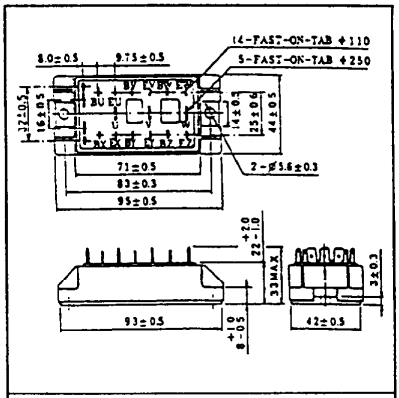
# MG25J6ES40

HIGH POWER SWITCHING APPLICATIONS.
MOTOR CONTROL APPLICATIONS.

- The Electrodes are Isolated from Case.
- 6 IGBTs are Built Into 1 Package.
- Enhancement-Mode
- Low Saturation Voltage
  : $V_{CE\,(sat)} = 3.5V$ (Max.) ($I_C = 25A$)
- High Speed: $t_f = 0.35\mu s$ (Max.) ($I_C = 25A$)
  $t_{rr} = 0.15\mu s$ (Max.) ($I_F = 25A$)

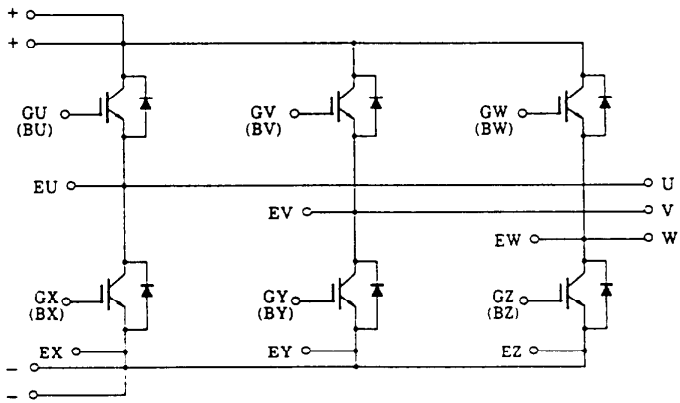
Unit in mm




| | |
|---|---|
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | 2-72A5A |

Weight : 225g

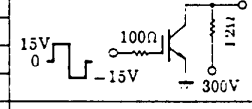
EQUIVALENT CIRCUIT

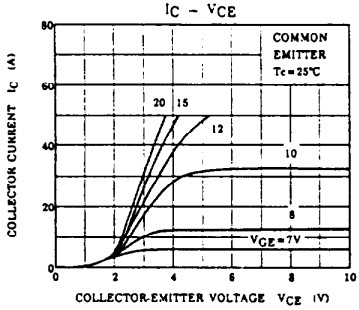


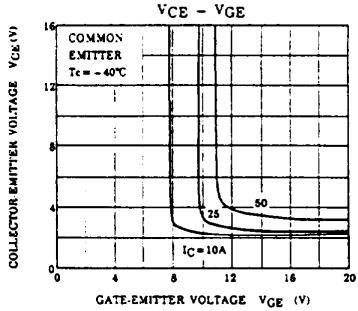
MAXIMUM RATINGS (Ta = 25°C)

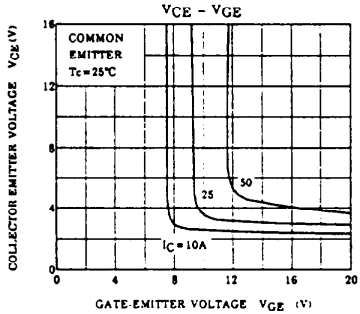
| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Collector-Emitter Voltage | | $V_{CES}$ | 600 | V |
| Gate-Emitter Voltage | | $V_{GES}$ | ±20 | V |
| Collector Current | DC | $I_C$ | 25 | A |
| | 1ms | $I_{CP}$ | 50 | |
| Forward Current | DC | $I_F$ | 25 | A |
| | 1ms | $I_{FM}$ | 50 | |
| Collector Power Dissipation (Tc = 25°C) | | $P_C$ | 100 | W |
| Junction Temperature | | $T_j$ | 150 | °C |
| Storage Temperature Range | | $T_{stg}$ | −40~125 | °C |
| Isolation Voltage | | $V_{Isol}$ | 2500 (AC, 1 min.) | V |
| Screw Torque | | — | 3 | N·m |

