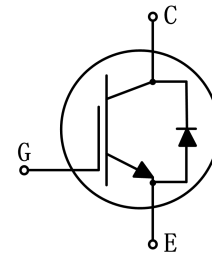
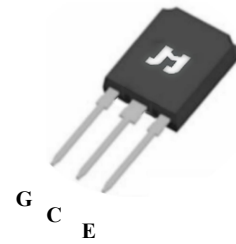


**Key performance:**

- $V_{CE}=1200V$
- $I_C=75A@T_C=100^{\circ}C$
- $V_{CE(sat)}=1.7V$

**Features:**

- Trench and field-stop technology
- Easy parallel switching capability
- Short circuit withstand time 10 $\mu$ s
- Low  $V_{CEsat}$
- High ruggedness performance
- RoHS compliant

**TO-247PLUS**

**Applications:**

- servo drive
- Inverters

**Package parameters**

| Type        | Marking  | Package    | Packaging Method |
|-------------|----------|------------|------------------|
| JJT75N120SA | T75120SA | TO-247PLUS | Tube             |

## Maximum ratings

| Symbol    | Parameter  | Values      | Unit             |
|-----------|--|-------------|------------------|
| $V_{CES}$ | Collector-emitter voltage                                    | 1200        | V                |
| $V_{GES}$ | Gate-emitter voltage   | $\pm 20$    | V                |
| $I_C$     | Continuous collector current ( $T_C=25^\circ\text{C}$ )      | 150         | A                |
|           | Continuous collector current ( $T_C=100^\circ\text{C}$ )     | 75          | A                |
| $I_{CM}$  | Pulsed collector current, $t_p$ limited by $T_{vjmax}$       | 300         | A                |
| $I_F$     | Diode continuous forward current ( $T_C=100^\circ\text{C}$ ) | 75          | A                |
| $I_{FM}$  | Diode maximum current, $t_p$ limited by $T_{vjmax}$          | 150         | A                |
| $t_{sc}$  | Short circuit withstand time                                 | 10          | $\mu\text{s}$    |
| $P_{tot}$ | Power dissipation ( $T_C=25^\circ\text{C}$ )                 | 882         | W                |
|           | Power dissipation ( $T_C=100^\circ\text{C}$ )                | 441         | W                |
| $T_{vj}$  | Operating junction temperature range                         | -40 to +175 | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature range                                    | -55 to +150 | $^\circ\text{C}$ |

## Thermal characteristics

| Symbol        | Parameter                                      | Values |      | Unit |
|---------------|--|--------|------|------|
|               |  | Typ.   | Max. |      |
| $R_{th(j-c)}$ | Thermal resistance, junction to case for IGBT  | -      | 0.17 | K/ W |
| $R_{th(j-c)}$ | Thermal resistance, junction to case for Diode | -      | 0.35 | K/ W |
| $R_{th(j-a)}$ | Thermal resistance, junction to ambient        | -      | 40   | K/ W |

**Electrical characteristics of IGBT** ( $T_{vj}=25^{\circ}\text{C}$  unless otherwise specified)

**Static characteristics**

| Symbol        | Parameter                            | Test condition  | Values |      |      | Unit          |
|---------------|--------------------------------------|---|--------|------|------|---------------|
|               |                                      |   | Min.   | Typ. | Max. |               |
| $BV_{CES}$    | Collector-emitter breakdown voltage  | $V_{GE}=0\text{V}, I_C=250\mu\text{A}$                          | 1200   | -    | -    | V             |
| $I_{CES}$     | Collector-emitter leakage current    | $V_{CE}=1200\text{V}, V_{GE}=0\text{V}$                         | -      | -    | 100  | $\mu\text{A}$ |
| $I_{GES}$     | Gate leakage current, forward        | $V_{GE}=20\text{V}, V_{CE}=0\text{V}$                           | -      | -    | 100  | nA            |
|               | Gate leakage current, reverse        | $V_{GE}=-20\text{V}, V_{CE}=0\text{V}$                          | -      | -    | -100 | nA            |
| $V_{GE(th)}$  | Gate-emitter threshold voltage       | $V_{GE}=V_{CE}, I_C=1\text{mA}$                                 | 5.0    | 5.5  | 6.0  | V             |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | $V_{GE}=15\text{V}, I_C=75\text{A}$                             | -      | 1.7  | -    | V             |
|               |                                      | $V_{GE}=15\text{V}, I_C=75\text{A}, T_{vj}=175^{\circ}\text{C}$ | -      | 2.2  | -    | V             |

