

NPN SILICON EPITAXIAL TRANSISTOR
FOR HIGH-FREQUENCY AMPLIFIERS AND MID-SPEED SWITCHING

FEATURES

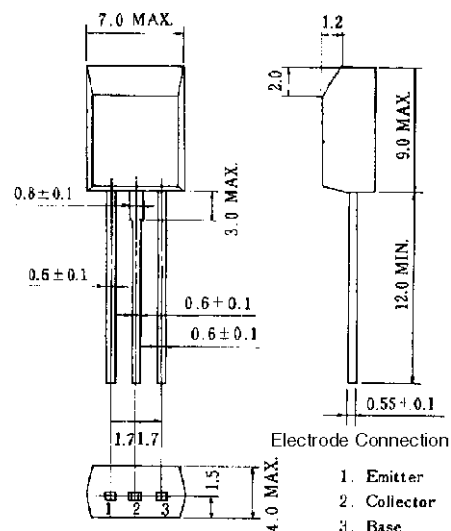
- Complementary transistor with 2SA1154
- High P_T in small dimension and high voltage
 $P_T = 1\text{ W}$, $V_{CE0} = 60\text{ V}$

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	60	V
Collector to emitter voltage	V_{CEO}	60	V
Emitter to base voltage	V_{EBO}	5.0	V
Collector current (DC)	$I_{C(DC)}$	0.7	A
Collector current (pulse)	$I_{C(pulse)^*}$	1.0	A
Total power dissipation	P_T	1	W
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

* $PW \leq 10\text{ ms}$, duty cycle $\leq 50\%$

PACKAGE DRAWING (UNIT: mm)



ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = 60\text{ V}$, $I_E = 0$			100	nA
Emitter cutoff current	I_{EBO}	$V_{EB} = 5.0\text{ V}$, $I_C = 0$			100	nA
DC current gain	h_{FE1}	$V_{CE} = 1.0\text{ V}$, $I_C = 0.1\text{ A}$ *	90	200	400	
DC current gain	h_{FE2}	$V_{CE} = 1.0\text{ V}$, $I_C = 0.5\text{ A}$ *	50	150		
DC base voltage	V_{BE}	$V_{CE} = 6.0\text{ V}$, $I_C = 10\text{ mA}$	600	635	700	mV
Collector saturation voltage	$V_{CE(sat)}$	$I_C = 0.5\text{ A}$, $I_B = 50\text{ mA}$ *		0.12	0.35	V
Base saturation voltage	$V_{BE(sat)}$	$I_C = 0.5\text{ A}$, $I_B = 50\text{ mA}$ *		0.90	1.2	V
Output capacitance	C_{ob}	$V_{CB} = 6.0\text{ V}$, $I_E = 0$, $f = 1.0\text{ MHz}$		13		pF
Gain bandwidth product	f_r	$V_{CE} = 6.0\text{ V}$, $I_E = -10\text{ mA}$		110		MHz
Turn-on time	t_{on}	Refer to the test circuit.		60		ns
Storage temperature	t_{stg}			600		ns
Turn-off time	t_{off}			650		ns

