

MIG30J901H

Maximum Ratings (Ta = 25°C)

| STAGE | | CHARACTERISTIC | | SYMBOL | RATINGS | UNIT | |
|---|---|---------------------------------|-------|------------|--------------------|------|---|
| Inverter | Collector-Emitter Voltage | | | V_{CES} | 600 | V | |
| | Gate-Emitter Voltage | | | V_{GES} | ±20 | V | |
| | Collector Current | DC | | I_C | 30 | A | |
| | | 1ms | | I_{CP} | 60 | | |
| | Forward Current | DC | | I_F | 30 | A | |
| | | 1ms | | I_{FM} | 60 | | |
| Collector Power Dissipation (Tc = 25°C) | | | P_C | 100 | W | | |
| Converter | Repetitive Peak Reverse Voltage | | | V_{RRM} | 800 | V | |
| | Average Output Rectified Current | | | I_O | 20 | A | |
| | Peak One Cycle Surge Forward Current (50Hz, Non-Repetitive) | | | I_{FSM} | 250 | A | |
| Brake | IGBT | Collector-Emitter Voltage | | | V_{CES} | 600 | V |
| | | Gate-Emitter Voltage | | | V_{GES} | ±20 | V |
| | | Collector Current | DC | | I_C | 15 | A |
| | | | 1ms | | I_{CP} | 30 | |
| | Collector Power Dissipation (Tc = 25°C) | | | P_C | 65 | W | |
| | FRD | Repetitive Peak Reverse Voltage | | | V_{RRM} | 600 | V |
| | | Forward Current | DC | | I_F | 15 | A |
| | | | 1ms | | I_{FM} | 30 | |
| Module | Junction Temperature | | | T_j | 150 | °C | |
| | Storage Temperature Range | | | T_{stg} | -40 ~ 125 | °C | |
| | Isolation Voltage | | | V_{isol} | 2500 (AC 1 minute) | V | |
| | Screw Torque | | | — | 3 | N•m | |

Electrical Characteristics (Ta = 25°C)

a. Inverter Stage

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MX. | UNIT |
|--------------------------------------|---------------------|----------------|--|------|------|----------|---------------|
| Gate Leakage Current | | I_{GES} | $V_{GE} = \pm 20V, V_{CE} = 0$ | - | - | ± 20 | μA |
| Collector Cut-off Current | | I_{CES} | $V_{CE} = 600V, V_{GE} = 0$ | - | - | 1.0 | mA |
| Gate-Emitter Cut-off Voltage | | $V_{GE (off)}$ | $V_{CE} = 5V, I_C = 30mA$ | 3.0 | - | 6.0 | V |
| Collector-Emitter Saturation Voltage | | $V_{CE (sat)}$ | $I_C = 30A, V_{GE} = 15V$ | - | 3.0 | 4.0 | V |
| Input Capacitance | | C_{ies} | $V_{CE} = 10V, V_{GE} = 0$ $f = 1MHz$ | - | 2000 | - | pF |
| Switching Time | Turn-on Delay Time | $t_{d(on)}$ | Inductive Load $V_{CC} = 300V$ $I_C = 30A$ $V_{GE} = \pm 15V$ $R_G = 82\Omega$ (Note 1) | - | 0.08 | 0.16 | μs |
| | Rise Time | t_r | | - | 0.12 | 0.24 | |
| | Turn-on Time | t_{on} | | - | 0.40 | 0.80 | |
| | Turn-off Delay Time | $t_{d(off)}$ | | - | 0.30 | 0.60 | |
| | Fall Time | t_f | | - | 0.15 | 0.30 | |
| | Turn-off Time | t_{off} | | - | 0.60 | 1.00 | |
| Forward Voltage | | V_F | $I_F = 30A, V_{GE} = 0$ | - | 1.5 | 2.3 | V |
| Reverse Recovery Time | | t_{rr} | $I_F = 30A, V_{GE} = -10V$ $di/dt = 50A/\mu s$ | - | 0.08 | 0.15 | μs |
| Thermal Resistance | | $R_{th(j-c)}$ | Transistor | - | - | 1.25 | $^{\circ}C/W$ |
| | | | Diode | - | - | 1.56 | |

