Hometaxial-Base High-Power Silicon N-P-N Transistor

40251

Rugged, Broadly Applicable Device For Industrial and Commercial Use

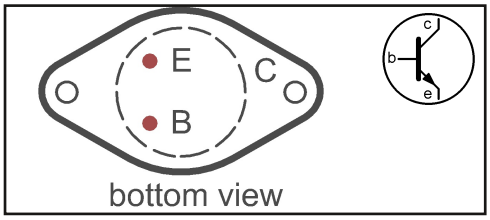
Applications:

- **Series and shunt regulators**
- **High-fidelity amplifiers**
- **Power-switching circuits**
- **Solenoid drivers**
- **Low-frequency inverters**

The 40251 is a silicon n-p-n transistor intended for a wide variety of high-power applications. The hometaxial-base construction of these device renders them highly resistant to second breakdown over a wide range of operation conditions.

The 40251 is supplied in a JEDEC TO-204MA hermetic steel package.

Terminal Designations



JEDEC TO-204MA

MAXIMUM RATINGS, *Absolute-Maximum Values:*

V_{CBO}	**50**	V
$V_{CER}^{(SUS)}$ with external base-to-emitter resistance (R_{BE}) = 100Ω	**-**	V
$V_{CEO}^{(SUS)}$	**40**	V
$V_{CEV}^{(SUS)}$ V_{BE} = -1.5V	**50**	V
V_{EBO}	**5**	V
I_C	**15**	A
I_B	**7**	A
P_T $T_C \leq 25°C$ P_T $T_C > 25°C$	**117** **derate linearly to 200°C**	W
T_{stg} T_J	**-65 to +200**	°C
T_L At distance ≥ 1/32 in. (0.8mm) from seating plane for 10s max.	**235**	°C

Source: RCA SSD-220C (1981)

Electrical Characteristics, *at Case Temp. (T_C) = 25°C unless otherwise specified*

Symbol	TEST CONDITIONS				LIMITS		UNITS
	VOLTAGE V dc		CURRENT A dc				
	V_{CE}	V_{BE}	I_C	I_B	Min	Max	
I_{CEO}	25			0	-	-	mA
I_{CEX}	40	-1.5			-	2	mA
T_C = 150°C	40	-1.5			-	10	
I_{EBO}		-5			-	10	mA
$V_{(BR)CBO}$			0.1		50	-	V
$V_{(BR)CEV}$		-1.5	0.1		50	-	V
$V_{(BR)EBO}$ I_E = 0.01A			0		5	-	V
$V_{CEO}^{(sus)}$			0.2[a]	0	40	-	V
$V_{CEO}^{(sus)}$ R_{BE} = 100Ω			0.2[a]		-	-	
$V_{CEV}^{(sus)}$		-1.5	0.1[a]		-	-	
h_{FE}	4		8[a]		15	60	
					-	-	
V_{BE}	4		8[a]		-	2.2	V
$V_{CE}^{(sat)}$			8[a]	0.8[a]	-	1.5	V
					-	-	
h_{fe} f = 1kHz	4		1		-	-	
f_T	4		1		-	-	kHz
$\|h_{fe}\|$ f = 0.4MHz	4		1		-	-	
f_{hfe}	4		1		-	-	kHz
$I_{S/b}$ t_p = 1s nonrep.	39				3	-	A
$R_{\theta JC}$					-	1.5	°C/W

Note a: Pulsed, Pulse duration = 300μs, duty facor = 1.8%

Terms and Symbols

C_{obo} - open-circuit ommon-base output capacitance
C_{ob} - common-base output capacitance
$f_{\alpha b}$ - base (alpha) cutoff frequency
f_T - gain-bandwidth product (unity-gain frequency for devices in which gain roll-off has a -1 slope)
h_{FE} - dc forward-current transfer ratio
h_{fe} - common-emitter, small-signal, short-circuit, forward-current transfer ratio
$|h_{fe}|$ - magnitude of common-emitter, small-signal, short-circuit, forward-current transfer ratio
I_C - continous collector current
I_{CM} - peak collector current
I_{CER} - collector-cutoff current with specified resistance between base and emitter
I_{CEX} - collector-cutoff current with specified circuit between base and emitter
I_B - continous base current
I_{EBO} - emitter-cutoff current, collector open
I_{CBO} - collector-cutoff current, emitter open
$I_{S/b}$ - forward-bias, second break-down collector current
P_T - transistor dissipation at specified temperature
$r_{CE}^{(sat)}$ - dc collector-to-emitter saturation resistance
R_{BE} - external base-to-emitter resistance
$R_{\theta JC}$ - thermal resistance, junction-to-case
$R_{\theta JA}$ - thermal resistance, junction-to-ambient
$R_{\theta JFA}$ - thermal resistance, junction-to-free air
t_d - delay time
t_r - rise time
t_s - storage time
t_f - fall time
T_C - case temperature
T_{stg} - storage temperature
T_J - operating (junction) temperature
T_L - lead temperature during soldering
V_{CBO} - collector-to-base voltage, emitter open
V_{CEO} - collector-to-emitter voltage, base open
$V_{CEO}^{(sus)}$ - collector-to-emitter sustaining voltage, base open
$V_{CER}^{(sus)}$ - collector-to-emitter sustaining voltage with specified resistance between base and emitter
V_{EBO} - emitter-to-base voltage, collector open
V_{BE} - base-to-emitter voltage
V_{CE}^{sat} - collector-to-emitter saturation voltage
T - torque
θ - conduction angle