# N-Channel Insulated Gate Bipolar Power Transistor

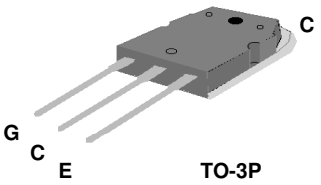
**High Speed Switching**

**Low Saturation Voltage**

**Typical $V_{CE(sat)}$ = 3.0V at $I_C$=30A**

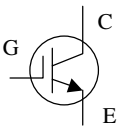
**Industry-standard TO-3P**

**RoHS-compliant, halogen-free**




TO-3P

| | |
|---|---|
| $V_{CES}$ | 1000V |
| $I_C$ | 30A |




## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{CES}$ | Collector-Emitter Voltage | 1000 | V |
| $V_{GE}$ | Gate-Emitter Voltage | ±30 | V |
| $I_C$ at $T_C$ =25°C | Collector Current | θ | A |
| $I_C$ at $T_C$ =100°C | Collector Current | 30 | A |
| $I_{CM}$ | Pulsed Collector Current | 120 | A |
| $P_D$ at $T_C$ =25°C | Maximum Power Dissipation | 208 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to +150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to +150 | ℃ |
| $T_L$ | Maximum Lead Temperature for Soldering Purposes, 1/8 inch from case for 5 seconds . | 300 | ℃ |

**Notes:**

1. Repetitive rating: Pulse width limited by maximum junction temperature.

## Thermal Data

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| Rthj-c | MaximumThermal Resistance, Junction-Case | 0.6 | °C/W |
| Rthj-a | Maximum Thermal Resistance, Junction-Ambient | 40 | °C/W |

## Electrical Specifications at $T_j$=25℃ (unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | Collect-to-Emitter Breakdown Voltage | $V_{GE}$=0V, $I_C$=250uA | 1000 | - | - | V |
| $I_{GES}$ | Gate-to-Emitter Leakage Current | $V_{GE}$=±30V, $V_{CE}$=0V | - | - | ±500 | nA |
| $I_{CES}$ | Collector-Emitter Leakage Current | $V_{CE}$=1000V, $V_{GE}$=0V | - | - | 1 | mA |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $V_{GE}$=15V, $I_C$=30A | - | 3 | 3.6 | V |
| | | $V_{GE}$=15V, $I_C$=60A | - | 3.8 | - | V |
| $V_{GE(th)}$ | Gate Threshold Voltage | $V_{CE}$=$V_{GE}$, $I_C$=1mA | 3 | 4.4 | 7 | V |
| $Q_g$ | Total Gate Charge | $I_C$=30A | - | 55 | 88 | nC |
| $Q_{ge}$ | Gate-Emitter Charge | $V_{CC}$=500V | - | 12 | - | nC |
| $Q_{gc}$ | Gate-Collector Charge | $V_{GE}$=15V | - | 27 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{CC}$=500V, | - | 3 | 0 | -ns |
| $t_r$ | Rise Time | $I_c$=30A, | - | 4 | 0 | -ns |
| $t_{d(off)}$ | Turn-off Delay Time | $V_{GE}$=15V, | - | 105 | - | ns |
| $t_f$ | Fall Time | $R_G$=5Ω, | - | 290 | 440 | ns |
| $E_{on}$ | Turn-On Switching Loss | Inductive Load | - | 1.2 | - | mJ |
| $E_{off}$ | Turn-Off Switching Loss | | - | 1.7 | - | mJ |
| $C_{ies}$ | Input Capacitance | $V_{GE}$=0V | - | 1320 | 2110 | pF |
| $C_{oes}$ | Output Capacitance | $V_{CE}$=30V | - | 105 | - | pF |
| $C_{res}$ | Reverse Transfer Capacitance | f=1.0MHz | - | 9 | - | pF |

