XP0121M

Silicon NPN epitaxial planar type

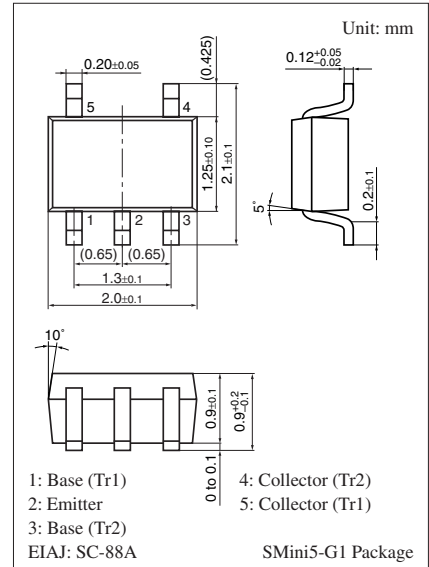For switching/digital circuits

■ Features
- Two elements incorporated into one package
  (Emitter-coupled transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half
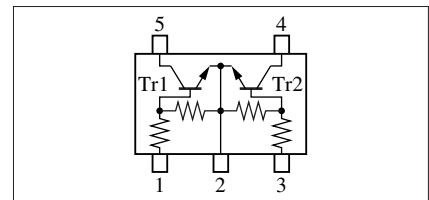
■ Basic Part Number
- UNR221M × 2

■ Absolute Maximum Ratings $T_a = 25°C$

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	V_{CBO}	50	V
Collector-emitter voltage (Base open)	V_{CEO}	50	V
Collector current	I_C	100	mA
Total power dissipation	P_T	150	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

Unit: mm

1: Base (Tr1)   4: Collector (Tr2)
2: Emitter   5: Collector (Tr1)
3: Base (Tr2)
EIAJ: SC-88A   SMini5-G1 Package

Marking Symbol: EM

Internal Connection

■ Electrical Characteristics $T_a = 25°C \pm 3°C$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = 10\ \mu A,\ I_E = 0$	50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 2\ mA,\ I_B = 0$	50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = 50\ V,\ I_E = 0$			0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = 50\ V,\ I_B = 0$			0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{EB} = 6\ V,\ I_C = 0$			0.2	mA
Forward current transfer ratio	h_{FE}	$V_{CE} = 10\ V,\ I_C = 5\ mA$	80			—
h_{FE} Ratio *	$h_{FE(Small /Large)}$	$V_{CE} = 10\ V,\ I_C = 5\ mA$	0.50	0.99		—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 10\ mA,\ I_B = 0.3\ mA$			0.25	V
Output voltage high-level	V_{OH}	$V_{CC} = 5\ V,\ V_B = 0.5\ V,\ R_L = 1\ k\Omega$	4.9			V
Output voltage low-level	V_{OL}	$V_{CC} = 5\ V,\ V_B = 2.5\ V,\ R_L = 1\ k\Omega$			0.2	V
Input resistance	R_1		−30%	2.2	+30%	$k\Omega$
Resistance ratio	R_1 / R_2			0.047		—
Transition frequency	f_T	$V_{CB} = 10\ V,\ I_E = −2\ mA,\ f = 200\ MHz$		150		MHz

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

2. ∗: Ratio between 2 elements

P_T — T_a

Total power dissipation P_T (mW) vs Ambient temperature T_a (°C)

I_C — V_{CE}

Collector current I_C (mA) vs Collector-emitter voltage V_{CE} (V)

$I_B = 1.0$ mA
0.9 mA
0.8 mA
0.7 mA
0.6 mA
0.5 mA
0.4 mA
0.3 mA
0.2 mA
0.1 mA

$V_{CE(sat)}$ — I_C

Collector-emitter saturation voltage $V_{CE(sat)}$ (V) vs Collector current I_C (mA)

$I_C / I_B = 10$

$T_a = 75°C$
$-25°C$
$25°C$

h_{FE} — I_C

Forward current transfer ratio h_{FE} vs Collector current I_C (mA)

$V_{CE} = 10$ V

$T_a = 75°C$
$25°C$
$-25°C$

C_{ob} — V_{CB}

Collector output capacitance (Common base, input open circuited) C_{ob} (pF) vs Collector-base voltage V_{CB} (V)

$f = 1$ MHz
$T_a = 25°C$

I_O — V_{IN}

Output current I_O (μA) vs Input voltage V_{IN} (V)

$V_O = 5$ V
$T_a = 25°C$

V_{IN} — I_O

Input voltage V_{IN} (V) vs Output current I_O (mA)

$V_O = 0.2$ V
$T_a = 25°C$