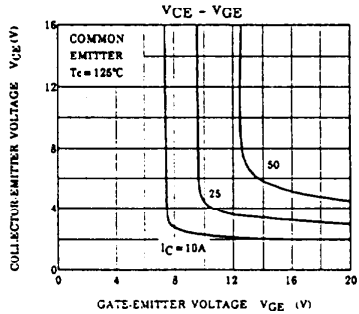
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

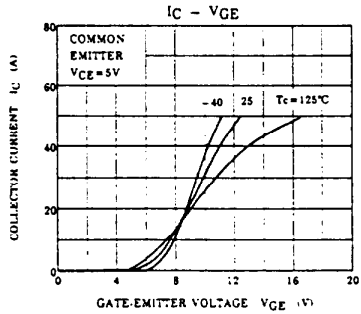
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Gate Leakage Current | | $I_{GES}$ | $V_{GE}$ = ±20V, $V_{CE}$ = 0 | — | — | ±500 | nA |
| Collector Cut-off Current | | $I_{CES}$ | $V_{CE}$ = 600V, $V_{GE}$ = 0 | — | — | 1.0 | mA |
| Collector-Emitter Breakdown Voltage | | $V_{(BR)CES}$ | $I_C$ = 10mA, $V_{GE}$ = 0 | 600 | — | — | V |
| Gate-Emitter Cut-off Voltage | | $V_{GE(off)}$ | $I_C$ = 25mA, $V_{CE}$ = 5V | 3.0 | — | 6.0 | V |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | $I_C$ = 25A, $V_{GE}$ = 15V | — | 2.7 | 3.5 | V |
| Input Capacitance | | $C_{ies}$ | $V_{CE}$ = 10V, $V_{GE}$ = 0, f = 1MHz | — | 2000 | — | pF |
| Switching Time | Rise Time | $t_r$ |  | — | 0.3 | 0.6 | μs |
| | Turn-on Time | $t_{on}$ | | — | 0.4 | 0.8 | |
| | Fall Time | $t_f$ | | — | 0.18 | 0.35 | |
| | Turn-off Time | $t_{off}$ | | — | 0.60 | 1.0 | |
| Forward Voltage | | $V_F$ | $I_F$ = 25A, $V_{GE}$ = 0 | — | 1.7 | 2.5 | V |
| Reverse Recovery Time | | $t_{rr}$ | $I_F$ = 25A, $V_{GE}$ = −10V, di/dt = 50A/μs | — | 0.08 | 0.15 | μs |
| Thermal Resistance | | $R_{th\ (j-c)}$ | Transistor | — | — | 1.25 | °C/W |
| | | | Diode | — | — | 1.56 | |

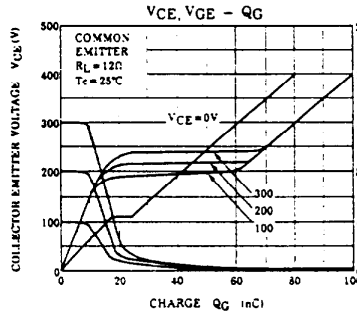

$I_C$ – $V_{CE}$
COMMON EMITTER
$T_c$ = 25°C
20
15
12
10
8
$V_{GE}$ = 7V
COLLECTOR CURRENT $I_C$ (A)
COLLECTOR-EMITTER VOLTAGE $V_{CE}$ (V)


$V_{CE}$ – $V_{GE}$
COMMON EMITTER
$T_c$ = – 40°C
50
25
$I_C$ = 10A
COLLECTOR EMITTER VOLTAGE $V_{CE}$ (V)
GATE-EMITTER VOLTAGE $V_{GE}$ (V)

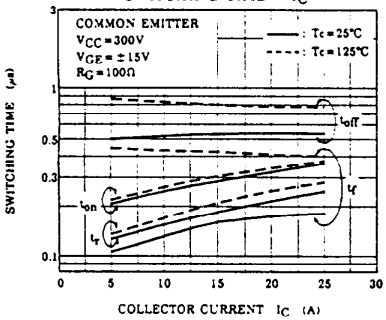

$V_{CE}$ – $V_{GE}$
COMMON EMITTER
$T_c$ = 25°C
50
25
$I_C$ = 10A
COLLECTOR EMITTER VOLTAGE $V_{CE}$ (V)
GATE-EMITTER VOLTAGE $V_{GE}$ (V)


