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**DATA SHEET**

**PART NO. : PC75I120AB**

**REV : A / 0**

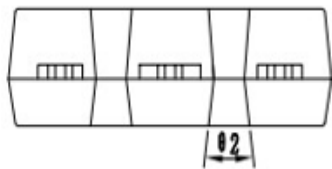
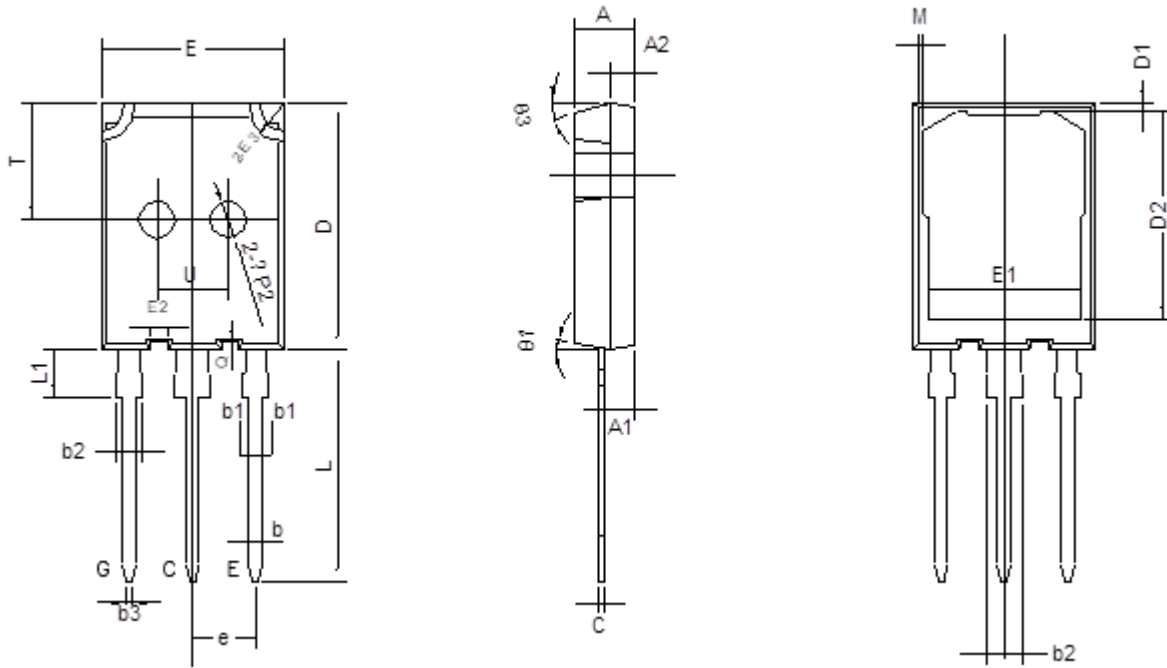
CUSTOMER'S APPROVAL : \_\_\_\_\_ DCC : \_\_\_\_\_

