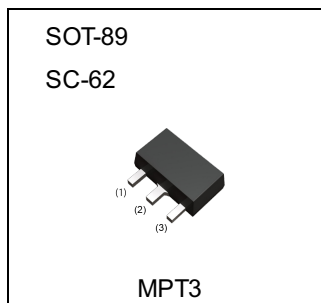


| Parameter | Value |
|-----------|-------|
| $V_{CEO}$ | 50V   |
| $I_C$     | 3A    |

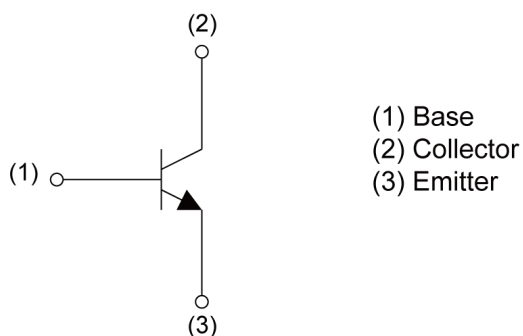
## ●Outline



## ●Features

- 1) Low saturation voltage, typically  
 $V_{CE(sat)} = 350\text{mV (Max.)}$   
 $(I_C/I_B = 1\text{A}/50\text{mA})$
- 2) High speed switching

## ●Inner circuit



## ●Application

LOW FREQUENCY AMPLIFIER, HIGH SPEED SWITCHING

## ●Packaging specifications

| Part No. | Package       | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|----------|---------------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| 2SCR533P | SOT-89 (MPT3) | 4540         | T100        | 180            | 12              | 1000                      | NM      |

**● Absolute maximum ratings** ( $T_a = 25^\circ\text{C}$ )

| Parameter                    | Symbol               | Values      | Unit             |
|------------------------------|----------------------|-------------|------------------|
| Collector-base voltage       | $V_{\text{CBO}}$     | 50          | V                |
| Collector-emitter voltage    | $V_{\text{CEO}}$     | 50          | V                |
| Emitter-base voltage         | $V_{\text{EBO}}$     | 6           | V                |
| Collector current            | $I_{\text{C}}$       | 3           | A                |
|                              | $I_{\text{CP}}^{*1}$ | 6           | A                |
| Power dissipation            | $P_{\text{D}}^{*2}$  | 0.5         | W                |
|                              | $P_{\text{D}}^{*3}$  | 2.0         | W                |
| Junction temperature         | $T_{\text{j}}$       | 150         | $^\circ\text{C}$ |
| Range of storage temperature | $T_{\text{stg}}$     | -55 to +150 | $^\circ\text{C}$ |

**● Electrical characteristics** ( $T_a = 25^\circ\text{C}$ )

| Parameter                            | Symbol                    | Conditions                                                                                                                                                                                    | Values |      |      | Unit          |
|--------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|------|---------------|
|                                      |                           |                                                                                                                                                                                               | Min.   | Typ. | Max. |               |
| Collector-base breakdown voltage     | $BV_{\text{CBO}}$         | $I_{\text{C}} = 100\mu\text{A}$                                                                                                                                                               | 50     | -    | -    | V             |
| Collector-emitter breakdown voltage  | $BV_{\text{CEO}}$         | $I_{\text{C}} = 1\text{mA}$                                                                                                                                                                   | 50     | -    | -    | V             |
| Emitter-base breakdown voltage       | $BV_{\text{EBO}}$         | $I_{\text{E}} = 100\mu\text{A}$                                                                                                                                                               | 6      | -    | -    | V             |
| Collector cut-off current            | $I_{\text{CBO}}$          | $V_{\text{CB}} = 50\text{V}$                                                                                                                                                                  | -      | -    | 1.0  | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{\text{EBO}}$          | $V_{\text{EB}} = 4\text{V}$                                                                                                                                                                   | -      | -    | 1.0  | $\mu\text{A}$ |
| Collector-emitter saturation voltage | $V_{\text{CE(sat)}}^{*4}$ | $I_{\text{C}} = 1\text{A}, I_{\text{B}} = 50\text{mA}$                                                                                                                                        | -      | 130  | 350  | mV            |
| DC current gain                      | $h_{\text{FE}}$           | $V_{\text{CE}} = 3\text{V}, I_{\text{C}} = 50\text{mA}$                                                                                                                                       | 180    | -    | 450  | -             |
| Transition frequency                 | $f_{\text{T}}^{*4}$       | $V_{\text{CE}} = 10\text{V}, I_{\text{E}} = -500\text{mA},$<br>$f = 100\text{MHz}$                                                                                                            | -      | 320  | -    | MHz           |
| Output capacitance                   | $C_{\text{ob}}$           | $V_{\text{CB}} = 10\text{V}, I_{\text{E}} = 0\text{A},$<br>$f = 1\text{MHz}$                                                                                                                  | -      | 13   | -    | pF            |
| Turn-On time                         | $t_{\text{on}}$           | $I_{\text{C}} = 1.5\text{A},$<br>$I_{\text{B1}} = 150\text{mA},$<br>$I_{\text{B2}} = -150\text{mA},$<br>$V_{\text{CC}} \approx 10\text{V},$<br>$R_{\text{L}} = 6.8\Omega$<br>See test circuit | -      | 50   | -    | ns            |
| Storage time                         | $t_{\text{stg}}$          |                                                                                                                                                                                               | -      | 450  | -    | ns            |
| Fall time                            | $t_{\text{f}}$            |                                                                                                                                                                                               | -      | 80   | -    | ns            |

