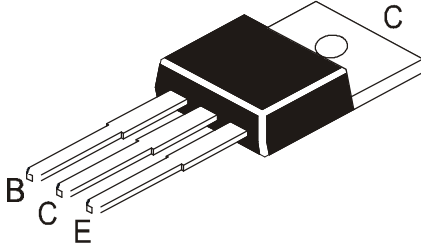
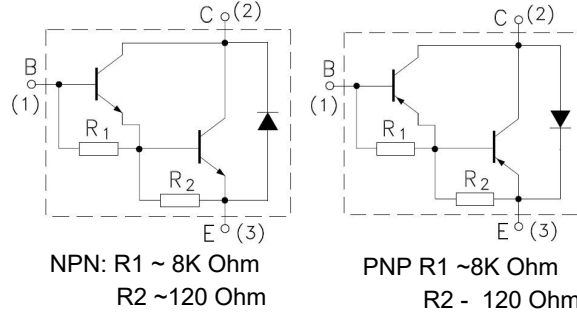


## DARLINGTON PLASTIC POWER TRANSISTORS



### Internal Schematic Diagram



**TIP120** | **TIP125**  
**TIP121** | **TIP126**  
**TIP122** | **TIP127**  
**NPN** | **PNP**

**TO-220**  
**Plastic Package**

## High Power Switching, Hammer Drive, Pulse Motor Drive and Inductive Load Drive Applications

### ABSOLUTE MAXIMUM RATINGS

DESCRIPTION		TIP120/125	TIP121/126	TIP122/127	UNIT
Collector Emitter Voltage	$V_{CEO}$	60	80	100	V
Collector Base Voltage	$V_{CBO}$	60	80	100	V
Emitter Base Voltage	$V_{EBO}$		5		V
Collector Current Continuous	$I_C$		5		A
Collector Current Peak	$I_{CM}$		8		A
Base Current	$I_B$		120		mA
Power Dissipation upto $T_c=25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$		65		W
Power Dissipation upto $T_a=25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$		0.52		W/ $^\circ\text{C}$
Unclamped Inductive Load Energy	*E		2		W
Operating And Storage Junction Temperature	$T_j, T_{stg}$		16		mW/ $^\circ\text{C}$
			50		mJ
			- 65 to +150		$^\circ\text{C}$

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

### THERMAL RESISTANCE

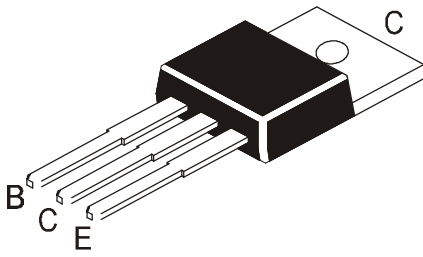
Junction to Case	$R_{th(j-c)}$	1.92	$^\circ\text{C/W}$
Junction to Ambient in free air	$R_{th(j-a)}$	62.5	$^\circ\text{C/W}$

### ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ unless specified otherwise)

DESCRIPTION	SYMBOL	TEST CONDITION	TIP120/125		TIP121/126		TIP122/127		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
Collector Emitter (sus) Voltage	* $V_{CEO(sus)}$	$I_C=100\text{mA}$ , $I_B=0$	60		80		100		V
Collector Cut Off Current	$I_{CEO}$	$V_{CE}=50\text{V}$ , $I_B=0$ $V_{CE}=40\text{V}$ , $I_B=0$ $V_{CE}=30\text{V}$ , $I_B=0$		0.5		0.5		0.5	mA mA mA
Collector Cut Off Current	$I_{CBO}$	$V_{CB}=100\text{V}$ , $I_E=0$ $V_{CB}=80\text{V}$ , $I_E=0$ $V_{CB}=60\text{V}$ , $I_E=0$		0.2		0.2		0.2	mA mA mA
Emitter Cut Off Current	$I_{EBO}$	$V_{EB}=5\text{V}$ , $I_C=0$		2.0		2.0		2.0	mA
DC Current Gain	* $h_{FE}$	$I_C=0.5\text{A}$ , $V_{CE}=3\text{V}$ $I_C=3\text{A}$ , $V_{CE}=3\text{V}$	1000 1000		1000 1000		1000 1000		
Collector Emitter Saturation Voltage	* $V_{CE(sat)}$	$I_C=3\text{A}$ , $I_B=12\text{mA}$ $I_C=5\text{A}$ , $I_B=20\text{mA}$		2.0 4.0		2.0 4.0		2.0 4.0	V V
Base Emitter On Voltage	* $V_{BE(on)}$	$I_C=3\text{A}$ , $V_{CE}=3\text{V}$		2.5		2.5		2.5	V

