

TIP31, TIP31A, TIP31B, TIP31C, (NPN), TIP32, TIP32A, TIP32B, TIP32C, (PNP)

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Complementary Silicon Plastic Power Transistors

Designed for use in general purpose amplifier and switching applications.

Features

- Collector-Emitter Saturation Voltage -
 $V_{CE(sat)} = 1.2 \text{ Vdc (Max) @ } I_C = 3.0 \text{ Adc}$
- Collector-Emitter Sustaining Voltage -
 $V_{CEO(sus)} = 40 \text{ Vdc (Min) - TIP31, TIP32}$
 $= 60 \text{ Vdc (Min) - TIP31A, TIP32A}$
 $= 80 \text{ Vdc (Min) - TIP31B, TIP32B}$
 $= 100 \text{ Vdc (Min) - TIP31C, TIP32C}$
- High Current Gain - Bandwidth Product
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- Compact TO-220 AB Package
- Pb-Free Packages are Available*

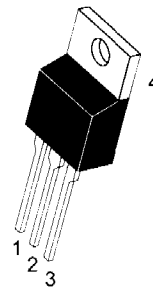
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage TIP31, TIP32 TIP31A, TIP32A TIP31B, TIP32B TIP31C, TIP32C	V_{CEO}	40 60 80 100	Vdc
Collector-Base Voltage TIP31, TIP32 TIP31A, TIP32A TIP31B, TIP32B TIP31C, TIP32C	V_{CB}	40 60 80 100	Vdc
Emitter-Base Voltage	V_{EB}	5.0	Vdc
Collector Current Continuous Peak	I_C	3.0 5.0	Adc
Base Current	I_B	1.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	40 0.32	W W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	2.0 0.016	W W/ $^\circ\text{C}$
Unclamped Inductive Load Energy (Note 1)	E	32	mJ
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

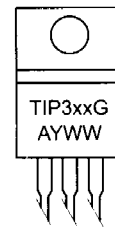
1. $I_C = 1.8 \text{ A, L} = 20 \text{ mH, P.R.F.} = 10 \text{ Hz, } V_{CC} = 10 \text{ V, } R_{BE} = 100 \Omega$

**3 AMPERE
POWER TRANSISTORS
COMPLEMENTARY SILICON
40-60-80-100 VOLTS,
40 WATTS**



TO-220AB

MARKING DIAGRAM



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.125	$^{\circ}C/W$

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}C$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage (Note 2) ($I_C = 30 \text{ mAdc}$, $I_B = 0$)	TIP31, TIP32 TIP31A, TIP32A TIP31B, TIP32B TIP31C, TIP32C	$V_{CEO(sus)}$	40 60 80 100	- - - -	Vdc
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}$, $I_B = 0$) ($V_{CE} = 60 \text{ Vdc}$, $I_B = 0$)	TIP31, TIP32, TIP31A, TIP32A TIP31B, TIP31C, TIP32B, TIP32C	I_{CEO}	- -	0.3 0.3	mAdc
Collector Cutoff Current ($V_{CE} = 40 \text{ Vdc}$, $V_{EB} = 0$) ($V_{CE} = 60 \text{ Vdc}$, $V_{EB} = 0$) ($V_{CE} = 80 \text{ Vdc}$, $V_{EB} = 0$) ($V_{CE} = 100 \text{ Vdc}$, $V_{EB} = 0$)	TIP31, TIP32 TIP31A, TIP32A TIP31B, TIP32B TIP31C, TIP32C	I_{CES}	- - - -	200 200 200 200	μAdc
Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$)		I_{EBO}	-	1.0	mAdc

ON CHARACTERISTICS (Note 2)

DC Current Gain ($I_C = 1.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) ($I_C = 3.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)		h_{FE}	25 10	- 50	-
Collector-Emitter Saturation Voltage ($I_C = 3.0 \text{ Adc}$, $I_B = 375 \text{ mAdc}$)		$V_{CE(sat)}$	-	1.2	Vdc
Base-Emitter On Voltage ($I_C = 3.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)		$V_{BE(on)}$	-	1.8	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain - Bandwidth Product ($I_C = 500 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f_{test} = 1.0 \text{ MHz}$)		f_T	3.0	-	MHz
Small-Signal Current Gain ($I_C = 0.5 \text{ Adc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)		h_{fe}	20	-	-

2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.