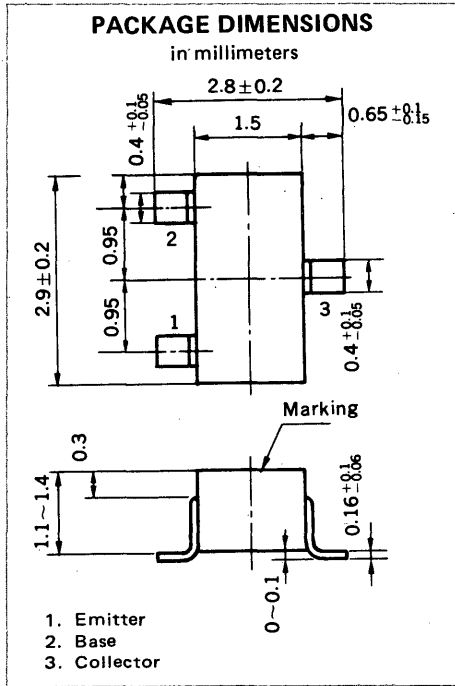


**HIGH SPEED SWITCHING**  
**NPN SILICON EPITAXIAL TRANSISTOR**  
**MINI MOLD**



**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	$V_{CB0}$	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 $25^\circ \text{C}$ 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	

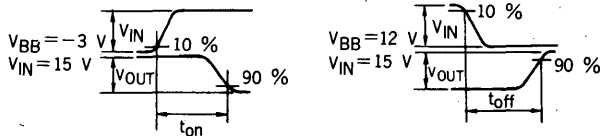
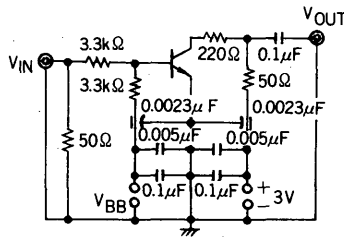
\* Pulsed:  $PW \leq 350 \mu\text{s}$ , Duty Cycle  $\leq 2\%$

**$h_{FE}$  Classification**

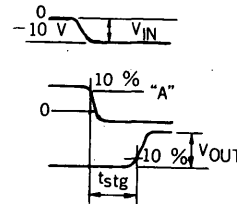
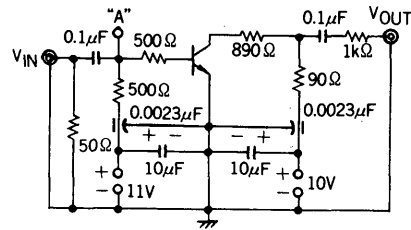
Marking	B33	B34	B35
$h_{FE}$	40 to 80	60 to 120	100 to 200

SWITCHING TIME TEST CIRCUIT

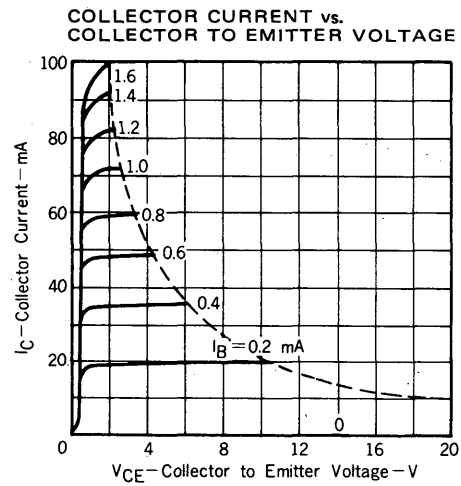
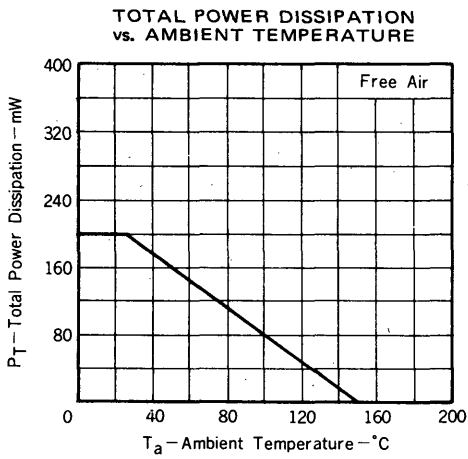
$T_{on}$ ,  $T_{off}$  TEST CIRCUIT



