

# PUB4121 (PU4121), PUB4421 (PU4421)

## Silicon NPN triple diffusion planar type darlington

### For power amplification

#### ■ Features

- Built-in zener diode (30 V) between collector and base
- Small variation in withstand pressure
- Large energy handling capability
- High-speed switching
- PUB4121 (PU4121): NPN 4 elements
- PUB4421 (PU4421): NPN 2 elements × 2

#### ■ Absolute Maximum Ratings $T_C = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	$V_{CBO}$	$30 \pm 5$	V
Collector-emitter voltage (Base open)	$V_{CEO}$	$30 \pm 5$	V
Emitter-base voltage (Collector open)	$V_{EBO}$	5	V
Collector current	$I_C$	2	A
Peak collector current	$I_{CP}$	4	A
Collector power dissipation	$P_C$	15	W
	$T_a = 25^\circ\text{C}$	3.5	
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

#### ■ Electrical Characteristics $T_C = 25^\circ\text{C} \pm 3^\circ\text{C}$

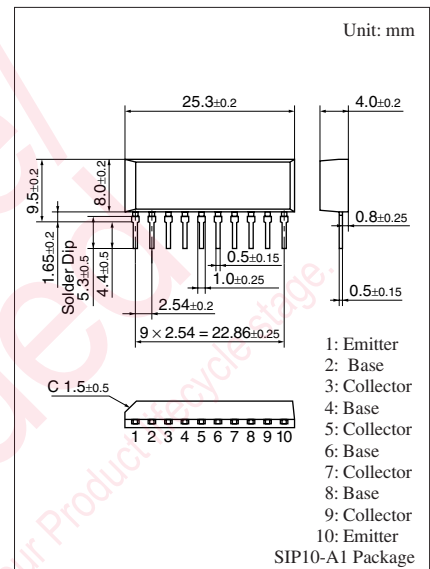
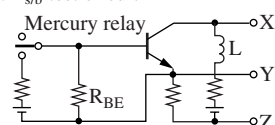
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter voltage (Base open)	$V_{CEO}$	$I_C = 5 \text{ mA}, I_B = 0$	25		35	V
Collector-base cutoff current (Emitter open)	$I_{CBO}$	$V_{CB} = 25 \text{ V}, I_E = 0$			100	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	$I_{EBO}$	$V_{EB} = 5 \text{ V}, I_C = 0$			2	mA
Forward current transfer ratio	$h_{FE1}$	$V_{CE} = 4 \text{ V}, I_C = 1 \text{ A}$	1000			—
	$h_{FE2}^{*1}$	$V_{CE} = 4 \text{ V}, I_C = 2 \text{ A}$	1000		10000	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 2 \text{ A}, I_B = 8 \text{ mA}$			2.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 2 \text{ A}, I_B = 8 \text{ mA}$			2.5	V
Transition frequency	$f_T$	$V_{CE} = 10 \text{ V}, I_C = 0.5 \text{ A}, f = 1 \text{ MHz}$		20		MHz
Turn-on time	$t_{on}$	$I_C = 2 \text{ A}$		0.4		$\mu\text{s}$
Storage time	$t_{stg}$	$I_{B1} = 8 \text{ mA}, I_{B2} = -8 \text{ mA}$		3.0		$\mu\text{s}$
Fall time	$t_f$	$V_{CC} = 20 \text{ V}$		1.0		$\mu\text{s}$
Energy handling capability <sup>*2</sup>	$E_{s/b}$	$I_C = 1.45 \text{ A}, L = 100 \text{ mH}, R_{BE} = 100 \Omega$	100			mJ

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. \*1: Rank classification

Rank	Free	P	Q
$h_{FE}$	1000 to 10000	2000 to 10000	1000 to 5000

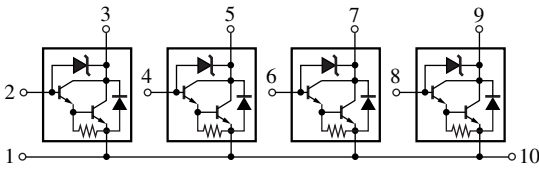
\*2:  $E_{s/b}$  test circuit



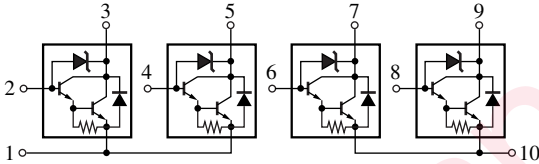
Note) The part numbers in the parenthesis show conventional part number.

