UP03390

Silicon NPN epitaxial planar type (Tr1)
Silicon PNP epitaxial planar type (Tr2)

For digital circuits

■ Features

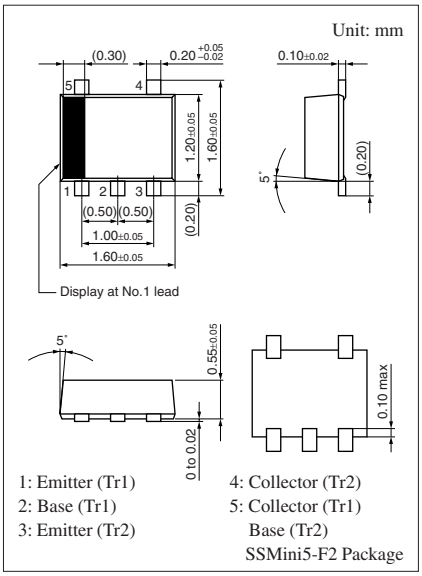
- Two elements incorporated into one package
  (Transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number

- UNR1114 + UNR1213

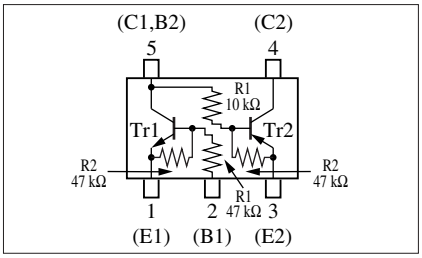
■ Absolute Maximum Ratings $T_a = 25°C$

Parameter		Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	50	V
	Collector-emitter voltage (Base open)	V_{CEO}	50	V
	Collector current	I_C	100	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	−50	V
	Collector-emitter voltage (Base open)	V_{CEO}	−50	V
	Collector current	I_C	−100	mA
Overall	Total power dissipation	P_T	125	mW
	Junction temperature	T_j	125	°C
	Storage temperature	T_{stg}	−55 to +125	°C



Marking Symbol: EX

Internal Connection



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

• Tr1

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, $I_C = 0$			0.1	mA
Forward current transfer ratio	h_{FE}	$V_{CE} = 10$ V, $I_C = 5$ mA	80			—
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, $R_L = 1$ kΩ	4.9			V
Output voltage low-level	V_{OL}	$V_{CC} = 5$ V, $V_B = 3.5$ V, $R_L = 1$ kΩ			0.2	V
Input resistance	R_1		−30%	47	+30%	kΩ
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{CB} = 10$ V, $I_E = -2$ mA, f = 200 MHz		150		MHz

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

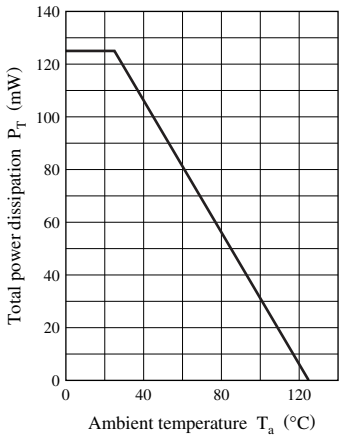
• Tr2

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			—
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, $R_L = 1$ kΩ	−4.9			V
Output voltage low-level	V_{OL}	$V_{CC} = -5$ V, $V_B = -2.5$ V, $R_L = 1$ kΩ			− 0.2	V
Input resistance	R_1		−30%	10	+30%	kΩ
Resistance ratio	R_1 / R_2		0.17	0.21	0.25	—
Transition frequency	f_T	$V_{CB} = -10$ V, $I_E = 1$ mA, f = 200 MHz		80		MHz