DRAWING NO. : DS-91P-22-0019

DATE : 2023-06-07

Page : 1

### Package Dimensions



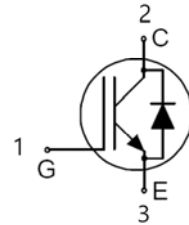
| symbol | unit: mm |       |       |
|--------|----------|-------|-------|
|        | MIN      | NOM   | MAX   |
| *A     | 4.90     | 5.00  | 5.10  |
| *A1    | 2.31     | 2.41  | 2.51  |
| A2     | 1.90     | 2.00  | 2.10  |
| *b     | 1.15     | 1.20  | 1.25  |
| *b1    | 1.95     | 2.10  | 2.25  |
| *b2    | 2.95     | 3.10  | 3.25  |
| b3     | 0.45     | 0.60  | 0.75  |
| *c     | 0.55     | 0.60  | 0.68  |
| *D     | 20.90    | 21.00 | 21.10 |
| D1     | 1.00     | 1.20  | 1.40  |
| D2     | 15.25    | 16.55 | 16.85 |
| *E     | 15.70    | 15.80 | 15.90 |
| E1     | 13.10    | 13.30 | 13.50 |
| E2     | 1.25     | 1.45  | 1.65  |
| E3     | 1.80     | 2.00  | 2.20  |
| *e     | 5.40     | 5.44  | 5.48  |
| *L     | 19.80    | 19.92 | 20.10 |
| *L1    | -        | -     | 4.30  |
| ΦP     | 2.30     | 2.50  | 2.70  |
| Q      | 0.50     | 0.68  | 0.80  |
| T      | 9.80     | 10.00 | 10.20 |
| U      | 5.80     | 6.00  | 6.20  |
| θ 1    | 5°       | 7°    | 9°    |
| θ 2    | 13°      | 16°   | 19°   |
| θ 3    | 13°      | 15°   | 17°   |

### Features

- 1200V trench gate/field termination process
- Low switching losses
- Positive temperature coefficient

### Applications

- Solar Inverter
- Welding Machine
- UPS



### Maximum Ratings

| Parameter                         | Conditions                                      | Symbol        | Value       | Unit               |
|-----------------------------------|---|---------------|-------------|--------------------|
| Collector-Emitter voltage         | $T_{vj}=25^{\circ}\text{C}$                     | $V_{CE}$      | 1200        | V                  |
| Gate to Emitter Voltage           | -   | $V_{GE}$      | $\pm 20$    | V                  |
| Transient Gate to Emitter Voltage | -   |               | $\pm 30$    | V                  |
| collector current<br>G C E        | $T_c=25^{\circ}\text{C}$                        | $I_c$         | 150         | A                  |
|                                   | $T_c=100^{\circ}\text{C}$                       |               | 75          |                    |
| Pulsed Collector Current          | Pulse width limited by max junction temperature | $I_{pulse}$   | 300         | A                  |
| Diode Forward Current             | $T_c=25^{\circ}\text{C}$                        | $I_F$         | 150         | -                  |
|                                   | $T_c=100^{\circ}\text{C}$                       |               | 75          |                    |
| Operating Junction Temperature    | -   | $T_J$         | -55 to +175 | $^{\circ}\text{C}$ |
| Storage Temperature Range         | -   | $T_{stg}$     | -55 to +150 | $^{\circ}\text{C}$ |
| Thermal resistance                | -   | $R_{th(j-a)}$ | 40          | K/W                |



# Trench Field-Stop Technology IGBT

## PC75I120AB

REV:A / 0

### IGBT Characteristic

#### Static Characteristic

| Parameter                            | Conditions                                     | Symbol  | Value |              |      | Unit |
|--------------------------------------|--|---|-------|--------------|------|------|
|                                      |  |   | Min.  | Typ.         | Max. |      |
| Collector-emitter breakdown voltage  | $V_{GE} = 0V, I_C = 0.25mA$                    | $V_{(BR)CES}$                                 | 1200  |              |      | V    |
| Collector-Emitter saturation voltage | $V_{GE}=15V, I_C=75A$<br>$V_{GE}=15V, I_C=75A$ | $T_{vj}=25^{\circ}C$<br>$T_{vj}=175^{\circ}C$ |       | 2.11<br>3.03 | 2.60 | V    |
| Gate-Emitter threshold voltage       | $I_C=2.6mA, V_{GE}=V_{CE}$                     | $T_{vj}=25^{\circ}C$                          | 5.0   | 5.6          | 6.5  | V    |
| Transconductance                     | $V_{CE}=20V, I_C=75A$                          | $G_{fs}$                                      |       | 98.8         |      | S    |
| Collector-emitter cut-off current    | $V_{CE}=1200V, V_{GE}=0V$                      | $T_{vj}=25^{\circ}C$                          |       |              | 1    | mA   |
| Gate-emitter leakage current         | $V_{CE}=0V, V_{GE}=20V$                        | $T_{vj}=25^{\circ}C$                          |       |              | 200  | nA   |

