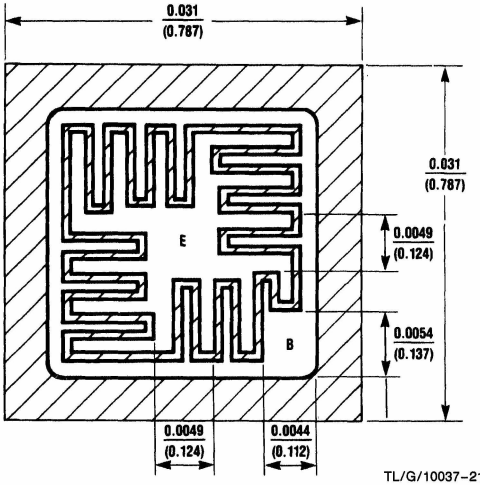
National Semiconductor

Process 39
NPN Medium Power



TL/G/10037–21

DESCRIPTION

Process 39 is a double-diffused, silicon epitaxial planar device. Complement to Process 79.

APPLICATION

This device was designed for general purpose medium power amplifiers and switching circuits that require collector currents to 1A.

PRINCIPAL DEVICE TYPES

TO-202 EBC: D40D7-14, NSDU06

TO-237 EBC: 2N6717, 92PU06

TO-226 EBC: MPS6717

TO-92 EBC: PN6717

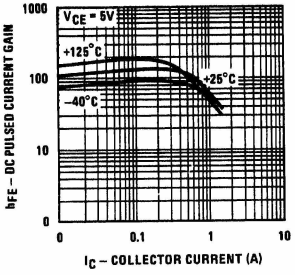
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Symbol	Conditions	Min	Typ	Max	Units
BV_{CEO}	I_C = 10 mA	80			V
BV_{CBO}	I_C = 100 μA	100			V
BV_{EBO}	I_E = 10 μA	5			V
I_{CBO}	V_{CB} = 80V			100	nA
I_{EBO}	V_{EB} = 4V			100	nA
h_{FE}	I_C = 100 mA, V_{CE} = 1V I_C = 500 mA, V_{CE} = 1V	50 20		300	
$V_{CE(SAT)}$	I_C = 500 mA, I_B = 50 mA			0.8	V
$V_{BE(SAT)}$	I_C = 500 mA, I_B = 50 mA			1.3	V
f_T	I_C = 100 mA, V_{CE} = 10V	80	150		MHz
C_{ob}	V_{CB} = 10V, f = 1 MHz		10	15	pF
$P_{D(max)}$					
TO-202	T_C = 25°C	10			W
	T_A = 25°C	2			
TO-226	T_C = 25°C	2			W
	T_A = 25°C	1			W
TO-237	T_C = 25°C	2			W
	T_A = 25°C	850			mW
TO-92	T_A = 25°C	600			mW
θ_{JC}					
TO-202	T_C = 25°C			12.5	°C/W
TO-237	T_C = 25°C			62.5	°C/W

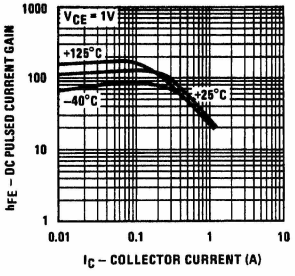
Process 39

Symbol	Conditions	Min	Typ	Max	Units
θ_{JA}					
TO-202	T_A = 25°C			62.5	°C/W
TO-226	T_A = 25°C			125	°C/W
TO-237	T_A = 25°C			147	°C/W
TO-92	T_A = 25°C			208	°C/W
$T_{J(max)}$	All Plastic Parts	150			°C

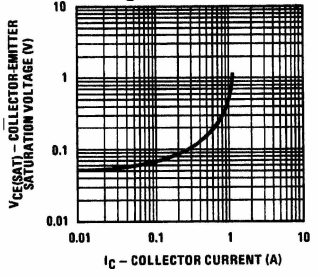
Typical Pulsed Current Gain vs Collector Current



