

IGBT MODULE (S-Series)

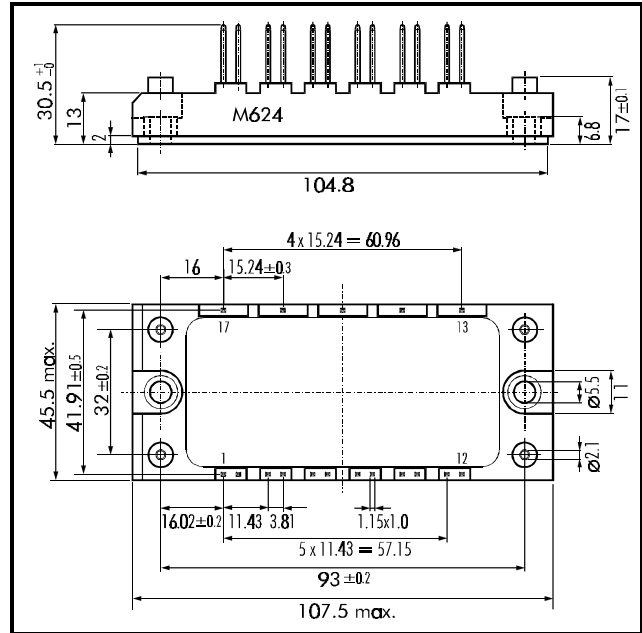
■ Outline Drawing

■ Features

- NPT-Technologie
- Solderable Package
- Square SC SOA at $10 \times I_C$
- High Short Circuit Withstand-Capability
- Small Temperature Dependence of the Turn-Off Switching Loss
- Low Losses And Soft Switching

■ Applications

- High Power Switching
- A.C. Motor Controls
- D.C. Motor Controls
- Uninterruptible Power Supply



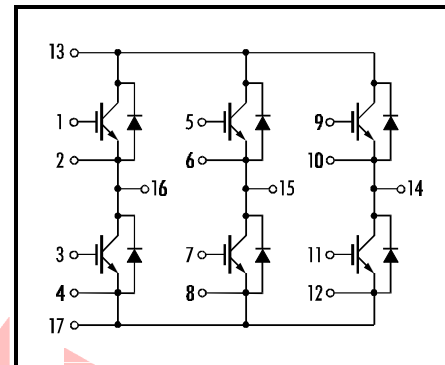
■ Maximum Ratings and Characteristics

• Absolute Maximum Ratings ($T_c=25^\circ\text{C}$)

| Items | Symbols | Ratings | Units |
|---|---------------------|----------------------|------------------|
| Collector-Emitter Voltage | V_{CES} | 1200 | V |
| Gate -Emitter Voltage | V_{GES} | ± 20 | V |
| Collector Current ($25^\circ\text{C} / 80^\circ\text{C}$) | Continuous | I_C | 15 / 10 |
| | 1ms | $I_{C\text{PULSE}}$ | 30 / 20 |
| | Continuous | $-I_C$ | 15 / 10 |
| | 1ms | $-I_{C\text{PULSE}}$ | 30 / 20 |
| Max. Power Dissipation | P_C | 100 | W |
| Operating Temperature | T_j | +150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -40 ~ +125 | $^\circ\text{C}$ |
| Isolation Voltage | A.C. 1min. V_{is} | 2500 | V |
| Screw Torque | Mounting *1 | 3.5 | Nm |

Note: *1:Recommendable Value; 2.5 - 3.5 Nm (M5)

■ Equivalent Circuit



• Electrical Characteristics (at $T_j=25^\circ\text{C}$)

| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|---------------|--------------------------------|------|------|------|---------------|
| Zero Gate Voltage Collector Current | I_{CES} | $V_{GE}=0V$ $V_{CE}=1200V$ | | | 1.0 | mA |
| Gate-Emitter Leakage Current | I_{GES} | $V_{CE}=0V$ $V_{GE}=\pm 20V$ | | | 200 | μA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $V_{GE}=20V$ $I_C=10\text{mA}$ | 6.0 | | 9.0 | V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $V_{GE}=15V$ $I_C=10A$ | | 2.1 | | V |
| Input capacitance | C_{ies} | $V_{GE}=0V$ | | 1200 | | pF |
| Output capacitance | C_{oes} | $V_{CE}=10V$ | | | | |
| Reverse Transfer capacitance | C_{res} | $f=1\text{MHz}$ | | | | |
| Turn-on Time | t_{ON} | $V_{CC}=600V$ | | 0.60 | 1.2 | μs |
| | t_r | $I_C=10A$ | | 0.40 | 0.6 | |
| Turn-off Time | t_{OFF} | $V_{GE}=\pm 15V$ | | 0.45 | 1.0 | |
| | t_f | $R_G=120\Omega$ | | 0.10 | 0.3 | |
| Diode Forward On-Voltage | V_F | $I_F=10A$ $V_{GE}=0V$ | | | 3.3 | V |
| Reverse Recovery Time | t_{rr} | $I_F=10A$ | | | 350 | ns |

• Thermal Characteristics

| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------|---------------|-----------------------|------|------|------|--------------------|
| Thermal Resistance | $R_{th(j-c)}$ | IGBT | | | 1.25 | $^\circ\text{C/W}$ |
| | $R_{th(j-e)}$ | Diode | | | 2.00 | |
| | $R_{th(c-j)}$ | With Thermal Compound | | 0.05 | | |

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