$V_{CE}$ – $V_{GE}$
COMMON EMITTER
$T_c$ = 125°C
50
25
$I_C$ = 10A
COLLECTOR EMITTER VOLTAGE $V_{CE}$ (V)
GATE-EMITTER VOLTAGE $V_{GE}$ (V)

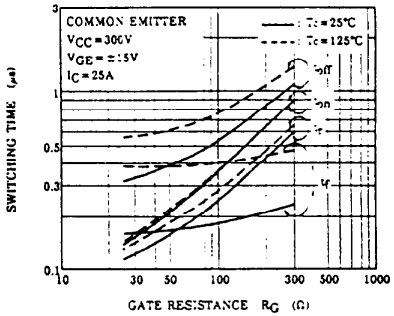

$I_C$ – $V_{GE}$
COMMON EMITTER
$V_{CE}$ = 5V
– 40
25
$T_c$ = 125°C
COLLECTOR CURRENT $I_C$ (A)
GATE-EMITTER VOLTAGE $V_{GE}$ (V)


$V_{CE}$, $V_{GE}$ – $Q_G$
COMMON EMITTER
$R_L$ = 12Ω
$T_c$ = 25°C
$V_{CE}$ = 0V
300
200
100
COLLECTOR EMITTER VOLTAGE $V_{CE}$ (V)
GATE-EMITTER VOLTAGE $V_{GE}$ (V)
CHARGE $Q_G$ (nC)

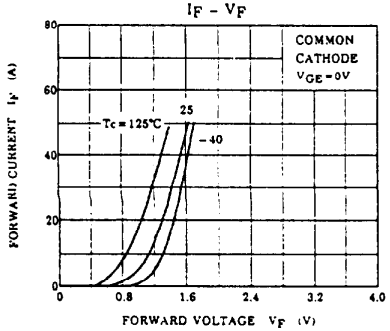
SWITCHING TIME – $I_C$



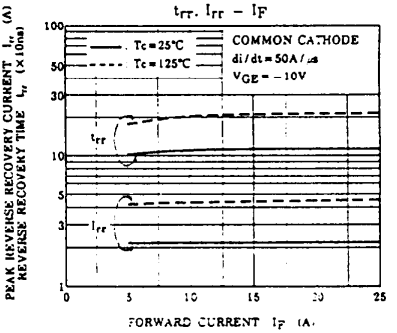

SWITCHING TIME – $R_G$



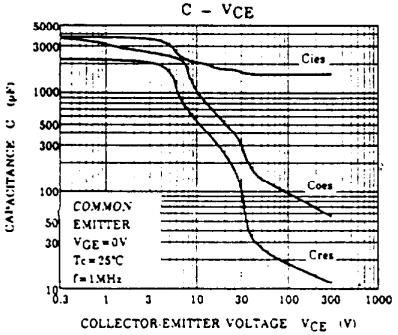

$I_F$ – $V_F$



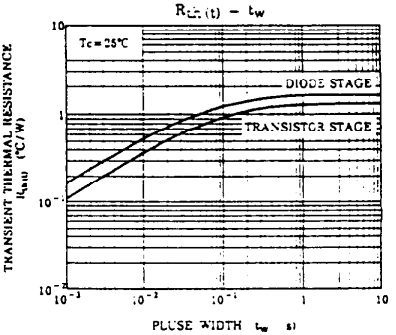

$t_{rr}$, $I_{rr}$ – $I_F$



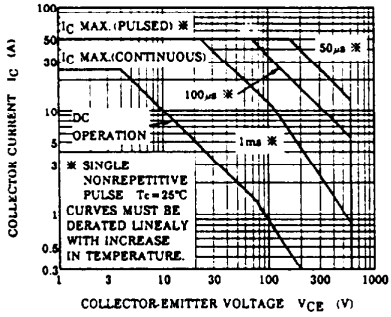

C – $V_{CE}$




$R_{th}$ (t) – $t_w$



SAFE OPERATING AREA




REVERSE BIAS SOA