\*Pulse Test : Pulse width  $\leq 300\text{ms}$ , Duty Cycle  $\leq 2\%$

# DARLINGTON PLASTIC POWER TRANSISTORS



TIP120	TIP125
TIP121	TIP126
TIP122	TIP127
NPN	PNP

**TO-220**  
**Plastic Package**

## ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ unless specified otherwise)

### DYNAMIC CHARACTERISTIC

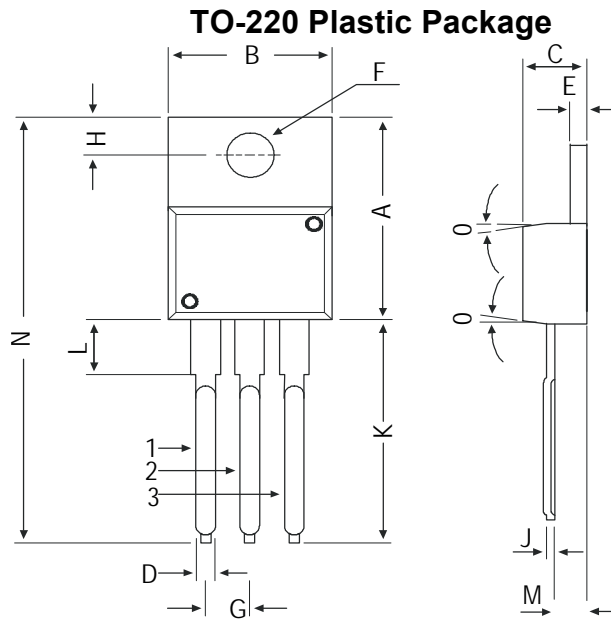
DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Small Signal Current Gain	$h_{fe}$	$I_C=3\text{A}, V_{CE}=4\text{V}, f=1\text{MHz}$	4			
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, I_E=0, f=0.1\text{MHz}$ <b>TIP125,126,127</b> <b>TIP120,121,122</b>			300	pF
					200	pF

### SWITCHING CHARACTERISTICS

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Turn on time	$t_{on}$	$I_C=3\text{A}, R_L=10\Omega$ $I_{B1}=I_{B2}=12\text{mA}$		0.4		$\mu\text{s}$
Turn off time	$t_{off}$	$V_{EB(off)}=5\text{V}$		1.2		$\mu\text{s}$

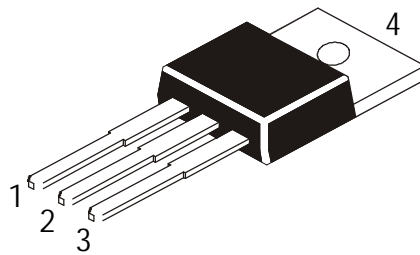
TIP120	TIP125
TIP121	TIP126
TIP122	TIP127
NPN	PNP

### TO-220 Plastic Package



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	7 DEG	

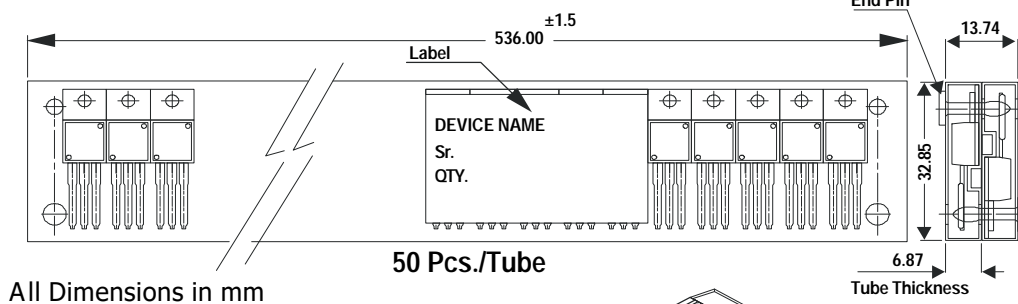
All dimensions in mm.



#### Pin Configuration

1. Base
2. Collector
3. Emitter
4. Collector

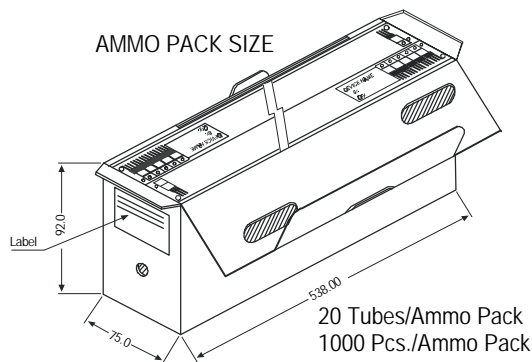
### TO-220 Tube Packing



All Dimensions in mm

50 Pcs./Tube

AMMO PACK SIZE



### Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-220 /FP	200 pcs/polybag	396 gm/200 pcs	3" x 7.5" x 7.5"	1.0K	17" x 15" x 13.5"	16.0K	36 kgs
	50 pcs/tube	120 gm/50 pcs	3.5" x 3.7" x 21.5"	1.0K	19" x 19" x 19"	10.0K	29 kgs

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