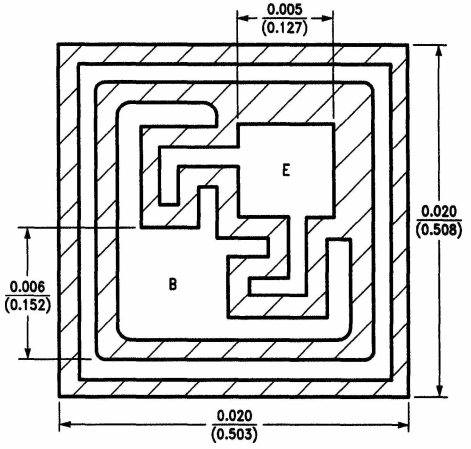
National Semiconductor

Process 10
NPN Small Signal



TL/G/10034–65

DESCRIPTION

Process 10 is a non-overlay, double-diffused, silicon epitaxial device. Complement to Process 68.

APPLICATION

This device was designed for general purpose amplifier applications at collector currents to 500 mA.

PRINCIPAL DEVICE TYPES

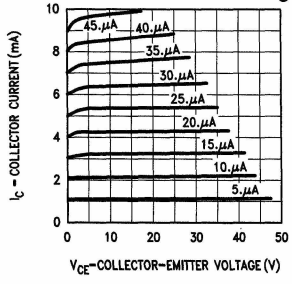
TO-92 EBC: PN100, PN2222
TO-92 ECB: 2N3415
TO-116: MPQ100
TO-236: MMBT100, 100A
16-SOIC: MMPQ100

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

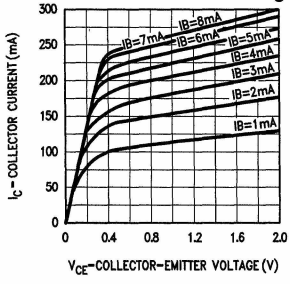
Symbol	Conditions	Min	Typ	Max	Units
BV_{CBO}	I_C = 10 μA	75			V
BV_{CEO}	I_C = 1 mA	45			V
BV_{EBO}	I_E = 10 μA	6			V
I_{CBO}	V_{CB} = 60V			50	nA
I_{CES}	V_{CE} = 40V			50	nA
I_{EBO}	V_{EB} = 4V			50	nA
h_{FE}	I_C = 100 μA, V_{CE} = 1V I_C = 10 mA, V_{CE} = 1V I_C = 100 mA, V_{CE} = 1V I_C = 150 mA, V_{CE} = 5V I_C = 300 mA, V_{CE} = 5V	80 100 100 100 60	250	600	
$V_{CE(s)}$	I_C = 10 mA, I_B = 1 mA			0.2	V
$V_{BE(s)}$	I_C = 10 mA, I_B = 1 mA			0.85	V
$V_{CE(s)}$	I_C = 200 mA, I_B = 20 mA			0.4	V
$V_{BE(s)}$	I_C = 200 mA, I_B = 20 mA			1.0	V
C_{ob}	V_{CB} = 5V, f = 1 MHz		3.5	4.5	pF
f_T	V_{CE} = 20V, I_C = 20 mA	200	300		MHz
t_s	I_C = 10 mA, I_{B_1} = I_{B_2} = 1 mA		275		ns
t_{OFF}	I_C = 150 mA, I_{B_1} = I_{B_2} = 15 mA		225		ns
NF	I_C = 100 μA, V_{CE} = 5V, R_G = 2 kΩ, f = 1 kHz		1.5		dB
$P_{D(max)}$ TO-92 TO-236	 T_A = 25°C T_C = 25°C	 600 350			 mW mW

Process 10

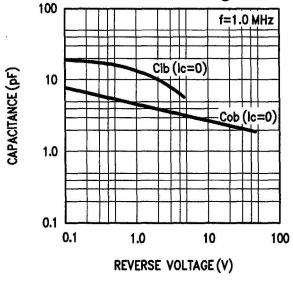
Collector Current vs Collector-Emitter Voltage



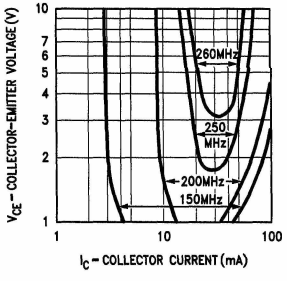
Collector Current vs Collector-Emitter Voltage



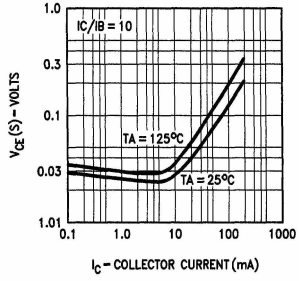
Input and Output Capacitance vs Reverse Voltage



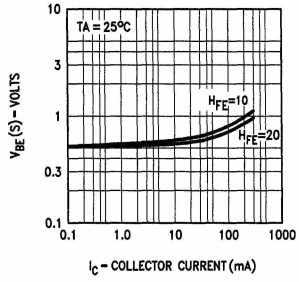
Contours of Constant Gain Bandwidth Product (FT)



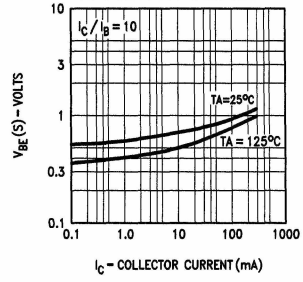
Collector Saturation Voltage vs Collector Current



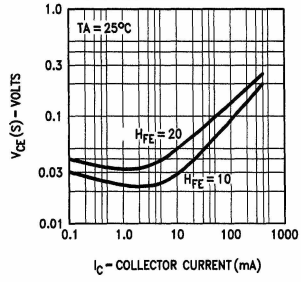
Base Saturation Voltage vs Collector Current



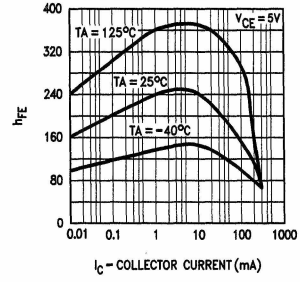
Base Saturation Voltage vs Collector Current



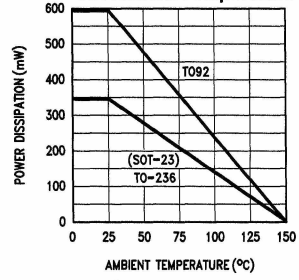
Collector Saturation Voltage vs Collector Current



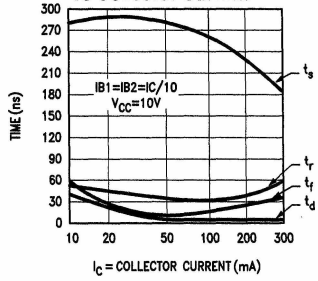
D.C. Current Gain vs Collector Current



Total Power Dissipation vs Ambient Temperature



Switching Times vs Collector Current



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