#### Dynamic Characteristic

| Parameter                    | Conditions                           | Symbol                            | Value |      |      | Unit |
|------------------------------|--------------------------------------|-----------------------------------|-------|------|------|------|
|                              |                                      |                                   | Min.  | Typ. | Max. |      |
| input capacitance            |                                      | $C_{ies}$                         |       | 7.72 |      | nF   |
| Output capacitance           | $f=1MHz, V_{CE}=25V,$<br>$V_{GE}=0V$ | $T_{vj}=25^{\circ}C$<br>$C_{oes}$ |       | 0.28 |      |      |
| Reverse transfer capacitance |                                      | $C_{res}$                         |       | 0.13 |      |      |

#### Switching Characteristic

| Parameter                      | Conditions   | Symbol                             | Value |      |      | Unit |    |
|--------------------------------|--|------------------------------------|-------|------|------|------|----|
|                                |  |                                    | Min.  | Typ. | Max. |      |    |
| Turn-on delay time             |  | $t_{don}$                          |       | 51   |      | ns   |    |
| Rise time                      |  | $t_r$                              |       | 193  |      |      |    |
| Turn-off delay time            | $I_C=75A, V_{CE}=600V$                                   | $t_{doff}$                         |       | 180  |      |      |    |
| Fall time                      | $V_{GE}=\pm 15V,$<br>$R_G=10\Omega$                      | $T_{vj}=25^{\circ}C$<br>$t_f$      |       | 98   |      |      |    |
| Turn-on energy loss per pulse  | ((inductive load))                                       | $E_{on}$                           |       | 9.5  |      |      | mJ |
| Turn-off energy loss per pulse |  | $E_{off}$                          |       | 2.7  |      |      |    |
| Total switching energy         |  | $E_{tot}$                          |       | 12.2 |      |      |    |
| Turn-on delay time             | $I_C=75A, V_{CE}=600V$<br>$V_{GE}=\pm 15V, R_G=10\Omega$ | $T_{vj}=175^{\circ}C$<br>$t_{don}$ |       | 40   |      | mJ   |    |



# Trench Field-Stop Technology IGBT

## PC75I120AB

REV:A / 0

| Parameter                                | Conditions       | Symbol     | Value         |      |      | Unit |
|--|------------------|------------|---------------|------|------|------|
|  |                  |            | Min.          | Typ. | Max. |      |
| Rise time                                | (inductive load) | $t_r$      |               | 171  |      |      |
| Turn-off delay time                      |                  | $t_{doff}$ |               | 202  |      |      |
| Fall time                                |                  | $t_f$      |               | 119  |      |      |
| Turn-on energy loss per pulse            |                  | $E_{on}$   |               | 14.6 |      |      |
| Turn-off energy loss per pulse           |                  | $E_{off}$  |               | 3.5  |      |      |
| Total switching energy                   |                  | $E_{tot}$  |               | 18.1 |      |      |
| IGBT thermal resistance, junction - case |                  |            | $R_{th(j-C)}$ |      | 0.27 |      |

### Diode Characteristic

#### Static Characteristic

| Parameter       | Conditions             | Symbol  | Value |              |      | Unit |
|-----------------|------------------------|---|-------|--------------|------|------|
|                 |                        |   | Min.  | Typ.         | Max. |      |
| Forward voltage | $I_F=75A$<br>$I_F=75A$ | $T_{vj}=25^{\circ}C$<br>$T_{vj}=175^{\circ}C$ | $V_F$ | 1.93<br>1.67 | 2.40 | V    |