**Dynamic characteristics**

| Symbol    | Parameter                    | Test condition  | Values |      |      | Unit |
|-----------|------------------------------|---|--------|------|------|------|
|           |                              |   | Min.   | Typ. | Max. |      |
| $C_{ies}$ | Input capacitance            | $V_{CE}=30\text{V}$<br>$V_{GE}=0\text{V}$<br>$f=1\text{MHz}$    | -      | 6800 | -    | pF   |
| $C_{oes}$ | Output capacitance           |   | -      | 350  | -    | pF   |
| $C_{res}$ | Reverse transfer capacitance |   | -      | 60   | -    | pF   |
| $Q_g$     | Total gate charge            | $V_{CC}=960\text{V}$<br>$V_{GE}=15\text{V}$<br>$I_C=75\text{A}$ | -      | 420  | -    | nC   |

### Switching characteristics

| Symbol       | Parameter              | Test condition   | Values |      |      | Unit |
|--------------|------------------------|--|--------|------|------|------|
|              |                        |  | Min.   | Typ. | Max. |      |
| $t_{d(on)}$  | Turn-on delay time     | $V_{CC}=600V$<br>$V_{GE}=0/15V$<br>$I_C=75A$<br>$R_G=10\Omega$<br>Inductive load                         | -      | 86   | -    | ns   |
| $t_r$        | Rise time              |  | -      | 186  | -    | ns   |
| $t_{d(off)}$ | Turn-off delay time    |  | -      | 520  | -    | ns   |
| $t_f$        | Fall time              |  | -      | 84   | -    | ns   |
| $E_{on}$     | Turn-on energy         |  | -      | 11.9 | -    | mJ   |
| $E_{off}$    | Turn-off energy        |  | -      | 4.7  | -    | mJ   |
| $E_{ts}$     | Total switching energy |  | -      | 16.6 | -    | mJ   |
| $t_{d(on)}$  | Turn-on delay time     | $V_{CC}=600V$<br>$V_{GE}=0/15V$<br>$I_C=75A$<br>$R_G=10\Omega$<br>Inductive load<br>$T_{vj}=175^\circ C$ | -      | 84   | -    | ns   |
| $t_r$        | Rise time              |  | -      | 194  | -    | ns   |
| $t_{d(off)}$ | Turn-off delay time    |  | -      | 580  | -    | ns   |
| $t_f$        | Fall time              |  | -      | 63   | -    | ns   |
| $E_{on}$     | Turn-on energy         |  | -      | 17.5 | -    | mJ   |
| $E_{off}$    | Turn-off energy        |  | -      | 6.8  | -    | mJ   |
| $E_{ts}$     | Total switching energy |  | -      | 24.3 | -    | mJ   |

