

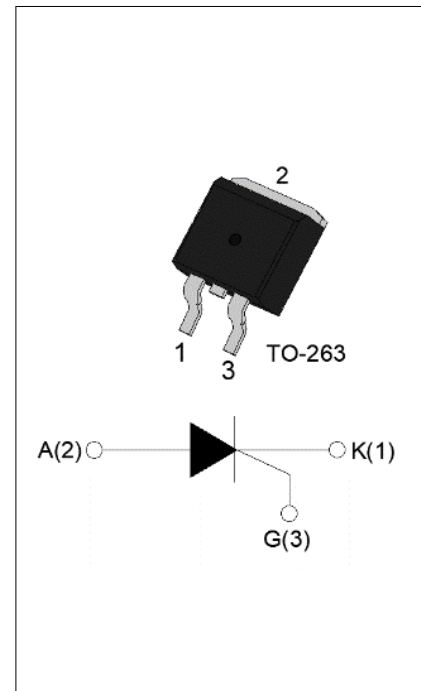
**DESCRIPTION:**

With high ability to withstand the shock loading of large current, JCT151E-650RH of silicon controlled rectifiers provides high dV/dt rate with strong resistance to electromagnetic interference.

It is especially recommended for use on solid state relay, motorcycle, power charger, T-tools etc. Package TO-263 is RoHS compliant.

**MAIN FEATURES**

| Symbol            | Value     | Unit |
|-------------------|-----------|------|
| $I_{T(RMS)}$      | 12        | A    |
| $V_{DRM}/V_{RRM}$ | 650       | V    |
| $I_{GT}$          | $\leq 15$ | mA   |

**ABSOLUTE MAXIMUM RATINGS**

| Parameter                                                                                                          | Symbol       | Value   | Unit                   |
|--------------------------------------------------------------------------------------------------------------------|--------------|---------|------------------------|
| Storage junction temperature range                                                                                 | $T_{stg}$    | -40-150 | $^{\circ}\text{C}$     |
| Operating junction temperature range                                                                               | $T_j$        | -40-150 | $^{\circ}\text{C}$     |
| Repetitive peak off-state voltage ( $T_j=25^{\circ}\text{C}$ )                                                     | $V_{DRM}$    | 650     | V                      |
| Repetitive peak reverse voltage ( $T_j=25^{\circ}\text{C}$ )                                                       | $V_{RRM}$    | 650     | V                      |
| Average on-state current ( $T_c \leq 128^{\circ}\text{C}$ )                                                        | $I_{T(AV)}$  | 7.5     | A                      |
| RMS on-state current ( $T_c \leq 128^{\circ}\text{C}$ )                                                            | $I_{T(RMS)}$ | 12      | A                      |
| Non repetitive surge peak on-state current ( $t_p=10\text{ms}$ , $T_j=25^{\circ}\text{C}$ )                        | $I_{TSM}$    | 120     | A                      |
| Non repetitive surge peak on-state current ( $t_p=8.3\text{ms}$ , $T_j=25^{\circ}\text{C}$ )                       |              | 132     |                        |
| $I^2t$ value for fusing ( $t_p=10\text{ms}$ , $T_j=25^{\circ}\text{C}$ )                                           | $I^2t$       | 72      | $\text{A}^2\text{s}$   |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ , $f=100\text{Hz}$ , $T_j=150^{\circ}\text{C}$ ) | $di/dt$      | 100     | $\text{A}/\mu\text{s}$ |
| Peak gate current ( $t_p=20\mu\text{s}$ , $T_j=150^{\circ}\text{C}$ )                                              | $I_{GM}$     | 4       | A                      |

|                                                                                      |             |     |    |
|--------------------------------------------------------------------------------------|-------------|-----|----|
| Average gate power dissipation ( $T_j=150^{\circ}\text{C}$ )                         | $P_{G(AV)}$ | 1   | W  |
| Peak gate power                                                                      | $P_{GM}$    | 10  | W  |
| Peak pulse voltage<br>( $T_j=25^{\circ}\text{C}$ ; non-repetitive, off-state; FIG.8) | $V_{pp}$    | 0.7 | kV |

