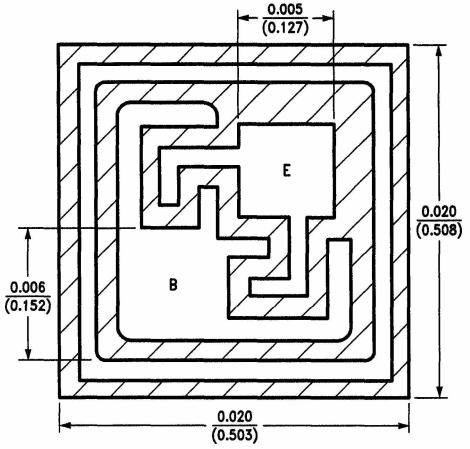
National Semiconductor

Process 68
PNP Small Signal



TL/G/10038–26

GENERAL DESCRIPTION

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

APPLICATION

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

PRINCIPAL DEVICE TYPE

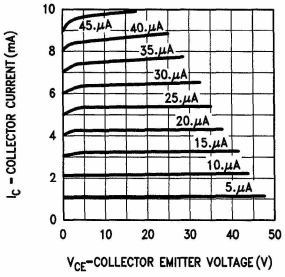
TO-92 EBC: PN200, PN2907
TO-92 ECB: 2N4061
TO-116: MPQ200
TO-236: MMBT200, 200A
16-SOIC: MMPQ200

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

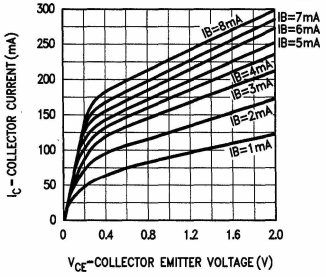
Symbol	Conditions	Min	Typ	Max	Units
BV_{CBO}	I_C = 10 μA	60			V
BV_{CEO}	I_C = 1 mA	45			V
BV_{EBO}	I_E = 10 μA	6			V
I_{CBO}	V_{CB} = 50V			50	nA
I_{CES}	V_{CE} = 40V			50	nA
I_{EBO}	V_{EB} = 4V			50	nA
h_{FE}	I_C = 100 μA, V_{CE} = 1V	80			
	I_C = 10 mA, V_{CE} = 1V	100	250	600	
	I_C = 100 mA, V_{CE} = 1V	100			
	I_C = 150 mA, V_{CE} = 5V	100		500	
	I_C = 300 mA, V_{CE} = 5V	50			
$V_{CE(s)}$	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		4.0	6.0	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	T_A = 25°C	600			mW
TO-236	T_C = 25°C	350			mW

Process 68

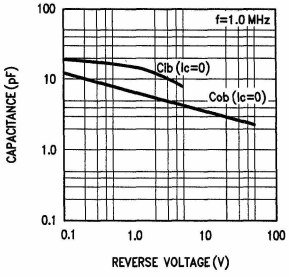
Collector Current vs Collector-Emitter Voltage



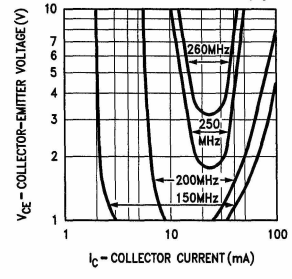
Collector Current vs Collector-Emitter Voltage



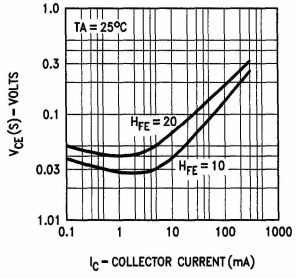
Input and Output Capacitance vs Reverse Voltage



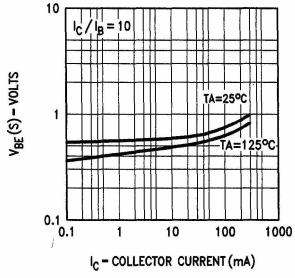
Contours of Constant Gain Bandwidth Product (f_T)



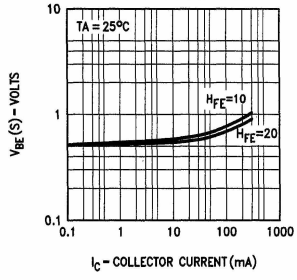
Collector Saturation Voltage vs Collector Current



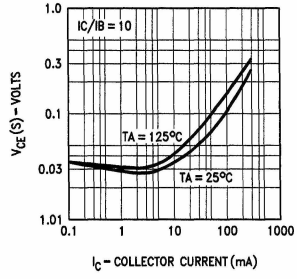
Base Saturation Voltage vs Collector Current



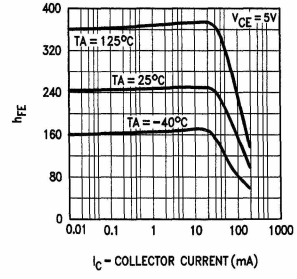
Base Saturation Voltage vs Collector Current



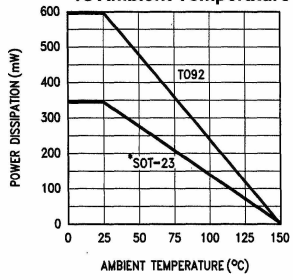
Collector Saturation Voltage vs Collector Current



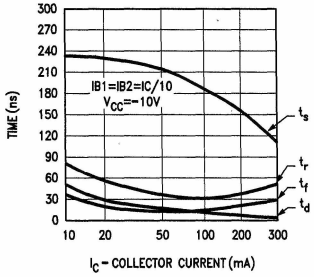
DC Current Gain vs Collector Current



Total Power Dissipation vs Ambient Temperature



Switching Times vs Collector Current



*Mounted on 10 x 8 x 0.6 mm copper pad on epoxy-glass FR-4 board.

TL/G/10038–27