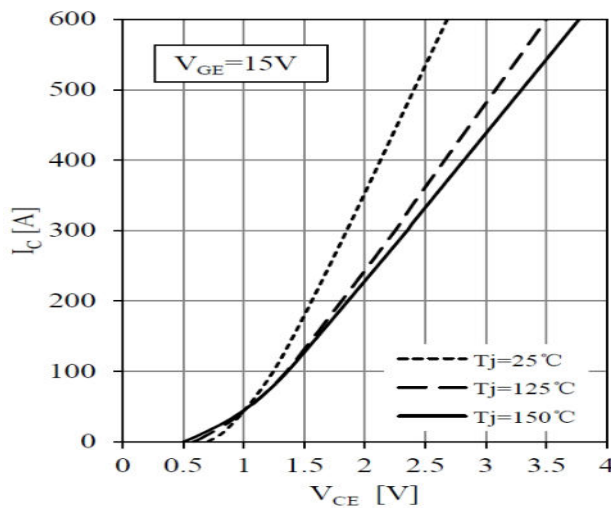
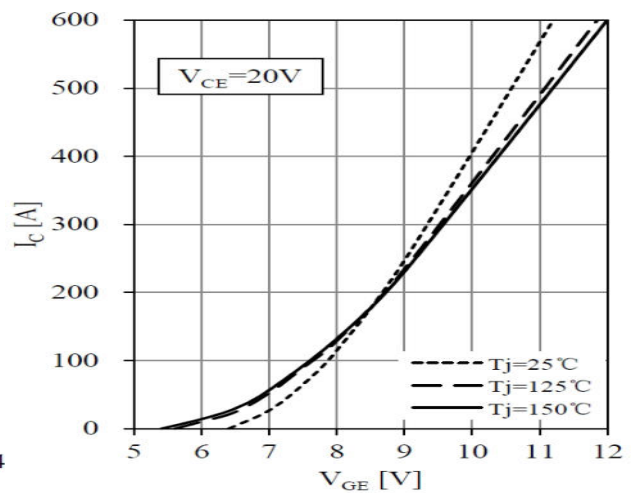
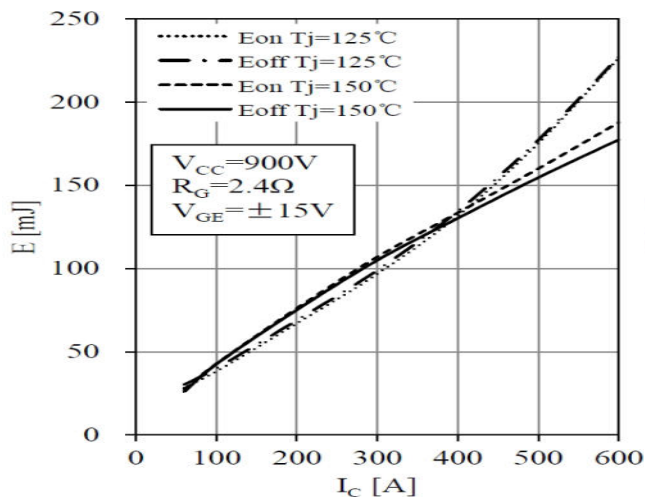
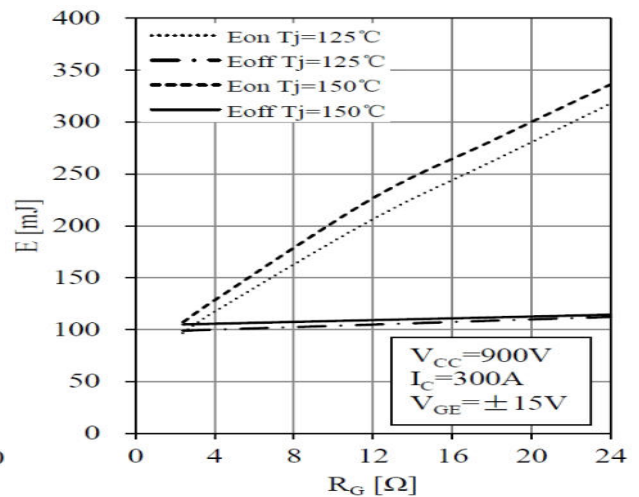
- Low $V_{CE(sat)}$ trench IGBT technology
- 10 μ s short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175°C