\*1  $P_{\text{W}}=10\text{ms}$ , Single Pulse

\*2 Each terminal mounted on a reference land.

\*3 Mounted on a ceramic board.(40×40×0.7mm)

\*4 Pulsed

●Electrical characteristic curves( $T_a = 25^\circ\text{C}$ )

Fig.1 Ground Emitter Propagation Characteristics

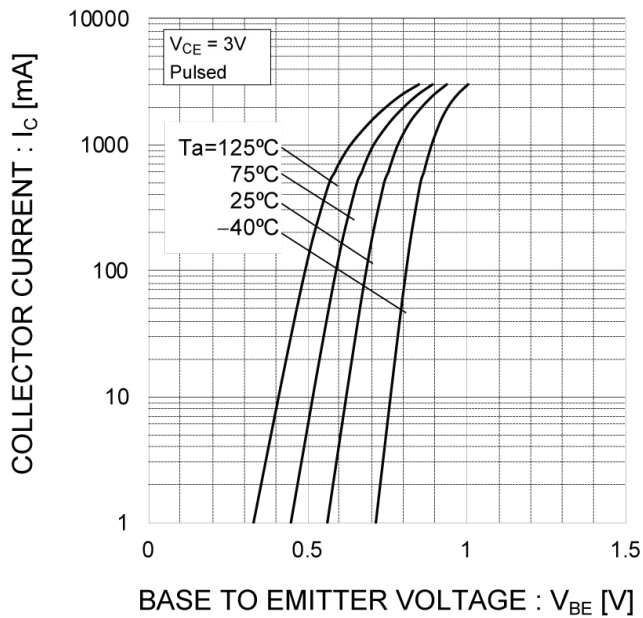


Fig.2 Typical Output Characteristics

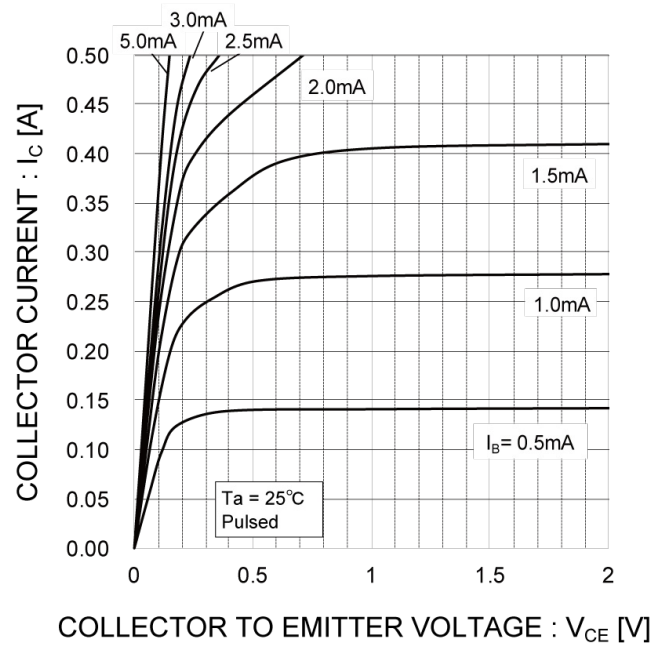


Fig.3 DC Current Gain vs. Collector Current (I)

