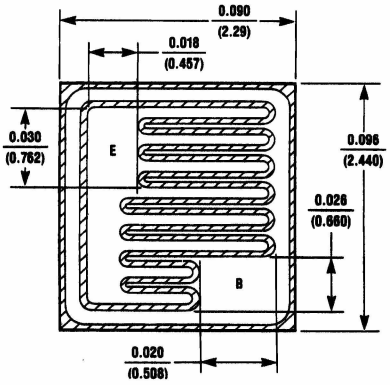
National Semiconductor

Process 5Q
PNP Planar Power



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DESCRIPTION

Process 5Q is a double-diffused silicon epitaxial planar device. Complement to Process 4Q.

APPLICATION

This device was designed for power amplifier, regulator and switching circuits where speed is important.

Electrical Characteristics (T_A = 25°C)

Symbol	Conditions	Min	Typ	Max	Units
BV_{CEO}	I_C = 100 mA (Note 1)	50		120	V
BV_{CES}	I_C = 1 mA	60			V
BV_{EBO}	I_E = 1 mA	5	8		V
I_{CES}	V_{CE} = 50V			5	μA
I_{EBO}	V_{EB} = 5V			5	μA
h_{FE}	V_{CE} = 5V, I_C = 20 mA	30			
h_{FE}	V_{CE} = 5V, I_C = 1A (Note 1)	50	100	300	
h_{FE}	V_{CE} = 5V, I_C = 8A (Note 1)	20			
$V_{CE(SAT)}$	I_C = 8A, I_B = 0.8A (Note 1)		0.6	1	V
$V_{BE(SAT)}$	I_C = 8A, I_B = 0.8A (Note 1)		1.2		V
f_t	V_{CE} = 5V, I_C = 0.5A	40			MHz
C_{OB}	V_{CB} = 10V		170		pF
C_{IB}	V_{EB} = 1V		870		pF
t_r	I_C = 5A, V_{CE} = 30V I_{B1} = I_{B2} = 0.5A		40		ns
t_s			500		ns
t_f			60		ns
$P_{D(max)}$ TO-220	T_C = 25°C	60			W
θ_{JC} TO-220	T_C = 25°C			2.08	°C/W
θ_{JA} TO-220	T_A = 25°C			62.5	°C/W
$T_{J(max)}$	All Plastic Parts	150			°C

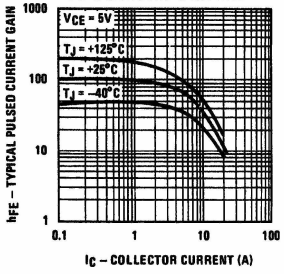
Note 1: Pulsed measurement = 300 μs pulse width.

Process 5Q

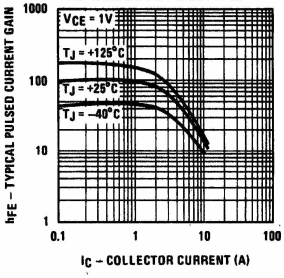
This process is available in the following device types.

	V_{CEO} (V), Min	h_{FE}		@ I_C (A)
		Min	Max	
TO-220 (NS Package 57)				
D45H1	30	35		2
D45H2	30	60		2
D45H4	45	35		2
D45H5	45	60		2
D45H7	60	35		2
D45H8	60	60		2
D45H10	80	35		2
D45H11	80	60		2

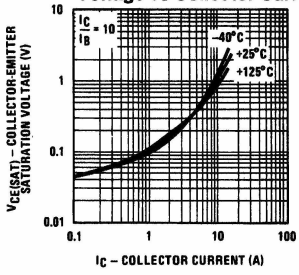
Typical Pulsed Current Gain vs Collector Current



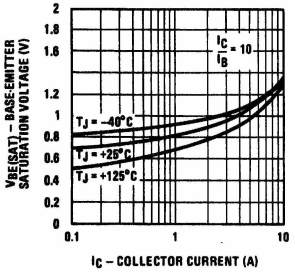
Typical Pulsed Current Gain vs Collector Current



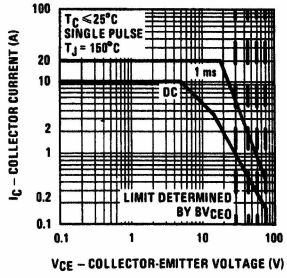
Collector-Emitter Saturation Voltage vs Collector Current



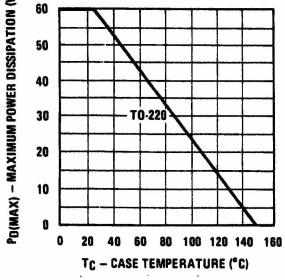
Base-Emitter Saturation Voltage vs Collector Current



Safe Operating Area TO-220



Maximum Power Dissipation vs Case Temperature



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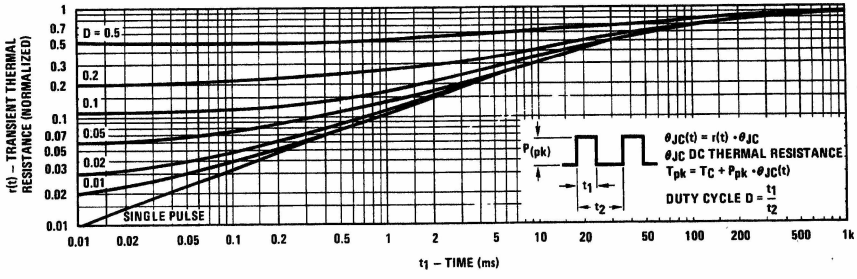
Thermal Response in TO-220 Package



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