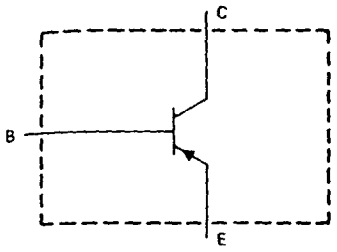
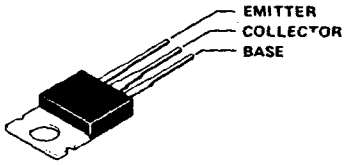
- Designed for Complementary Use With TIP29 series
- 30 W at 25°C Case Temperature
- 1 A Continuous Collector Current
- 3 A Peak Collector Current
- Minimum f_T of 3 MHz at 10 V, 0.2 A
- Customer Specified Selections Available
- Designed for Power Amplifier and High-Speed Switching Applications

device schematic



TO-220AB PACKAGE



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

	TIP30	TIP30A	TIP30B	TIP30C
Collector-base voltage	– 80 V	– 100 V	– 120 V	– 140 V
Collector-emitter voltage (I_B = 0)	– 40 V	– 60 V	– 80 V	– 100 V
Emitter-base voltage	– 5 V			
Continuous collector current	– 1 A			
Peak collector current (see Note 1)	– 3 A			
Continuous base current	– 0.4 A			
Safe operating area at 25°C case temperature	See Figure 4			
Continuous device dissipation at 25°C case temperature (see Note 2)	30 W			
Continuous device dissipation at (or below) 25°C free-air temperature (see Note 3)	2 W			
Unclamped inductive load energy (see Note 4)	32 mJ			
Operating collector junction and storage temperature range	– 65°C to 150°C			
Lead temperature 3.2 mm (0.125 inch) from case for 10 seconds	250°C			

NOTES: 1. This value applies for $t_w \leq 0.3$ ms, duty cycle $\leq 10\%$.
2. Derate linearly to 150°C case temperature at the rate of 0.24 W/°C.
3. Derate linearly to 150°C free-air temperature at the rate of 16mW/°C.
4. This rating is based on the capability of the transistor to operate safely in the circuit in Figure 2.

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

	TIP30D	TIP30E	TIP30F
Collector-base voltage	−160 V	−180 V	−200 V
Collector-emitter voltage (I_B = 0)	−120 V	−140 V	−160 V
Emitter-base voltage	−5 V		
Continuous collector current	−1 A		
Peak collector current (see Note 1)	−3 A		
Continuous base current	−0.4 A		
Safe operating area at 25°C case temperature	See Figure 4		
Continuous device dissipation at 25°C case temperature (see Note 2)	30 W		
Continuous device dissipation at (or below) 25°C free-air temperature (see Note 3)	2 W		
Unclamped inductive load energy (see Note 4)	32 mJ		
Operating collector junction and storage temperature range	−65°C to 150°C		
Lead temperature 3,2 mm (0.125 inch) from case for 10 seconds	250°C		

NOTES: 1. This value applies for $t_w \leq 0.3$ ms, duty cycle ≤ 10%.
2. Derate linearly to 150°C case temperature at the rates of 0.24 W/°C.
3. Derate linearly to 150°C free-air temperature at the rate of 16 mW/°C.
4. This rating is based on the capability of the transistor to operate safely in the circuit in Figure 2.

electrical characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS	TIP30 MIN	TIP30 TYP	TIP30 MAX	TIP30A MIN	TIP30A TYP	TIP30A MAX	TIP30B MIN	TIP30B TYP	TIP30B MAX	TIP30C MIN	TIP30C TYP	TIP30C MAX	UNIT
$V_{(BR)CEO}$	I_C = −30 mA, I_B = 0, See Note 5	−40			−60			−80			−100			V
I_{CEO}	V_{CE} = −30 V, I_B = 0			−0.3			−0.3							mA
	V_{CE} = −60 V, I_B = 0									−0.3			−0.3	
I_{CES}	V_{CE} = −80 V, V_{BE} = 0			−0.2										mA
	V_{CE} = −100 V, V_{BE} = 0						−0.2							
	V_{CE} = −120 V, V_{BE} = 0									−0.2				
	V_{CE} = −140 V, V_{BE} = 0												−0.2	
I_{EBO}	V_{EB} = −5 V, I_C = 0			−1			−1			−1			−1	mA
h_{FE}	V_{CE} = −4 V, I_C = −0.2 A, See Notes 5 and 6	20			20			20			20			
	V_{CE} = −4 V, I_C = −1 A, See Notes 5 and 6	15		75	15		75	15		75	15		75	
V_{BE}	V_{CE} = −4 V, I_C = −1 A, See Notes 5 and 6			−1.3			−1.3			−1.3			−1.3	V
$V_{CE(sat)}$	I_B = −125 mA, I_C = −1 A, See Notes 5 and 6			−0.7			−0.7			−0.7			−0.7	V
h_{fe}	V_{CE} = −10 V, I_C = −0.2 A, f = 1 kHz	20			20			20			20			
$\lvert h_{fe} \rvert$	V_{CE} = −10 V, I_C = −0.2 A, f = 1 MHz	3			3			3			3			

