

XP04654 (XP4654)

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

For high-speed switching

■ Features

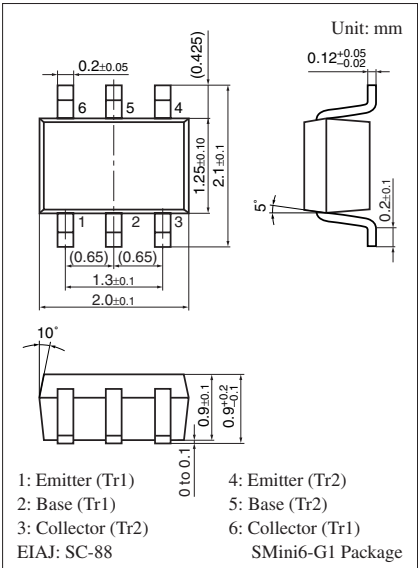
- Two elements incorporated into one package
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number

- 2SC3757 + 2SA1738

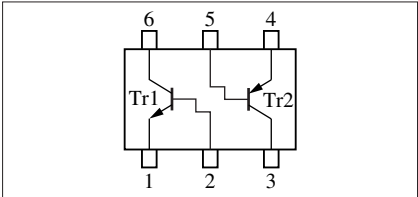
■ Absolute Maximum Ratings $T_a = 25^{\circ}\text{C}$

	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	$^{\circ}\text{C}$
	Storage temperature	T_{stg}	−55 to +150	$^{\circ}\text{C}$



Marking Symbol: ED

Internal Connection



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

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

• Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{\text{CB}} = 40 \text{ V}, I_{\text{E}} = 0$			0.1	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = 4 \text{ V}, I_{\text{C}} = 0$			0.1	μA
Forward current transfer ratio	h_{FE}	$V_{\text{CE}} = 1 \text{ V}, I_{\text{C}} = 10 \text{ mA}$	60		320	—
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 10 \text{ mA}, I_{\text{B}} = 1 \text{ mA}$		0.17	0.25	V
Base-emitter saturation voltage	$V_{\text{BE(sat)}}$	$I_{\text{C}} = 10 \text{ mA}, I_{\text{B}} = 1 \text{ mA}$			1.0	V
Transition frequency	f_{T}	$V_{\text{CB}} = 10 \text{ V}, I_{\text{E}} = -10 \text{ mA}, f = 200 \text{ MHz}$		450		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{\text{CB}} = 10 \text{ V}, I_{\text{E}} = 0, f = 1 \text{ MHz}$		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

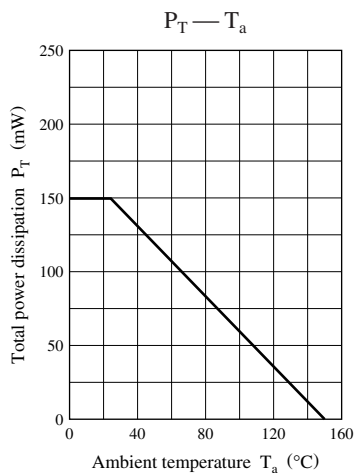
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

• Tr2

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{\text{CB}} = -8 \text{ V}, I_{\text{E}} = 0$			-0.1	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = -3 \text{ V}, I_{\text{C}} = 0$			-0.1	μA
Forward current transfer ratio	h_{FE1}	$V_{\text{CE}} = -1 \text{ V}, I_{\text{C}} = -10 \text{ mA}$	50		150	—
	h_{FE2}	$V_{\text{CE}} = -1 \text{ V}, I_{\text{C}} = -1 \text{ mA}$	30			
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = -10 \text{ mA}, I_{\text{B}} = -1 \text{ mA}$		-0.1	-0.2	V
Transition frequency	f_{T}	$V_{\text{CB}} = -10 \text{ V}, I_{\text{E}} = 10 \text{ mA}, f = 200 \text{ MHz}$	800	1 500		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{\text{CB}} = -5 \text{ V}, I_{\text{E}} = 0, f = 1 \text{ MHz}$		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

