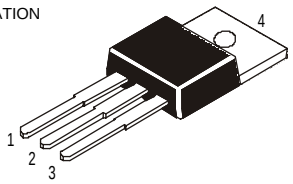
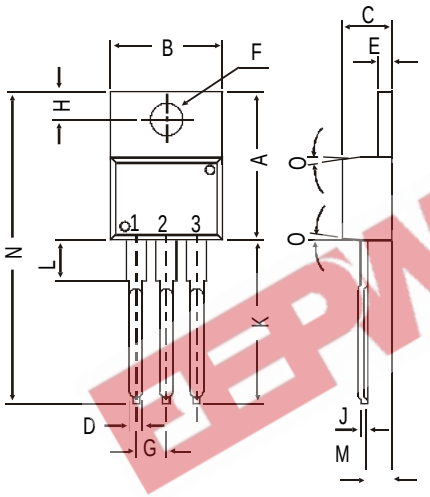
TO-220 Plastic Package

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 diminsions in mm.

ABSOLUTE MAXIMUM RATINGS

			31 ***32***	***31A*** ***32A***	***31B*** ***32B***	***31C*** ***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°C	P_{tot}	*max.*		*40*			*W*
Junction temperature	T_j	*max.*		*150*			*°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°C unless otherwise specified)*

Limiting values			***31*** ***32***	***31A*** ***32A***	***31B*** ***32B***	***31C*** ***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*

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°C	P_{tot}	max.	40	W
Derate above 25°C		max	0.32	W/°C
Total power dissipation upto T_A=25°C	P_{tot}	max.	2	W
Derate above 25°C		max	0.016	W/°C
Junction temperature	T_j	max.	150	°C
Storage temperature	T_{stg}		–65 to +150	°C

THERMAL RESISTANCE

From junction to case	$R_{th\ j-c}$	3.125	°C/W
From junction to ambient	$R_{th\ j-a}$	62.5	°C/W

CHARACTERISTICS

T_{amb} = 25°C unless otherwise specified

			31 32	31A 32A	31B 32B	31C 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 ≤ 300 µs; duty cycle ≤ 2%.

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