**ELECTRICAL CHARACTERISTICS** ( $T_j=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol    | Test Condition                                                                   | Value |      |      | Unit             |
|-----------|----------------------------------------------------------------------------------|-------|------|------|------------------|
|           |                                                                                  | MIN.  | TYP. | MAX. |                  |
| $I_{GT}$  | $V_D=12\text{V } R_L=33\Omega$                                                   | -     | -    | 15   | mA               |
| $V_{GT}$  |                                                                                  | -     | -    | 1    | V                |
| $V_{GD}$  | $V_D=V_{DRM} T_j=150^{\circ}\text{C } R_L=3.3\text{k}\Omega$                     | 0.2   | -    | -    | V                |
| $I_L$     | $I_G=1.2I_{GT}$                                                                  | -     | -    | 40   | mA               |
| $I_H$     | $I_T=100\text{mA}$                                                               | -     | -    | 30   | mA               |
| dV/dt     | $V_D=436\text{V}$ Gate Open $T_j=125^{\circ}\text{C}$                            | 800   | -    | -    | V/ $\mu\text{s}$ |
|           | $V_D=436\text{V}$ Gate Open $T_j=150^{\circ}\text{C}$                            | 500   | -    | -    |                  |
| $t_{on}$  | $I_G=20\text{mA } I_A=200\text{mA } I_R=20\text{mA}$<br>$T_j=25^{\circ}\text{C}$ | -     | 3    | -    | $\mu\text{s}$    |
| $t_{off}$ |                                                                                  | -     | 50   | -    |                  |

**STATIC CHARACTERISTICS**

| Symbol    | Parameter                               |                           | Value(MAX.) | Unit          |
|-----------|-----------------------------------------|---------------------------|-------------|---------------|
| $V_{TM}$  | $I_{TM}=23\text{A } t_p=380\mu\text{s}$ | $T_j=25^{\circ}\text{C}$  | 1.6         | V             |
| $V_{TO}$  | Threshold voltage                       | $T_j=150^{\circ}\text{C}$ | 0.74        | V             |
| $R_D$     | Dynamic resistance                      | $T_j=150^{\circ}\text{C}$ | 33          | m $\Omega$    |
| $I_{DRM}$ | $V_D=V_{DRM} V_R=V_{RRM}$               | $T_j=25^{\circ}\text{C}$  | 5           | $\mu\text{A}$ |
| $I_{RRM}$ |                                         | $T_j=150^{\circ}\text{C}$ | 0.2         | mA            |

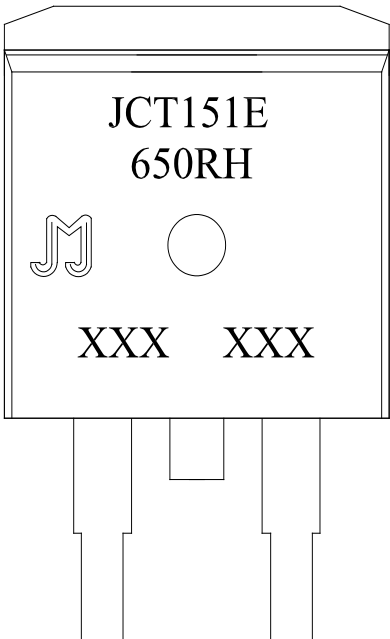
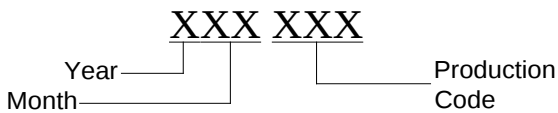
**THERMAL RESISTANCES**