b. Converter Stage

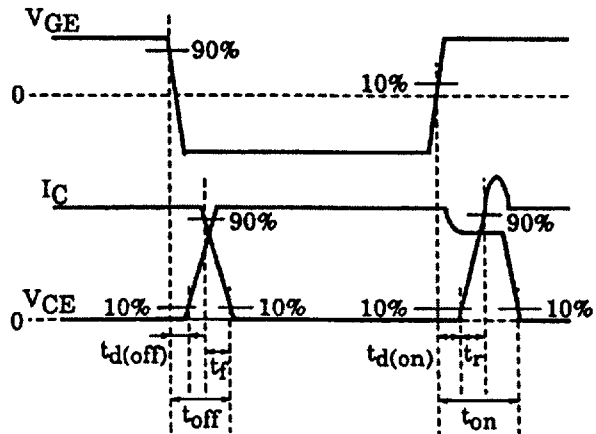
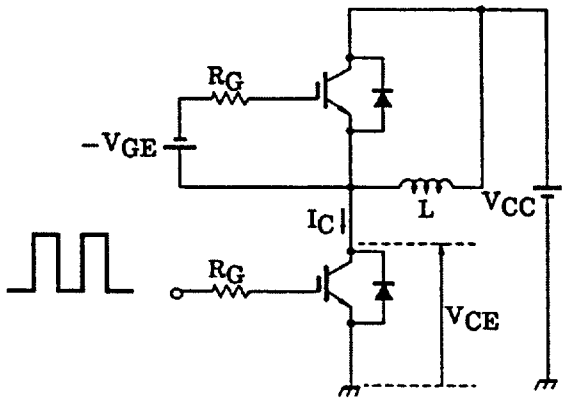
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MX. | UNIT |
|--------------------------------------|---------------|---------------------|------|------|------|---------------|
| Repetitive Peak Reverse Current | I_{RRM} | $V_{RRM} = 800V$ | - | - | 50 | μA |
| Peak Forward Voltage | V_{FM} | $I_{FM} = 20A$ | - | 1.05 | 1.20 | V |
| Peak One Cycle Surge Forward Current | I_{FSM} | 50Hz Sine-half-wave | 250 | - | - | A |
| Thermal Resistance | $R_{th(j-c)}$ | | - | - | 2.50 | $^{\circ}C/W$ |