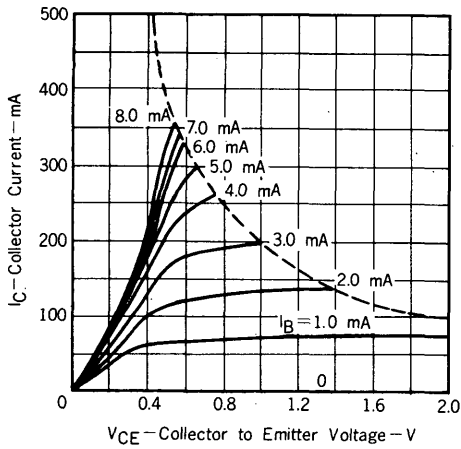
$T_{stg}$  TEST CIRCUIT



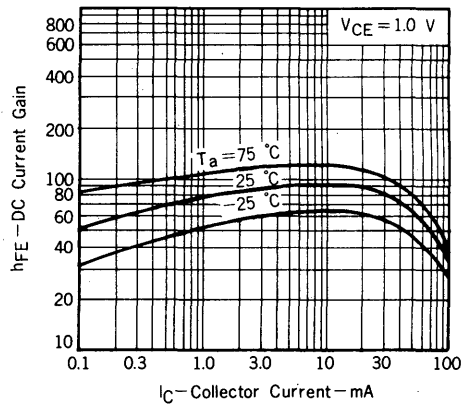
TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



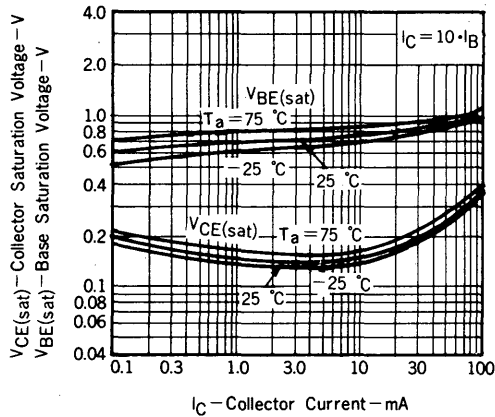
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



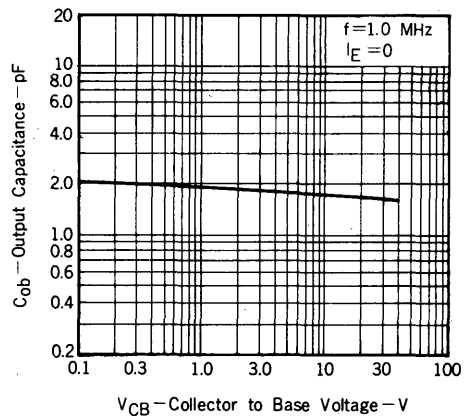
DC CURRENT GAIN vs. COLLECTOR CURRENT



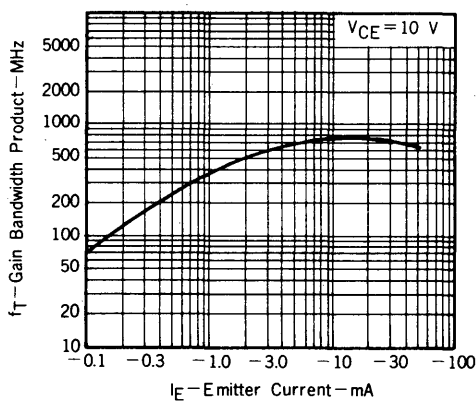
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



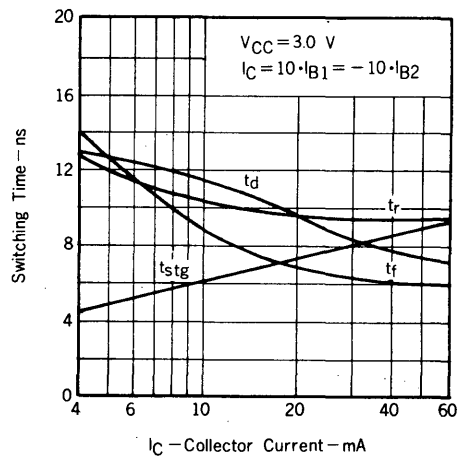
OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



SWITCHING TIME vs. COLLECTOR CURRENT



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JULY-15-85M

Printed in Japan



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