

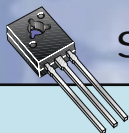
# Power Bipolar Transistors



**Selection  
guide**



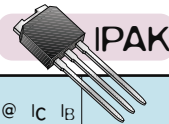
April 2000



## SOT-32 / TO-126

Device	Type	V <sub>CEO</sub>	V <sub>CBO</sub>	V <sub>CES</sub>	V <sub>CEV</sub>	I <sub>C</sub>	P <sub>tot</sub>	h <sub>FE</sub> @ I <sub>C</sub> V <sub>CE</sub>		V <sub>CE(sat)</sub> @ I <sub>C</sub> I <sub>B</sub>			Application	
								min	max	[A]	[V]	[V]		[A]
<b>BD433</b>	<b>BD434</b>	22	22	4	36	50			2	1	0.5	2	200	Gen. Purp.
	<b>MJE210</b>	25	40	5	15	45	180	2	1	1.8	5	1000	Gen. Purp.	
<b>BD435</b>	<b>BD436</b>	32	32	4	36	50			2	1	0.5	2	200	Gen. Purp.
<b>MJE521</b>		40	40	4	40	40			1	1				Gen. Purp.
<b>BD135</b>	<b>BD136</b>	45	45	1.5	12.5	40	250	0.15	2	0.5	0.5	50	Gen. Purp.	
	<b>BD234</b>	45	45	2	25	25			1	2	0.6	1	100	Gen. Purp.
<b>BD437</b>	<b>BD438</b>	45	45	4	36	40			2	1	0.6	2	200	Gen. Purp.
	<b>BD138</b>	60	60	1.5	12.5	40	250	0.15	2	0.5	0.5	50	Gen. Purp.	
<b>BD235</b>	<b>BD236</b>	60	60	2	25	25			1	2	0.6	1	100	Gen. Purp.
<b>BD439</b>	<b>BD440</b>	60	60	4	36	25			2	1	0.8	2	200	Gen. Purp.
<b>2N5191</b>		60	60	4	40	25	100	1.5	2	1.4	4	1000	Switching	
<b>BD677</b>	<b>BD678</b>	60	60	4	40	750			1.5	3	2.5	1.5	30	Gen. Purp.
<b>BD677A</b>	<b>BD678A</b>	60	60	4	40	750			2	3	2.8	2	40	Gen. Purp.
2N4923		80	80	1	30	30	150	0.5	1	0.6	1	100	Gen. Purp.	
<b>BD139</b>	<b>BD140</b>	80	80	1.5	12.5	40	250	0.15	2	0.5	0.5	50	Gen. Purp.	
BD139-10	<b>BD140-10</b>	80	80	1.5	12.5	63	250	0.15	2	0.5	0.5	50	Gen. Purp.	
<b>BD179</b>		80	80	3	30	40			0.15	2	0.8	1	100	Gen. Purp.
<b>BD441</b>	<b>BD442</b>	80	80	4	36	15			2	1	0.8	2	200	Gen. Purp.
<b>2N5192</b>	<b>2N5195</b>	80	80	4	40	20	80	1.5	2	1.4	4	1000	Switching	
2N6039	<b>2N6036</b>	80	80	4	40	750	15000	2	3	2	2	8	Gen. Purp.	
<b>BD679</b>	<b>BD680</b>	80	80	4	40	750			1.5	3	2.5	1.5	30	Gen. Purp.
<b>BD679A</b>	<b>BD680A</b>	80	80	4	40	750			2	3	2.8	2	40	Gen. Purp.
<b>MJE802</b>		80	80	4	40	750			1.5	3	3	4	40	Gen. Purp.
<b>BD237</b>	<b>BD238</b>	80	100	2	25	25			1	2	0.6	1	100	Gen. Purp.
<b>MJE182</b>	<b>MJE172</b>	80	100	3	12.5	12			1.5	1	0.9	1.5	150	Gen. Purp.
<b>BD681</b>	<b>BD682</b>	100	100	4	40	750			1.5	3	2.5	1.5	30	Gen. Purp.
<b>MJE3440</b>		250	350	0.3	15	50	200	0.02	10	0.5	0.05	4	Switching	
<b>MJE340</b>	<b>MJE350</b>	300	300	0.5	20	30	240	0.05	10				Switching	
2N5657		350	375	0.5	20	30	250	0.1	10	2.5	0.25	25	Gen. Purp.	
<b>ST13003</b>		400	700	1.5	40	8			0.5	2	1	1	250	Lighting/SMPS
<b>BULT118</b>		400	700	2	45	10	50	0.5	5	1	1	200	Lighting/SMPS	
BULT118D		400	700	2	45	10	50	0.5	5	1	1	200	Lighting/SMPS	
<b>BUX87</b>		450	1000	0.5	40	12			0.04	5	1	0.2	20	SMPS

