TO-220 Plastic Package   **TIP31, TIP31A, TIP31B, TIP31C**
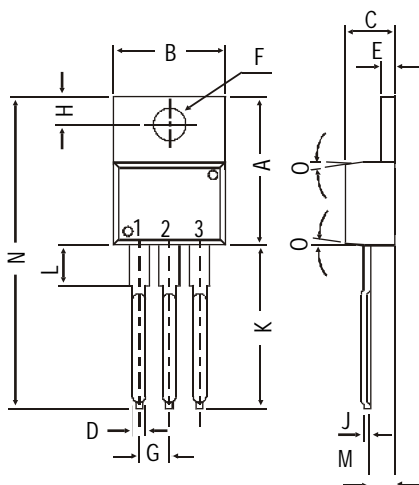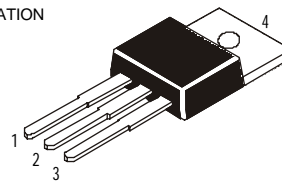**TIP32, TIP32A, TIP32B, TIP32C**

Boca Semiconductor Corp.   (BSC)

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 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

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