**Electrical characteristics of Diode** ( $T_{vj}=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol    | Parameter                           | Test condition  | Values |      |      | Unit |
|-----------|-------------------------------------|---|--------|------|------|------|
|           |                                     |   | Min.   | Typ. | Max. |      |
| $V_F$     | Diode forward voltage               | $I_F=75\text{A}$  | -      | 1.8  | -    | V    |
|           |                                     | $I_F=75\text{A}, T_{vj}=175^{\circ}\text{C}$  | -      | 1.5  | -    | V    |
| $t_{rr}$  | Diode reverse recovery time         | $V_R=600\text{V}$<br>$I_F=75\text{A}$<br>$di_F/dt=-200\text{A}/\mu\text{s}$                                 | -      | 364  | -    | ns   |
| $I_{rrm}$ | Diode peak reverse recovery current |   | -      | 11   | -    | A    |
| $Q_{rr}$  | Diode reverse recovery charge       |   | -      | 2300 | -    | nC   |
| $t_{rr}$  | Diode reverse recovery time         | $V_R=600\text{V}$<br>$I_F=75\text{A}$<br>$di_F/dt=-200\text{A}/\mu\text{s}$<br>$T_{vj}=175^{\circ}\text{C}$ | -      | 576  | -    | ns   |
| $I_{rrm}$ | Diode peak reverse recovery current |   | -      | 23   | -    | A    |
| $Q_{rr}$  | Diode reverse recovery charge       |   | -      | 8300 | -    | nC   |

## Typical performance characteristics

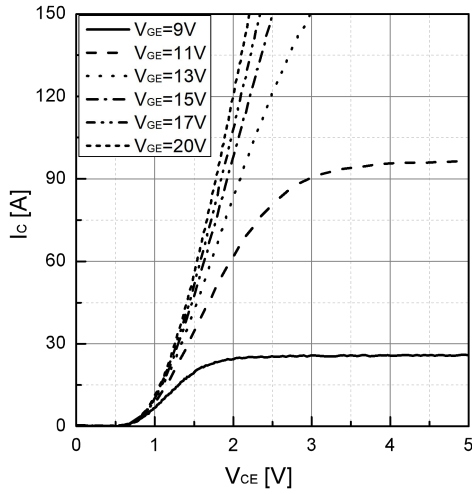


Fig 1. Typical output characteristic ( $T_{vj}=25^{\circ}\text{C}$ )

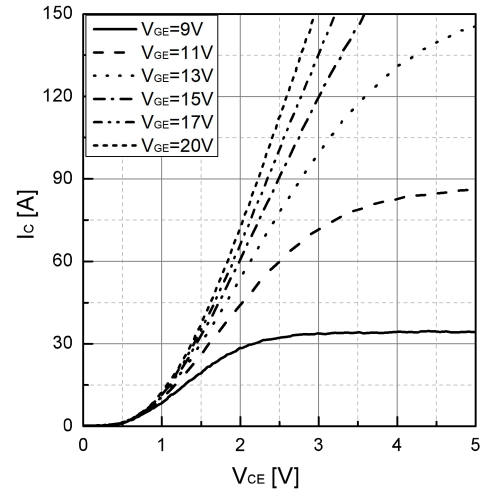


Fig 2. Typical output characteristic ( $T_{vj}=175^{\circ}\text{C}$ )

