JJMICROELECTRONICS

# 750V 120A Trench and Field Stop IGBT

**JJT120N75SA**

## Key performance:

- $V_{CE}$=750V
- $I_C$=120A@$T_C$=100℃
- $V_{CE(sat)}$=1.4V

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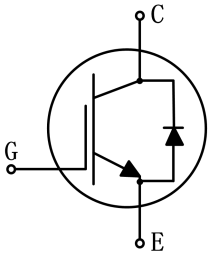


## Features:

- Trench and field-stop technology.
- Easy parallel switching capability.

## Benefits:

- High efficiency for inverters.
- High ruggedness performance.
- RoHS compliant.

## Applications:

- PFC applications
- Uninterruptible power supplies
- Solar inverters

## Package parameters

| Type | Marking | Package | Packaging Method |
|---|---|---|---|
| JJT120N75SA | T12075SA | TO-247PLUS | Tube |

## Maximum ratings

| Symbol | Parameter | Values | Unit |
|---|---|---|---|
| $V_{CES}$ | Collector-emitter voltage | 750 | V |
| $V_{GES}$ | Gate-emitter voltage | ±20 | V |
| $I_C$ | Continuous collector current ($T_C$=25℃) | 150 | A |
| | Continuous collector current ($T_C$=100℃) | 120 | A |
| $I_{CM}$ | Pulsed collector current, $t_p$ limited by $T_{vjmax}$ | 300 | A |
| $I_F$ | Diode continuous forward current ($T_C$=25℃) | 120 | A |
| $I_{FM}$ | Diode maximum current, $t_p$ limited by $T_{vjmax}$ | 500 | A |
| $t_{sc}$ | Short circuit withstand time | 10 | μs |
| $P_{tot}$ | Power dissipation ($T_C$=25℃) | 394 | W |
| | Power dissipation ($T_C$=100℃) | 197 | W |
| $T_{vj}$ | Operating junction temperature range | -40 to +175 | ℃ |
| $T_{stg}$ | Storage temperature range | -55 to +150 | ℃ |

## Thermal characteristics

| Symbol | Parameter | Values | | Unit |
|---|---|---|---|---|
| | | Typ. | Max. | |
| $R_{th(j-c)}$ | Thermal resistance, junction to case for IGBT | - | 0.135 | K/ W |
| $R_{th(j-c)}$ | Thermal resistance, junction to case for Diode | - | 0.15 | K/ W |
| $R_{th(j-a)}$ | Thermal resistance, junction to ambient | - | 40 | K/ W |

## Electrical characteristics of IGBT ($T_{vj}$=25℃ unless otherwise specified)

### Static characteristics

| Symbol | Parameter | Test condition | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | Collector-emitter breakdown voltage | $V_{GE}$=0V, $I_C$=250μA | 750 | - | - | V |
| $I_{CES}$ | Collector-emitter leakage current | $V_{CE}$=750V, $V_{GE}$=0V | - | - | 50 | μA |
| $I_{GES}$ | Gate leakage current, forward | $V_{GE}$=20V, $V_{CE}$=0V | - | - | 100 | nA |
| | Gate leakage current, reverse | $V_{GE}$=-20V, $V_{CE}$=0V | - | - | -100 | nA |
| $V_{GE(th)}$ | Gate-emitter threshold voltage | $V_{GE}$=$V_{CE}$, $I_C$=1mA | 4.5 | 5.0 | 5.5 | V |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | $V_{GE}$=15V, $I_C$=120A | - | 1.4 | - | V |
| | | $V_{GE}$=15V, $I_C$=120A, $T_{vj}$=175℃ | - | 1.7 | - | V |

### Dynamic characteristics

| Symbol | Parameter | Test condition | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $C_{ies}$ | Input capacitance | $V_{CE}$=25V<br>$V_{GE}$=0V<br>$f$=1MHz | - | 11245 | - | pF |
| $C_{oes}$ | Output capacitance | | - | 390 | - | pF |
| $C_{res}$ | Reverse transfer capacitance | | - | 88 | - | pF |
| $Q_g$ | Total gate charge | $V_{CC}$=600V<br>$V_{GE}$=15V<br>$I_C$=120A | - | 382 | - | nC |

