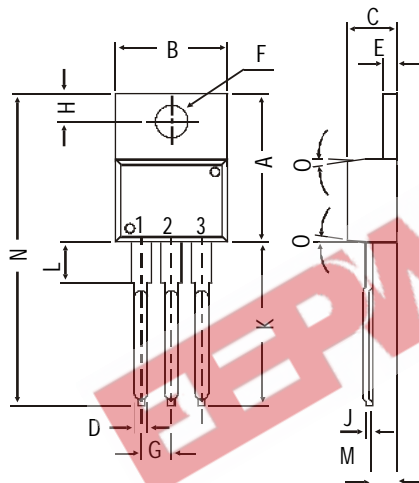
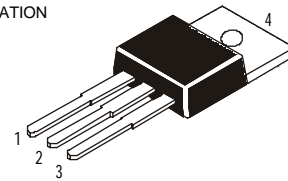


TO-220 Plastic Package

**TIP31, TIP31A, TIP31B, TIP31C
TIP32, TIP32A, TIP32B, TIP32C**

*TIP31, 31A, 31B, 31C NPN PLASTIC POWER TRANSISTORS
TIP32, 32A, 32B, 32C PNP PLASTIC POWER TRANSISTORS
General Purpose Amplifier and Switching Applications*

PIN CONFIGURATION
1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR



DIM	MIN.	MAX.
A	14.42	16.51
B	9.63	10.67
C	3.56	4.83
D		0.90
E	1.15	1.40
F	3.75	3.88
G	2.29	2.79
H	2.54	3.43
J		0.56
K	12.70	14.73
L	2.80	4.07
M	2.03	2.92
N		31.24
O		DEG 7

All dimensions in mm.

ABSOLUTE MAXIMUM RATINGS

		31	31A	31B	31C	
		32	32A	32B	32C	
Collector-base voltage (open emitter)	V_{CBO}	max. 40	60	80	100	V
Collector-emitter voltage (open base)	V_{CEO}	max. 40	60	80	100	V
Collector current	I_C	max.	3.0			A
Total power dissipation up to $T_C = 25^\circ C$	P_{tot}	max.	40			W
Junction temperature	T_j	max.	150			$^\circ C$
Collector-emitter saturation voltage						
$I_C = 3 A; I_B = 375 mA$	V_{CEsat}	max.	1.2			V
D.C. current gain						
$I_C = 3 A; V_{CE} = 4 V$	h_{FE}	min.	10			
		max.	50			

RATINGS (at $T_A=25^\circ C$ unless otherwise specified)

Limiting values		31	31A	31B	31C	
		32	32A	32B	32C	
Collector-base voltage (open emitter)	V_{CBO}	max. 40	60	80	100	V
Collector-emitter voltage (open base)	V_{CEO}	max. 40	60	80	100	V
Emitter-base voltage (open collector)	V_{EBO}	max.	5.0			V

**TIP31, TIP31A, TIP31B, TIP31C
TIP32, TIP32A, TIP32B, TIP32C**

Collector current	I_C	max.	3.0	A
Collector current (Peak)	I_{CM}	max.	5.0	A
Base current	I_B	max.	1.0	A
Total power dissipation upto $T_C=25^\circ C$	P_{tot}	max.	40	W
Derate above $25^\circ C$		max	0.32	W $^\circ C$
Total power dissipation upto $T_A=25^\circ C$	P_{tot}	max.	2	W
Derate above $25^\circ C$		max	0.016	W $^\circ C$
Junction temperature	T_j	max.	150	$^\circ C$
Storage temperature	T_{stg}		-65 to +150	$^\circ C$

THERMAL RESISTANCE

From junction to case	R_{thj-c}		3.125	$^\circ C/W$
From junction to ambient	R_{thj-a}		62.5	$^\circ C/W$

CHARACTERISTICS

$T_{amb} = 25^\circ C$ unless otherwise specified

			31	31A	31B	31C	
			32	32A	32B	32C	
Collector cutoff current							
$I_B = 0; V_{CE} = 30V$	I_{CEO}	max.	0.3	0.3	-	-	mA
$I_B = 0; V_{CE} = 60V$	I_{CEO}	max.	-	-	0.3	0.3	mA
$V_{BE} = 0; V_{CE} = V_{CEO(max)}$	I_{CES}	max.			0.2		mA
Emitter cut-off current							
$I_C = 0; V_{EB} = 5 V$	I_{EBO}	max.			1.0		mA
Breakdown voltages							
$I_C = 30 mA; I_B = 0$	$V_{CEO(sus)}^*$	min.	40	60	80	100	V
$I_C = 1 mA; I_E = 0$	V_{CBO}	min.	40	60	80	100	V
$I_E = 1 mA; I_C = 0$	V_{EBO}	min.			5.0		V
Saturation voltage							
$I_C = 3 A; I_B = 375 mA$	V_{CEsat}^*	max.			1.2		V
Base emitter on voltage							
$I_C = 3 A; V_{CE} = 4 V$	$V_{BE(on)}^*$	max.			1.8		V
D.C. current gain							
$I_C = 1 A; V_{CE} = 4 V$	h_{FE}^*	min.			25		
$I_C = 3 A; V_{CE} = 4 V$	h_{FE}^*	min.			10		
		max.			50		
Small-signal current gain							
$I_C = 0.5A; V_{CE} = 10V; f = 1 KHz$	$ h_{fe} $	min.			20		
Transition frequency							
$I_C = 0.5A; V_{CE} = 10V; f = 1 MHz$	$f_T (1)$	min.			3		MHz

* Pulse test: pulse width $\leq 300 \mu s$; duty cycle $\leq 2\%$.
(1) $f_T = |h_{fe}| \cdot f_{test}$