Internal Connection

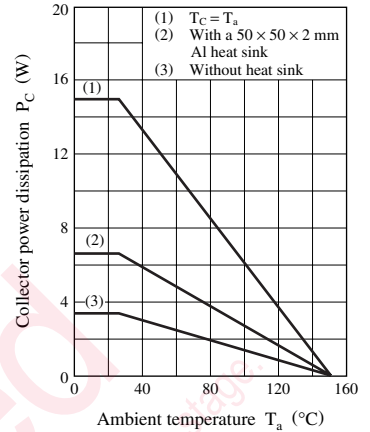
• PUB4121



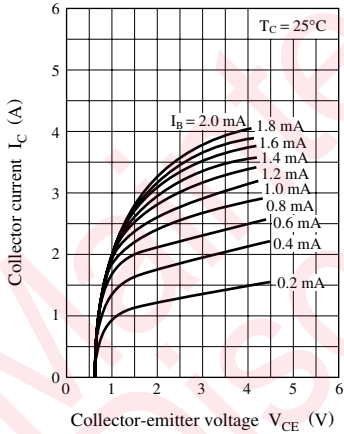
• PUB4421



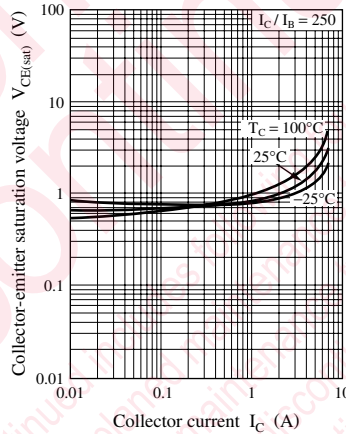
$P_C - T_a$



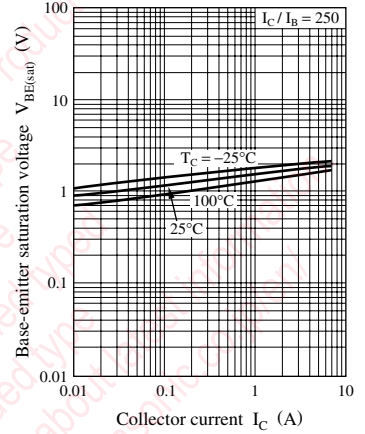
$I_C - V_{CE}$



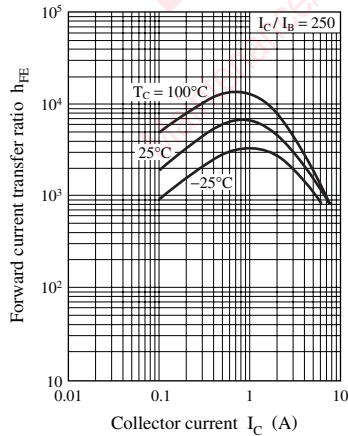
$V_{CE(sat)} - I_C$



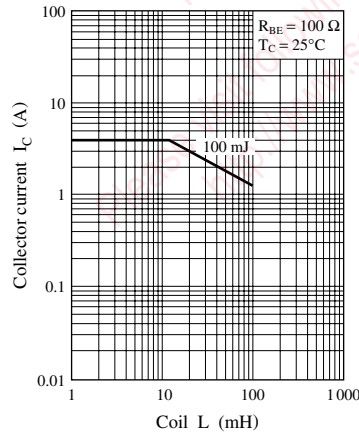
$V_{BE(sat)} - I_C$



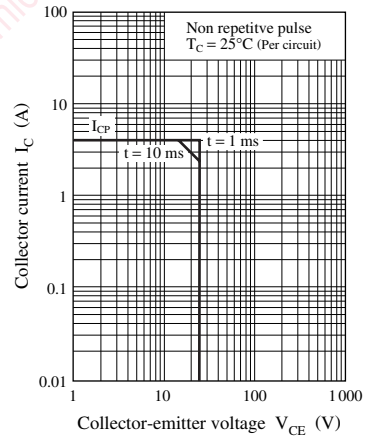
$h_{FE} - I_C$



Guidance load characteristic



Safe operation area



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