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

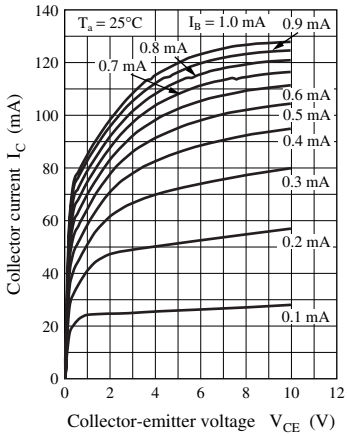
Common characteristics chart

P_T — T_a

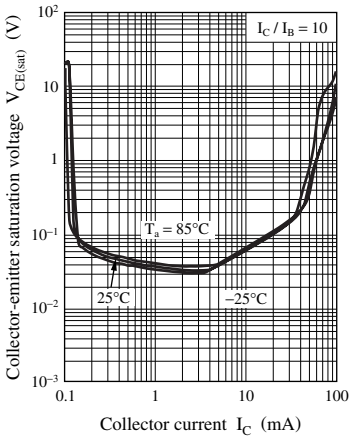


Characteristics charts of Tr1

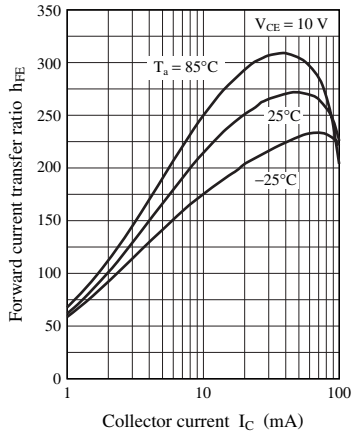
I_C — V_{CE}



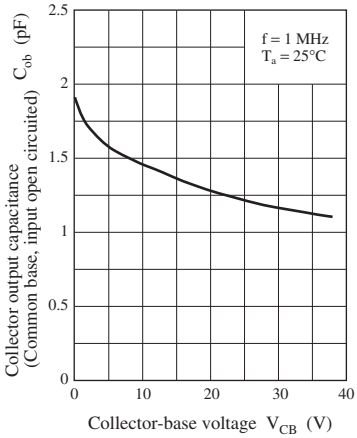
$V_{CE(sat)}$ — I_C



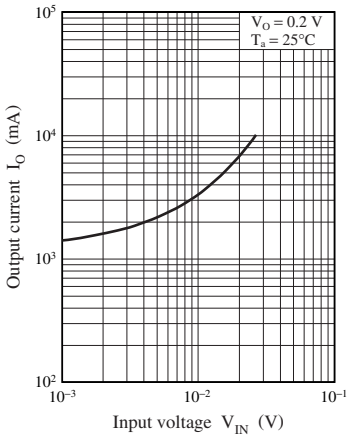
h_{FE} — I_C



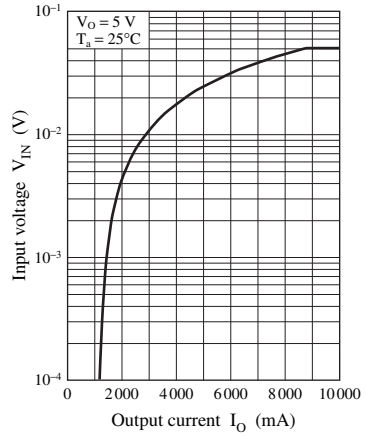
C_{ob} — V_{CB}



I_O — V_{IN}

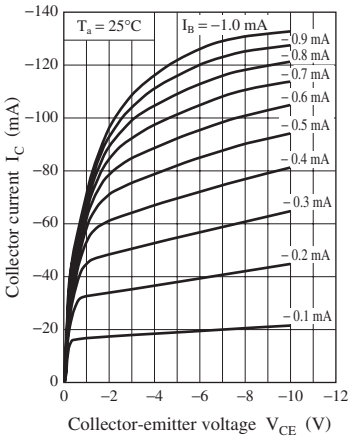


V_{IN} — I_O

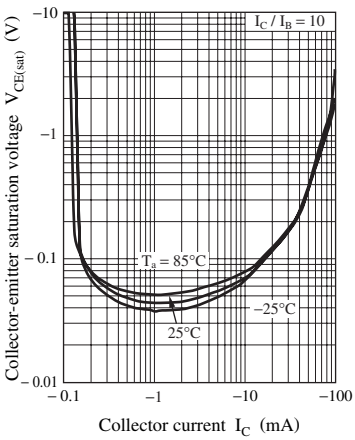


Characteristics charts of Tr2

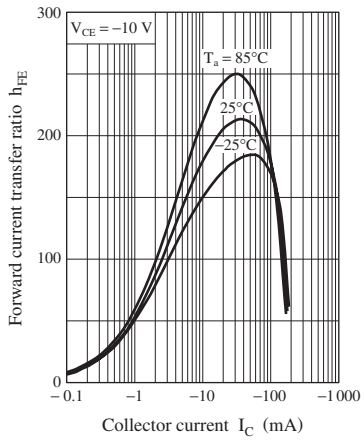
I_C — V_{CE}



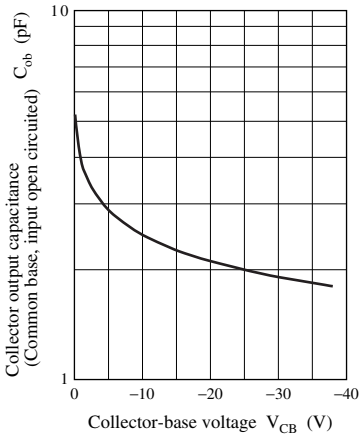
$V_{CE(sat)}$ — I_C



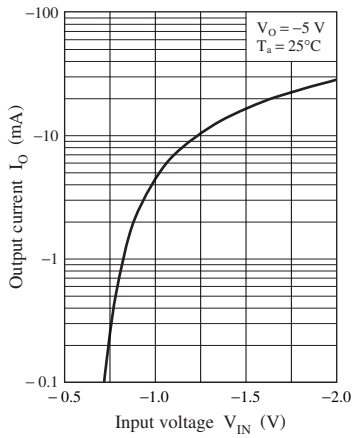
h_{FE} — I_C



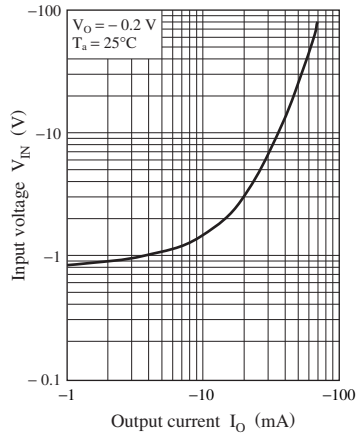
C_{ob} — V_{CB}



I_O — V_{IN}



V_{IN} — I_O



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