Typical Pulsed Current Gain vs Collector Current

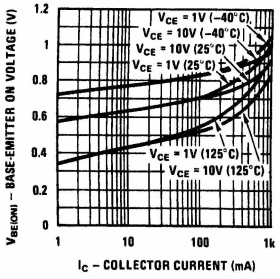


Collector-Emitter Saturation Voltage vs Collector Current

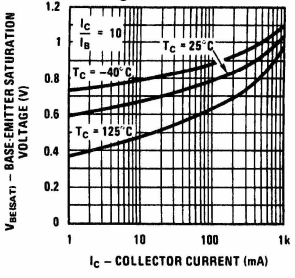


TL/G/10037–22

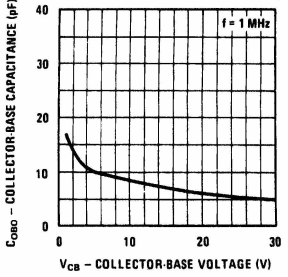
Base-Emitter ON Voltage vs Collector Current



Base-Emitter Saturation Voltage vs Collector Current



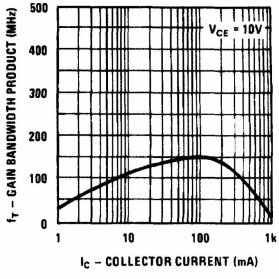
Collector-Base Capacitance vs Collector-Base Voltage



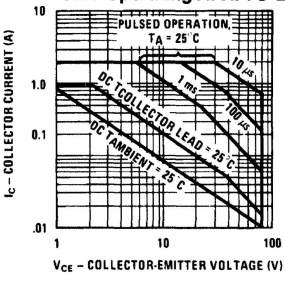
TL/G/10037–23

Process 39

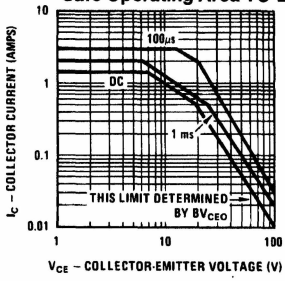
Gain Bandwidth Product vs Collector Current



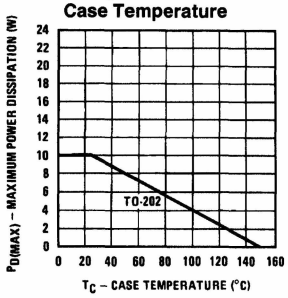
Safe Operating Area TO-237



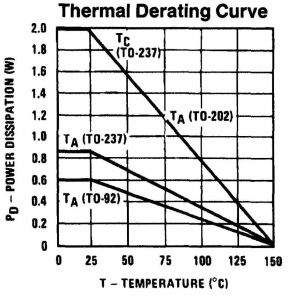
Safe Operating Area TO-202



Maximum Power Dissipation vs Case Temperature

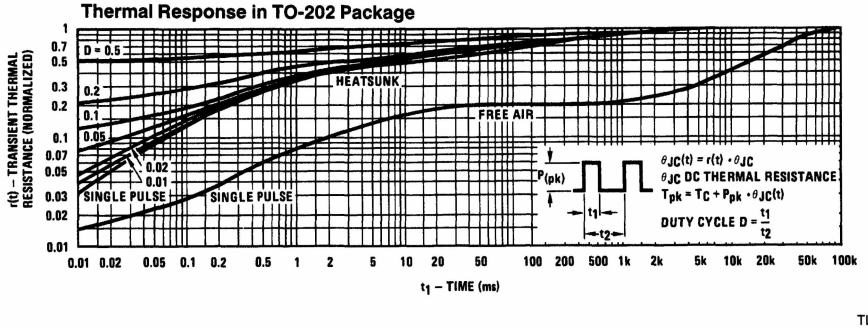


Thermal Derating Curve



TL/G/10037–76

Thermal Response in TO-202 Package



TL/G/10037–25