Typical Applications:

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

| SYMBOL | CHARACTERISTIC | TEST CONDITIONS | VALUE | | | UNIT | |
|---------------|--|--|---|------|-----------|------------------|---|
| | | | Min | Type | Max | | |
| V_{CES} | Collector-Emitter voltage | $T_j=25^\circ\text{C}$ | | | 1700 | V | |
| V_{GES} | Gate-Emitter voltage | $T_j=25^\circ\text{C}$ | | | ± 20 | V | |
| I_c | Collector current | Continuous@ $T_C=100^\circ\text{C}$ | | | 300 | A | |
| I_{CP} | | $T_P=1\text{ms}$ | | | 600 | A | |
| P_D | Maximum Power Dissipation | $T_j=175^\circ\text{C}$, 1 device | | | 1829 | W | |
| T_j | Junction temperature | / | | | 175 | $^\circ\text{C}$ | |
| T_{stg} | Storage temperature | / | -40 | | 125 | $^\circ\text{C}$ | |
| V_{iso} | Isolation between terminal and copper base | $T_j=25^\circ\text{C}$, AC: 1minute | 4000 | | | V | |
| Screw torque | Mounting(M6) | / | 2.5 | | 5.0 | N·m | |
| | Terminals(M6) | / | 3.0 | | 5.0 | N·m | |
| I_{CES} | Zero gate voltage collector current | $T_j=25^\circ\text{C}$, $V_{CE}=1700\text{V}$, $V_{GE}=0\text{V}$ | | | 1.0 | mA | |
| I_{GES} | Gate-Emitter leakage current | $T_j=25^\circ\text{C}$, $V_{CE}=0\text{V}$, $V_{GE}=\pm 20\text{V}$ | | | ± 0.4 | μA | |
| $V_{GE(th)}$ | Gate-Emitter threshold voltage | $T_j=25^\circ\text{C}$, $V_{CE}=20\text{V}$, $I_c=12\text{mA}$ | 5.6 | 6.2 | 6.8 | V | |
| $V_{CE(sat)}$ | Collector-Emitter saturation voltage | $T_j=25^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_c=300\text{A}$ | | 1.85 | 2.20 | V | |
| | | $T_j=125^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_c=300\text{A}$ | | 2.25 | | V | |
| | | $T_j=150^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_c=300\text{A}$ | | 2.35 | | V | |
| R_{Gint} | Internal gate resistor | $T_j=25^\circ\text{C}$ | | 2.5 | | Ω | |
| C_{ies} | Input capacitance | $T_j=25^\circ\text{C}$, $V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$ | | 36.1 | | nF | |
| C_{res} | Reverse transfer capacitance | | | 0.88 | | nF | |
| t_{on} | Turn-on time | $T_j=125^\circ\text{C}$, $V_{CC}=900\text{V}$, $I_c=300\text{A}$, $V_{GE}=\pm 15\text{V}$, $R_g=2.4\Omega$, Inductive load | | 224 | | ns | |
| t_r | | | | 55 | | ns | |
| t_{off} | Turn-off time | | | 611 | | ns | |
| t_f | | | | 159 | | ns | |
| E_{on} | Turn-on energy loss per pulse | | | 96.8 | | mJ | |
| E_{off} | Turn-off energy loss per pulse | | | 99.0 | | mJ | |
| I_{sc} | SC data | | $t_{sc} \leq 10 \mu\text{s}$, $V_{GE}=15\text{V}$, $T_j=150^\circ\text{C}$, $V_{CC}=1000\text{V}$, $V_{CEM} \leq 1700\text{V}$ | | 1200 | | A |