#### Switching Characteristic

| Parameter                                 | Conditions  | Symbol                | Value    |       |      | Unit    |
|---|---|-----------------------|----------|-------|------|---------|
|   |   |                       | Min.     | Typ.  | Max. |         |
| Peak reverse recovery current             |   | $I_{RM}$              |          | 18    |      | A       |
| Reverse Recovered charge                  | $I_F=75A, -$<br>$di_F/dt=320A/\mu s$<br>$V_R=600V, V_{GE}=-15V$ | $T_{vj}=25^{\circ}C$  | $Q_{rr}$ | 4.21  |      | $\mu C$ |
| Reverse Recovery Time                     |   |                       | $t_{rr}$ | 444   |      | ns      |
| Reverse recovered energy                  |   | $E_{rec}$             |          | 1.7   |      | mJ      |
| Peak reverse recovery current             |   | $I_{RM}$              |          | 43    |      | A       |
| Reverse Recovered charge                  | $I_F=75A, -$<br>$di_F/dt=320A/\mu s$<br>$V_R=600V, V_{GE}=-15V$ | $T_{vj}=175^{\circ}C$ | $Q_{rr}$ | 15.36 |      | $\mu C$ |
| Reverse Recovery Time                     |   |                       | $t_{rr}$ |       | 767  |         |
| Reverse recovered energy                  |   | $E_{rec}$             |          | 6.2   |      | mJ      |
| Diode thermal resistance, junction - case |   | $R_{th(j-C)}$         |          | 0.28  |      | K/W     |

### Typical Characteristics

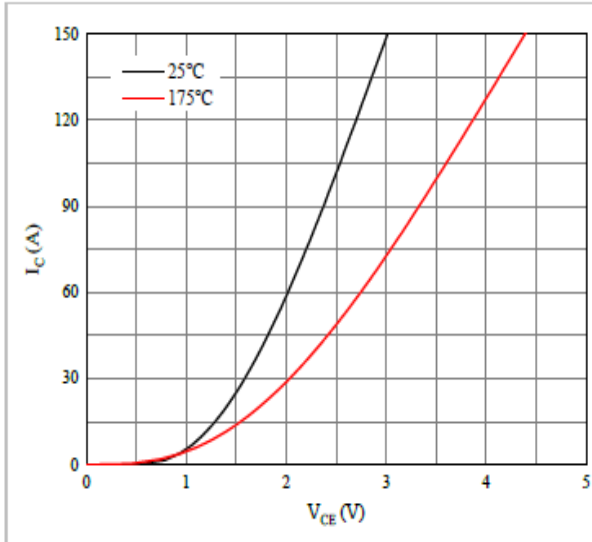


Figure 1. Typical output characteristics ( $V_{GE}=15V$ )

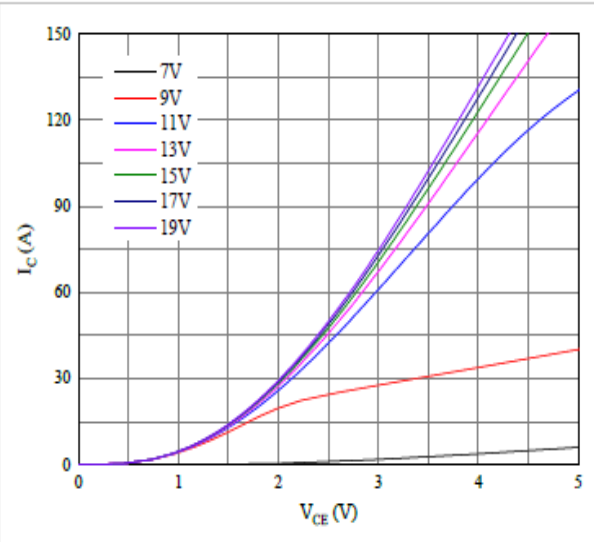


Figure 2. Typical output characteristics ( $T_{vj}=175^{\circ}C$ )