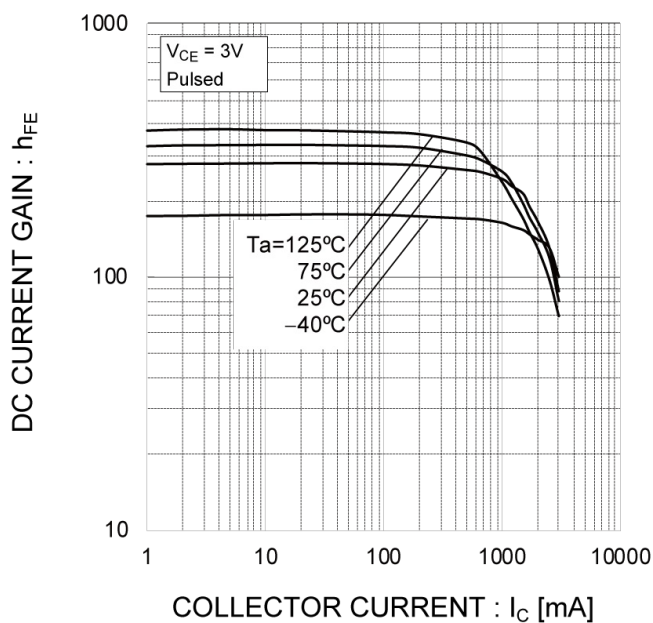
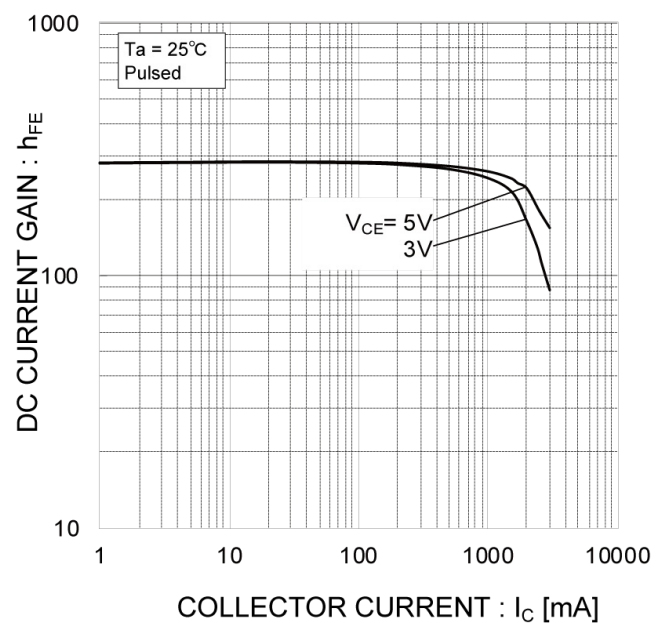


Fig.4 DC Current Gain vs. Collector Current (II)



●Electrical characteristic curves( $T_a = 25^\circ\text{C}$ )

Fig.5 Collector-Emitter Saturation  
Voltage vs. Collector Current (I)

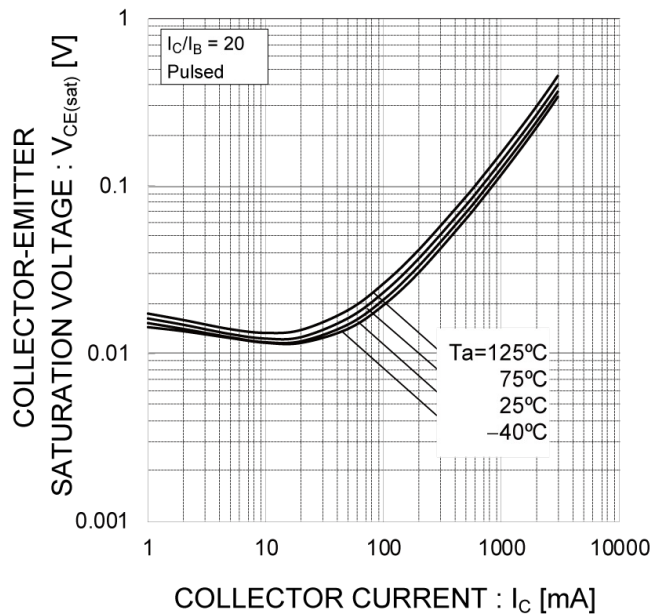


Fig.6 Collector-Emitter Saturation  
Voltage vs. Collector Current (II)

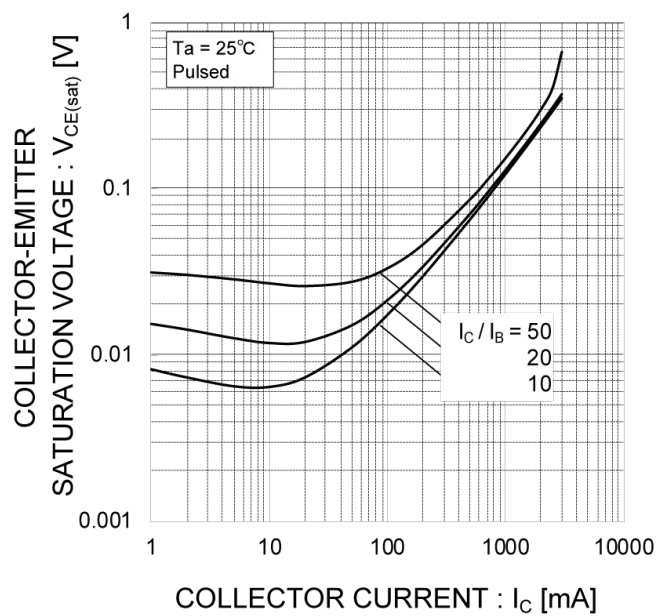


Fig.7 Base-Emitter Saturation Voltage  
vs. Collector Current

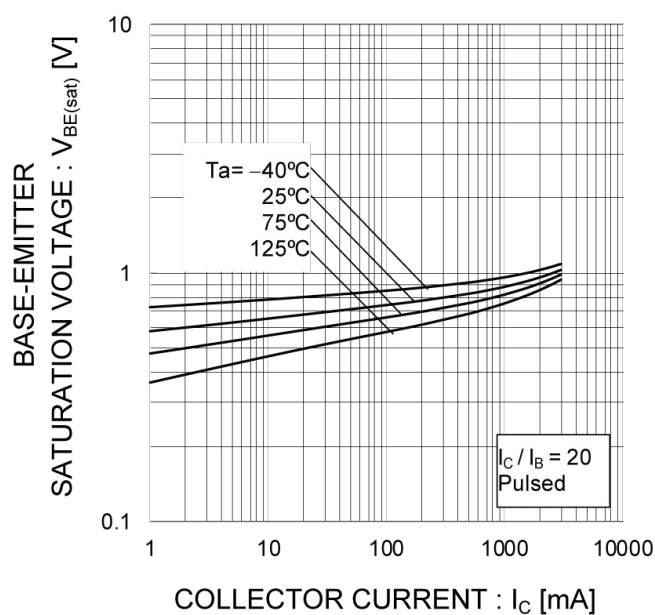
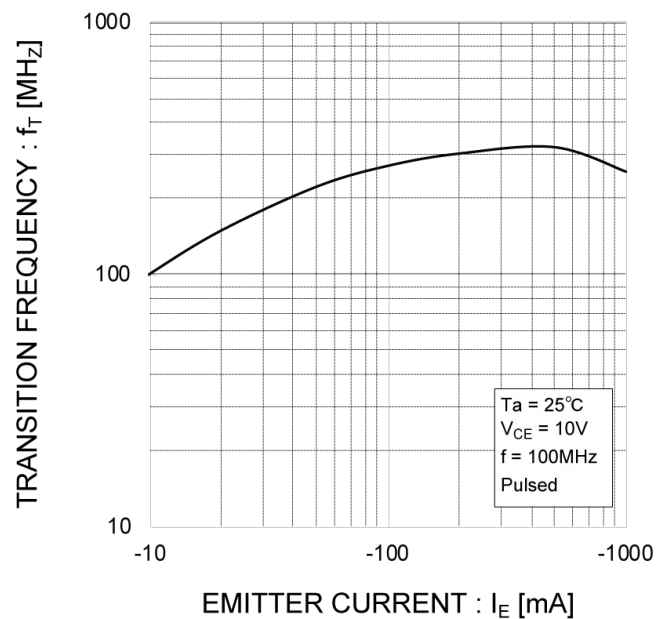


Fig.8 Gain Bandwidth Product vs.  
Emitter Current



● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ )

Fig.9 Emitter Input Capacitance vs.  
Emitter-Base Voltage  
Collector Output Capacitance vs.  
Collector-Base Voltage

