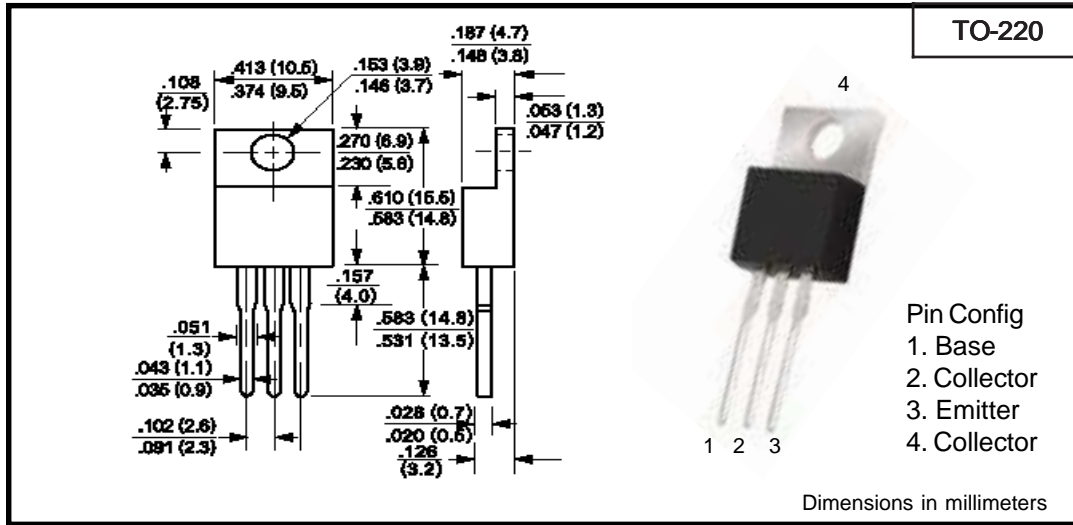


**TO-220 - Power Transistors and Darlington**



**Electrical Characteristics (Ta=25°C)**

Part #	Polarity	$V_{CBO}$	$V_{CEO}$	$V_{EBO}$	$P_D$	$I_C$	$I_{CES}$	@ $V_{CE}$	$h_{FE}$	$h_{FE}$	@ $I_C$	$V_{CE}$	$V_{CE}^{(SAT)}$	$V_{BE}^{(SAT)}$	@ $I_C$	$f_T$	@ $I_C$
		(V) Min	(V) Min	(V) Min													
2N5294	NPN	80	70	7	36	4	500 <sup>4</sup>	50	30	120	0.5	4	1.0		0.5	0.8	200
2N5296	NPN	60	40	5	36	4	500 <sup>4</sup>	50	30	120	1.0	4	1.0		1.0	0.8	200
2N5298	NPN	80	60	5	36	4	500 <sup>4</sup>	50	20	80	1.5	4	1.0		1.5	0.8	200
2N6107	PNP	80	70	5	40	7	1000 <sup>1</sup>	60	30 2.3	150	2.0 7.0	4 4	3.5 1.0		7.0 2.0	10	500
2N6109	PNP	60	50	5	40	7	1000 <sup>1</sup>	40	30 2.3	150	2.5 7.0	4 4	3.5 1.0		7.0 2.5	10	500
2N6121	NPN	45	45	5	40	4	1000 <sup>1</sup>	45	25 10	100	1.5 4.0	2 2	0.6 1.4		1.5 4.0	2.5	1000
2N6290	NPN	60	50	5	40	7	1000 <sup>1</sup>	40	30 2.3	150	2.5 7.0	4 4	1.0 3.5		2.5 7.0	4	500
2N6292	NPN	80	70	5	40	7	1000 <sup>1</sup>	60	30 2.3	150	2.0 7.0	4 4	1.0 3.5		2.0 7.0	4	500
BD239C	NPN	115	100	5	30	2	200	100	40 15		0.2 1.0	4 4	0.7		1.0	3	200
BD240C	PNP	115	100	5	30	2	200	100	40 15		0.2 1.0	4 4	0.7		1.0	3	200
BD241A	NPN	70	60	5	40	3	200	60	25 10		1.0 3.0	4 4	1.2		3.0	3	500
BD241C	NPN	115	100	5	40	3	200	100	25 10		1.0 3.0	4 4	1.2		3.0	3	500
BD242C	PNP	115	100	5	40	3	200	60	25 10		1.0 3.0	4 4	1.2		3.0	3 <sup>5</sup>	200
BD243C	NPN	100	100	5	65	6	400	100	30 15		0.3 3.0	4 4	1.5		6.0	3	500