## DPAK

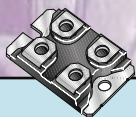


## IPAK

Device	Type	V <sub>CEO</sub>	V <sub>CBO</sub>	V <sub>CES</sub>	V <sub>CEV</sub>	I <sub>C</sub>	P <sub>tot</sub>	h <sub>FE</sub> @ I <sub>C</sub> V <sub>CE</sub>		V <sub>CE(sat)</sub> @ I <sub>C</sub> I <sub>B</sub>			Application	
								min	max	[A]	[V]	[V]		[A]
<b>MJD3055T4</b>	<b>MJD2955T4</b>	60	70	10	20	20	20	100	4	4	1.1	4	400	Gen. Purp.
<b>MJD31BT4</b>	<b>MJD32BT4</b>	80	80	3	15	10	50	3	4	1.2	3	375	Gen. Purp.	
<b>MJD44H11T4</b>	<b>MJD45H11T4</b>	80	80	10	20	40			4	1	1	8	400	Gen. Purp.
<b>MJD112T4</b>	<b>MJD117T4</b>	100	100	2	20	1000	12000	2	3	2	2	8	Gen. Purp.	
<b>MJD31CT4</b>	<b>MJD32CT4</b>	100	100	3	15	10	50	3	4	1.2	3	375	Gen. Purp.	
<b>MJD122T4</b>	<b>MJD127T4</b>	100	100	5	20	1000	12000	4	4	2	4	16	Gen. Purp.	
<b>MJD47T4</b>		250	350	1	15	10			1	10	1	1	200	Switching
<b>MJD340T4</b>	<b>MJD350T4</b>	300	300	0.5	15	30	240	0.05	10				Gen. Purp.	
<b>MJD50T4</b>		400	500	1	15	30	150	0.3	10	1	1	200	Switching	
<b>BULD118D-1</b>		400	700	2	20	10	50	0.5	5	1	1	200	Lighting	
<b>BUXD87-1</b>		450	1000	0.5	20	12			0.04	5	1	0.2	20	SMPS
<b>STD616A-1</b>		450	1000	1.6	20	4			1.6	5	0.5	0.8	250	SMPS

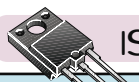
# = typ □ = 100°C Suffix: T4 = DPAK in tape & reel Suffix: -1 = IPAK in tubes

ST preferred products in bold, shaded areas indicate Darlington



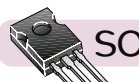
ISOTOP® UL recognized

Device	Type	V <sub>CEO</sub>	V <sub>CBO</sub> V <sub>VES</sub> V <sub>CEV</sub>	I <sub>C</sub>	P <sub>tot</sub>	h <sub>FE</sub> @ I <sub>C</sub>		V <sub>CE</sub>	V <sub>CE(sat)</sub> @ I <sub>C</sub>			I <sub>B</sub>	Application
						min	max		[V]	[A]	[mA]		
ESM2012DV	NPN	120	150	120	175	1200	#	100	5	1.5 □	70	0.25	Industrial
BUT30V	PNP	125	200	100	250	27	#	100	5	1.5	100	10	Industrial
ESM2030DV		300	400	67	150	300	#	56	5	1.8 □	40	0.4	Industrial
BUT32V		300	400	80	250	16	#	40	5	0.9	40	4	Industrial
ESM3030DV		300	400	100	225	300	#	85	5	2.2 □	85	2.4	Industrial
BUT232V		300	400	140	300	17	#	70	5	1.9 □	70	7	Industrial
ESM3045DV		450	600	24	125	120	#	20	5	2 □	20	1.2	Industrial
ESM4045DV		450	600	42	150	220	#	35	5	2	35	2	Industrial
ESM5045DV		450	600	60	175	150	#	50	5	2 □	50	2.8	Industrial
ESM6045DV		450	600	84	250	120	#	70	5	2 □	70	4	Industrial
BUV298V		450	850	60	250	12	#	32	5	2	32	6.4	Industrial
BUV98AV		450	1000	30	150	9	#	24	5	1.5	16	3.2	Industrial
BUV98V		450	1000	30	150	9	#	24	5	1.5	20	4	Industrial
BUV298AV		450	1000	50	250	12	#	32	5	1.2	32	6.4	Industrial
ESM6045AV		450	1000	72	250	150	#	60	5	2 □	60	2.4	Industrial
BUF460AV		450	1000	80	270	15	#	60	5	2	60	12	Industrial