## Switching characteristics

| Symbol | Parameter | Test condition | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $t_{d(on)}$ | Turn-on delay time | $V_{CC}$=470V<br>$V_{GE}$=0/15V<br>$I_C$=120A<br>$R_G$=4.7Ω<br>Inductive load | - | 48 | - | ns |
| $t_r$ | Rise time | | - | 141 | - | ns |
| $t_{d(off)}$ | Turn-off delay time | | - | 265 | - | ns |
| $t_f$ | Fall time | | - | 130 | - | ns |
| $E_{on}$ | Turn-on energy | | - | 7.9 | - | mJ |
| $E_{off}$ | Turn-off energy | | - | 6.5 | - | mJ |
| $E_{ts}$ | Total switching energy | | - | 14.5 | - | mJ |

## Electrical characteristics of Diode ($T_{vj}$=25℃ unless otherwise specified)

| Symbol | Parameter | Test condition | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_F$ | Diode forward voltage | $I_F$=120A | - | 1.8 | - | V |
| | | $I_F$=60A,$T_{vj}$=175℃ | - | 1.76 | - | V |
| $t_{rr}$ | Diode reverse recovery time | $V_R$=400V<br>$I_F$=60A<br>d$i_F$/d$t$=-450A/μs | - | 158 | - | ns |
| $I_{rrm}$ | Diode peak reverse recovery current | | - | 38 | - | A |
| $Q_{rr}$ | Diode reverse recovery charge | | - | 3.9 | - | nC |

## Package dimension

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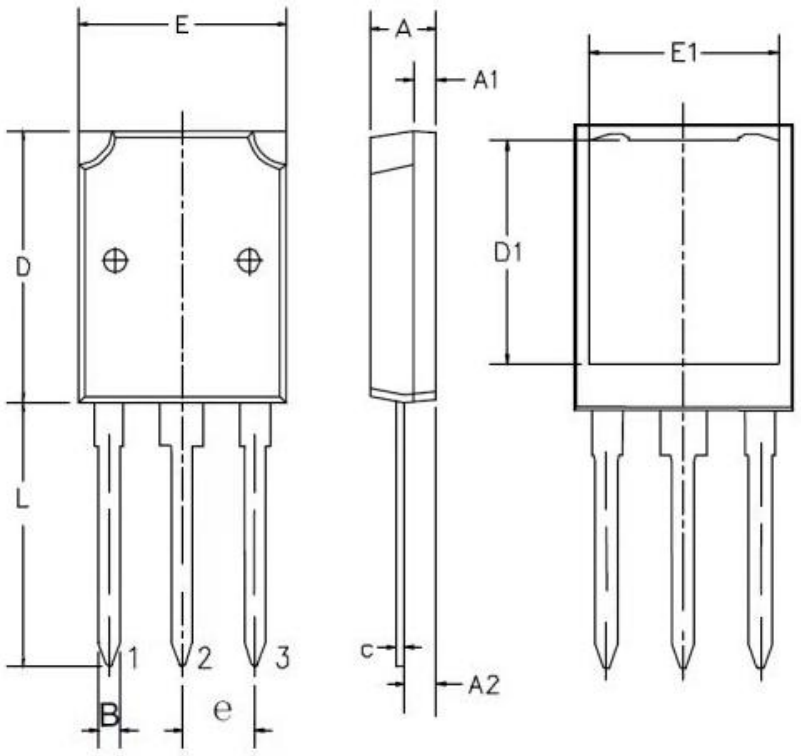


| Ref. | Min.(mm) | Typ.(mm) | Max.(mm) |
|---|---|---|---|
| A | 4.92 | 5.00 | 5.08 |
| A1 | 2.27 | 2.35 | 2.43 |
| A2 | 1.92 | 2.00 | 2.08 |
| B | 1.16 | 1.20 | 1.24 |
| C | 0.58 | 0.60 | 0.62 |
| D | 20.80 | 20.90 | 21.00 |
| E | 15.80 | 15.90 | 16.00 |
| E1 | 13.94 | 14.02 | 14.10 |
| e | 5.34 | 5.44 | 5.54 |
| L | 19.80 | 20.00 | 20.20 |

## Revision history

| Date | Revision | Changes |
|---|---|---|
| 2025-01-10 | Rev 1.0 | Release of the preliminary datasheet. |
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