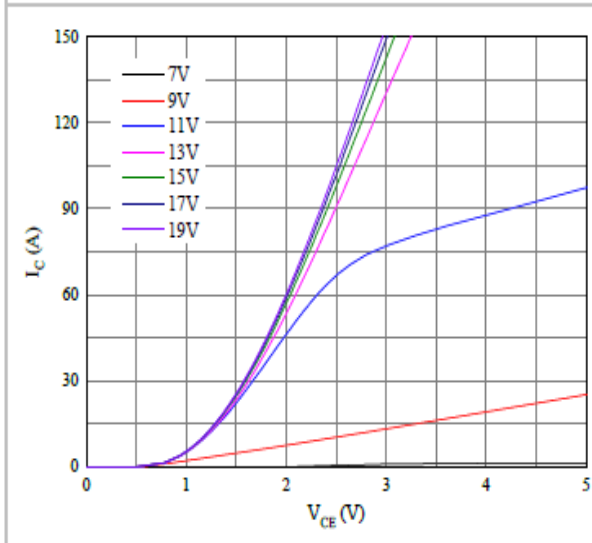


Figure 3. Typical output characteristics ( $T_{vj}=25^{\circ}C$ )

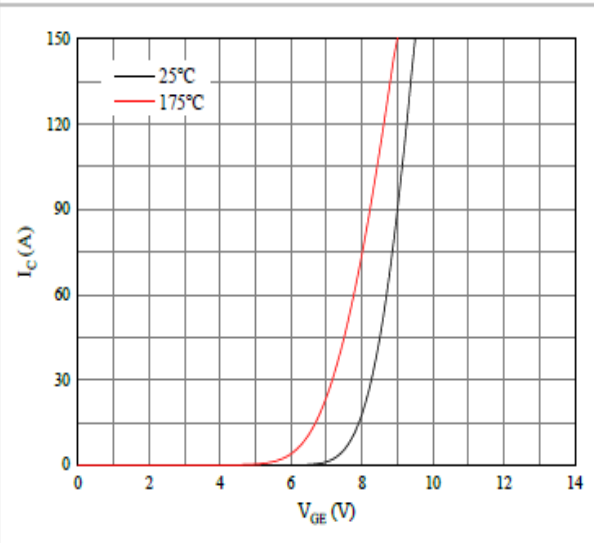


Figure 4. Typical transfer characteristic ( $V_{CE}=20V$ )

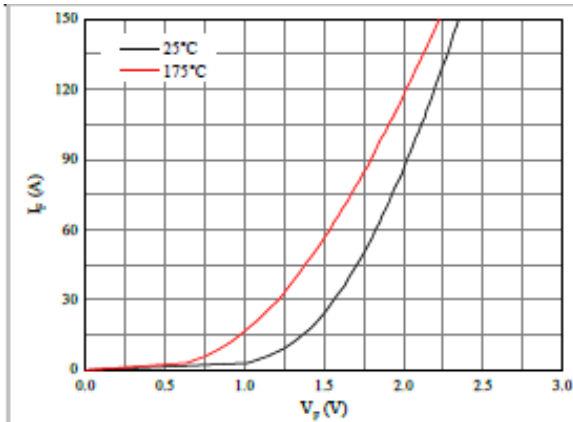


Figure 5. Forward characteristic of Diode

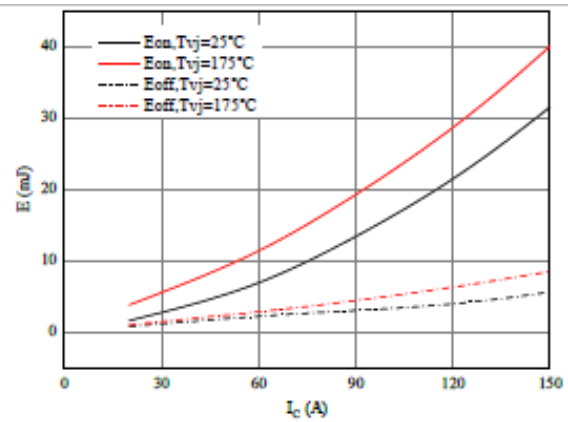


Figure 6. Switching losses of IGBT

$V_{GE} = \pm 15V$ ,  $R_{Gon} = 10\Omega$ ,  $R_{Goff} = 10\Omega$ ,  $V_{CE} = 600V$

