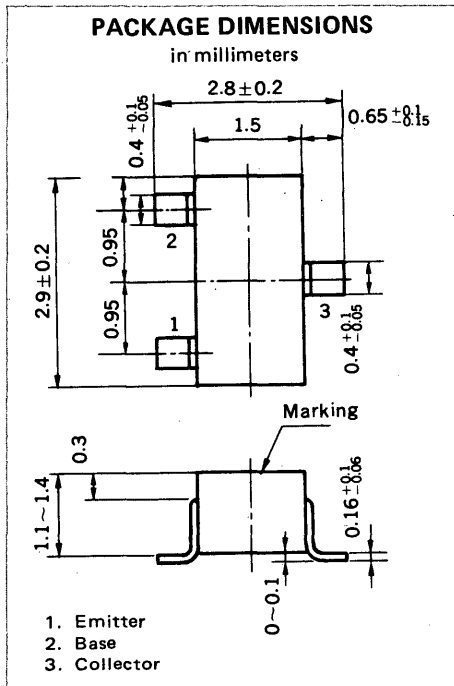


HIGH SPEED SWITCHING
NPN SILICON EPITAXIAL TRANSISTOR
MINI MOLD



FEATURE

- High Speed: $t_{on} < 12 \text{ ns}$ $t_{off} < 18 \text{ ns}$

ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Current ($T_a = 25^\circ\text{C}$)

Collector to Base Voltage	V_{CBO}	40	V
Collector to Emitter Voltage	V_{CEO}	15	V
Emitter to Base Voltage	V_{EBO}	5.0	V
Collector Current (DC)	I_C	200	mA

Maximum Power Dissipation

Total Power Dissipation at 25°C Ambient Temperature	P_T	200	mW
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Maximum Temperatures

Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			100	nA	$V_{CB} = 20 \text{ V}, I_E = 0$
Emitter Cutoff Current	I_{EBO}			100	nA	$V_{EB} = 3.0 \text{ V}, I_C = 0$
DC Current Gain	h_{FE1}	40	90	200		$V_{CE} = 1.0 \text{ V}, I_C = 10 \text{ mA}$
Collector Saturation Voltage	$V_{CE(sat)}$		0.15	0.25	V	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$
Base Saturation Voltage	$V_{BE(sat)}$		0.80	0.85	V	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$
Gain Bandwidth Product	f_T	500	750		MHz	$V_{CE} = 10 \text{ V}, I_E = -10 \text{ mA}$
Output Capacitance	C_{ob}		1.8	4.0	pF	$V_{CB} = 5.0 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$
Turn-on Time	t_{on}		8.0	12	ns	See Test Circuit
Storage Time	t_{stg}		6.0	13	ns	
Turn-off Time	t_{off}		12	18	ns	

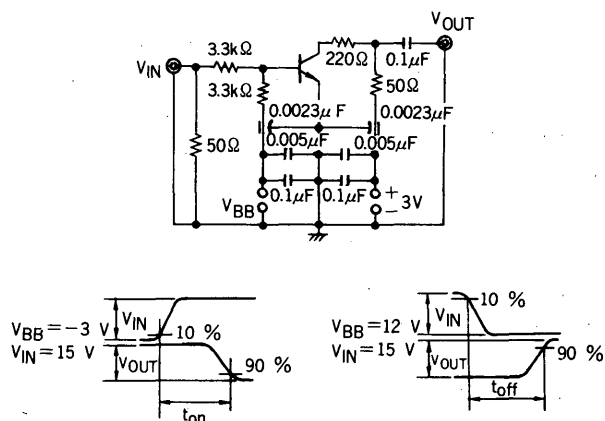
* Pulsed: $PW \leq 350 \mu\text{s}$, Duty Cycle $\leq 2\%$

h_{FE} Classification

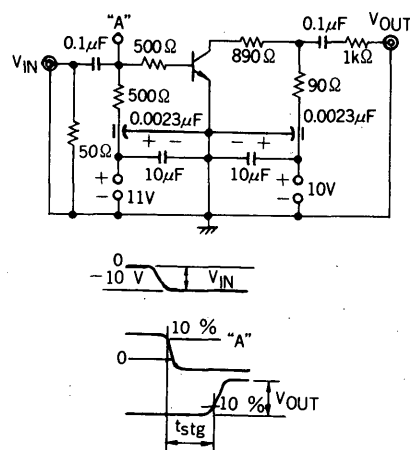
Marking	B33	B34	B35
h_{FE}	40 to 80	60 to 120	100 to 200