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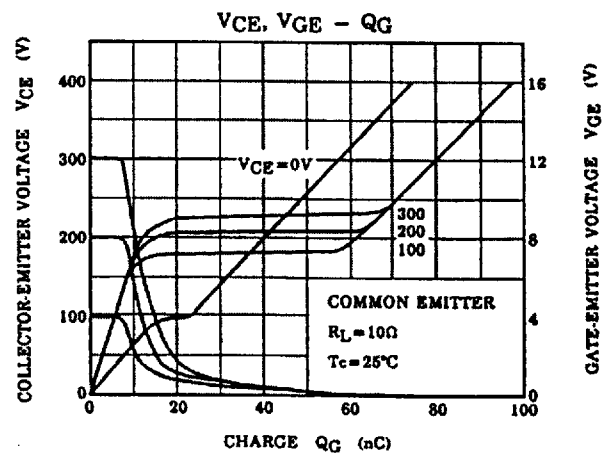
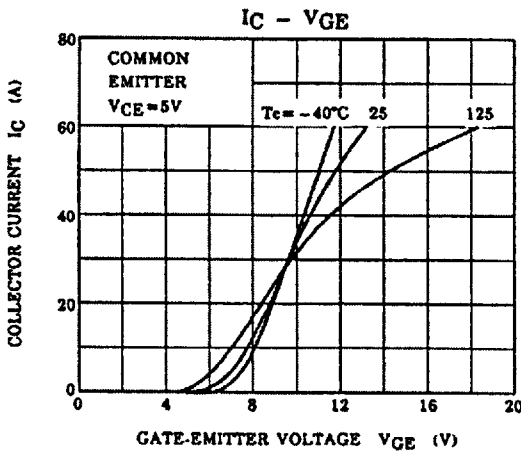
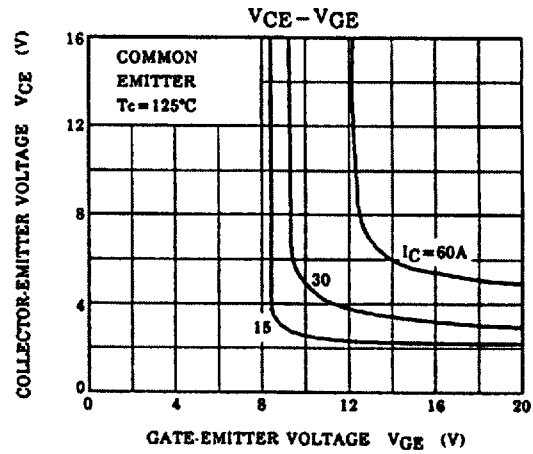
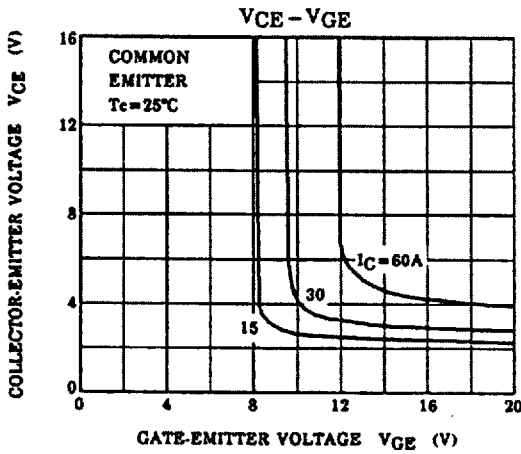
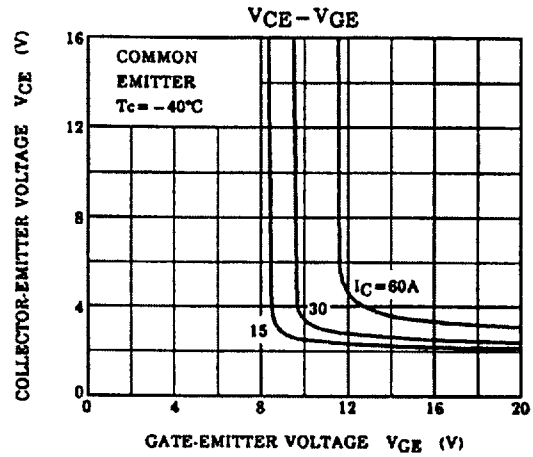
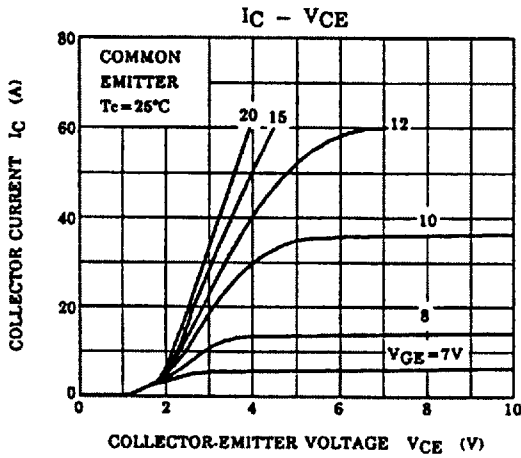
c. Brake Stage