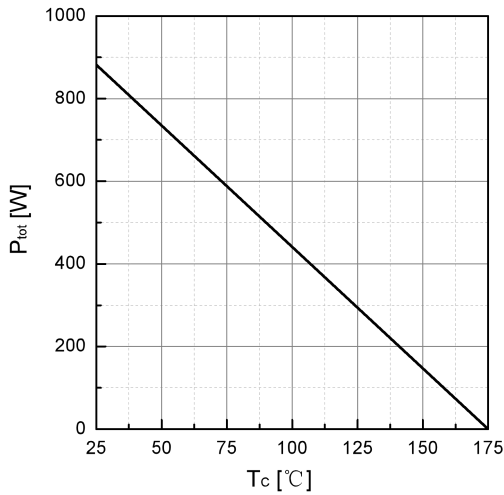


Fig 3. Power dissipation as a function of  $T_c$

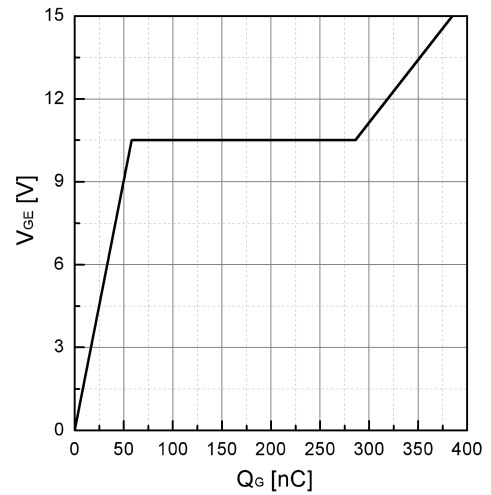


Fig 4. Typical Gate charge

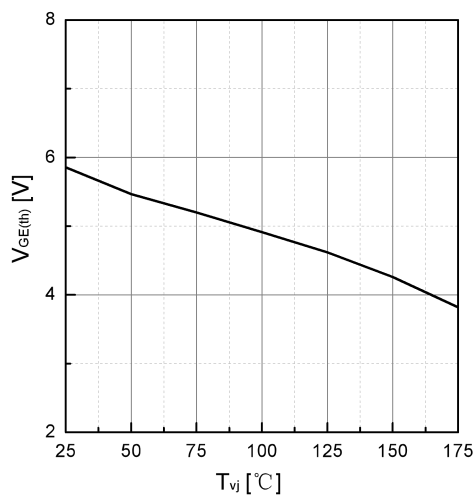


Fig 5. Typical  $V_{GE(th)}$  as a function of  $T_{vj}$   
( $I_C=1\text{mA}$ )