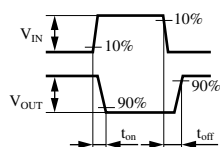
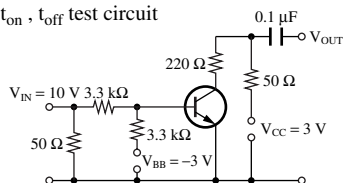
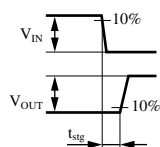
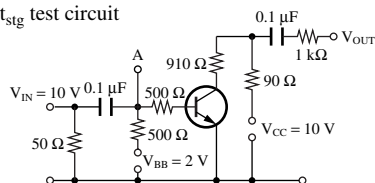
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

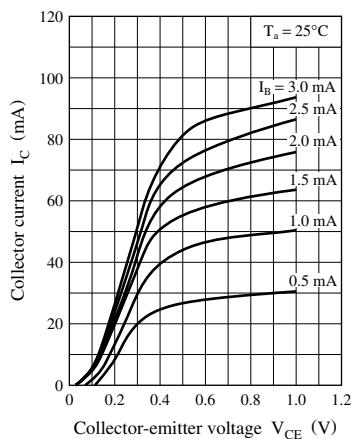
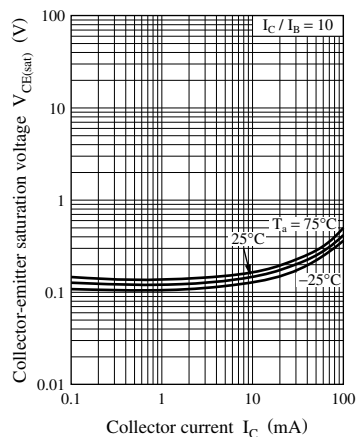
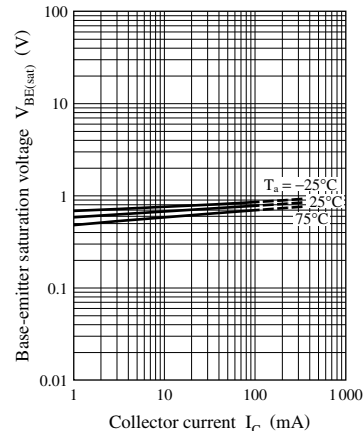
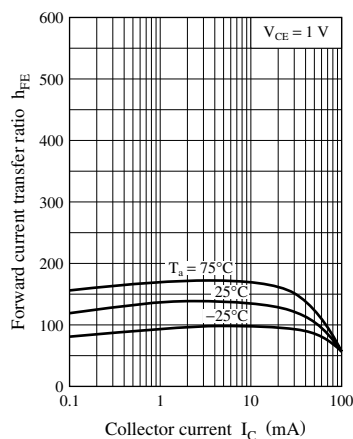
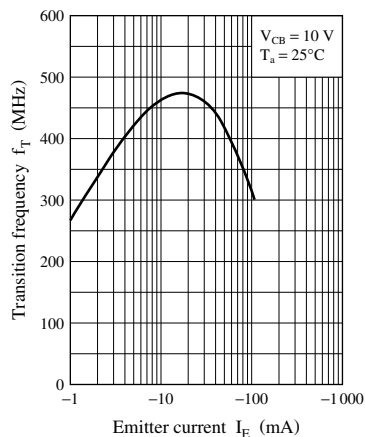
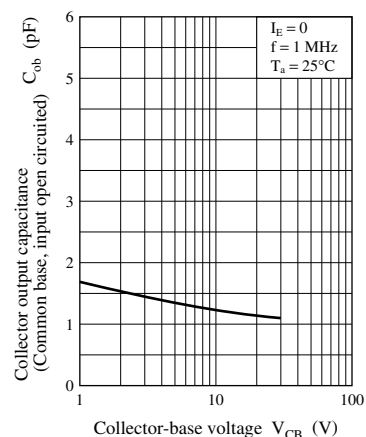


Characteristics charts of Tr1

Switching time measurement circuit

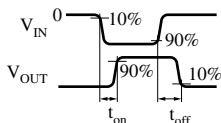
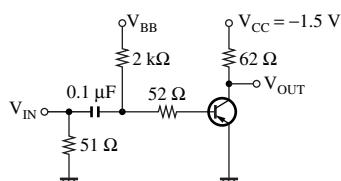
 t_{on} , t_{off} test circuit t_{stg} test circuit

(Waveform at A)