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MX. | UNIT |
|--------------------------------------|---------------------|---------------|---|------|------|----------|---------------|
| Gate Leakage Current | | I_{GES} | $V_{GE} = \pm 20V, V_{CE} = 0$ | - | - | ± 20 | μA |
| Collector Cut-off Current | | I_{CES} | $V_{CE} = 600V, V_{GE} = 0$ | - | - | 1.0 | mA |
| Repetitive Peak Reverse Current | | I_{RRM} | $V_{RRM} = 600V$ | - | - | 1.0 | mA |
| Gate-Emitter Cut-off Voltage | | $V_{GE(off)}$ | $V_{CE} = 5V, I_C = 15mA$ | 3.0 | - | 6.0 | V |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | $I_C = 15A, V_{GE} = 15V$ | - | 3.0 | 4.0 | V |
| Input Capacitance | | C_{ies} | $V_{CE} = 10V, V_{GE} = 0, f = 1MHz$ | - | 1000 | - | pF |
| Switching Time | Turn-on Delay Time | $t_{d(on)}$ | Inductive Load $V_{CC} = 300V$ $I_C = 15A$ $V_{GE} = \pm 15V$ $R_G = 150\Omega$ (Note 1) | - | 0.08 | 0.16 | μs |
| | Rise Time | t_r | | - | 0.12 | 0.24 | |
| | Turn-on Time | t_{on} | | - | 0.40 | 0.80 | |
| | Turn-off Delay Time | $t_{d(off)}$ | | - | 0.30 | 0.60 | |
| | Fall Time | t_f | | - | 0.30 | 0.55 | |
| | Turn-off Time | t_{off} | | - | 0.65 | 1.00 | |
| Forward Voltage | | V_F | $I_F = 15A, V_{GE} = 0$ | - | 1.7 | 2.5 | V |
| Thermal Resistance | | $R_{th(l-c)}$ | Transistor | - | - | 1.92 | $^{\circ}C/W$ |
| | | | Diode | - | - | 2.80 | |

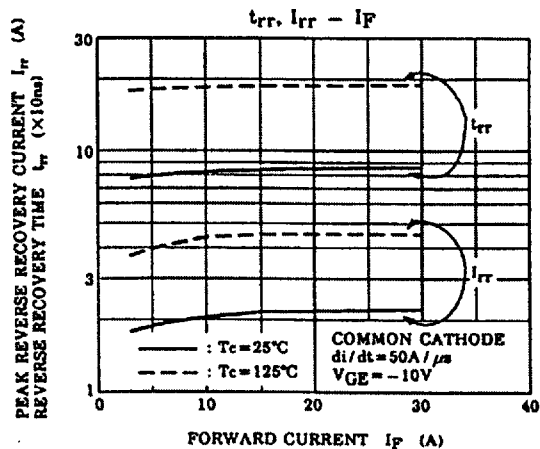
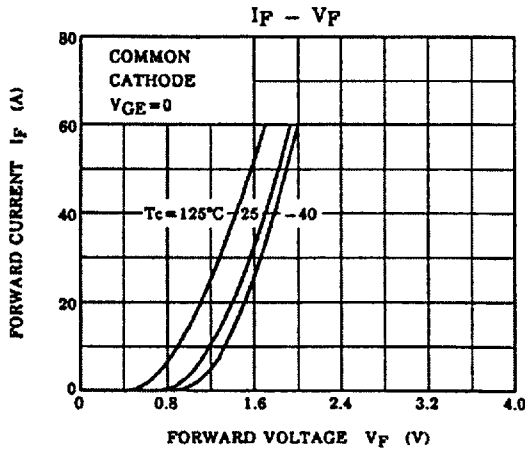
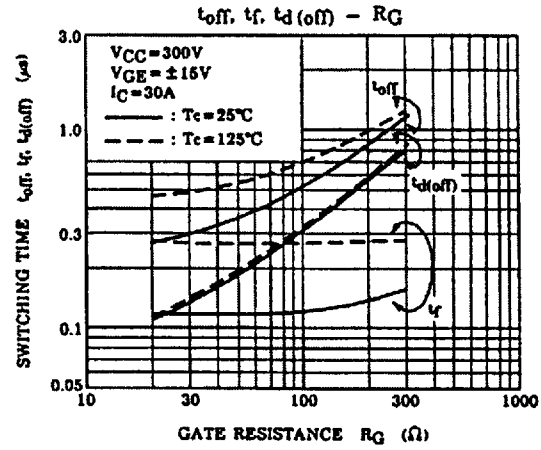
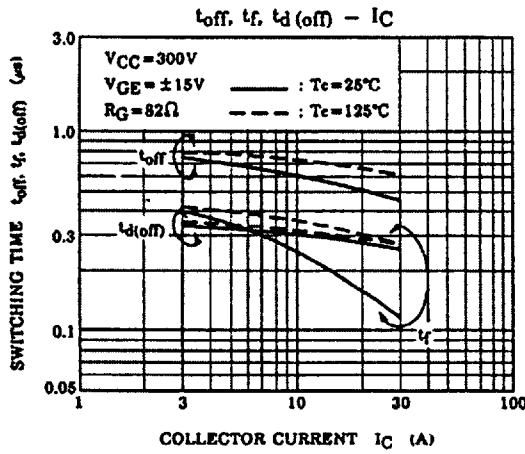
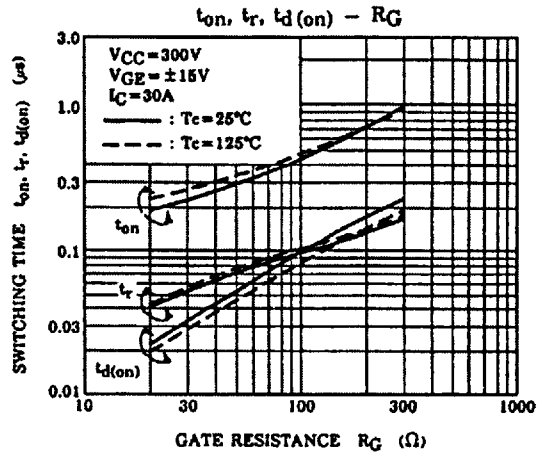
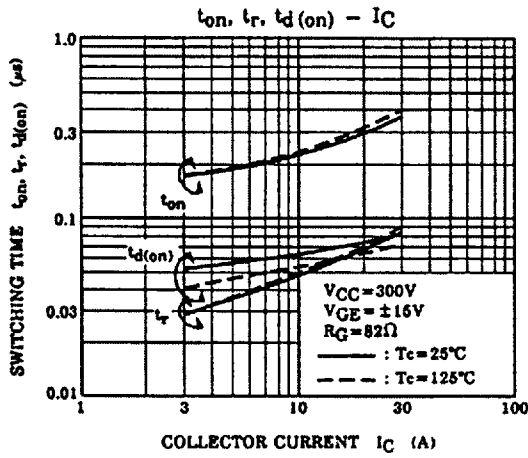
Note. 1 Switching Time Test Circuit & Timing Chart