SWITCHING TIME TEST CIRCUIT

T_{on}, T_{off} TEST CIRCUIT

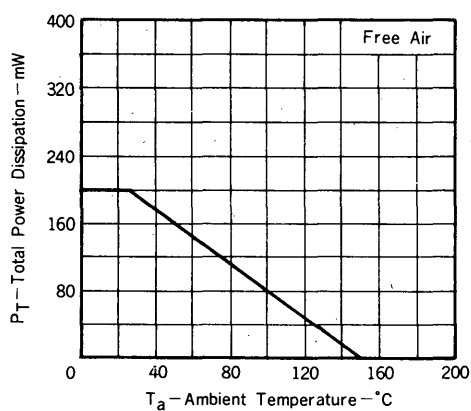


T_{stg} TEST CIRCUIT

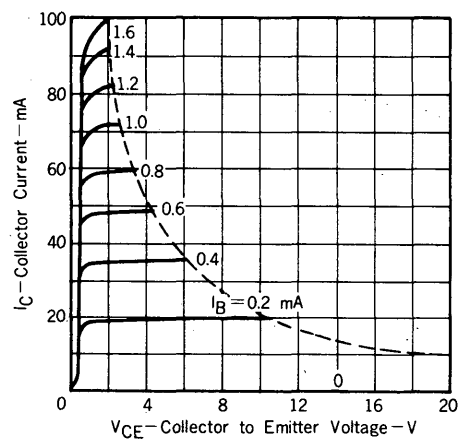


TYPICAL CHARACTERISTICS (T_a = 25 °C)

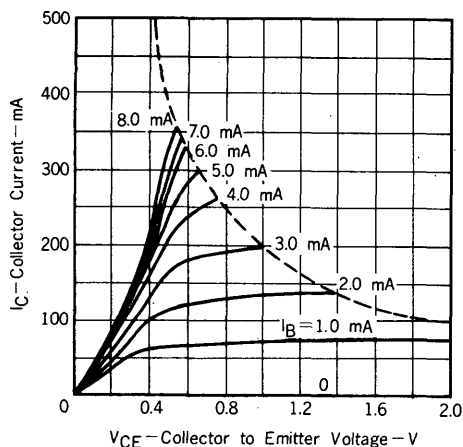
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



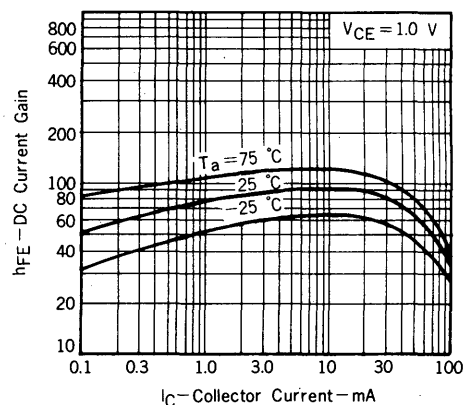
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



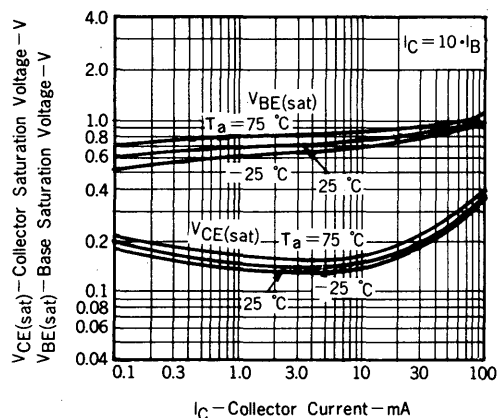
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



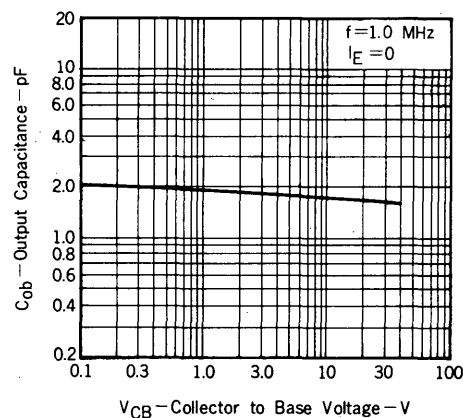
DC CURRENT GAIN vs.
COLLECTOR CURRENT



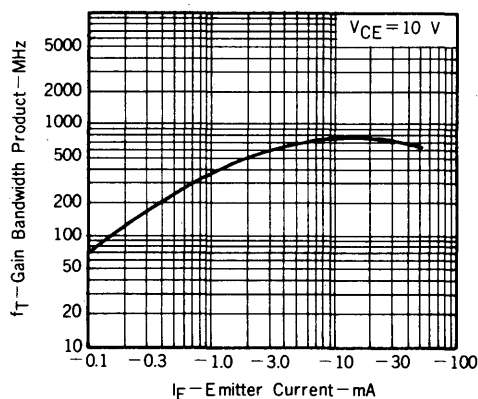
COLLECTOR AND BASE SATURATION
VOLTAGE vs. COLLECTOR CURRENT



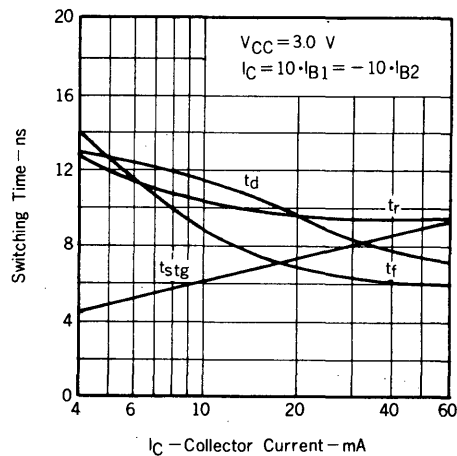
OUTPUT CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



GAIN BANDWIDTH PRODUCT
vs. EMITTER CURRENT



SWITCHING TIME
vs. COLLECTOR CURRENT



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