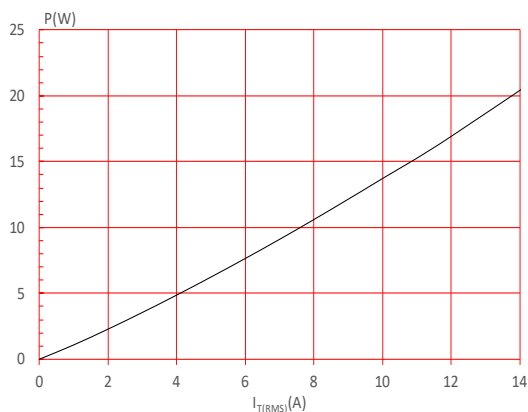
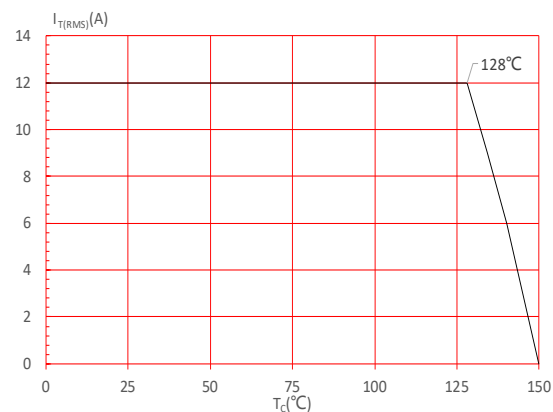
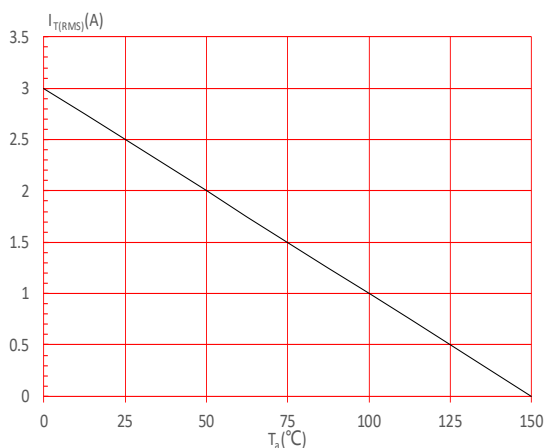
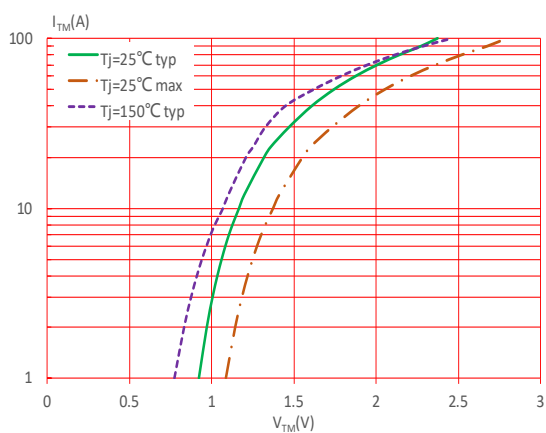
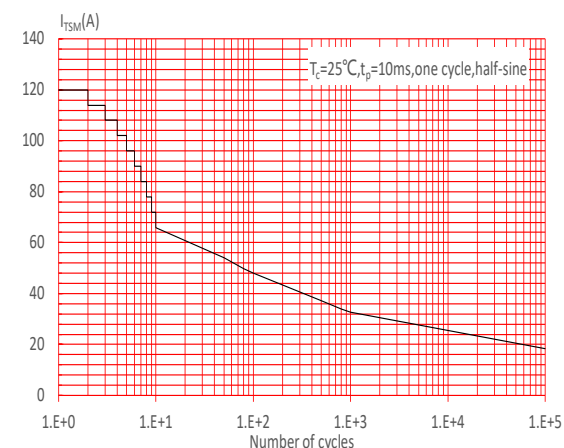
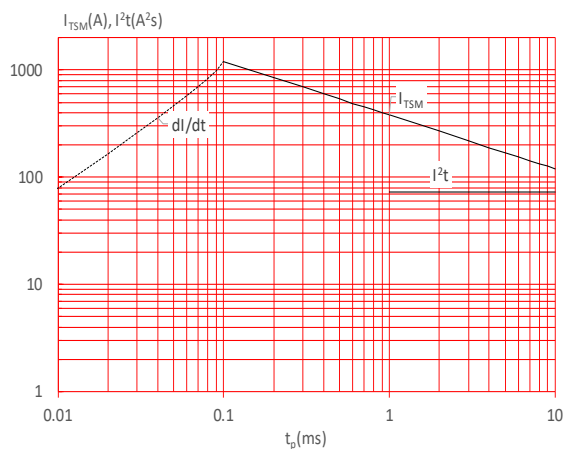
| Symbol        | Parameter                                                | Value | Unit                 |
|---------------|----------------------------------------------------------|-------|----------------------|
| $R_{th(j-c)}$ | junction to case (DC)                                    | 1.3   | $^{\circ}\text{C/W}$ |
| $R_{th(j-a)}$ | junction to ambient (DC, in free air, $S=1\text{cm}^2$ ) | 50    | $^{\circ}\text{C/W}$ |

