XP04654 (XP4654)

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

For high-speed switching

■ Features

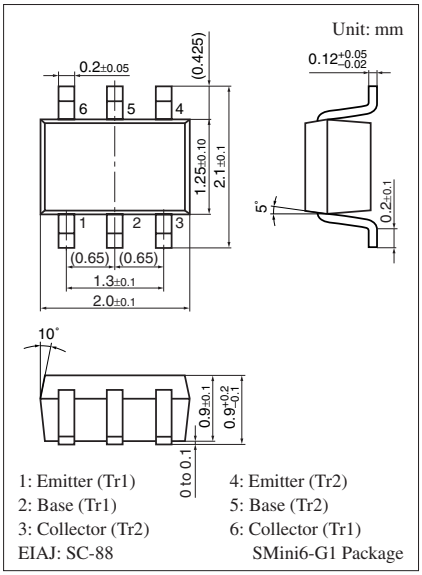
- Two elements incorporated into one package
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number

- 2SC3757 + 2SA1738

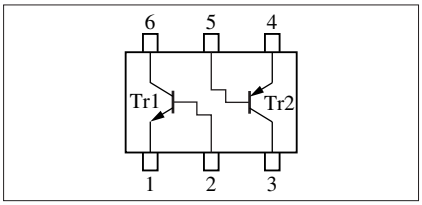
■ Absolute Maximum Ratings $T_a = 25°C$

Parameter		Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	40	V
	Collector-emitter voltage (E-B short)	V_{CES}	40	V
	Emitter-base voltage (Collector open)	V_{EBO}	5	V
	Collector current	I_C	100	mA
	Peak collector current	I_{CP}	300	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	−15	V
	Collector-emitter voltage (E-B short)	V_{CES}	−15	V
	Emitter-base voltage (Collector open)	V_{EBO}	−4	V
	Collector current	I_C	−50	mA
	Peak collector current	I_{CP}	−100	mA
Overall	Total power dissipation	P_T	150	mW
	Junction temperature	T_j	150	°C
	Storage temperature	T_{stg}	−55 to +150	°C



Marking Symbol: ED

Internal Connection



Note) The part number in the parenthesis shows conventional part number.

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

• Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	V_{CB} = 40 V, I_E = 0			0.1	µA
Emitter-base cutoff current (Collector open)	I_{EBO}	V_{EB} = 4 V, I_C = 0			0.1	µA
Forward current transfer ratio	h_{FE}	V_{CE} = 1 V, I_C = 10 mA	60		320	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = 10 mA, I_B = 1 mA		0.17	0.25	V
Base-emitter saturation voltage	$V_{BE(sat)}$	I_C = 10 mA, I_B = 1 mA			1.0	V
Transition frequency	f_T	V_{CB} = 10 V, I_E = −10 mA, f = 200 MHz		450		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz		2	6	pF
Turn-on time	t_{on}	Refer to the switching time measurement circuit		17		ns
Turn-off time	t_{off}			17		ns
Storage time	t_{stg}			10		ns

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

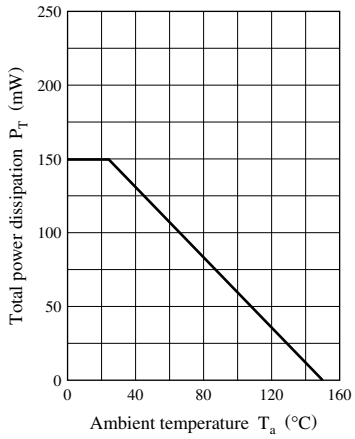
• Tr2

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	V_{CB} = −8 V, I_E = 0			− 0.1	µA
Emitter-base cutoff current (Collector open)	I_{EBO}	V_{EB} = −3 V, I_C = 0			− 0.1	µA
Forward current transfer ratio	h_{FE1}	V_{CE} = −1 V, I_C = −10 mA	50		150	—
	h_{FE2}	V_{CE} = −1 V, I_C = −1 mA	30			
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = −10 mA, I_B = −1 mA		− 0.1	− 0.2	V
Transition frequency	f_T	V_{CB} = −10 V, I_E = 10 mA, f = 200 MHz	800	1 500		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	V_{CB} = −5 V, I_E = 0, f = 1 MHz		1		pF
Turn-on time	t_{on}	Refer to the switching time measurement circuit		12		ns
Turn-off time	t_{off}			20		ns
Storage time	t_{stg}			19		ns