## Ordering Information

**AP30G100W-HF-3TB** **RoHS-compliant halogen-free TO-3P, shipped in tubes**

## Typical Electrical Characteristics

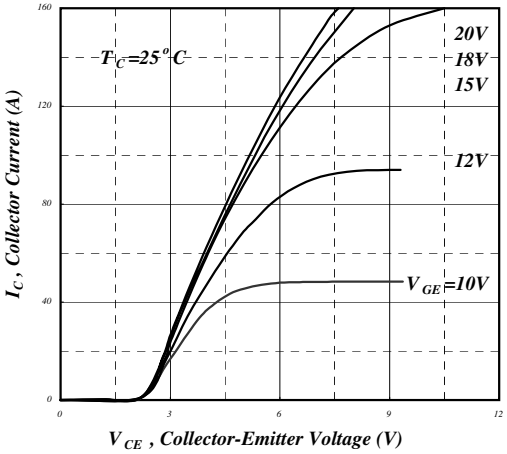



Fig 1. Typical Output Characteristics

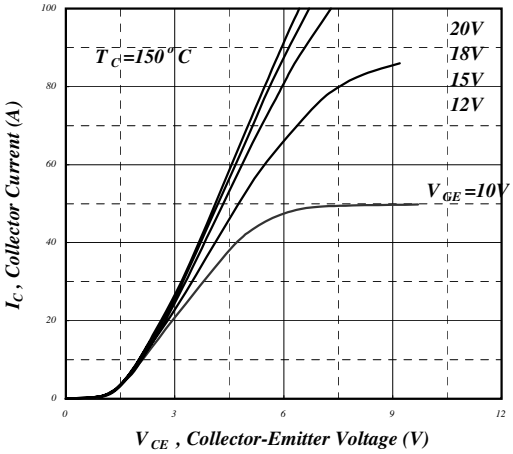



Fig 2. Typical Output Characteristics

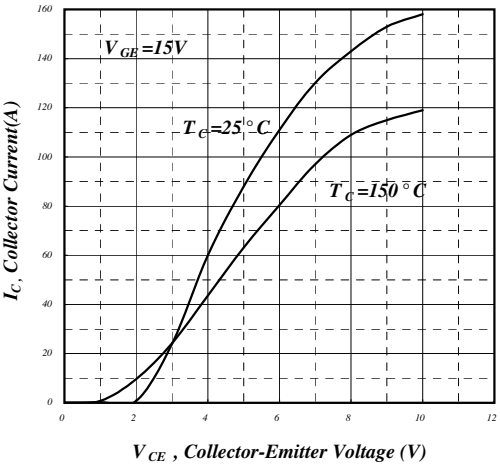



Fig 3. Typical Saturation Voltage Characteristics

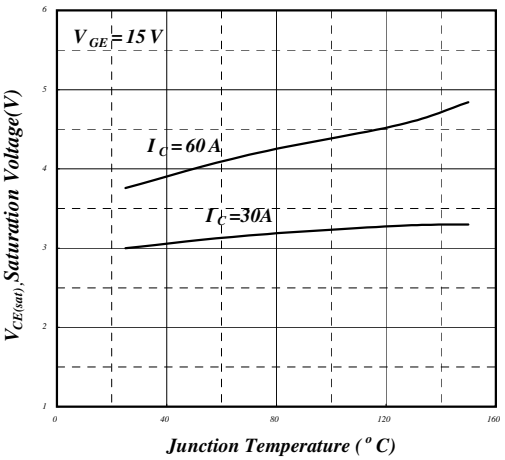



Fig 4. Typical Collector- Emitter Voltage vs. Junction Temperature

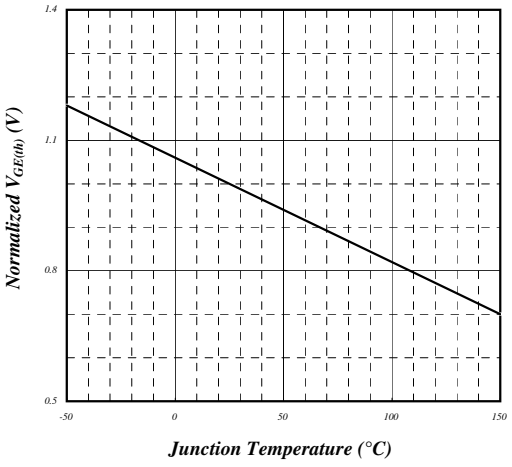



Fig 5. Gate Threshold Voltage vs. Junction Temperature

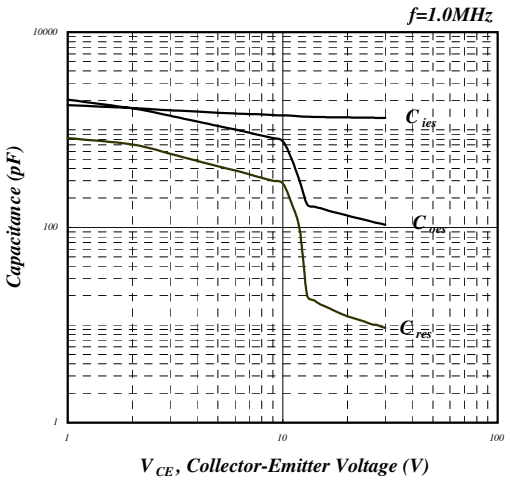



Fig 6. Typical Capacitance Characterisitics