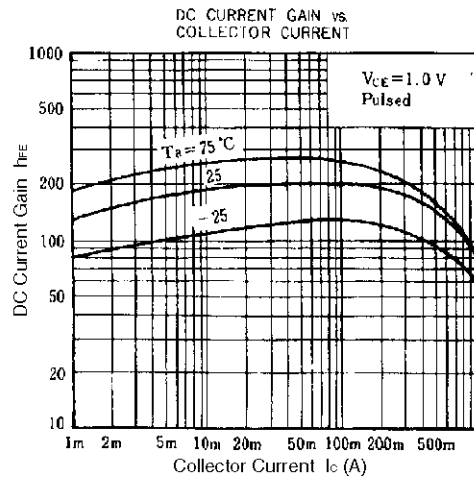
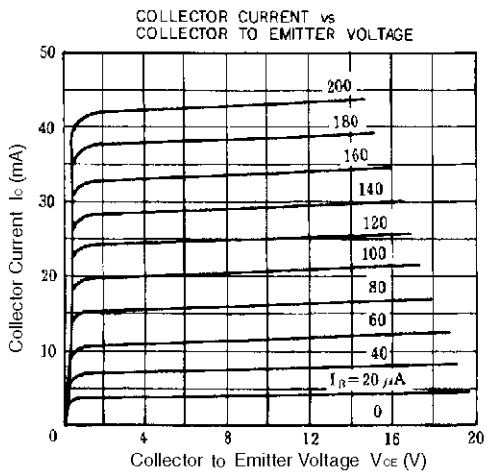
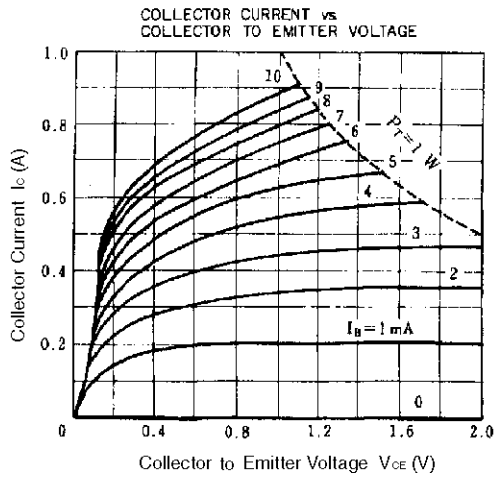
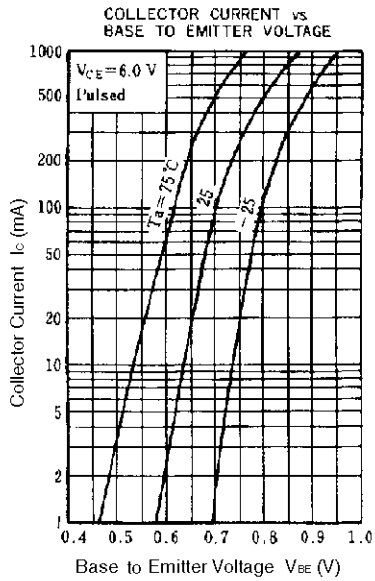
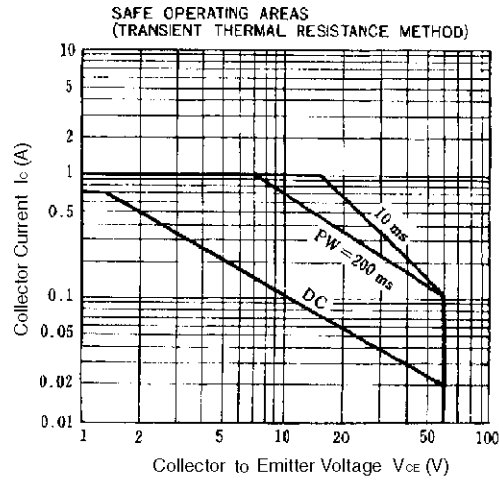
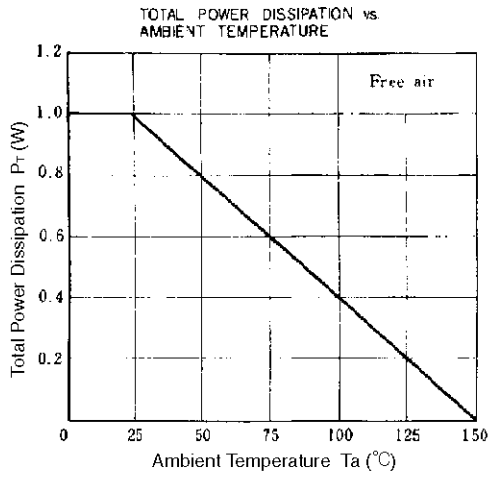
* Pulse test $PW \leq 350\ \mu\text{s}$, duty cycle $\leq 2\%$ per pulsed