## ORDERING INFORMATION

|                                   |           |                  |          |                                   |                           |                               |
|-----------------------------------|-----------|------------------|----------|-----------------------------------|---------------------------|-------------------------------|
| <u>J</u>                          | <u>CT</u> | <u>151</u>       | <u>E</u> | <u>-650R</u>                      | <u>H</u>                  | <u>-/</u>                     |
| JieJie Microelectronics Co., Ltd. | SCRs      | $I_{T(RMS)}:12A$ | E:TO-263 | 650R: $V_{DRM}/V_{RRM} \geq 650V$ | High junction temperature | Blank:Tube<br>-TR:Tape & Reel |

## MARKING

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

**FIG.1:** Maximum power dissipation versus RMS on-state current

**FIG.2:** RMS on-state current versus case temperature

**FIG.3:** RMS on-state current versus ambient temperature (printed circuit board FR4,copper thickness:35μm)(full cycle)

**FIG.5:** On-state characteristics

**FIG.4:** Surge peak on-state current versus number of cycles

**FIG.6:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10ms$ , and corresponding value of  $I^2t$  ( $di/dt < 100A/\mu s$ )


**FIG.7:** Relative variations of gate trigger current, holding current and latching current versus junction temperature

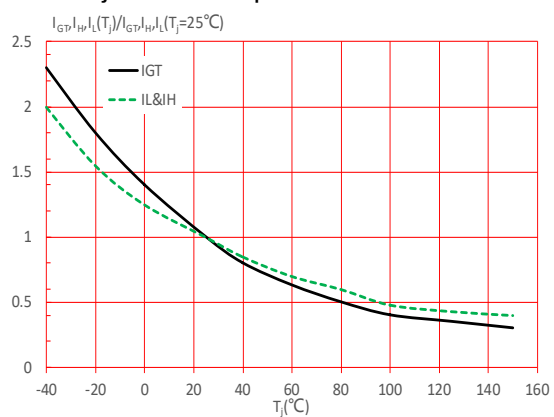
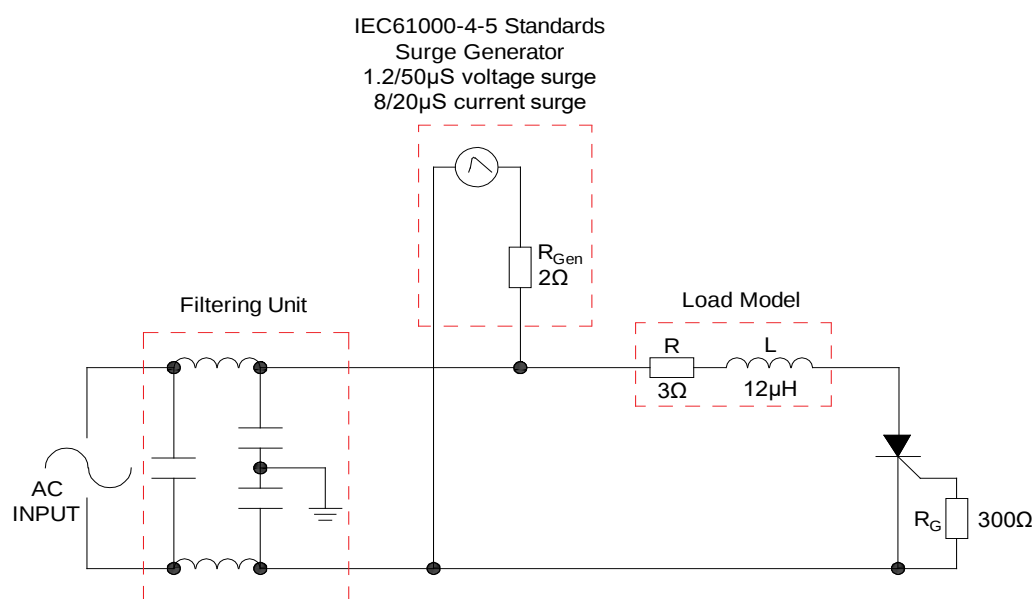
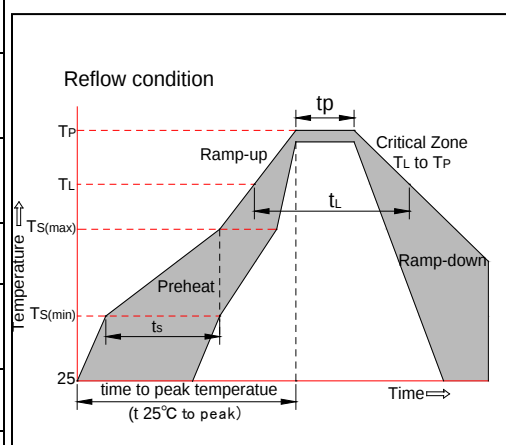


FIG.8: Test circuit for inductive and resistive loads to IEC-61000-4-5 standards.