<sup>1</sup>  $I_{CE0}$    <sup>2</sup>  $V_{CBO}$    <sup>3</sup>  $V_{CES}$    <sup>4</sup>  $I_{CER}$    <sup>5</sup>  $f_T$  Typical Values

Part #	Polarity	$V_{CBO}$	$V_{CEO}$	$V_{EBO}$	$P_D$ (W)	$I_C$ (A)	$I_{CES}$ ( $\mu$ A) Max	@ $V_{CE}$	$h_{FE}$	$h_{FE}$	@ $I_C$ (A)	$V_{CE}$ (V)	$V_{CE(SAT)}$	$V_{BE(SAT)}$	@ $I_C$ (A)	$f_T$	@ $I_C$ (mA)
		(V) Min	(V) Min	(V) Min					Min	Max			(V) Max	(V) Max		(MHz) Min	
BD244C	PNP	100	100	5	65	8	400	100	30		0.3	4	1.5		6.0	3.0 <sup>5</sup>	500
									15		3.0	4					
BD911	NPN	100	100	5	90	15	1000 <sup>1</sup>	50	40	250	0.5	4	1.0		5.0	3.0	500
									15	150	5.0	4	3.0	2.5	10.0		
									5		10.0	4					
BD912	PNP	100	100	5	90	15	1000 <sup>1</sup>	50	40	250	0.5	4	1.0		5.0	3.0	500
									15	150	5.0	4	3.0	2.5	10.0		
									5		10.0	4					
BU407	NPN	330	150	6	60	7	100	200					1.0	1.3	5.0	10.0	500
C44C11	NPN	90 <sup>3</sup>	80	5	30	4	10	90	100	220	0.2	1	0.5		1.0	50.0 <sup>5</sup>	20
									20		2.0	1					
C44C8	NPN	70 <sup>3</sup>	60	5	30	4	10	70	100	220	0.2	1	0.5		1.0	50.0 <sup>5</sup>	20
									20		2.0	1					
C45C5	PNP	55 <sup>3</sup>	45	5	30	4	10	50	40	120	0.2	1	0.5	1.3	1.0	40.0 <sup>5</sup>	20
									20		1.0	1					
C45C8	PNP	70 <sup>3</sup>	60	5	30	4	10	70	40	120	0.2	1	0.5		1.0	40.0 <sup>5</sup>	20
									20		1.0	1					
C45C11	PNP	90 <sup>3</sup>	80	5	30	4	10	90	40	120	0.2	1	0.5	1.3	1.0	40.0	20
									20		1.0	1					
CD13005	NPN	600	400	9	60	2	100 <sup>2</sup>	600	8	40	0.5	5	0.5	1	0.5	4.0	100
CSA614Y	PNP	80	55	5	25	3	50 <sup>2</sup>	50	120	240	0.5	5	0.5		1.0		
CSA940	PNP	150	150	5	25	1.5	10 <sup>2</sup>	120	40	140	0.5	10	1.5		0.5	4.0 <sup>5</sup>	500
CSA968	PNP	160	160	5	25	1.5	1.0 <sup>2</sup>	160	70	240	0.1	5	1.5		0.5	100 <sup>5</sup>	100