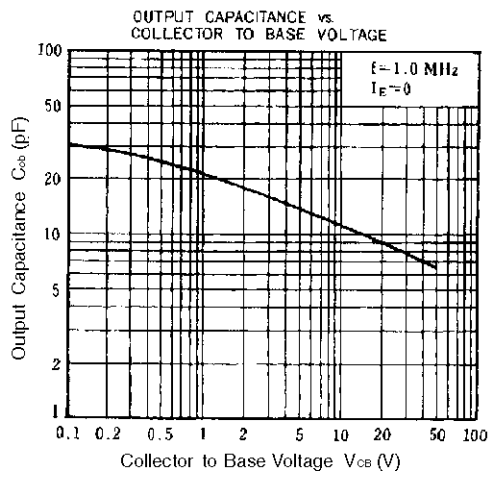
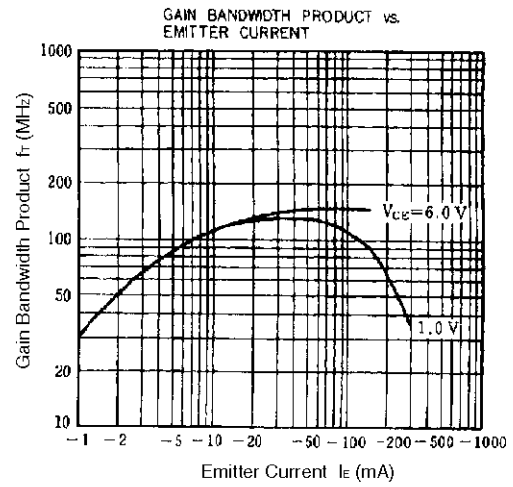
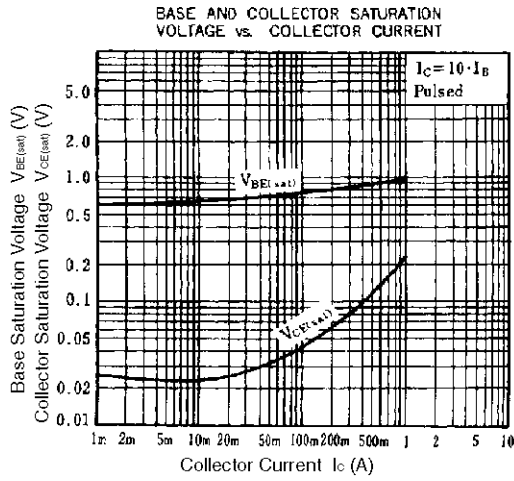
h_{FE} CLASSIFICATION

Marking	MA	LA	KA
h_{FE1}	90 to 180	135 to 270	200 to 400

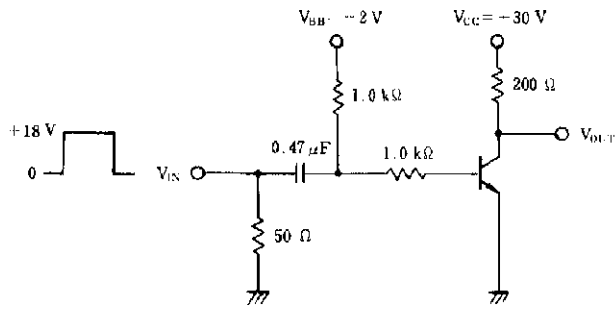
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TYPICAL CHARACTERISTICS (Ta = 25°C)



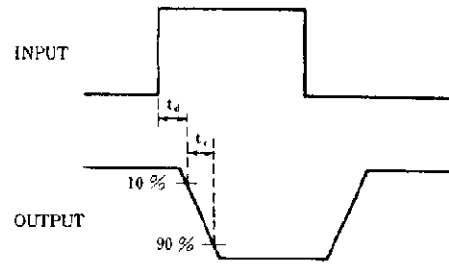


SWITCHING TIME TEST CIRCUIT

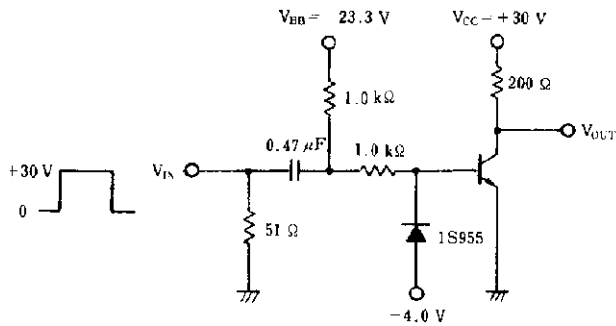


$t_r < 2.0\ \text{ns}$
 PW = $1.0\ \mu\text{s}$
 DC = 2 %

t_{on} Switching Circuit

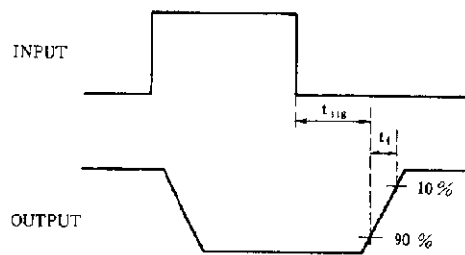


$t_{on} = t_d + t_r$
 VOLTAGE WAVEFORMS



$t_r < 2.0\ \text{ns}$
 PW = $1.0\ \mu\text{s}$
 DC = 2 %

t_{off} Switching Circuit



$t_{off} = t_{stg} + t_f$
 VOLTAGE WAVEFORMS

[MEMO]

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