NOTES 5. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ≤ 2%.
6 These parameters are measured using voltage-sensing contacts separate from the current-carrying contacts.

electrical characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS	TIP30D MIN	TIP30D TYP	TIP30D MAX	TIP30E MIN	TIP30E TYP	TIP30E MAX	TIP30F MIN	TIP30F TYP	TIP30F MAX	UNIT
$V_{(BR)CEO}$	I_C = −30 mA, I_B = 0, See Note 5	−120			−140			−160			V
I_{CEO}	V_{CE} = −90 V, I_B = 0			−0.3			−0.3			−0.3	mA
I_{CES}	V_{CE} = −90 V, V_{BE} = 0			−0.2							mA
	V_{CE} = −180 V, V_{BE} = 0						−0.2				
	V_{CE} = −200 V, V_{BE} = 0									−0.2	
I_{EBO}	V_{EB} = −5 V, I_C = 0			−1			−1			−1	mA
h_{FE}	V_{CE} = −4 V, I_C = −0.2 A, See Notes 5 and 6	40			40			40			
	V_{CE} = −4 V, I_C = −1 A, See Notes 5 and 6	15			15			15			
V_{BE}	V_{CE} = −4 V, I_C = −1 A, See Notes 5 and 6			−1.3			−1.3			−1.3	V
$V_{CE(sat)}$	I_B = −125 mA, I_C = −1 A, See Notes 5 and 6			−0.7			−0.7			−0.7	V
h_{fe}	V_{CE} = −10 V, I_C = −0.2 A, f = 1 kHz	20			20			20			
$\lvert h_{fe} \rvert$	V_{CE} = −10 V, I_C = −0.2 A, f = 1 MHz	3			3						

NOTES: 5. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ≤ 2%.
6. These parameters are measured with voltage-sensing contact separate from the current-carrying contacts.

thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$			4.17	°C/W
$R_{\theta JA}$			62.5	

resistive-load switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
t_{on}	I_C = −1 A, I_{B1} = −0.1 A, I_{B2} = 0.1 A, $V_{BE(off)}$ = 4.3 V, R_L = 30 Ω, See Figure 1		0.3		μs
t_{off}			1		

† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

TABLE 2.1. SELECTED SMALL-SIGNAL TRANSISTORS[a]

	V_{CEO} (V)	I_C max (mA)	h_{FE} typ[b]	I_C (mA)	C_{cb} typ[c] (pF)	f_T typ[d] (MHz)	Gain curve	Metal TO-5[e] npn	Metal TO-5[e] pnp	Metal TO-18[f] npn	Metal TO-18[f] pnp	Plastic TO-92[h] npn	Plastic TO-92[h] pnp
General	20	500	100	150	16	200		–	–	–	–	–	–
purpose	25	200	200	2	1.8-2.8	300	4	–	–	–	–	4124	4126
	40	200	200	10	1.8-2.8	300		–	–	3947	3251	3904	3906
High gain,	25	50	300	10	2-7	150		–	–	–	–	3391A[h],3707[h]	4058[h]
low noise	25	300	250	50	4	300		–	–	–	–	6008[h]	6009[h]
	25	50	500	5	1.5-4	500		–	–	–	–	5089	–
	40	20	700	1	14	200	2	LM394	–	–	–	–	–
	45	50	1000	10	1.5	300	1	–	–	–	–	5962	–
	50	50	350	5	1.8	400	3	–	–	2848	3965	4967,5210	4965,5087
High	30-60	600	150	150	5	300	5	2219	2905	2222	2907,3251	4401	4403
current	50	1000	100	200	7	450		3725	5022	4014	–	–	–
	60	1000	70	80	15	100		2102,3107	4036	–	–	–	–
	75	2000	70	500	20	60	7,9	5320	5322	–	–	–	–
High	150	600	100	10	3-6	250		–	4929	–	–	5550	5401
voltage	300	1000	50	50	10	50		3439	5416	–	–	–	–
High	12	50	80	3	0.7	1500	6	–	–	5179	–	3662[h]	–
speed	12	100	50	8	1.5	900	8	–	–	918	4208	5770	–
	12	200	75	25	3	500		–	–	2369	2894	5769	5771

[a] all transistors are 2Nxxx numbers, except for the LM394 dual transistor. Devices listed on a single row are similar in characteristics and in some cases are electrically identical. [b] see figure 2.76. [c] at V_{CB}=10V. [d] see figure 13.4. [e] or TO-39. [f] or TO-72, TO-46. [h] TO-92 and its variants have two basic pinouts: EBC and ECB. Transistors with superscript *h* are ECB; all others are EBC.