| | | | | | |
|----------------------|---------------------------------------|---|-------|-------|------|
| V _F | Forward on voltage | T _j =25°C ,I _F =300A, V _{GE} =0V | 1.80 | 2.25 | V |
| | | T _j =125°C ,I _F =300A, V _{GE} =0V | 1.90 | | V |
| | | T _j =150°C ,I _F =300A, V _{GE} =0V | 1.95 | | V |
| I _{RM} | Peak reverse recovery current | I _F =300A, -diF/dt=5400A/μs , V _R =900V, V _{GE} =-15V, T _j =125°C | 357 | | A |
| Q _r | Recovered charge | | 116 | | μC |
| E _{rec} | Reverse recovery energy | | 68.2 | | mJ |
| R _{th(j-c)} | Thermal resistance(1 device) | IGBT | | 0.082 | °C/W |
| | | FWD | | 0.129 | °C/W |
| R _{th(c-f)} | Contact thermal resistance (1 device) | With thermal compound | 0.033 | | °C/W |
| W _t | Weight | | | 300 | g |
| Outline | 454H3P | | | | |


Fig 1. IGBT Typical Output Characteristics

Fig 2. IGBT Typical Transfer Characteristics

Fig 3. IGBT Switching Loss vs. Ic

Fig 4. IGBT Switching Loss vs. R_G

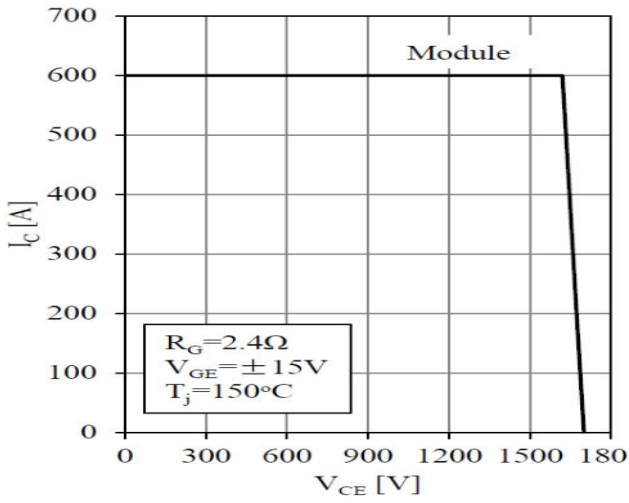


Fig 5. RBSOA

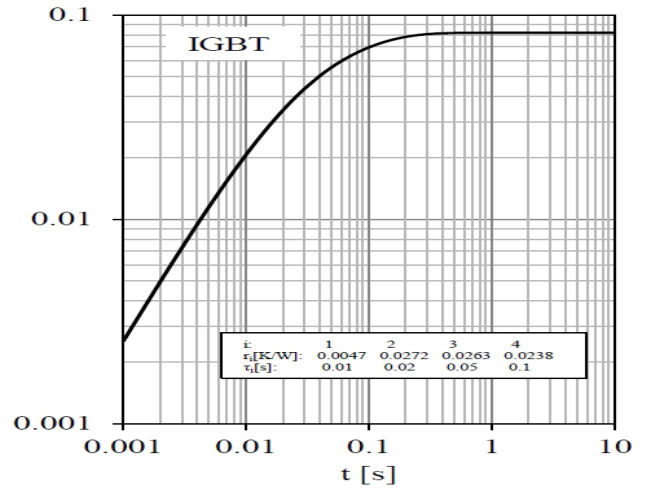


Fig 6. IGBT Transient Thermal Impedance

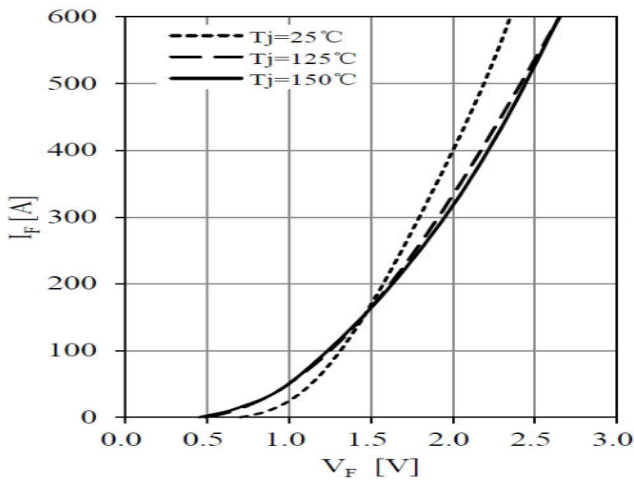


Fig 7. Forward Characteristics of Diode

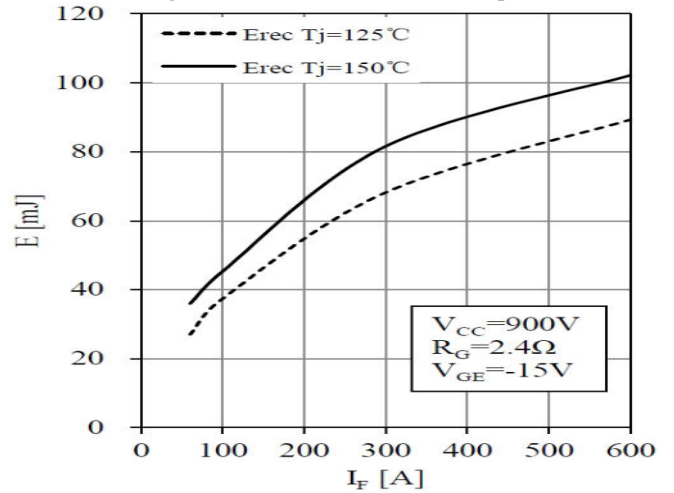


Fig 8. Diode Switching Loss vs. I_F

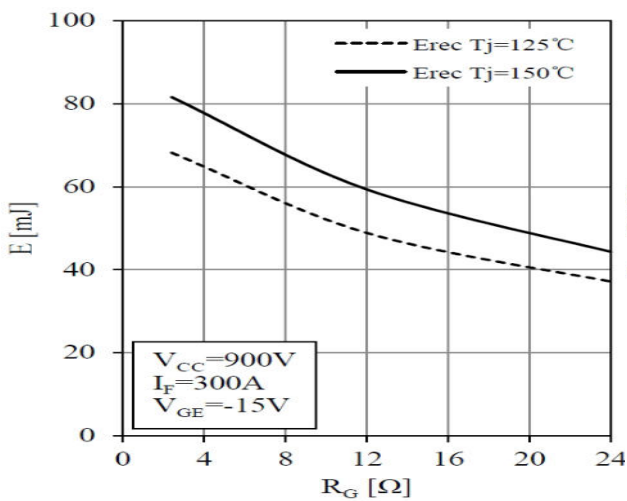


Fig9. Diode Switching Loss vs. R_G

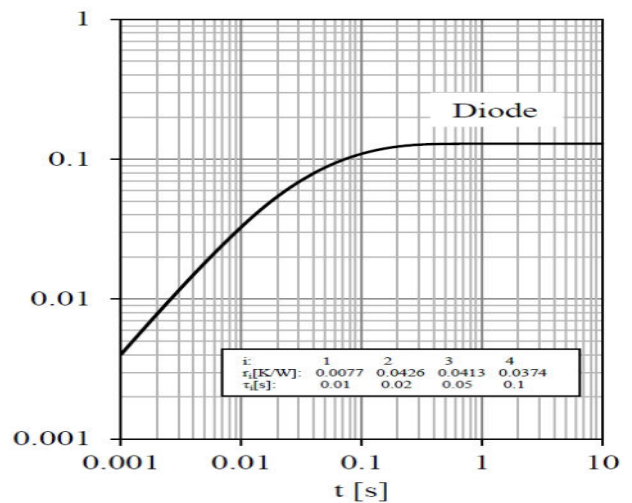


Fig 10. Diode Transient Thermal Impedance

Outline:

