



# NPN Transistor Bare Die – 2N3055

Rev 1.0  
22/08/23

**Bipolar Power Transistor in bare die form**  
Complement to PNP MJ2955

## Features:

- Collector current up to 15A
- High DC Current Gain,  $h_{FE} = 20-70 @ I_C = 4A$
- Low  $V_{CE(sat)} = 1.1V \text{ Max } @ I_C = 4A$
- Solderable back metal
- High Reliability tested grades for Military + Space

## Ordering Information:

The following part suffixes apply:

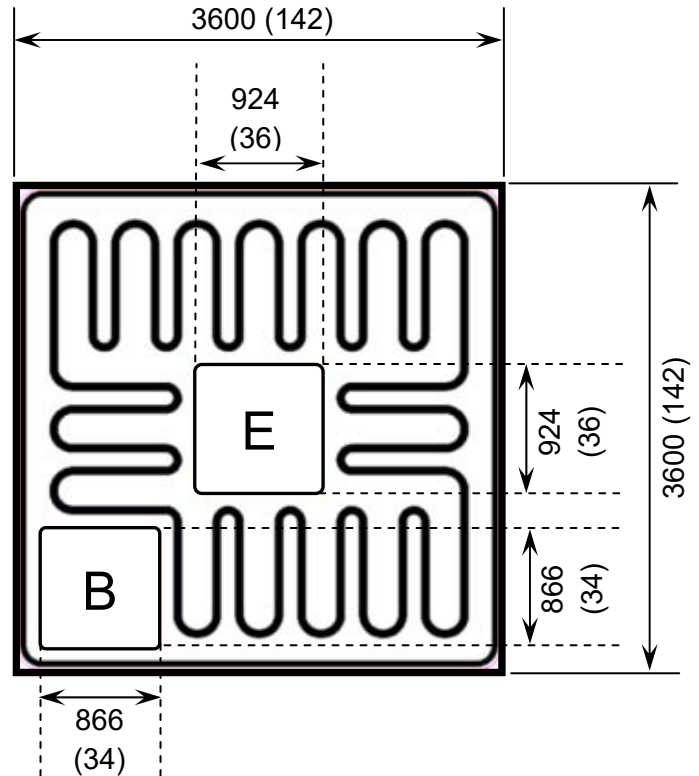
- No suffix - Commercial grade die
- "H" – Hi-rel grade die + MIL-STD-38534 Class H LAT
- "K" – Hi-rel grade die + MIL-STD-38534 Class K LAT.

LAT = Lot acceptance Test.

For information on Hi-Rel LAT flows please see below.

[www.siliconsupplies.com/bare-die-lot-qualification](http://www.siliconsupplies.com/bare-die-lot-qualification)

## Die Dimensions in $\mu\text{m}$ (mils)



**DIE BACK = COLLECTOR**

## Supply Formats:

- Default – Die in Waffle Pack (100 per tray capacity)
- Sawn Wafer on Tape – Specific request
- Unsawn Wafer – Specific request
- With additional electrical selection – Specific request
- Sawn as pairs or adjacent pair pick – Specific request

## Mechanical Specification

Die Size (Excluding Saw Street)	3600 x 3600 142 x 142	$\mu\text{m}$ mils
Emitter Pad Size	924 x 924 36 x 36	$\mu\text{m}$ mils
Base Pad Size	866 x 866 34 x 34	$\mu\text{m}$ mils
Die Thickness	250 ( $\pm 25$ ) 9.84 ( $\pm 1$ )	$\mu\text{m}$ mils
Top Metal Composition	Al	
Back Metal Composition	Ti/Ni/Ag	





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## Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	$V_{CBO}$	100	V
Collector-Emitter Voltage	$V_{CEO}$	60	V
	$V_{CER}$	70	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Collector Current - Continuous	$I_C$	15	A
Base Current	$I_B$	7	A
Junction Temperature	$T_J$	200	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65 to 200	$^\circ\text{C}$

## Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_E = 0$	100	-	-	V
Collector-Emitter Sustaining Voltage <sup>1</sup>	$V_{CEO(SUS)}$	$I_B = 0, I_C = 200\text{mA}$	60	-	-	V
	$V_{CER(SUS)}$	$R_{BE} = 100\Omega, I_C = 200\text{mA}$	70	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_C = 0$	7	-	-	V
Collector Cut-off Current	$I_{CEO}$	$V_{CE} = 30\text{V}, I_B = 0$	-	-	0.7	mA
	$I_{CEX}$	$V_{CE} = 100\text{V}, V_{BE(off)} = 1.5\text{V}$	-	-	1.0	mA
	$I_{CEX}^2$	$V_{CE} = 100\text{V}, V_{BE(off)} = 1.5\text{V}, T_J = 150^\circ\text{C}$	-	-	5.0	mA
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 7\text{V}, I_C = 0$	-	-	5.0	mA
<b>ON CHARACTERISTICS</b>						
Forward-Current Transfer Ratio <sup>1</sup>	$h_{FE}$	$I_C = 4\text{A}, V_{CE} = 4\text{V}$	20	-	70	-
		$I_C = 10\text{A}, V_{CE} = 4\text{V}$	5	-	-	-
Collector-Emitter Saturation Voltage <sup>1</sup>	$V_{CE(sat)}$	$I_C = 4\text{A}, I_B = 400\text{mA}$	-	-	1.1	V
		$I_C = 10\text{A}, I_B = 3.3\text{A}$	-	-	3.0	V
Base-Emitter On Voltage <sup>1</sup>	$V_{BE(on)}$	$I_C = 4\text{A}, V_{CE} = 4\text{V}$	-	-	1.5	V
<b>SMALL SIGNAL CHARACTERISTICS<sup>2</sup></b>						
Transition Frequency <sup>3</sup>	$f_T$	$V_{CE} = 10\text{V}, I_C = 0.5\text{A}, f_{TEST} = 1\text{MHz}$	2.5	-	-	MHZ
Small-Signal Current Gain	$h_{fe}$	$V_{CE} = 4\text{V}, I_C = 1\text{A}, f = 1\text{kHz}$	15	-	120	-

1. Pulsed duration = 300 $\mu\text{s}$ , duty cycle  $\leq 2\%$

2. Not production testing in die form, characterized by chip design and package verification

3.  $f_T = |h_{fe}| \cdot f_{TEST}$

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