ELECTRONICS, INC.
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# NTE2323
# Silicon NPN Transistor
# Quad, Amplifier

**Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CEO}$ . . . . . 200V
Collector–Base Voltage, $V_{CBO}$ . . . . . 200V
Emitter–Base Voltage, $V_{EBO}$ . . . . . 5V
Continuous Collector Current, $I_C$ . . . . . 500mA
Total Device Dissipation ($T_A$ = +25°C, Each Die), $P_D$ . . . . . 0.75W
Derate Above 25°C . . . . . 5.98mW/°C
Total Device Dissipation ($T_A$ = +25°C, Four Die Equal Power), $P_D$ . . . . . 1.7W
Derate Above 25°C . . . . . 13.6mW/°C
Operating Junction Temperature Range, $T_J$ . . . . . –55° to +150°C
Storage Temperature Range, $T_{stg}$ . . . . . –55° to +150°C
Thermal Reistance, Junction–to–Ambient, $R_{thJA}$
Each Die . . . . . 167°C/W
Effective, 4 Die . . . . . 73.5°C/W
Thermal Reistance, Junction–to–Case, $R_{thJC}$
Each Die . . . . . 100°C/W
Effective, 4 Die . . . . . 39°C/W
Coupling Factors, Junction–to–Ambient
Q1–Q4 or Q2–Q3 . . . . . 56%
Q1–Q2 or Q3–Q4 . . . . . 10%
Coupling Factors, Junction–to–Case
Q1–Q4 or Q2–Q3 . . . . . 46%
Q1–Q2 or Q3–Q4 . . . . . 5%

**Electrical Characteristics:** ($T_A$ = +25°C unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF Characteristics** | | | | | | |
| Collector–Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$ = 1mA, $I_B$ = 0 | 200 | – | – | V |
| Collector–Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$ = 100μA, $I_E$ = 0 | 20 | – | – | V |
| Emitter–Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$ = 100μA, $I_C$ = 0 | 5 | – | – | V |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$ = 150V, $I_E$ = 0 | – | – | 100 | nA |

**Electrical Characteristics (Cont'd):** ($T_A$ = +25°C unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **ON Characteristics** | | | | | | |
| DC Current Gain | $h_{FE}$ | $V_{CE}$ = 10V, $I_C$ = 1mA | 25 | 45 | – | |
| | | $V_{CE}$ = 10V, $I_C$ = 10mA | 40 | 60 | – | |
| | | $V_{CE}$ = 10V, $I_C$ = 30mA | 40 | 80 | – | |
| Collector–Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$ = 20mA, $I_B$ = 2mA | – | 0.3 | 0.5 | V |
| Base–Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C$ = 20mA, $I_B$ = 2mA | – | 0.7 | 0.9 | V |
| Current Gain–Bandwidth Product | $f_T$ | $V_{CE}$ = 20V, $I_C$ = 10mA, f = 100MHz | 50 | 80 | – | MHz |
| Output Capacitance | $C_{obo}$ | $V_{CB}$ = 20V, $I_E$ = 0, f = 1MHz | – | 2.5 | 5.0 | pF |
| Input Capacitance | $C_{ibo}$ | $V_{EB}$ = 3V, $I_C$ = 0, f = 1MHz | – | 40 | 50 | pF |

**Pin Connection Diagram**