## Typical Electrical Characteristics (cont.)

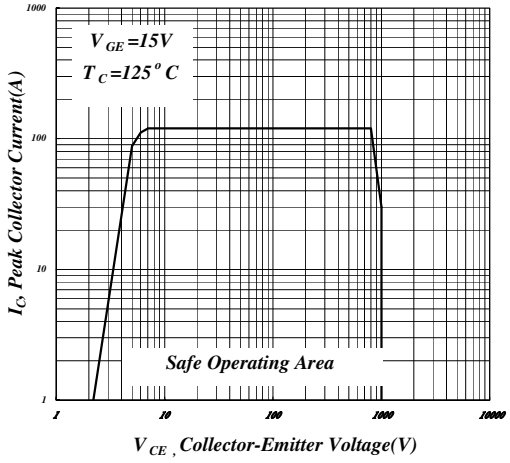



Fig 7. Turn-off SOA

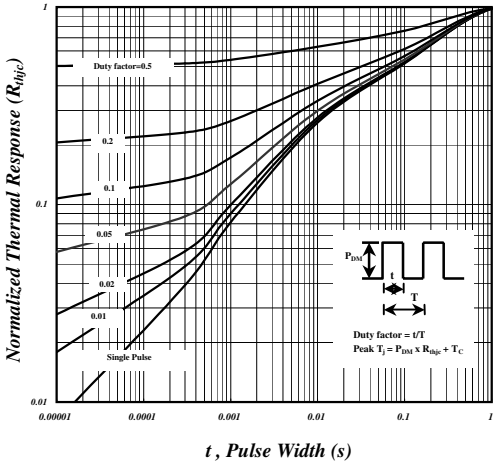



Fig 8. Effective Transient Thermal Impedance

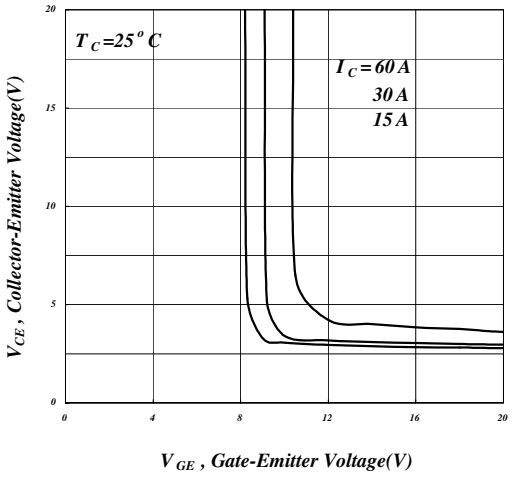



Fig 9. Saturation Voltage vs. $V_{GE}$

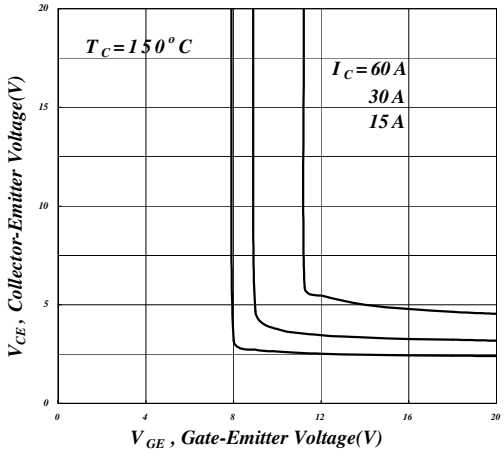



Fig 10. Saturation Voltage vs. $V_{GE}$

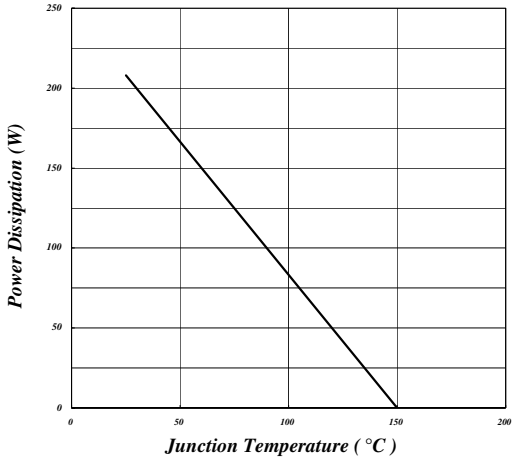



Fig11. Power Dissipation vs. Junction Temperature

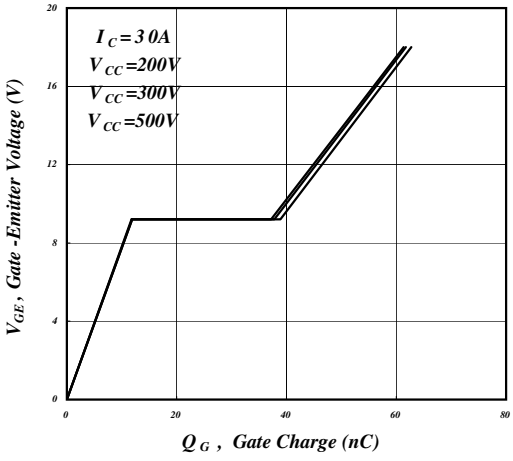
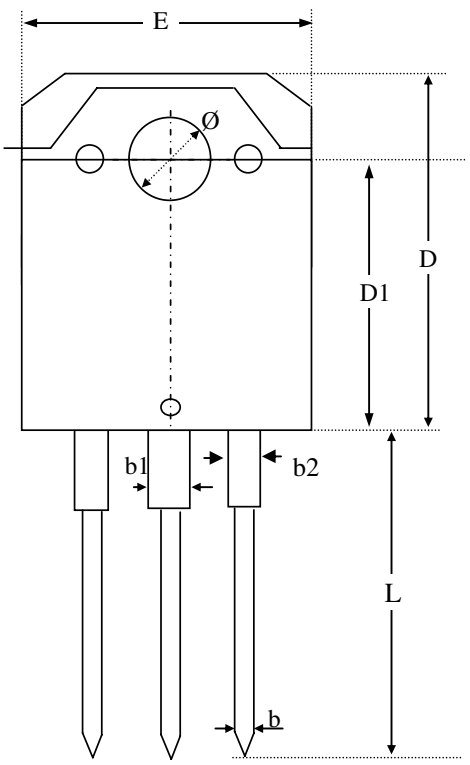
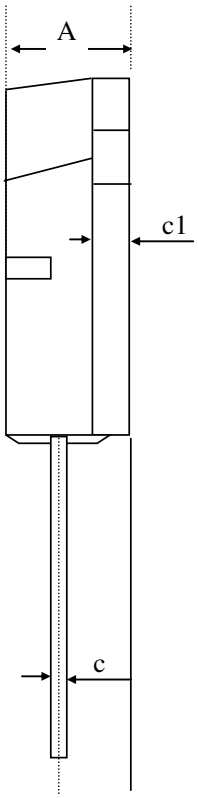



Fig 12. Gate Charge Characterisitics

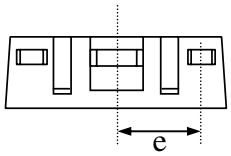