CSA1012Y	PNP	60	50	5	25	5	1.0 <sup>2</sup>	50	120	240	1.0	1	0.4	1.2	3.0	80 <sup>5</sup>	1000
									30		3.0	1					
CSB857	PNP	70	50	5	40	4	1.0 <sup>2</sup>	50	60	320	1.0	4	1.0		2.0	15.0 <sup>5</sup>	500
									35		0.1	4					
CSB1370E	PNP	60	60	5	30	3	10 <sup>2</sup>	60	100	200	0.5	5	1.5	1.5	2.0	15.0 <sup>5</sup>	
CSC2073	NPN	150	150	5	25	1.5	10 <sup>2</sup>	120	40	140	0.5	10	1.5		0.5	4.0 <sup>5</sup>	500
CSC2233	NPN	200	60	5	40	4	10 <sup>2</sup>	170	30	150	1.0	5	1.0	1.5	4.0	8.0 <sup>5</sup>	500
									20		4.0	5					
CSC2238	NPN	160	160	5	25	1.5	1.0 <sup>2</sup>	160	70	240	0.1	5	1.5		0.5	100 <sup>5</sup>	100
CSC3255S	NPN	80	60	5	40	10	100 <sup>2</sup>	40	70	250	1.0	2	0.6		5.0	100 <sup>5</sup>	1000
CSD313	NPN	60	60	5	30	3	100	20	40		0.1	2	1.0		2.0	8.0 <sup>5</sup>	500
									40	320	1.0	2					
CSD88O	NPN	60	60	7	30	3	100 <sup>2</sup>	60	60	300	0.5	5	1.0		3.0	3.0 <sup>5</sup>	500
MJE2955T	PNP	70	60	5	75	10	700 <sup>1</sup>	30	20	100	4.0	4	1.1		4.0	2.0 <sup>5</sup>	500
									5		10.0	4	8.0		10.0		
MJE3055T	NPN	70	60	5	75	10	700 <sup>1</sup>	30	20	100	4.0	4	1.1		4.0	2.0	500
									5		10.0	4	80		10.0		
MJE15028	NPN	120	120	5	50	8	100 <sup>1</sup>	120	40		0.1	2	0.5		1.0	30.0	500
									40		2.0	2					
									40		3.0	2					
									20		4.0	2					
MJE15029	PNP	120	120	5	50	8	100 <sup>1</sup>	150	40		0.1	2	0.5		1.0	30.0	500
									40		2.0	2					
									40		3.0	2					
									20		4.0	2					
MJE15030	NPN	150	150	5	50	8	100 <sup>1</sup>	120	40		0.1	2	0.5		1.0	30.0	500
									40		2.0	2					
									40		3.0	2					
									20		4.0	2					
MJE15031	PNP	150	150	5	50	8	100 <sup>1</sup>	150	40		0.1	2	0.5		1.0	30.0	500
									40		2.0	2					
									40		3.0	2					
									20		4.0	2					