ISOWATT218™ UL recognized

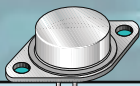
Device	Type	V <sub>CEO</sub>	V <sub>CBO</sub> V <sub>VES</sub> V <sub>CEV</sub>	I <sub>C</sub>	P <sub>tot</sub>	h <sub>FE</sub> @ I <sub>C</sub>		V <sub>CE</sub>	V <sub>CE(sat)</sub> @ I <sub>C</sub>			I <sub>B</sub>	Application
						min	max		[A]	[V]	[A]		
BU9412PFI	NPN	350	350	15	65	300		5	10	1.8	10	250	Electr. Ignition
BU941PFI	PNP	400	500	15	65	300		5	10	1.8	10	250	Electr. Ignition
BUV48FI		400	850	15	55					1.5	10	2000	Switching
BUV48AFI		450	1000	15	55					1.5	8	1600	Switching
ST1802HI		600	1500	10	50	4	9	5	5	1.5	4	1200	CTVs/Monitors
ST1803DHI		600	1500	10	50	4	9	4.5	5	1.5	4	1200	CTVs
ST2001HI		600	1500	10	55	5	10	6	5	1.5	5	1250	CTVs/Monitors
ST2009DHI		600	1500	10	55	5	10	5.5	5	1.5	5	1250	CTVs
ST2310HI		600	1500	10	55	5	8	7	5	3	7	1750	CTVs/Monitors
ST2408HI		600	1500	12	55	6	9	8	5	1.5	8	2000	CTVs/Monitors
BUV48CFI		700	1200	15	55					1.5	6	1500	Switching
BU808DFI		700	1400	8	52	60	270	5	5	1.6	5	500	CTVs
BUH315		700	1500	6	44	6	12	3	5	1.5	3	750	CTVs
BUH315D		700	1500	6	44	4	9	3	5	1.5	3	1000	CTVs
THD218DHI		700	1500	7	50	6	13	4	5	1.5	4	1000	CTVs
BU508AFI		700	1500	8	50					1	4.5	2000	CTVs
BU508DFI		700	1500	8	50					1	4.5	2000	CTVs
BUH515		700	1500	8	50	6		5	5	1.5	5	1250	CTVs
BUH515D		700	1500	8	50	5	10	5	5	1.5	5	1250	CTVs
S2000AFI		700	1500	8	50	2.25		4.5	1	1	4.5	2000	CTVs/Monitors
THD277HI		700	1500	8	50	6	13	4	5	0.9	4	1000	CTVs/Monitors
BUH615D		700	1500	8	55	5	11	6	5	1.5	6	1500	CTVs
THD215HI		700	1500	10	57	6		6	5	1.3	6	1200	CTVs/Monitors
THD200FI		700	1500	10	57	6.5		7	5	1.5	7	1500	CTVs/Monitors
BUH1015HI		700	1500	14	70	7	14	10	5	1.5	10	2000	CTVs/Monitors



SOT-82

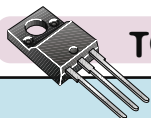
Device	Type	V <sub>CEO</sub>	V <sub>CBO</sub> V <sub>VES</sub> V <sub>CEV</sub>	I <sub>C</sub>	P <sub>tot</sub>	h <sub>FE</sub> @ I <sub>C</sub>		V <sub>CE</sub>	V <sub>CE(sat)</sub> @ I <sub>C</sub>			I <sub>B</sub>	Application
						min	max		[A]	[V]	[A]		
	BD336	100	100	6	60	750		3	3	2	3	12	Gen. Purp.
BULK128D		400	700	4	55	8		2	5	1.5	2.5	500	Lighting/SMPS
BULK128D-B		400	700	4	55	8		2	5	1.5	2.5	500	Lighting/SMPS
BULK38D		450	800	5	60	8		2	5	1.1	3	750	Lighting/SMPS

# = typ □ = 100°C



## TO-3

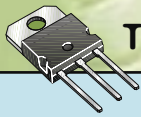
Device	Type	V <sub>CEO</sub> [V]	V <sub>CBO</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	h <sub>FE</sub> @ I <sub>C</sub> V <sub>CE</sub>				V <sub>CE(sat)</sub> @ I <sub>C</sub> I <sub>B</sub>			Application
						min	max	[A]	[V]	[V]	[A]	[mA]	
2N3771		40	50	30	150	15	60	15	4	2	15	1500	Gen. Purp.
2N3772		60	80	20	150	15	60	10	4	1.4	10	1000	Gen. Purp.
2N3055	MJ2955	60	100	15	115	20	70	4	4	1.1	4	400	Gen. Purp.
MJ3001	MJ2501	80	80	10	150	1000		5	3	2	5	20	Gen. Purp.
2N5886		80	80	25	200	20	100	10	4	1	15	1500	Gen. Purp.
MJ11014	MJ11013	90	90	30	200	1000		20	5	3	20	200	Gen. Purp.
MJ802		90	100	30	200	25	100	7.5	2	0.8	7.5	750	Gen. Purp.
2N5038		90	150	20	140	20	100	12	5	1	12	1200	Switching
2N6059		100	100	12	150	750		6	3	3	12	120	Gen. Purp.
MJ4035	MJ4032	100	100	16	150	1000		10	3	4	16	80	Gen. Purp.
2N6284	2N6287	100	100	20	160	750	18000	10	3	3	20	200	Gen. Purp.
BUX10		125	160	25	150	10		20	4	0.6	10	1000	Switching
BUV20		125	160	50	250	20	60	25	2	0.6	25	2500	Switching
BUT90		125	200	50	250					0.9	70	7000	Switching
BUT100		125	200	50	300					0.9	100	10000	Switching
BUR51		200	300	60	350	15		50	4	1	30	2000	Switching
BUX22		250	300	40	350	20	60	10	4	1.5	20	2500	Switching
BUT92		250	350	50	250					1.2	35	3500	Switching
BUR52		250	350	60	350	15		40	4	1	25	2000	Switching
BU941Z		350	350	15	180	300		5	10	1.8	10	250	Electr. Ignition
BU931		400	500	15	175	300		5	10	1.8	8	100	Electr. Ignition
BU941		400	500	15	180	300		5	10	1.8	10	250	Electr. Ignition
BUX80		400	800	10	100	30		1.2	5	3	8	2500	Switching
2N6547		400	850	15	175	6		10	2	1.5	10	2000	Switching
BUX48		400	850	15	175					1.5	10	2000	Switching
BUX98		400	850	30	250					1.5	20	4000	Switching
BU326A		400	900	6	75	25 #		1	5	3	4	1250	Monochr. TVs
BUY69A		400	1000	10	100	15		2.5	10	3.3	8	2500	Switching
BUF420M		450	850	30	200					0.5 #	20	2000	SMPS/Industr.
BUX348		450	850	45	300					0.9	30	6000	Switching
BUX48A		450	1000	15	175					1.5	10	2000	Switching
BUX98A		450	1000	30	250					1.5	16	3200	Switching
BUX48C		700	1200	15	175					1.5	6	1500	Switching
BUX98C		700	1200	30	250					1.5	12	3000	Switching
BU208A		700	1500	8	150					1	4.5	2000	CTVs
BU208D		700	1500	8	150					1	4.5	2000	CTVs