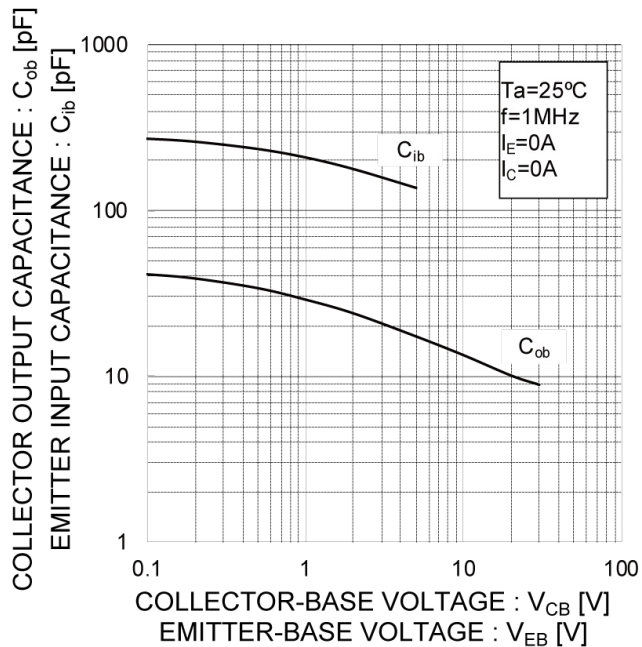
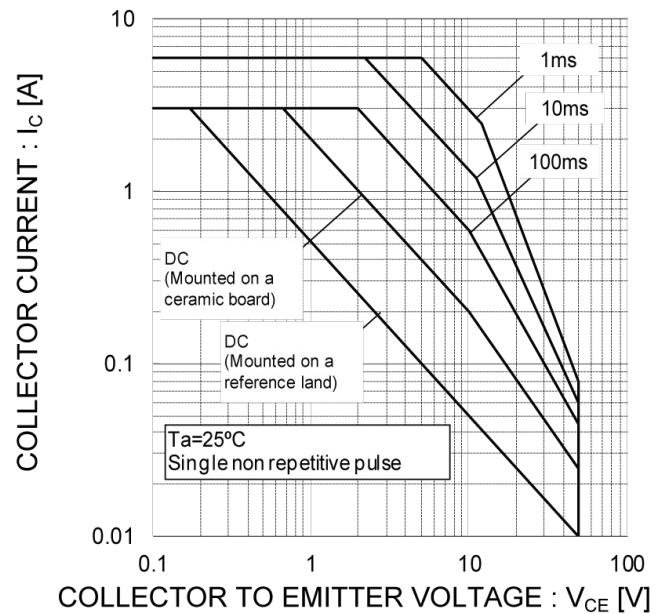
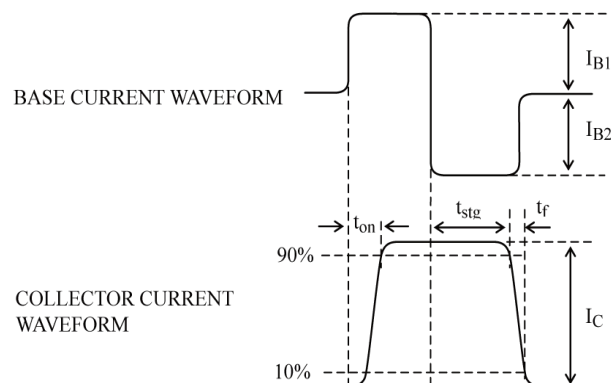
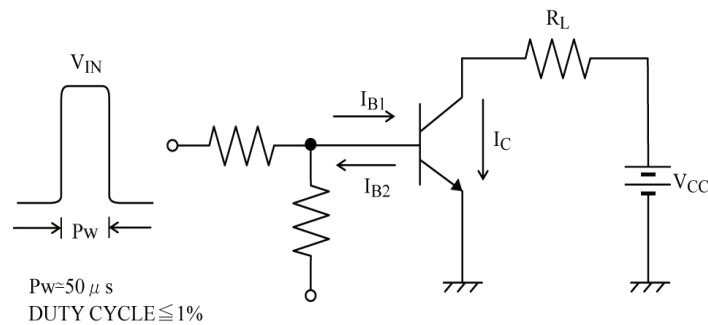