<sup>1</sup> $I_{CEO}$    <sup>2</sup> $I_{CBO}$    <sup>3</sup> $V_{CES}$    <sup>4</sup> $I_{CER}$    <sup>5</sup> $f_T$  Typical Values



Part #	Polarity	V <sub>CBO</sub> (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EBO</sub> (V) Min	P <sub>D</sub> (W)	I <sub>C</sub> (A)	I <sub>CES</sub> ( $\mu$ A) Max	@ V <sub>CE</sub>	h <sub>FE</sub> Min	h <sub>FE</sub> Max	@ I <sub>C</sub> (A)	V <sub>CE</sub> (V)	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Max	@ I <sub>C</sub> (A)	f <sub>T</sub> (MHz) Min	@ I <sub>C</sub> (mA)
TIP29C	NPN	100	100	5	30	1	200	100	40 15		0.2 1.0	4 4	0.7		1.0	3.0	200
TIP30C	PNP	100	100	5	30	1	200	100	40 15		0.2 1.0	4 4	0.7		1.0	3.0	200
TIP31C	NPN	100	100	5	40	3	200	100	10 25	50	3.0 1.0	4 4	1.2		3.0	3.0	500
TIP32	PNP	40	40	5	40	3	200	40	10 25	50	3.0 1.0	4 4	1.2		3.0	3.0	500
TIP32C	PNP	100	100	5	40	3	200	100	10 25	50	3.0 1.0	4 4	1.2		3.0	3.0	500
TIP41C	NPN	100	100	5	65	6	400	100	15 30	75	3.0 0.3	4 4	1.5		6.0	3.0	500
TIP42C	PNP	100	100	5	65	6	400	100	15 30	75	3.0 0.3	4 4	1.5		6.0	3.0	500
TIP47	NPN	350	250	5	40	1	1000	350	30 10	150	0.3 1.0	10 10	1.0		1.0	10.0	200
TIP49	NPN	450	350	5	40	1	1000	450	30 10	150	0.3 1.0	10 10	1.0		1.0	10.0	200
TIP50	NPN	500	400	5	40	1	1000	500	30 10	150	0.3 1.0	10 10	1.0		1.0	10.0	200
TIP102	NPN	100	100	5	80	8	50 <sup>1</sup>	50	1000 200	20000	3.0 8.0	4 4	2.0 2.5		3.0 8.0		
TIP105	PNP	60	60	5	80	8	50 <sup>1</sup>	30	1000 200	20000	3.0 8.0	4 4	2.0 2.5		3.0 8.0		
TIP106	PNP	80	80	5	80	8	50 <sup>1</sup>	40	1000 200	20000	3.0 8.0	4 4	2.0 2.5		3.0 8.0		
TIP107	PNP	100	100	5	80	8	50 <sup>1</sup>	50	1000 200	20000	3.0 8.0	4 4	2.0 2.5		3.0 8.0		
TIP110	NPN	60	60	5	50	2	2000 <sup>1</sup>	30	1000 500		1.0 2.0	4 4	2.5		2.0		
TIP112	NPN	100	100	5	50	2	2000 <sup>1</sup>	50	1000 500		1.0 2.0	4 4	2.5		2.0		
TIP115	PNP	60	60	5	50	2	2000 <sup>1</sup>	30	1000 500		1.0 2.0	4 4	2.5		2.0		
TIP116	PNP	80	80	5	50	2	2000 <sup>1</sup>	40	1000 500		1.0 2.0	4 4	2.5		2.0		
TIP117	PNP	100	100	5	50	2	2000 <sup>1</sup>	50	1000 500		1.0 2.0	4 4	2.5		2.0		
TIP120	NPN	60	60	5	65	5	500 <sup>1</sup>	30	1000 1000		0.5 3.0	3 3	2.0 4.0		3.0 5.0		
TIP121	NPN	80	80	5	65	5	500 <sup>1</sup>	40	1000 1000		3.0 0.5	3 3	2.0 4.0		3.0 5.0		
TIP122	NPN	100	100	5	65	5	500 <sup>1</sup>	50	1000 1000		3.0 0.5	3 3	2.0 4.0		3.0 5.0		
TIP125	PNP	60	60	5	65	5	500 <sup>1</sup>	30	1000 1000		0.5 3.0	3 3	2.0 4.0		3.0 5.0		
TIP126	PNP	80	80	5	65	5	500 <sup>1</sup>	40	1000 1000		3.0 0.5	3 3	2.0 4.0		3.0 5.0		
TIP127	PNP	100	100	5	65	5	500 <sup>1</sup>	50	1000 1000		3.0 0.5	3 3	2.0 4.0		3.0 5.0		
TIP132	NPN	100	100	5	70	8	200 <sup>2</sup>	100	5000		1.0	4	2.0		4.0		

<sup>1</sup> I<sub>CEO</sub>   <sup>2</sup> I<sub>CBO</sub>   <sup>3</sup> V<sub>CES</sub>   <sup>4</sup> I<sub>CER</sub>   <sup>5</sup> f<sub>T</sub> Typical Values



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