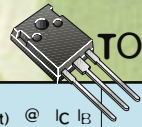
## TO-220FP UL compliant

Device	Type	V <sub>CEO</sub> [V]	V <sub>CBO</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	h <sub>FE</sub> @ I <sub>C</sub> V <sub>CE</sub>				V <sub>CE(sat)</sub> @ I <sub>C</sub> I <sub>B</sub>			Application
						min	max	[A]	[V]	[V]	[A]	[mA]	
BDX53BFP		80	80	8	29	750		3	3	2	3	12	Gen. Purp.
BD241BFP	BD242BFP	80	90	3	24	25		1	4	1.2	3	600	Gen. Purp.
TIP122FP	TIP127FP	100	100	5	29	1000		3	3	2	3	12	Gen. Purp.
BDW93CFP	BDW94CFP	100	100	12	33	750		5	3	2	5	20	Gen. Purp.
BUL128FP •		400	700	4	31	15		1	5	1.5	2.5	500	Lighting/SMPS
ST13007FP •		400	700	8	36	5	30	5	5	2	5	1000	Lighting/SMPS
BUL310FP		500	1000	5	36	10 #		3	2.5	1.1	3	600	Lighting/SMPS
SGSIF344FP		600	1200	7	40					1.5	3.5	700	SMPS
ST1803DFP •		600	1500	8	40	4	9	4.5	5	1.5	4	1200	CTVs/Monitors

# = typ    □ = 100°C    • = Available upon request



## TO-218 / SOT-93

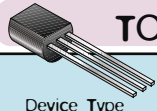


## TO-247

Device NPN	Type PNP	V <sub>CEO</sub> [V]	V <sub>CB0</sub> V <sub>VES</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	h <sub>FE</sub> @ I <sub>C</sub>		V <sub>CE</sub> [V]	V <sub>CE(sat)</sub> @ I <sub>C</sub>		I <sub>B</sub> [mA]	Application	
						min	max		[V]	[A]			
TIP140	TIP145	60	60	10	125	1000		5	4	3	10	40	Gen. Purp.
TIP3055	TIP2955	60	70	15	90	20		4	4	1.1	4	400	Gen. Purp.
TIP33A		60	100	10	80	20	100	3	4	1	3	300	Gen. Purp.
BUW48		60	120	30	150					1.4	40	4000	Switching
TIP141	TIP146	80	80	10	125	1000		5	4	2	5	10	Gen. Purp.
	TIP36B	80	80	25	125	15	75	15	4	1.8	15	1500	Gen. Purp.
SGSD100	SGSD200	80	80	25	130	300		20	3	1.75	10	40	Gen. Purp.
BUW49		80	160	30	150					1.2	30	3000	Switching
TIP142	TIP147	100	100	10	125	1000		5	4	2	5	10	Gen. Purp.
BDW83C	BDW84C	100	100	15	130	750	20000	6	3	2.5	6	12	Gen. Purp.
TIP35C	TIP36C	100	100	25	125	15	75	15	4	1.8	15	1500	Gen. Purp.
TIP33C	TIP34C	100	140	10	80	20	100	3	4	1	3	300	Gen. Purp.
BUT70		125	200	40	200					0.9	70	7000	Switching
BUTW92*		250	500	60	180	9		60	3	1	60	15000	Switching
BU941ZP		350	350	15	155	300		5	10	1.8	10	250	Electr. Ignition
BU931P		400	500	15	135	300		5	10	1.8	10	250	Electr. Ignition
BU941P		400	500	15	155	300		5	10	1.8	10	250	Electr. Ignition
BU426A		400	900	6	114	30#		0.6	5	1.5	2.5	500	Monochr. TVs
BUF410		450	850	15	125					0.5#	10	2000	SMPS
BUX98PI <sup>Δ</sup>		450	850	30	115	5		20	2	0.9	20	4000	Switching
BUF420		450	850	30	200					0.5#	20	2000	SMPS
BUF410A		450	1000	15	125					0.5#	10	2000	SMPS
BUL810		450	1000	15	125	10	40	5	5	1.5	8	1600	Lighting/SMPS
BUV48A		450	1000	15	125					1.5	10	2000	Switching
BUX98AP		450	1000	24	200					1.2	16	3200	Switching
BUF420AI <sup>Δ</sup>		450	1000	30	115					0.5#	20	2000	SMPS/Industr.
BUF420A		450	1000	30	200					0.5#	20	2000	SMPS/Industr.
BUV48B		600	1200	15	125					3	10	4000	Switching
BUV48C		700	1200	15	125					1.5	6	1500	Switching
BU508A		700	1500	8	125					1	4.5	2000	CTVs
BUH1015		700	1500	14	160	7	14	10	5	1.5	10	2000	CTVs/Monitors
BUH1215		700	1500	16	200	7		12	5	1.5	12	2400	CTVs/Monitors