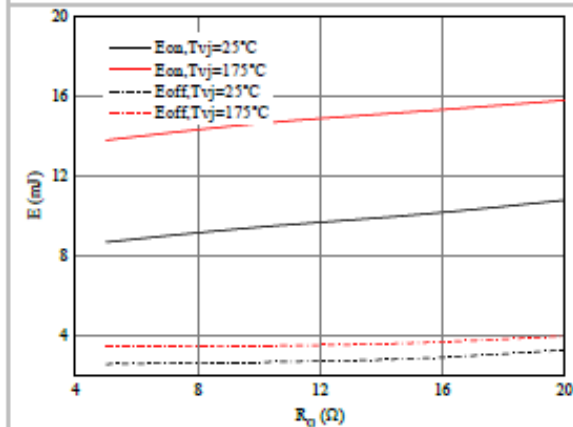


Figure 7. Switching losses of IGBT

$V_{GE} = \pm 15V$ ,  $I_C = 75A$ ,  $V_{CE} = 600V$

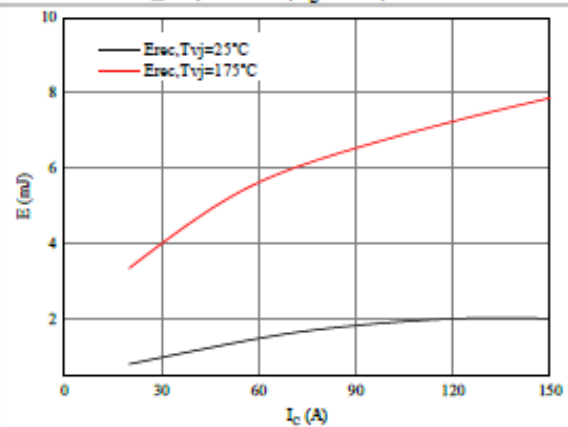


Figure 8. Switching losses of Diode

$R_{gon} = 10\Omega$ ,  $V_{CE} = 600V$

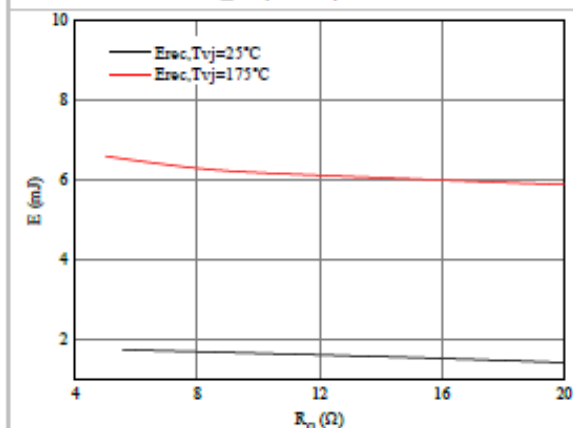


Figure 9. Switching losses of Diode

$I_F = 75A$ ,  $V_{CE} = 600V$

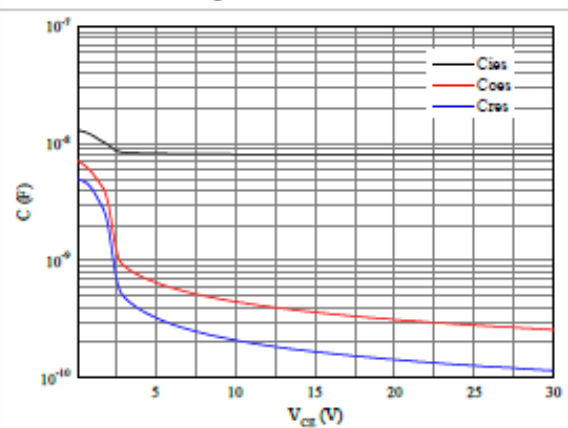


Figure 10. Capacitance characteristic



# Trench Field-Stop Technology IGBT

PC75I120AB

REV:A / 0

## ● PART NO. SYSTEM :

P C 15 H 120 A C