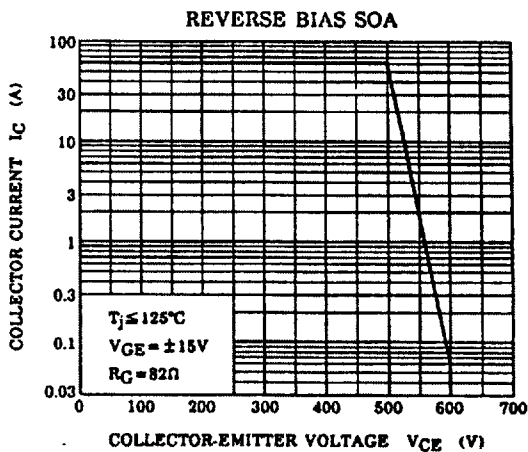
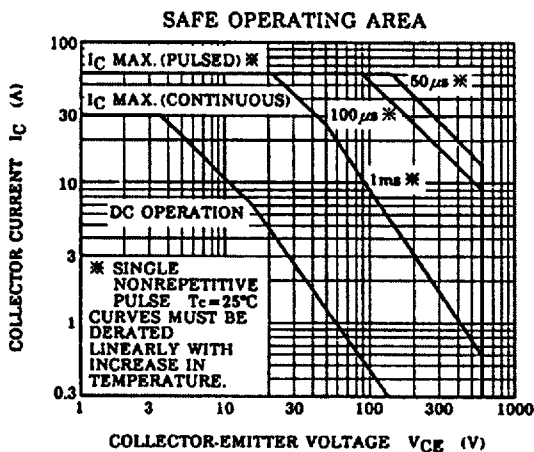
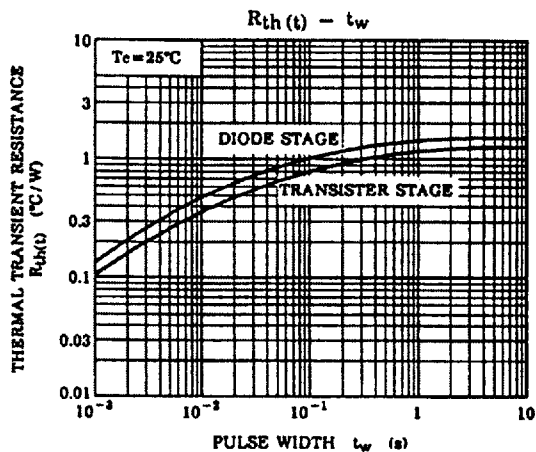
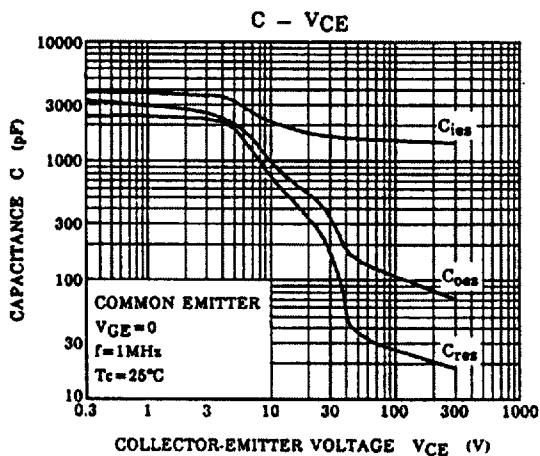
a. Inverter Stage