\* = TO-247 package

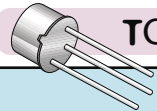
Δ = TOP3-I package



## TO-92

Device NPN	Type PNP	V <sub>CEO</sub> [V]	V <sub>CB0</sub> V <sub>VES</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	h <sub>FE</sub> @ I <sub>C</sub>		V <sub>CE</sub> [V]	V <sub>CE(sat)</sub> @ I <sub>C</sub>		I <sub>B</sub> [mA]	Application	
						min	max		[V]	[A]			
STX112		100	100	2	0.8	1000		1	4	2.5	2	8	Gen. Purp.
STPSA42		300	500	0.5	0.625	3		0.1	2	2.5	0.2	100	Lighting

Additional devices dedicated to low cost CFL applications are available also



## TO-39

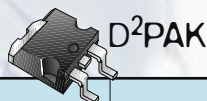
Device NPN	Type PNP	V <sub>CEO</sub> [V]	V <sub>CB0</sub> V <sub>VES</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	h <sub>FE</sub> @ I <sub>C</sub>		V <sub>CE</sub> [V]	V <sub>CE(sat)</sub> @ I <sub>C</sub>		I <sub>B</sub> [mA]	Application	
						min	max		[V]	[A]			
	BSS44	60	65	5	5	40	70	2	2	1	5	500	Switching
BFX34		60	120	5	5	40	150	2	2	1	5	500	Switching
	2N5153	80	100	5	10	70	200	2.5	5	0.75	2.5	250	Switching
2N5681		100	100	1	10	40	150	0.25	2	1	0.5	50	Switching
2N5682		120	120	1	10	40	150	0.25	2	1	0.5	50	Switching
	2N5415	200	200	1	10	30	150	0.05	10	2.5	0.05	5	Switching
BUY49S		200	250	3	10	40		0.5	5	0.2	0.5	50	Switching
2N3440		250	300	1	10	40	160	0.02	10	0.5	0.05	4	Switching
	2N5416	300	350	1	10	30	120	0.05	10	2.5	0.05	5	Switching
2N3439		350	450	1	10	40	160	0.02	10	0.5	0.05	4	Switching