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

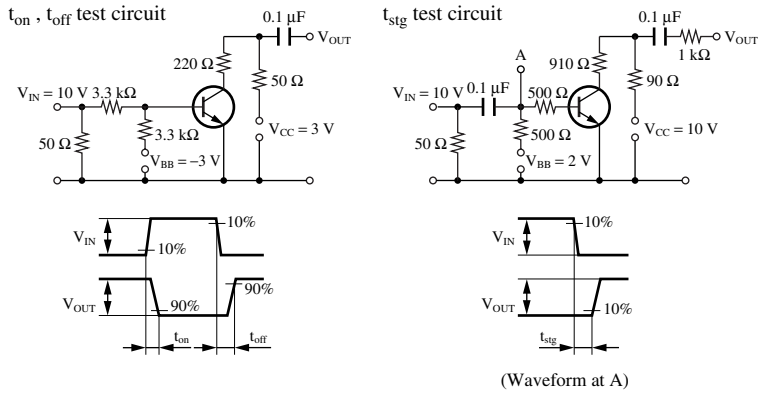
Common characteristics chart

P_T — T_a

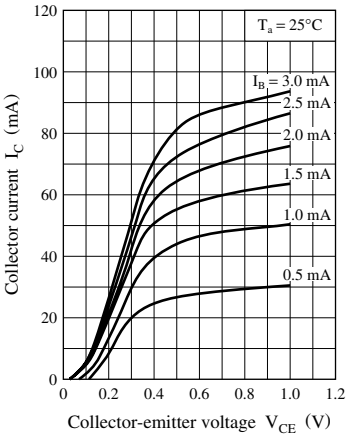


Characteristics charts of Tr1

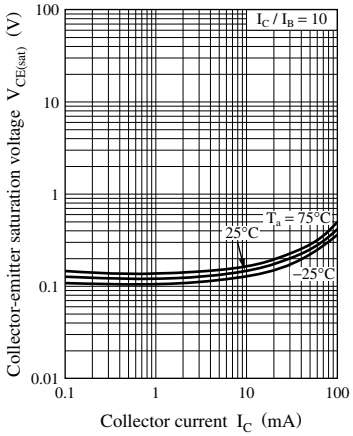
Switching time measurement circuit



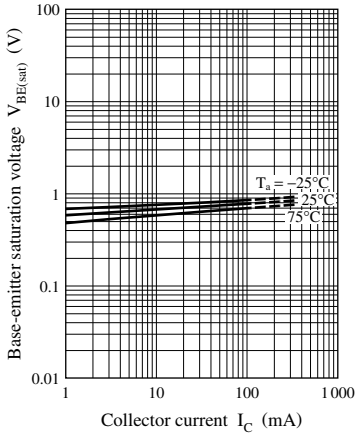
I_C — V_{CE}



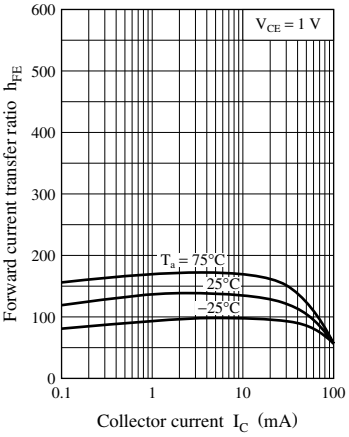
$V_{CE(sat)}$ — I_C



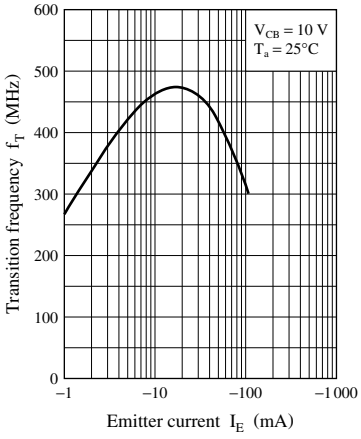
$V_{BE(sat)}$ — I_C



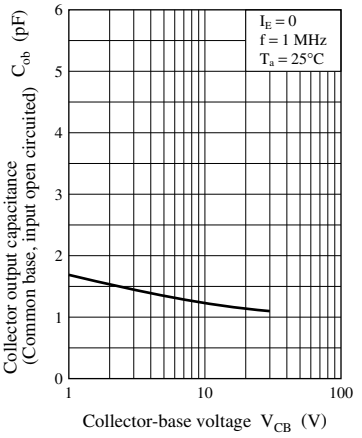
h_{FE} — I_C



f_T — I_E



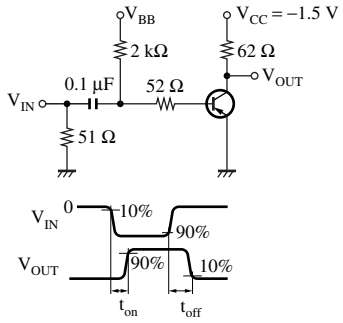
C_{ob} — V_{CB}



Characteristics charts of Tr2

