

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

FEATURES

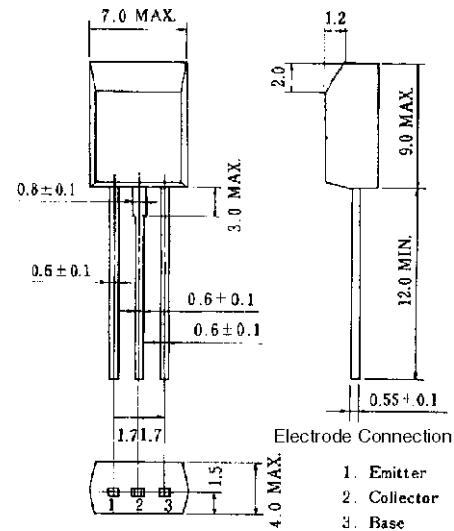
- Complementary transistor with 2SA1154
- High  $P_T$  in small dimension and high voltage  
 $P_T = 1\text{ W}$ ,  $V_{CE0} = 60\text{ V}$

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

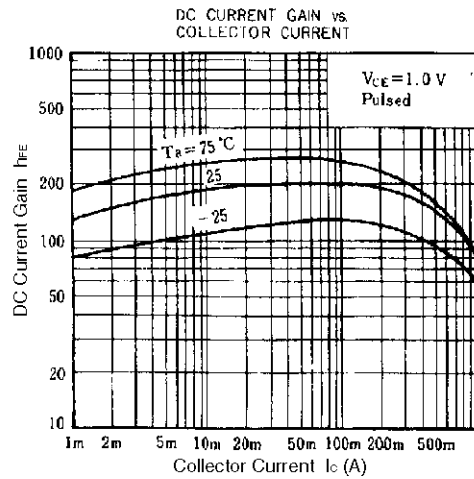
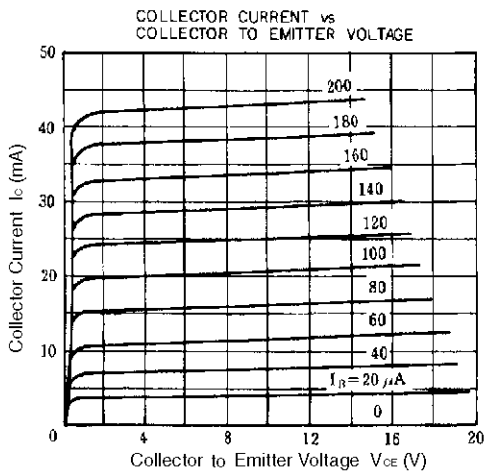
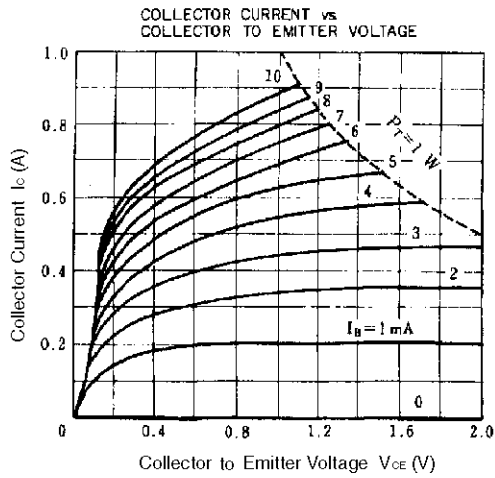
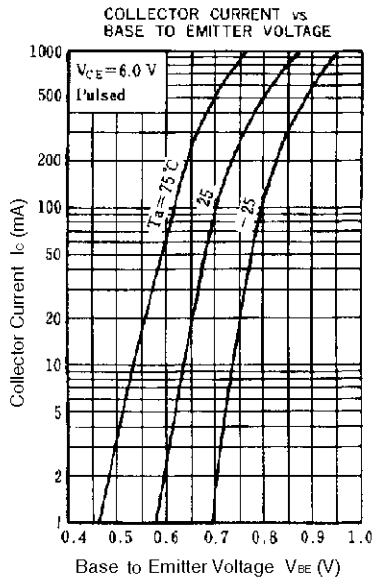
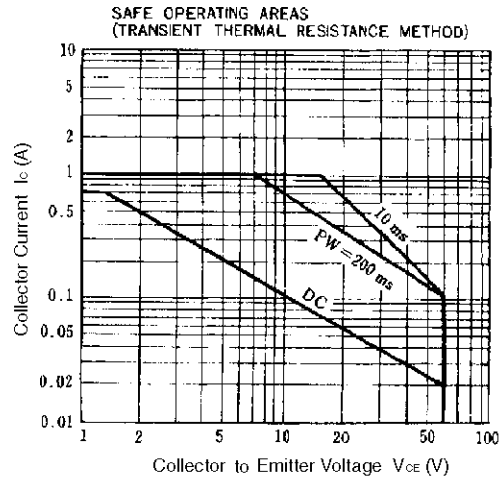
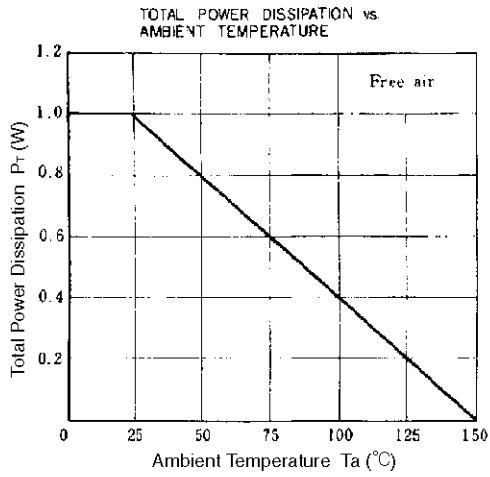
\* Pulse test  $PW \leq 350\ \mu\text{s}$ , duty cycle  $\leq 2\%$  per pulsed