# = typ

□ = 100°C



TO-220



D<sup>2</sup>PAK

Device	Type	V <sub>CEO</sub> [V]	V <sub>CBO</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	h <sub>FE</sub> @ I <sub>C</sub> V <sub>CE</sub>		V <sub>CE(sat)</sub> @ I <sub>C</sub> I <sub>B</sub>			Application		
						min	max	[A]	[V]	[V]		[A]	[mA]
	<b>2N6111</b>	30	40	7	40	30		4	3	1	3	300	Gen. Purp.
BD533	<b>BD534</b>	45	45	8	50	25		2	2	0.8	2	200	Gen. Purp.
	<b>D45H5</b>	45	45	10	50	40		4	1	1	8	400	Gen. Purp.
<b>TIP29A</b>	<b>TIP30A</b>	60	60	1	30	15		1	4	0.7	1	125	Gen. Purp.
<b>TIP110</b>	<b>TIP115</b>	60	60	2	50	1000		1	4	2.5	2	8	Gen. Purp.
<b>TIP31A</b>	<b>TIP32A</b>	60	60	3	40	25		1	4	1.2	3	375	Gen. Purp.
<b>TIP120</b>	<b>TIP125</b>	60	60	5	65	1000		3	3	2	3	12	Gen. Purp.
TIP41A	<b>TIP42A</b>	60	60	6	65	15	75	3	4	1.5	6	600	Gen. Purp.
<b>BD535</b>	<b>BD536</b>	60	60	8	50	25		2	2	0.8	2	200	Gen. Purp.
	<b>TIP135</b>	60	60	8	70	1000	15000	4	4	2	4	16	Gen. Purp.
	<b>TIP105</b>	60	60	8	80	1000	20000	3	4	2	3	6	Gen. Purp.
<b>D44H8</b>	<b>D45H8</b>	60	60	10	50	40		4	1	1	8	400	Gen. Purp.
<b>BD707</b>	<b>BD708</b>	60	60	12	75	15	150	4	4	1	4	400	Gen. Purp.
<b>BD241A</b>	<b>BD242A</b>	60	70	3	40	25		1	4	1.2	3	600	Gen. Purp.
<b>MJE3055T</b>	<b>MJE2955T</b>	60	70	10	75	20	70	4	4	1.1	4	400	Gen. Purp.
<b>2N6487</b>	<b>2N6490</b>	60	70	15	75	20	150	5	4	1.3	5	500	Gen. Purp.
	<b>2N6107</b>	70	80	7	40	30		4	2	1	2	200	Gen. Purp.
	<b>TIP32B</b>	80	80	3	40	25		1	4	1.2	3	375	Gen. Purp.
<b>TIP121</b>	<b>TIP126</b>	80	80	5	65	1000		3	3	2	3	12	Gen. Purp.
<b>BD243B</b>	<b>BD244B</b>	80	80	6	65	15		3	4	1.5	6	1000	Gen. Purp.
<b>TIP41B</b>		80	80	6	65	15	75	3	4	1.5	6	600	Gen. Purp.
<b>BD537</b>	<b>BD538</b>	80	80	8	50	15		2	2	0.8	2	200	Gen. Purp.
<b>BDX53B</b>	<b>BDX54B</b>	80	80	8	60	750		3	3	2	3	12	Gen. Purp.
<b>D44H11</b>	<b>D45H11</b>	80	80	10	50	40		4	1	1	8	400	Gen. Purp.
<b>2N6388</b>		80	80	10	65	1000	20000	5	3	2	5	10	Gen. Purp.
	<b>2N6668</b>	80	80	10	65	1000	20000	5	3	2	5	10	Gen. Purp.
<b>BDX33B</b>	<b>BDX34B</b>	80	80	10	70	750		3	3	2.5	3	6	Gen. Purp.
<b>BD709</b>		80	80	12	75	15	150	4	4	1	4	400	Gen. Purp.
	<b>BDW94B</b>	80	80	12	80	750	20000	5	3	2	5	20	Gen. Purp.
<b>BD909</b>	<b>BD910</b>	80	80	15	90	15	150	5	4	1	5	500	Gen. Purp.
<b>BD241B</b>	<b>BD242B</b>	80	90	3	40	25		1	4	1.2	3	600	Gen. Purp.
<b>2N6488</b>		80	90	15	75	20	150	5	4	1.3	5	500	Gen. Purp.
<b>BUV26</b>		90	180	14	85					1.5	12	1200	Switching
<b>TIP29C</b>	<b>TIP30C</b>	100	100	1	30	15		1	4	0.7	1	125	Gen. Purp.
<b>TIP112</b>	<b>TIP117</b>	100	100	2	50	1000		1	4	2.5	2	8	Gen. Purp.
<b>TIP31C</b>	<b>TIP32C</b>	100	100	3	40	25		1	4	1.2	3	375	Gen. Purp.
<b>TIP122</b>	<b>TIP127</b>	100	100	5	65	1000		3	3	2	3	12	Gen. Purp.
<b>BD243C</b>	<b>BD244C</b>	100	100	6	65	15		3	4	1.5	6	1000	Gen. Purp.
<b>TIP41C</b>	<b>TIP42C</b>	100	100	6	65	15	75	3	4	1.5	6	600	Gen. Purp.
<b>BDX53C</b>	<b>BDX54C</b>	100	100	8	60	750		3	3	2	3	12	Gen. Purp.
<b>TIP132</b>	<b>TIP137</b>	100	100	8	70	1000	15000	4	4	2	4	16	Gen. Purp.
<b>TIP102</b>	<b>TIP107</b>	100	100	8	80	1000	20000	3	4	2	3	6	Gen. Purp.
<b>BDX33C</b>	<b>BDX34C</b>	100	100	10	70	750		3	3	2.5	3	6	Gen. Purp.
<b>TIP142T</b>	<b>TIP147T</b>	100	100	10	90	1000		5	4	3	10	40	Gen. Purp.
<b>BD711</b>	<b>BD712</b>	100	100	12	75	15	150	4	4	1	4	400	Gen. Purp.
<b>BDW93C</b>	<b>BDW94C</b>	100	100	12	80	750	20000	5	3	2	5	20	Gen. Purp.
<b>BD911</b>	<b>BD912</b>	100	100	15	90	15	150	5	4	1	5	500	Gen. Purp.
<b>BD239C</b>		100	115	2	30	15		1	4	0.7	1	200	Gen. Purp.
<b>BD241C</b>	<b>BD242C</b>	100	115	3	40	25		1	4	1.2	3	600	Gen. Purp.
<b>BUV27</b>		120	240	12	85					0.7	4	400	Switching
<b>BU407</b>		150	330	7	60					1	5	500	Monochr. TVs