Switching time measurement circuit

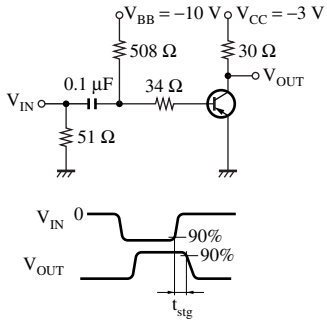
t_{on} , t_{off} test circuit



V_{IN} = −5.8 V
V_{BB} = Ground

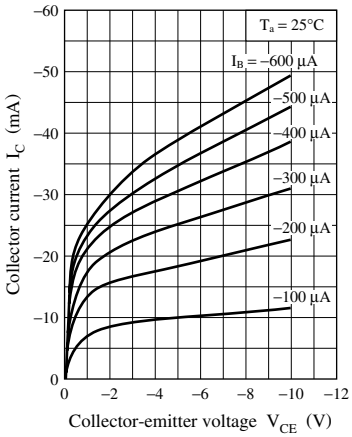
V_{IN} = 9.8 V
V_{BB} = −8.0 V

t_{stg} test circuit

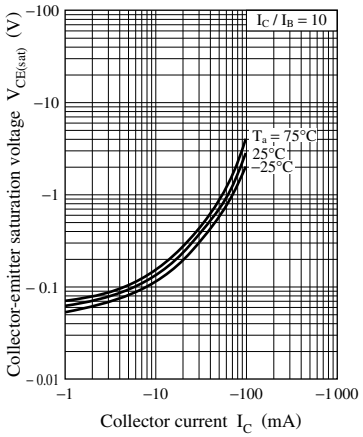


V_{IN} = 9.0 V

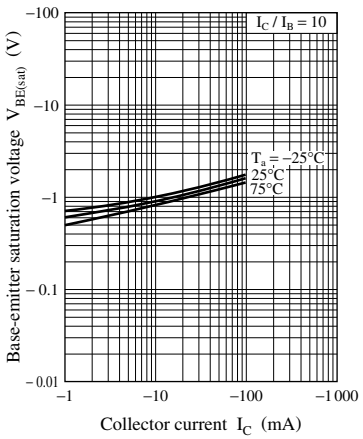
I_C — V_{CE}



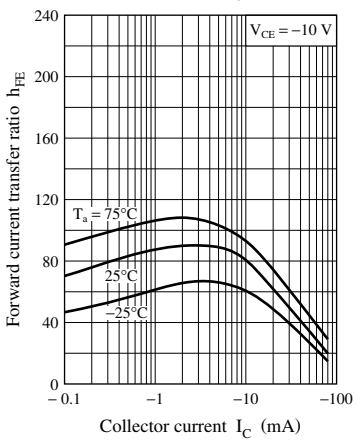
$V_{CE(sat)}$ — I_C



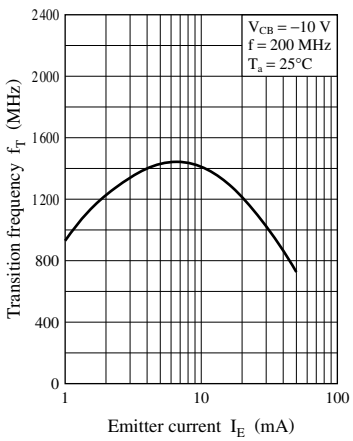
$V_{BE(sat)}$ — I_C



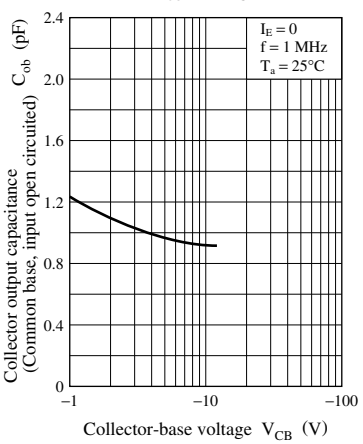
h_{FE} — I_C



f_T — I_E



C_{ob} — V_{CB}



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