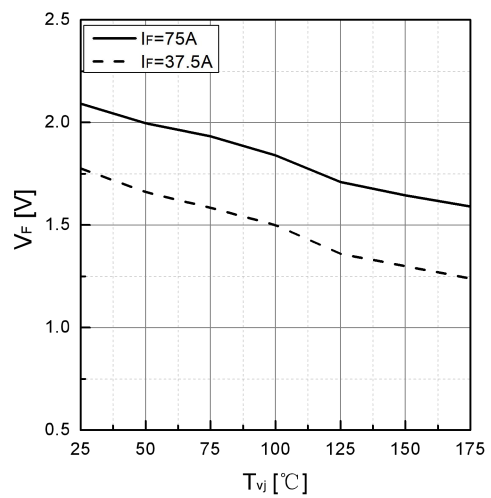


Fig 6. Typical  $V_F$  as a function of  $T_{vj}$

## Typical performance characteristics

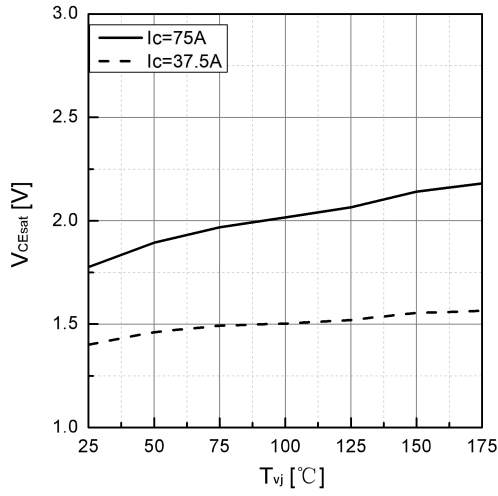


Fig 7. Typical  $V_{CEsat}$  as a function of  $T_{vj}$

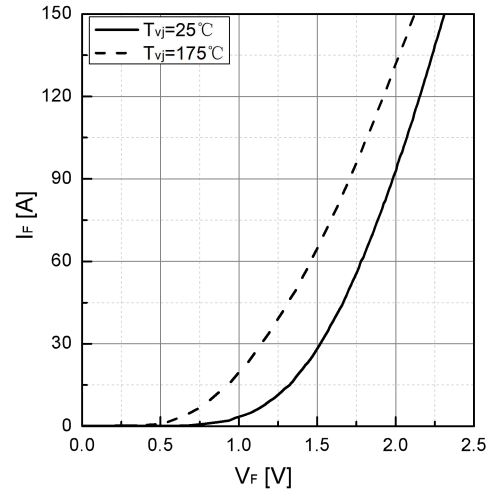


Fig 8. Typical  $I_F$  as a function of  $V_F$

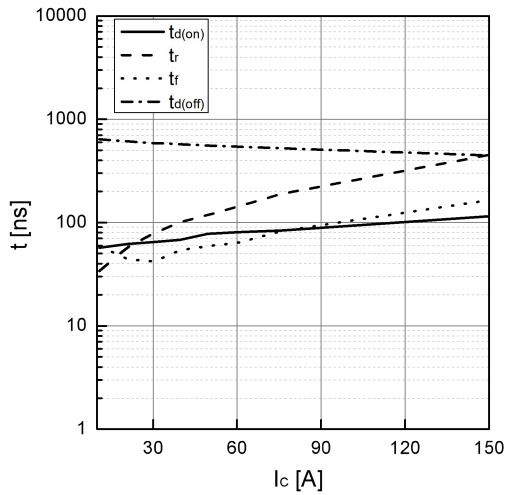


Fig 9. Typical switching time as a function of  $I_c$

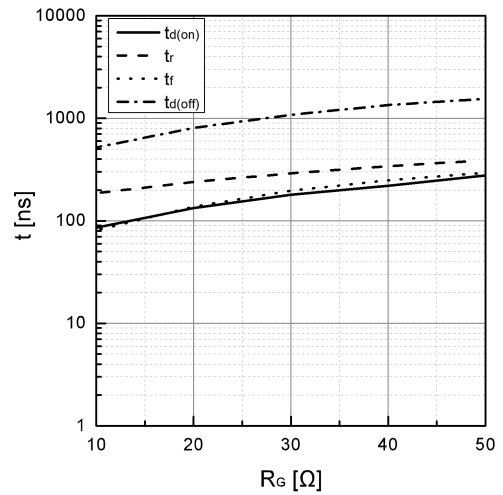


Fig 10. Typical switching times as a function of  $R_G$

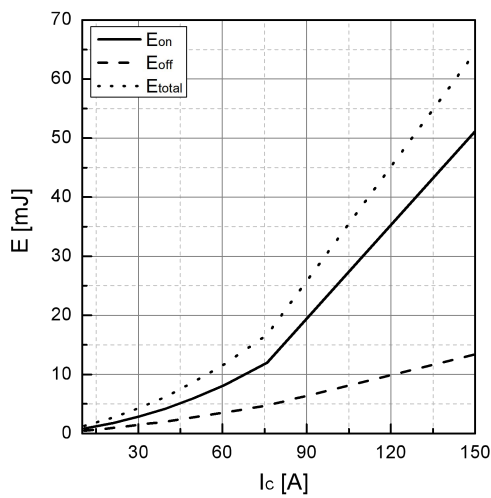


Fig 11. Typical switching energy losses as a function of  $I_c$

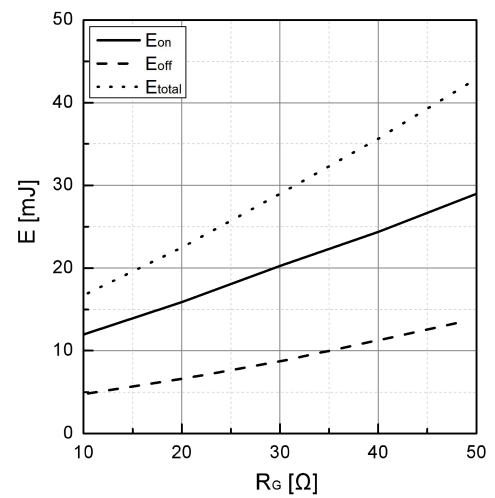


Fig 12. Typical switching energy losses as a function of  $R_G$

## Typical performance characteristics

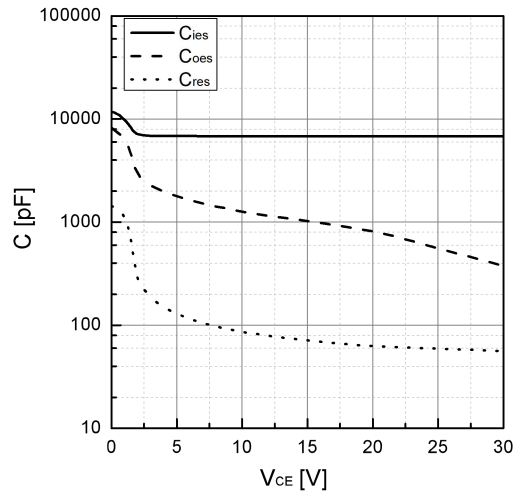
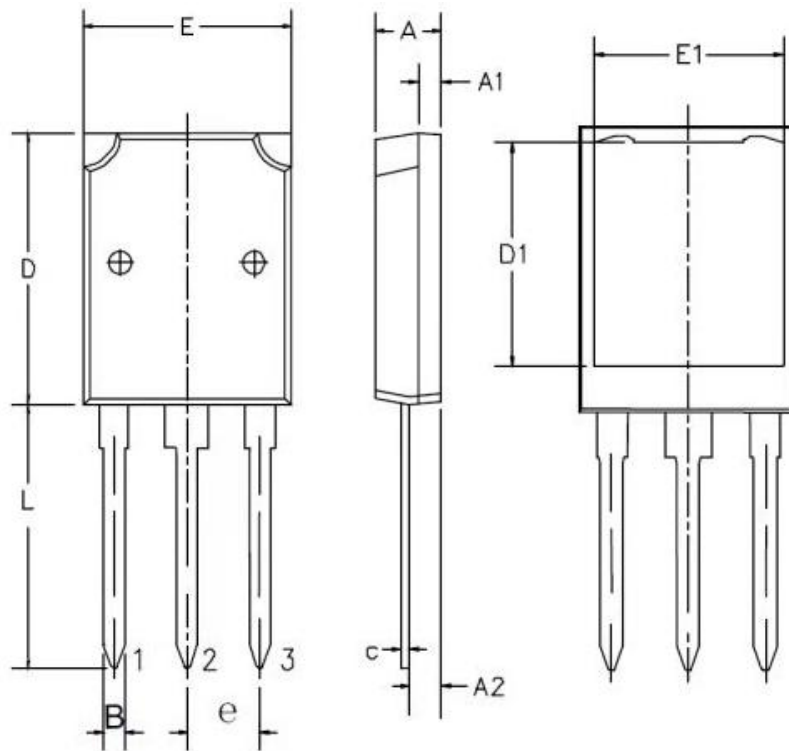


Fig 13. Typical capacitance as a function of  $V_{CE}$   
( $f=1\text{MHz}$ ,  $V_{GE}=0\text{V}$ )



**Package dimension**

TO-247PLUS



| Ref. | Min.(mm) | Typ.(mm) | Max.(mm) |
|------|----------|----------|----------|
| A    | 4.92     | 5.00     | 5.08     |
| A2   | 2.27     | 2.35     | 2.43     |
| A1   | 1.92     | 2.00     | 2.08     |
| B    | 1.16     | 1.20     | 1.24     |
| C    | 0.56     | 0.60     | 0.64     |
| D    | 20.70    | 20.90    | 21.1     |
| E    | 15.80    | 15.90    | 16.00    |
| E1   | 13.92    | 14.02    | 14.12    |
| e    | 5.34     | 5.44     | 5.54     |
| L    | 19.80    | 20.00    | 20.20    |

## Revision history

| Date       | Revision | Changes                 |
|------------|----------|-------------------------|
| 2024-08-26 | Rev. 1.2 | Update                  |
| 2025-02-17 | Rev. 1.3 | Modify the package size |
| 2025-03-03 | Rev. 2.0 | Replace sketch          |

## Disclaimer

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