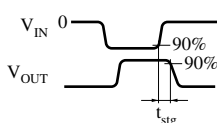
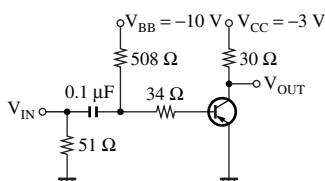
 $I_C - V_{CE}$  $V_{CE(sat)} - I_C$  $V_{BE(sat)} - I_C$  $h_{FE} - I_C$  $f_T - I_E$  $C_{ob} - V_{CB}$ 

Characteristics charts of Tr2

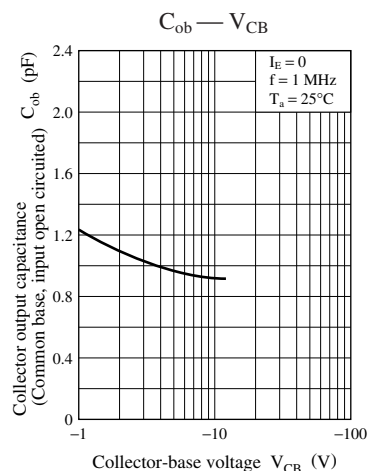
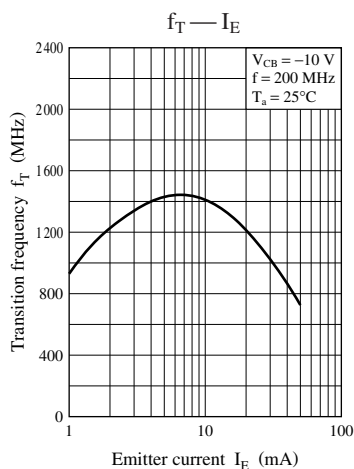
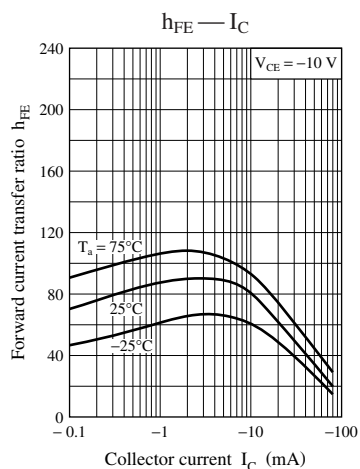
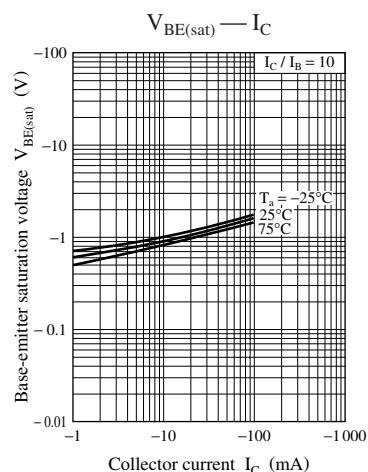
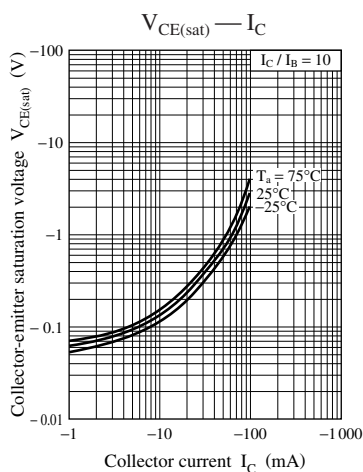
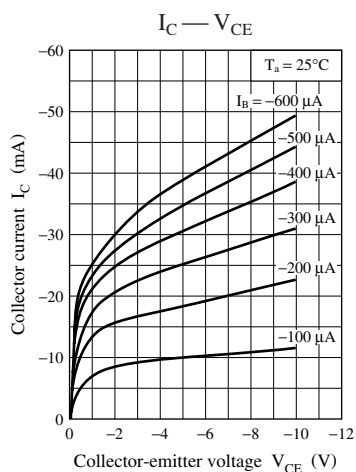
Switching time measurement circuit

 t_{on} , t_{off} test circuit

$V_{IN} = -5.8 \text{ V}$ $V_{IN} = 9.8 \text{ V}$
 $V_{BB} = \text{Ground}$ $V_{BB} = -8.0 \text{ V}$

 t_{stg} test circuit

$V_{IN} = 9.0 \text{ V}$



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