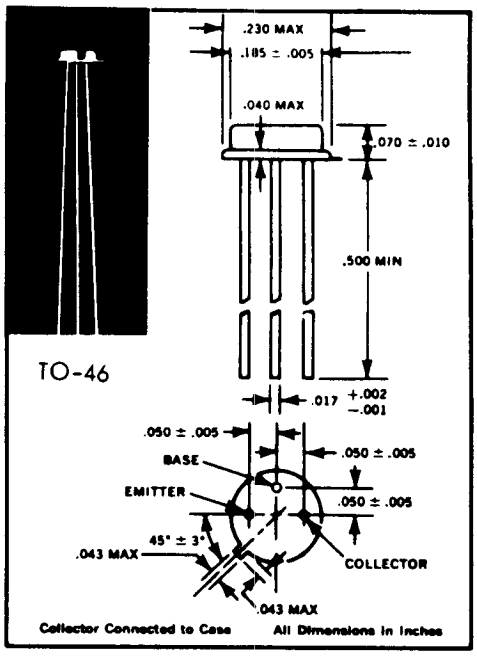
# PREMIUM PERFORMANCE ULTRA LOW $r_{ec}$ (sat) SILICON EPITAXIAL JUNCTION PNP SWITCHING TRANSISTORS

**2N4006 THRU 2N4011**

GEOMETRY 292, PG. 57

- $r_{EC}$ (sat) 3 Ohms Typical
- LOW $C_{eb}$
- LOW LEAKAGE
- HIGH $BV_{EBO}$




## ELECTRICAL DATA ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | 2N4006 2N4009 | 2N4007 2N4010 | 2N4008 2N4011 | UNITS |
|---|---|---|---|---|---|
| Collector to Emitter Voltage | $BV_{CEO}$ | -6 | -15 | -30 | Volts |
| Emitter to Collector Voltage | $BV_{ECO}$ | -6 | -15 | -30 | Volts |
| Collector to Base Voltage | $BV_{CBO}$ | -10 | -20 | -35 | Volts |
| Emitter to Base Voltage | $BV_{EBO}$ | -10 | -20 | -35 | Volts |
| Collector Current | $I_C$ | 100 | | | mA |
| Power Dissipation | $P_T$ | 400 | | | mW |
| Derating Factor | $D_F$ | 2.3 | | | mW/°C |
| Junction Temp. (Oper. & Stor.) | $T_J$ | -65°C to +200°C | | | |
| Lead Temp.(1/16"±1/32" from case) | $T_L$ | 240°C for 10 sec. | | | |

## ELECTRICAL CHARACTERISTICS: $T_A = 25°C$ (UNLESS OTHERWISE STATED)

| PARAMETER | SYMBOL | CONDITION | 2N4006 2N4009* | | 2N4007 2N4010* | | 2N4008 2N4011* | | * MATCH | UNITS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Max. | Min. | Max. | Min. | Max. | | |
| Collector to Base Leakage | $I_{CBO}$ | $V_{CB} = V_{CB}$ MAX. | — | 0.1 | — | 0.3 | — | 0.3 | — | nA |
| Emitter to Base Leakage | $I_{EBO}$ | $V_{EB} = V_{EB}$ MAX. | — | 0.1 | — | 0.3 | — | 0.3 | — | nA |
| Collector to Base Leakage | $I_{CBO}$ | $V_{CB} = V_{CB}$ MAX. ($T_A$ = 85°C) | — | 5.0 | — | 15.0 | — | 15.0 | — | nA |
| Emitter to Base Leakage | $I_{EBO}$ | $V_{EB} = V_{EB}$ MAX. ($T_A$ = 85°C) | — | 5.0 | — | 15.0 | — | 15.0 | — | nA |
| Offset Voltage | $V_O$ | $I_B$ = 0.1mA; $I_E$ = 0 | — | 0.2 | — | 0.5 | — | 0.5 | ±.02 | mV |
| Offset Voltage | $V_O$ | $I_B$ = 1mA; $I_E$ = 0 | — | 0.5 | — | 0.7 | — | 0.8 | — | mV |
| Inverted Saturation Resistance | $r_{EC(sat)}$ | $I_B$ = 0.1mA; $I_C$ = 0.1mA f = 1kHz | — | 15 | — | 20 | — | 20 | ±5 | Ohms |
| Inverted Saturation Resistance | $r_{EC(sat)}$ | $I_B$ = 1.0mA; $I_C$ = 0.1mA f = 1kHz | — | 4.0 | — | 6.0 | — | 6.0 | — | Ohms |
| DC Common Collector Forward Current Transfer Ratio | $h_{FC}$ | $V_{EC}$ = -6V; $I_E$ = 1mA | 40 | — | 30 | — | 20 | — | — | — |
| High Frequency Current Gain | $h_{fe}$ | $V_{CE}$ = -6V; $I_C$ = 1mA; f = 1MHz | 20 | — | 15 | — | 15 | — | — | — |
| Collector to Base Capacitance | $C_{ob}$ | $V_{CB}$ = -6V; $I_C$ = 1mA; f = 140kHz | — | 10 | — | 10 | — | 10 | — | pfd |
| Emitter to Base Capacitance | $C_{eb}$ | $V_{EB}$ = -6V; $I_E$ = 0; f = 140kHz | — | 6 | — | 6 | — | 6 | — | pfd |
| Delay Time | $t_D$ | $R_L$ = 220Ω $V_{CC}$ = -5V | — | 60 | — | 60 | — | 60 | — | ns |
| Rise Time | $t_R$ | $R_B$ = 1K, $V_{BB}$ = +5V | — | 120 | — | 120 | — | 120 | — | ns |
| Storage Time | $t_S$ | $V_{pulse}$ = -10V | — | 320 | — | 320 | — | 320 | ±100 | ns |
| Fall Time | $t_F$ | Tektronix Type R plug-in | — | 120 | — | 120 | — | 120 | — | ns |

**2N4009 - 2N4011**

* The 2N4009 is a matched pair of 2N4006
The 2N4010 is a matched pair of 2N4007
The 2N4011 is a matched pair of 2N4008

$\Delta V_O$ at $I_B$ = 0.1mA; -25°C/+100°C ±50μV
$\Delta V_{CB}$ at $I_B$ = 0.1mA; $I_E$ = 0 $T_A$ = 25°C ±100MV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