## Package Dimensions: TO-3P



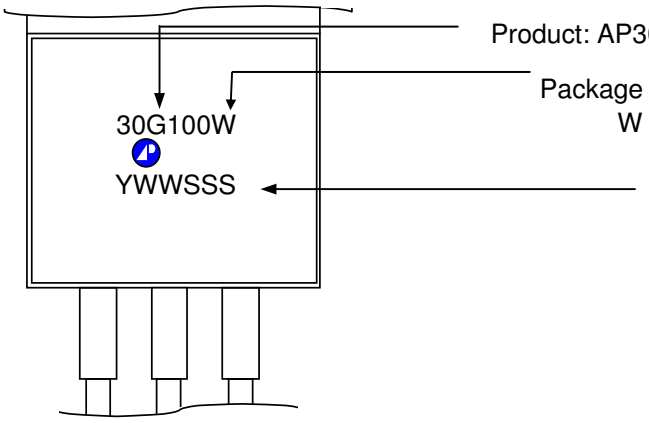

| YMBOLS | Millimeters | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 4.50 | 4.80 | 5.10 |
| b | 0.90 | 1.00 | 1.30 |
| b1 | 1.80 | 2.50 | 3.20 |
| b2 | 1.30 | -- | 2.30 |
| c | 0.40 | 0.60 | 0.90 |
| c1 | 1.40 | -- | 2.20 |
| D | 19.70 | 20.00 | 20.30 |
| D1 | 14.70 | 15.00 | 15.30 |
| E | 15.30 | -- | 16.10 |
| e | 4.45 | 5.45 | 6.45 |
| L | 17.50 | -- | 20.50 |
| Ø | 3.00 | 3.20 | 3.40 |

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.




## Marking Information: TO-3P

Laser Marking




Product: AP30G100

Package code:
W = RoHS-compliant halogen-free TO-3P

Date/lot code (YWWSSS)
Y: Last digit of the year
WW: Work week
SSS: Lot code sequence