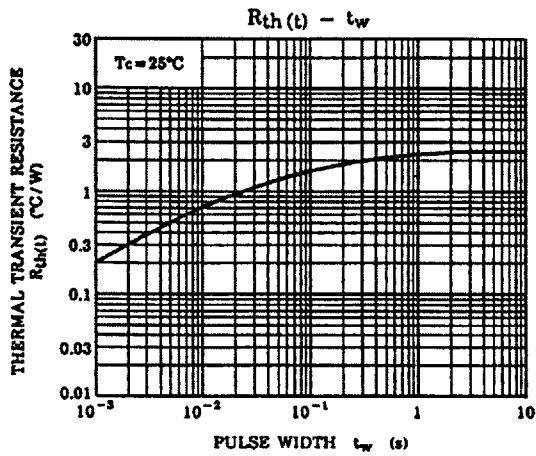
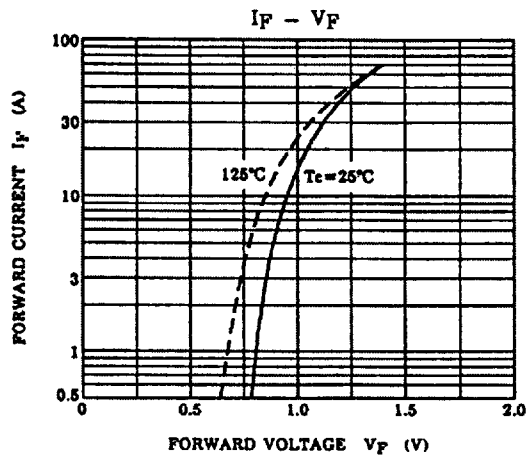
a. Inverter Stage