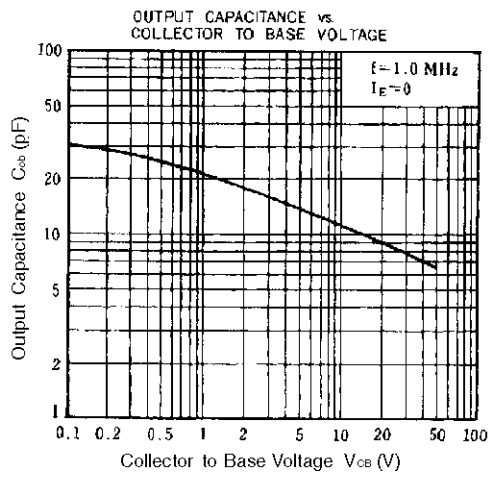
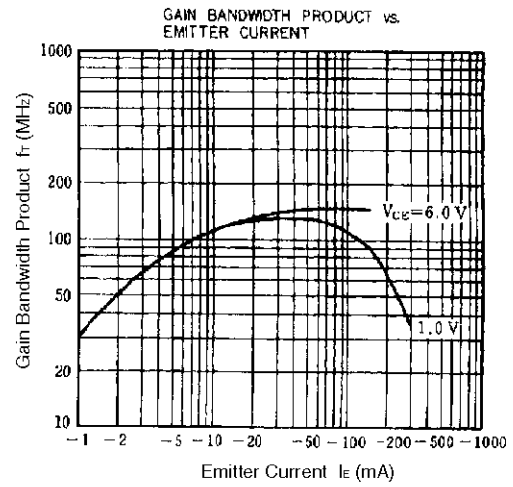
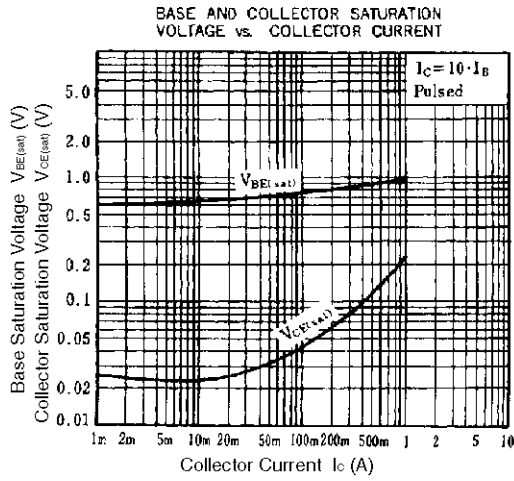
$h_{FE}$  CLASSIFICATION

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

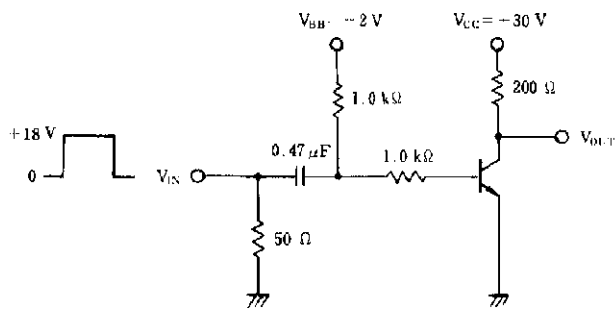
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TYPICAL CHARACTERISTICS (Ta = 25°C)



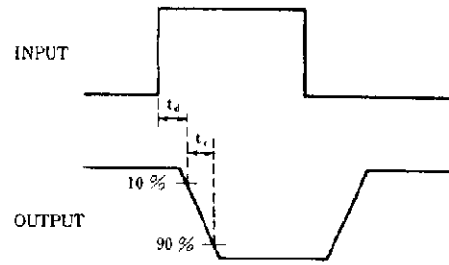


SWITCHING TIME TEST CIRCUIT

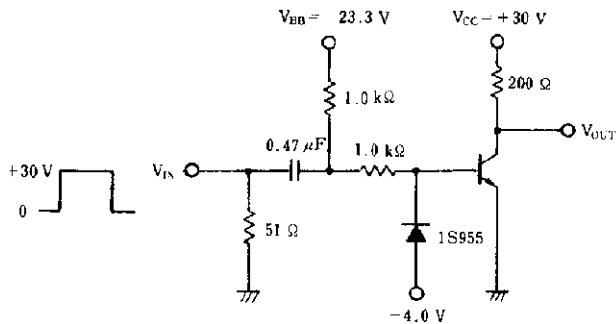


$t_r < 2.0 \text{ ns}$   
 PW = 1.0  $\mu\text{s}$   
 DC = 2 %

$t_{on}$  Switching Circuit

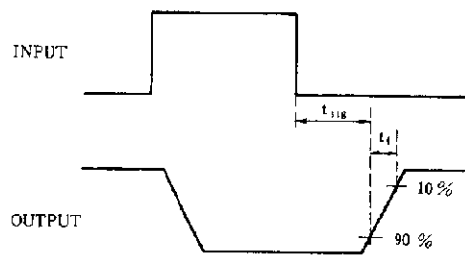


$t_{on} = t_d + t_r$   
 VOLTAGE WAVEFORMS



$t_r < 2.0 \text{ ns}$   
 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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