



Silicon Transistors

	
D29E9-10	D33D29-30
D29E9J1-10J1	D33D29J1-30J1

The PNP D29E9-10 series and the NPN D33D29-30 series are silicon, planar, passivated, epitaxial transistors intended for general purpose applications. These complementary pairs are especially suited for the drive stage in high power amplifiers, and for control and television circuitry.

FEATURES: • Low Collector Saturation Voltage • Excellent Beta Linearity over a Wide Current Range • Heatsinking Available on All Units

NOTE: Observe proper polarity on biases for PNP's and NPN's.

absolute maximum ratings: (25°C) (unless otherwise specified)

Voltages

Collector to Emitter	V_{CE0}	60	Volts
Emitter to Base	V_{EB0}	5	Volts
Collector to Base	V_{CB0}	70	Volts
Collector to Emitter	V_{CES}	70	Volts

Current

Collector (Continuous)	I_C	750	mA
Collector (Pulsed, 300 μ sec., pulse width, \leq 2% duty cycle)	I_{CM}	1000	mA

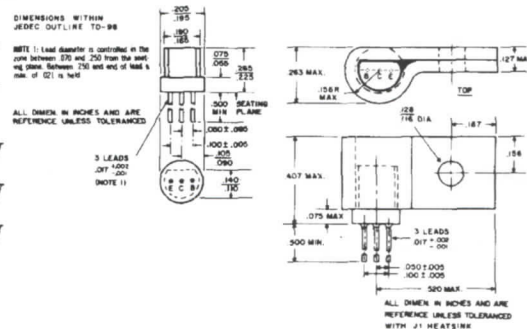
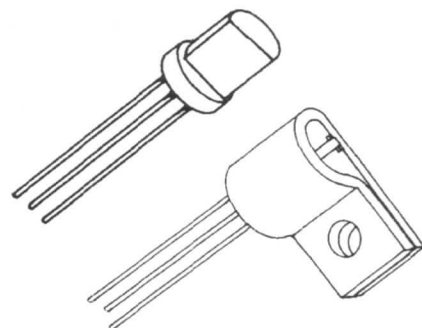
Dissipation

Total Power (Free Air, $T_A \leq 25^\circ\text{C}$)*	P_T	500	mW
Total Power with J1 Heatsink (Free Air, $T_A \leq 25^\circ\text{C}$)**	P_T	700	mW
Total Power with J1 Heatsink (Case Temp., $T_C \leq 25^\circ\text{C}$ ***)	P_T	1000	mW

Temperature

Storage	T_{STG}	-65 to +150	$^\circ\text{C}$
Operating	T_J	-65 to +150	$^\circ\text{C}$
Lead soldering ($\frac{1}{16}'' \pm \frac{1}{32}''$ from case for 10 sec. max.)	T_L	+260	$^\circ\text{C}$

*Derate 4.0 mW/ $^\circ\text{C}$ increase in ambient temperature above 25°C. **Derate 5.6 mW/ $^\circ\text{C}$ increase in ambient temperature above 25°C. ***Derate 8.0 mW/ $^\circ\text{C}$ increase in case temperature above 25°C.



electrical characteristics: (25°C) (unless otherwise specified)

NOTE: Characteristics apply to both heatsinked and non-heatsinked devices.

STATIC CHARACTERISTICS

		Min.	Max.	
Collector Cutoff Current ($V_{CE} = 25\text{V}$) ($V_{CB} = 25\text{V}$, $T_A = 100^\circ\text{C}$)	I_{CES}	—	100	nA
	I_{CES}	—	15	μA
Forward Current Transfer Ratio ($I_C = 2\text{ mA}$, $V_{CE} = 2\text{V}$) D29E9/D33D29 D29E10/D33D30 ($I_C = 500\text{ mA}$, $V_{CE} = 2\text{V}$) D29E9/D33D29 D29E10/D33D30	h_{FE}	60	120	
	h_{FE}	100	200	
	** h_{FE}	20	—	
	** h_{FE}	25	—	
	Collector Emitter Breakdown Voltage ($I_C = 10\text{ mA}$) ($I_C = 10\text{ }\mu\text{A}$)	** $V_{(BR)CEO}$ $V_{(BR)CES}$	60 70	—
Emitter Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{A}$)	$V_{(BR)EBO}$	5	—	Volts
Collector Saturation Voltage ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$)	** $V_{CE(SAT)}$	—	0.75	Volts
Base Saturation Voltage ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$)	** $V_{BE(SAT)}$	—	1.2	Volts

DYNAMIC CHARACTERISTICS

Output Capacitance, Common Base ($V_{CB} = 10\text{V}$, $f = 1\text{ MHz}$)	C_{cb}	—	15	pF
Input Capacitance, Common Base ($V_{BE} = 0.5\text{V}$, $f = 1\text{ MHz}$)	C_{cb}	—	55	pF
Gain Bandwidth Product ($I_C = 50\text{ mA}$, $V_{CE} = 2\text{V}$, $f = 20\text{ MHz}$) D29E9/D33D29 D29E10/D33D30	f_t	80	—	MHz
	f_t	120	—	MHz

**Pulse Conditions: Pulse width \leq 300 μ s Duty cycle \leq 2%