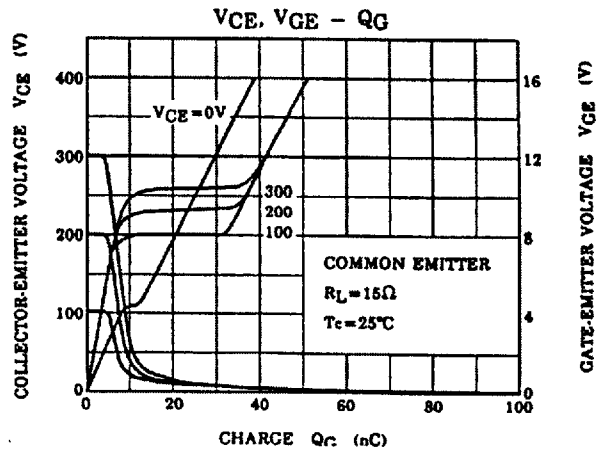
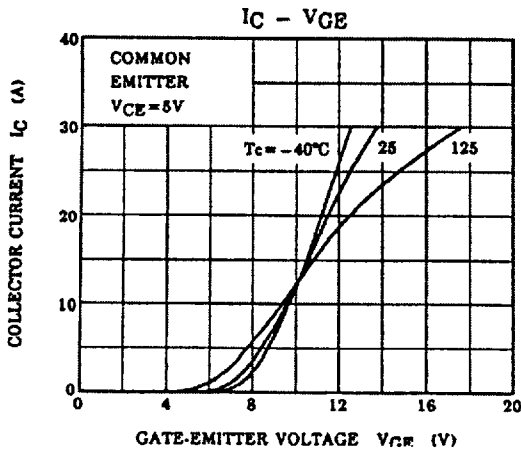
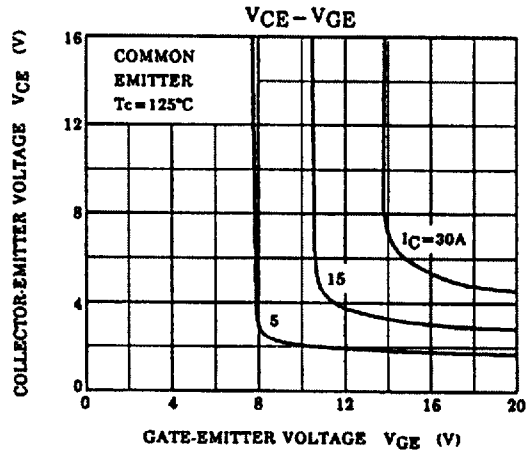
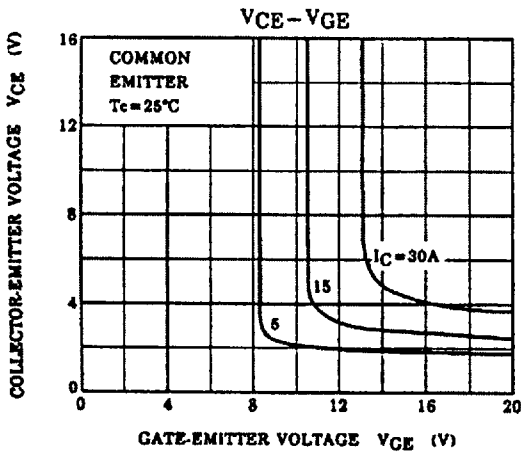
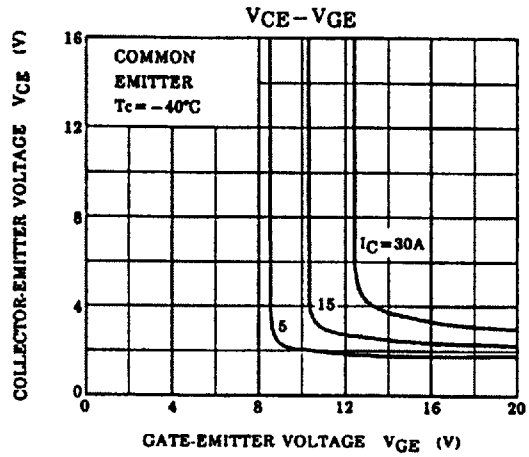
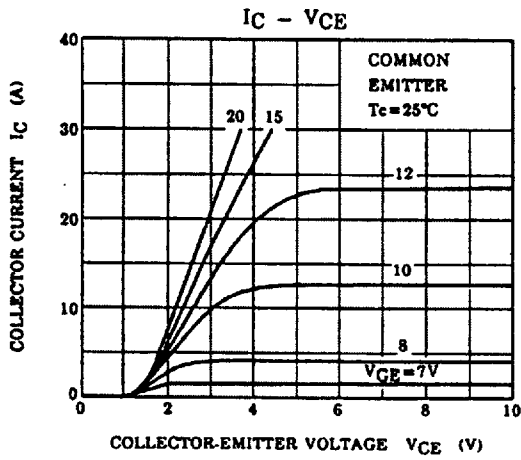
a. Inverter Stage



