



# NPN Transistor Bare Die, MMBTA28

Rev 1.0  
26/11/24

Darlington construction transistor in bare die form

## Features:

- Collector current up to 0.8A
- Very high current gain
- Enables high impedance circuitry
- Gold back metal
- High reliability tested grades for Military + Space

## Ordering Information:

The following part suffixes apply:

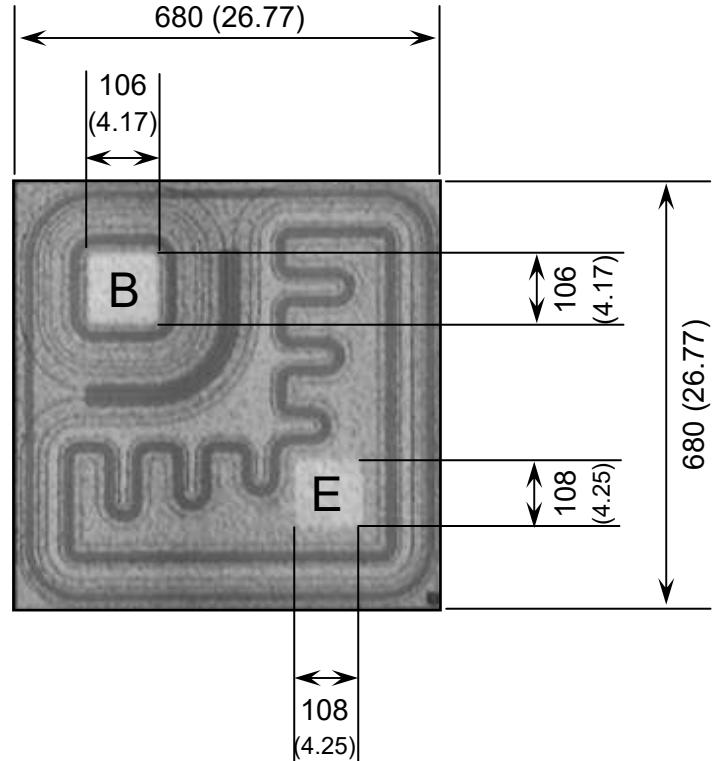
- No suffix - Commercial grade die
- "H" – Hi-rel grade die + MIL-STD-38534 Class H LAT
- "K" – Hi-rel grade die + MIL-STD-38534 Class K LAT.

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 (400 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)	680 x 680 26.77 x 26.77	$\mu\text{m}$ mils
Base Pad Size	106 x 106 4.17 x 4.17	$\mu\text{m}$ mils
Emitter Pad Size	108 x 108 4.25 x 4.25	$\mu\text{m}$ mils
Die Thickness	230 ( $\pm 20$ ) 9.06 ( $\pm 0.79$ )	$\mu\text{m}$ mils
Top Metal Composition	Al - 2 $\mu\text{m}$	
Back Metal Composition	AuAs - 0.9 $\mu\text{m}$	





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07/07/17

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

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	$V_{CBO}$	80	V
Collector-Emitter Voltage	$V_{CEO}$	80	V
Emitter-Base Voltage	$V_{EBO}$	12	V
Collector Current	$I_C$	800	mA
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$

## 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	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}, I_E = 0$	80	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 100\mu\text{A}, I_B = 0$	80	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}, I_C = 0$	12	-	-	V
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 60\text{V}, I_E = 0$	-	-	100	nA
	$I_{CES}$	$V_{CE} = 60\text{V}, I_E = 0$	-	-	500	nA
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 10\text{V}, I_C = 0$	-	-	100	nA
<b>ON CHARACTERISTICS<sup>1</sup></b>						
Forward-Current Transfer Ratio	$h_{FE}$	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$	10000	-	-	-
		$V_{CE} = 5\text{V}, I_C = 100\text{mA}$	10000	-	-	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 0.01\text{mA}$	-	-	1.2	V
		$I_C = 100\text{mA}, I_B = 0.1\text{mA}$	-	-	1.5	V
Base-Emitter On Voltage	$V_{BE(on)}$	$I_C = 100\text{mA}, V_{CE} = 5\text{V}$	-	-	2.0	V
<b>SMALL SIGNAL CHARACTERISTICS<sup>2</sup></b>						
Transition Frequency	$f_T$	$I_C = 15\text{mA}, V_{CE} = 5\text{V}, f = 100\text{MHz}$	125	-	-	MHz
Output Capacitance	$C_{obo}$	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	8	pF

1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$  2. Not production testing in die form, characterized by chip design and tested in package

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