ST preferred products in bold, shaded areas indicate Darlington

# TO-220 / D<sup>2</sup>PAK contd.

Device	Type	V <sub>CEO</sub> [V]	V <sub>CEO</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	h <sub>FE</sub> @ I <sub>C</sub> V <sub>CE</sub>				V <sub>CE(sat)</sub> @ I <sub>C</sub> I <sub>B</sub>			Application
						min	max	[A]	[V]	[V]	[A]	[mA]	
BU807		150	330	8	60					1.5	5	50	Monochr. TVs
	BDX54F	160	160	8	60	500		2	5	2	2	10	Gen. Purp.
BU406		200	400	7	60					1	5	500	Monochr. TVs
BU806		200	400	8	60					1.5	5	50	Monochr. TVs
BUV28		200	400	12	85					1.5	6	600	Switching
TIP47		250	350	1	40	30	150	1	10	1	1	200	Switching
TIP48		300	400	1	40	30	150	1	10	1	1	200	Switching
ST931ZT		350	350	10	125	300		5	10	1.8	8	100	Electr. Ignition
BU941ZT		350	350	15	150	300		5	10	1.8	10	250	Electr. Ignition
BUB941ZT *		350	350	15	150	300		5	10	1.8	10	250	Electr. Ignition
TIP49		350	450	1	40	30	150	1	10	1	1	200	Switching
ST901T		350	500	4	30	1500		2	2	1.3	2	20	Electr. Ignition
	MJE5852	400	450	8	80	15		2	5	2	4	1000	Switching
TIP50		400	500	1	40	30	150	1	10	1	1	200	Switching
BU931T		400	500	10	125	300		5	10	1.6	7	70	Electr. Ignition
BUB931T *		400	500	10	125	300		5	10	1.6	7	70	Electr. Ignition
BU810		400	600	7	75	100		2	2	2.5	4	200	Switching
BUL118		400	700	3	60	10	40	0.5	5	1.3	2	400	Lighting/SMPS
BUL128		400	700	4	70	14	40	2	5	1.5	2.5	500	Lighting/SMPS
BUL128D-B		400	700	4	70	8	40	2	5	1.5	2.5	500	Lighting/SMPS
ST13005		400	700	4	75	8	40	2	5	1	4	1000	Lighting/SMPS
STB13005-1 <sup>Δ</sup>		400	700	4	75	8	40	2	5	1	4	1000	Lighting/SMPS
MJE13007		400	700	8	80	6		5	5	1.5	5	1000	Switching
ST13007		400	700	8	80	5	30	5	5	2	5	1000	Lighting/SMPS
ST13007N		400	700	8	80	5	30	5	5	2	5	1000	Lighting/SMPS
BUL57		400	700	8	85	15	40	2	5	0.75	3	600	Lighting/SMPS
BUL67		400	700	10	100	15	50	1.5	3	1	4	800	Lighting/SMPS
MJE13009		400	700	12	100	6		8	5	1.5	8	1600	Switching
BUL381		400	800	5	70	8		2	5	1.1	3	800	Lighting/SMPS
BUL381D		400	800	5	70	8		2	5	1.1	3	750	Lighting/SMPS
BUL382		400	800	5	70	8		2	5	1.1	3	800	Lighting/SMPS
BUL382D		400	800	5	70	8		2	5	1.1	3	750	Lighting/SMPS
BUL138		400	800	5	80	8	40	2	5	1	4	1000	Lighting/SMPS
BUV46		400	850	5	70					1.5	2.5	500	Switching
MJE13007A		400	850	8	80	6	30	5	5	1.5	5	1000	Switching
BUL59		400	850	8	90	6	30	5	5	1.5	5	1000	Lighting/SMPS
BUL903ED		400	900	5	70	20		0.5	3	1.2	2	400	Lighting
BUL38D		450	800	5	80	8		2	5	1.1	3	750	Lighting/SMPS
BUL58D		450	800	8	85	5		5	5	1.5	4	800	Lighting/SMPS
BUL39D		450	850	4	70	4		5	10	1.1	2.5	500	Lighting/SMPS
BUL49D		450	850	5	80	10		0.01	5	0.3	1	200	Lighting/SMPS
BUV46A		450	1000	5	70					1.5	2	400	Switching
BUT11A		450	1000	5	83					1.5	2.5	500	SMPS
BUL510		450	1000	10	100	15	45	1	5	1.5	5	1250	Lighting/SMPS
BUL310		500	1000	5	75	10 <sup>#</sup>		3	2.5	1.1	3	600	Lighting/SMPS
BUL213		600	1300	3	60	16	36	0.35	3	0.9	1	200	Lighting/SMPS
BUL1403ED		650	1400	3	80	15		0.4	3	1.5	0.25	25	Lighting
BU505		700	1500	2.5	75					5	2	900	CTVs/Lighting
BUL216		800	1600	4	90	12	40	0.4	5	1	1	200	Lighting/SMPS
BUL416		800	1600	6	110	12	40	0.7	5	1.5	2	400	Lighting/SMPS
BUH2M20AP		1200	2000	0.03	40	10		0.01	10	5	0.002	0.4	CTVs