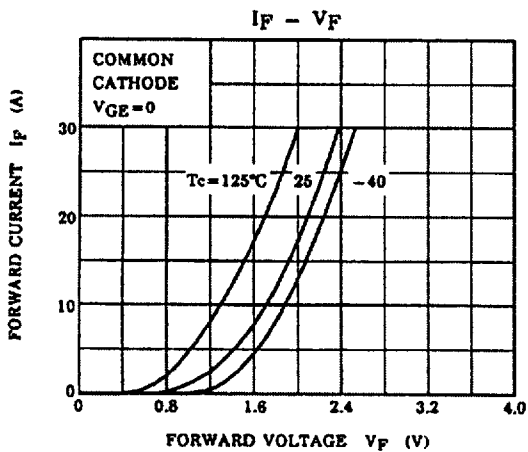
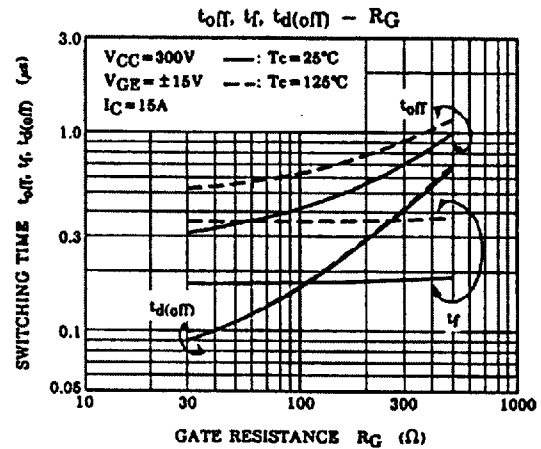
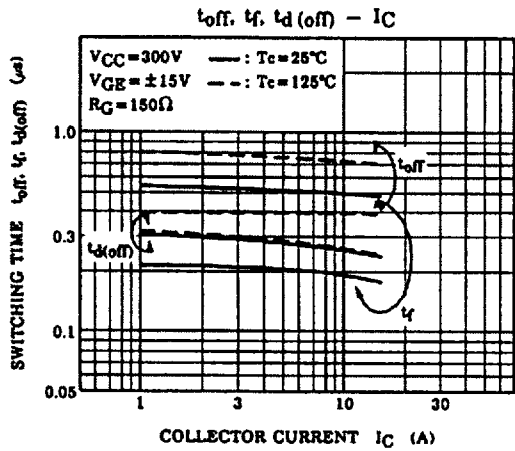
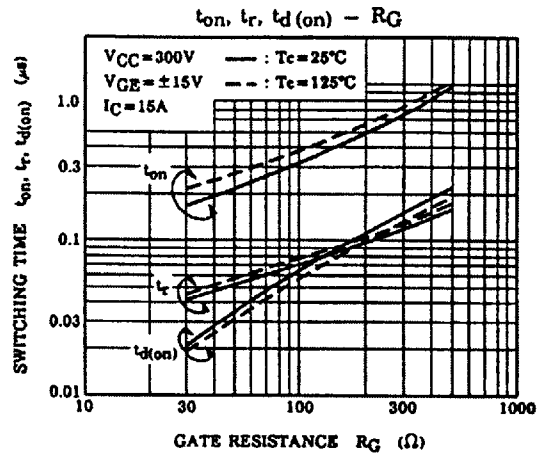
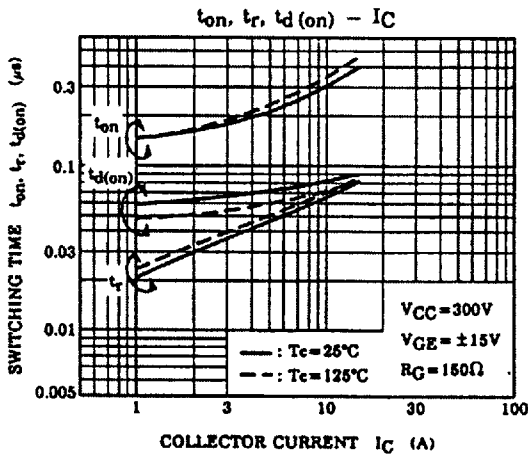
b. Converter Stage



c. Brake Stage



c. Brake Stage



c. Brake Stage

