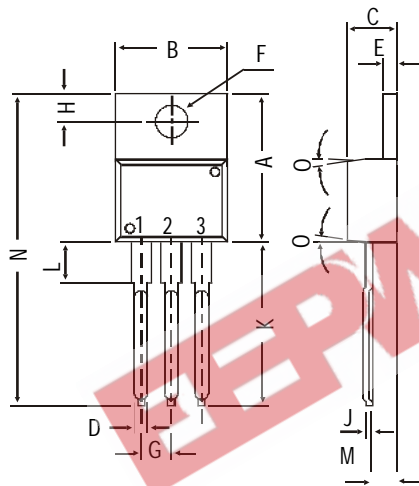
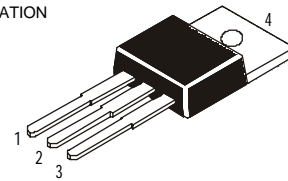


TO-220 Plastic Package

**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) $f_T = |h_{fe}| \cdot f_{test}$