## SOLDERING PARAMETERS

| Reflow Condition                                         |                                   | Pb-Free assembly<br>(see figure at right) |
|----------------------------------------------------------|-----------------------------------|-------------------------------------------|
| Pre Heat                                                 | -Temperature Min ( $T_{s(min)}$ ) | +150 $^{\circ}$ C                         |
|                                                          | -Temperature Max( $T_{s(max)}$ )  | +200 $^{\circ}$ C                         |
|                                                          | -Time (Min to Max) ( $t_s$ )      | 60-180 secs.                              |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)   |                                   | 3 $^{\circ}$ C/sec. Max                   |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                     |                                   | 3 $^{\circ}$ C/sec. Max                   |
| Reflow                                                   | -Temperature( $T_L$ ) (Liquidus)  | +217 $^{\circ}$ C                         |
|                                                          | -Temperature( $t_L$ )             | 60-150 secs.                              |
| Peak Temp ( $T_p$ )                                      |                                   | +260(+0/-5) $^{\circ}$ C                  |
| Time within 5 $^{\circ}$ C of actual Peak Temp ( $t_p$ ) |                                   | 20-40secs.                                |
| Ramp-down Rate                                           |                                   | 6 $^{\circ}$ C/sec. Max                   |
| Time 25 $^{\circ}$ C to Peak Temp ( $T_p$ )              |                                   | 8 min. Max                                |
| Do not exceed                                            |                                   | +260 $^{\circ}$ C                         |



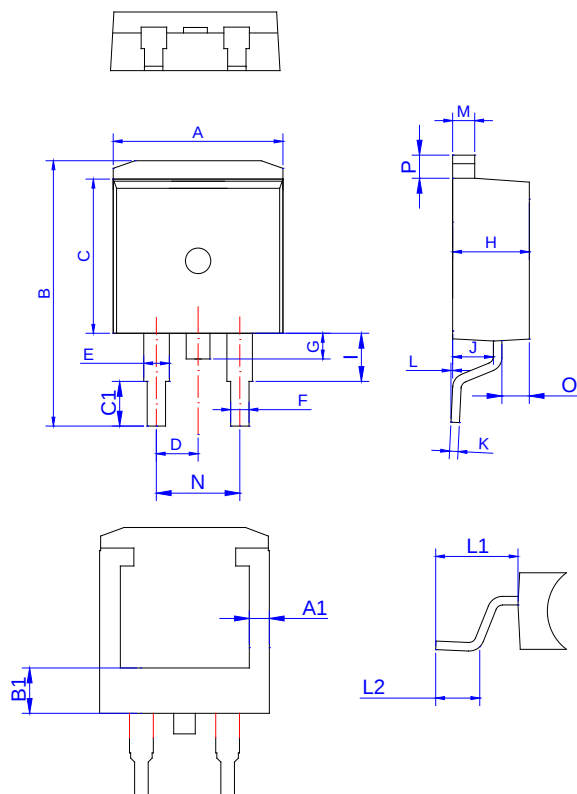
**ORDERING INFORMATION**

| Order code       | Voltage<br>$V_{\text{DRM}}/V_{\text{RRM}}$ (V) | IGT(mA) | Package | Base qty.<br>(pcs) | Delivery<br>mode |
|------------------|------------------------------------------------|---------|---------|--------------------|------------------|
| JCT151E-650RH    | 650                                            | 15      | TO-263  | 50                 | Tube             |
| JCT151E-650RH-TR |                                                |         |         | 800                | Tape & Reel      |