Fig.10 Safe Operating Area

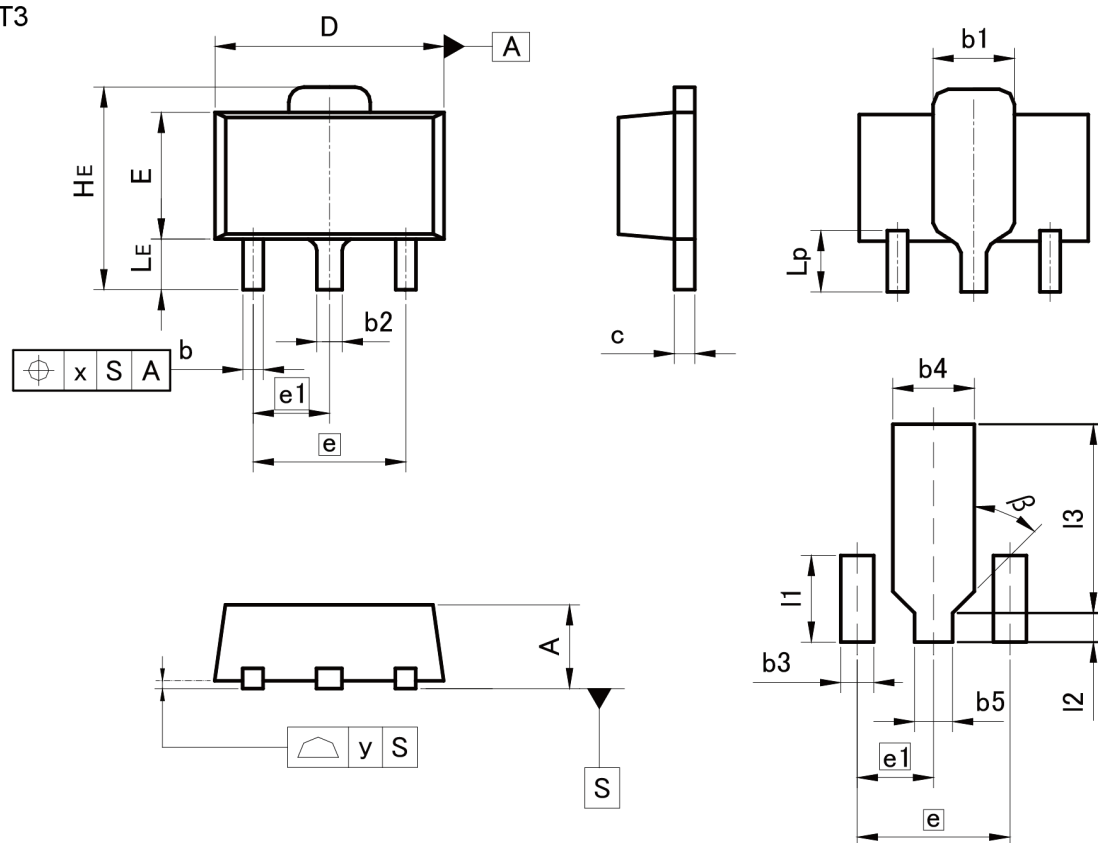


SWITCHING TIME TEST CIRCUIT



## ●Dimensions

MPT3



Pattern of terminal position areas  
[Not a recommended pattern of soldering pads]

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 1.40       | 1.50 | 0.055  | 0.059 |
| b   | 0.30       | 0.50 | 0.012  | 0.020 |
| b1  | 1.50       | 1.70 | 0.059  | 0.067 |
| b2  | 0.40       | 0.60 | 0.016  | 0.024 |
| c   | 0.35       | 0.50 | 0.014  | 0.020 |
| D   | 4.40       | 4.70 | 0.173  | 0.185 |
| E   | 2.40       | 2.70 | 0.094  | 0.106 |
| e   | 3.00       |      | 0.118  |       |
| e1  | 1.50       |      | 0.059  |       |
| HE  | 3.70       | 4.30 | 0.146  | 0.169 |
| LE  | 0.80       | 1.20 | 0.031  | 0.047 |
| Lp  | 1.01       | 1.41 | 0.040  | 0.056 |
| x   | —          | 0.15 | —      | 0.006 |
| y   | —          | 0.10 | —      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b3  | —          | 0.65 | —      | 0.026 |
| b4  | —          | 1.70 | —      | 0.067 |
| b5  | —          | 0.75 | —      | 0.030 |
| l1  | —          | 1.71 | —      | 0.067 |
| l2  | —          | 0.58 | —      | 0.023 |
| l3  | —          | 3.72 | —      | 0.146 |
| β   | 45°        |      | 45°    |       |

Dimension in mm/inches

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