**Document Revision History**

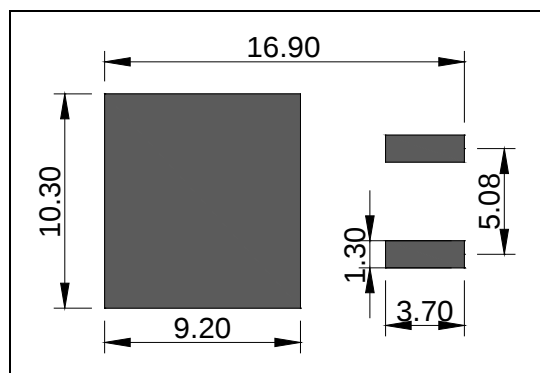
| Date         | Revision | Changes                        |
|--------------|----------|--------------------------------|
| Aug.21, 2025 | A.1.0    | Last update                    |
| Oct.16, 2025 | A.1.1    | Revise PACKAGE MECHANICAL DATA |

## PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 9.90        |      | 10.20 | 0.390  |       | 0.402 |
| A1   | 0.80        |      | 1.20  | 0.031  |       | 0.047 |
| B    | 14.70       |      | 15.80 | 0.579  |       | 0.622 |
| B1   | 2.15        |      | 2.55  | 0.085  |       | 0.100 |
| C    | 9.40        |      | 9.60  | 0.370  |       | 0.378 |
| C1   | 2.40        |      | 2.80  | 0.094  |       | 0.110 |
| D    | 2.40        |      | 2.70  | 0.094  |       | 0.106 |
| E    | 1.20        |      | 1.50  | 0.047  |       | 0.059 |
| F    | 0.75        |      | 0.85  | 0.029  |       | 0.033 |
| G    | 1.00        |      | 1.50  | 0.039  |       | 0.059 |
| H    | 4.40        |      | 4.70  | 0.173  |       | 0.185 |
| I    | 1.80        |      | 2.20  |        |       |       |
| J    | 2.30        |      | 2.70  | 0.091  |       | 0.106 |
| K    | 0.38        |      | 0.55  | 0.015  |       | 0.022 |
| L    | 0           | 0.10 | 0.25  | 0      | 0.004 | 0.010 |
| L1   | 4.65        |      | 5.05  | 0.183  |       | 0.199 |
| L2   | 1.90        |      |       | 0.075  |       |       |
| M    | 1.25        |      | 1.35  | 0.049  |       | 0.053 |
| N    | 4.80        |      | 5.20  |        |       |       |
| O    | 1.30        |      | 1.50  |        |       |       |
| P    | 1.20        |      | 1.50  | 0.047  |       | 0.059 |

## FOOTPRINT-TO-263 (dimensions in mm)



Technical drawing of a mechanical part, showing front and side views with dimensions.

**Front View Dimensions:**

- Overall width:  $530 \pm 0.5$
- Distance from left edge to center of hole: 518
- Distance from right edge to center of hole: 12.9
- Hole diameter:  $\varnothing 3.0$
- Surface finish symbol:  $\sqrt{0.05}$

**Side View Dimensions:**

- Overall height:  $7_{-0.2}^0$
- Distance from top edge to center of hole: 1.5
- Distance from bottom edge to center of hole: 1.5
- Distance from left edge to center of hole: 10 $\frac{+0.1}{-0.1}$
- Distance from right edge to center of hole: 0.6
- Distance from bottom edge to center of hole: 2.6
- Surface finish symbol:  $\sqrt{0.05}$

Technical drawing of a 4-hole circular plate. The drawing includes a top view, a side view (B-B), and a cross-section (A-A). Dimensions are labeled with letters and numbers. A table on the right lists the dimensions in millimeters and inches.

| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| W    | 23.70       | 24.00 | 24.30 | 0.933  | 0.945 | 0.957 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 11.40       | 11.50 | 11.60 | 0.449  | 0.453 | 0.457 |
| D0   | -           | 1.50  | 1.60  | -      | 0.059 | 0.063 |
| D1   | -           | 1.50  | 1.60  | -      | 0.059 | 0.063 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 15.90       | 16.00 | 16.10 | 0.626  | 0.630 | 0.634 |
| P2   | 1.90        | 2.00  | 2.10  | 0.075  | 0.079 | 0.083 |
| A0   | 10.80       | 10.90 | 11.00 | 0.425  | 0.429 | 0.433 |
| B0   | 16.20       | 16.30 | 16.40 | 0.638  | 0.642 | 0.646 |
| K0   | 4.80        | 4.90  | 5.00  | 0.189  | 0.193 | 0.197 |
| t    | 0.35        | 0.40  | 0.45  | 0.014  | 0.016 | 0.018 |

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