# = typ    □ = 100°C    \* = D<sup>2</sup>PAK    Δ = P<sup>2</sup>PAK

## Electronic Ballast Design-in Guidelines

Net-Work

Device	V <sub>CEO</sub> [V]	V <sub>CES</sub> V <sub>CEV</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	Package	Typical Applications (220V mains)			
						Compact Fluorescent Lamps	Industrial Lamp Ballasts push pull	half bridge	Halogen Lamps Transformer
ST13003	400	700	1.5	40	SOT-32	up to 13 W			
BUL118	400	700	2	45	SOT-32	up to 17 W		up to 20 W	
BULD118D-1	400	700	2	20	IPAK	up to 17 W		up to 20 W	
BULK128D-B	400	700	4	55	SOT-82	up to 23 W		up to 40 W	up to 30 W
STB13005-1	400	700	4	75	I <sup>2</sup> PAK	up to 23 W		up to 40 W	
BUL118	400	700	3	60	TO-220	up to 20 W		up to 20 W	
BUL128	400	700	4	70	TO-220	up to 23 W		up to 40 W	
BUL128D-B	400	700	4	70	TO-220	up to 23 W		up to 40 W	up to 30 W
ST13005	400	700	4	75	TO-220	up to 23 W		up to 40 W	
ST13007	400	700	8	80	TO-220		up to 140 W *	up to 140 W	
BUL57	400	700	8	85	TO-220		up to 140 W *	up to 140 W	
BUL67	400	700	10	100	TO-220				up to 150 W
BUL381D	400	800	5	70	TO-220	> 23 W	up to 80 W *	up to 80 W	
BUL382D	400	800	5	70	TO-220	> 23 W	up to 80 W *	up to 80 W	
BUL138	400	800	5	80	TO-220		up to 80 W *	up to 80 W	
BUL59	400	850	8	90	TO-220				up to 105 W
BUL89	400	850	12	110	TO-220				up to 250 W
BUL903ED $\diamond$	400	900	5	70	TO-220		up to 130 W *		
BUL38D	450	800	5	80	TO-220				up to 75 W
BUL58D	450	800	8	85	TO-220				up to 105 W
BUL39D	450	850	4	70	TO-220				up to 50 W
BUL49D	450	850	5	80	TO-220				up to 75 W
BUL510	450	1000	10	100	TO-220				up to 150 W
BUL310	500	1000	5	75	TO-220			up to 120 W	
BUL213	600	1300	3	60	TO-220		up to 90 W	up to 90 W $\Delta$	
BUL1403ED $\diamond$	650	1400	3	80	TO-220		up to 130 W $\Delta$		
BUL216	800	1600	4	90	TO-220		up to 130 W $\Delta$		
BUL416	800	1600	6	110	TO-220		up to 200 W $\Delta$		
BUL810	450	1000	15	125	TO-218				up to 300 W

Additional devices in TO-92 package dedicated to low cost CFL application are available also  
 $\diamond$  = New devices with integrated antisaturation and protection network, specifically designed for Electronic Lamp Ballast  
 \* = 120V AC mains     $\Delta$  = 277V AC mains    Suffix D = integrated free-wheeling diode

## Horizontal Deflection Design-in Guidelines

Device	V <sub>CEO</sub> [V]	V <sub>CBO</sub> [V]	I <sub>C</sub> [A]	P <sub>tot</sub> [W]	Package	Typical Applications	
						Colour Television (screen size)	Monitor (size/type)
BUL310FP	500	1000	5	36	TO-220FP	14"	
ST1802HI	600	1500	10	50	ISOWATT218	up to 25"	14"/SVGA
ST1803DHI	600	1500	10	50	ISOWATT218	up to 21"	
ST2001HI	600	1500	10	55	ISOWATT218	> 25"	15"/Multisync
ST2009DHI	600	1500	10	55	ISOWATT218	> 25"	
ST2310HI	600	1500	10	55	ISOWATT218	> 25"	15"/Multisync
ST2408HI	600	1500	12	55	ISOWATT218	> 25"	15 - 17"/Multisync
BU808DFI	700	1400	8	52	ISOWATT218	up to 21"	
BUH315	700	1500	6	44	ISOWATT218	up to 17"	
BUH315D	700	1500	6	44	ISOWATT218	up to 17"	
THD218DHI	700	1500	7	50	ISOWATT218	up to 25"	
BU508AFI	700	1500	8	50	ISOWATT218	up to 25"	
BU508DFI	700	1500	8	50	ISOWATT218	up to 25"	
BUH515	700	1500	8	50	ISOWATT218	up to 25"	14"/SVGA
BUH515D	700	1500	8	50	ISOWATT218	up to 25"	
S2000AFI	700	1500	8	50	ISOWATT218	up to 25"	
THD277HI	700	1500	8	50	ISOWATT218	up to 25"	14"/ SVGA
BUH615D	700	1500	8	55	ISOWATT218	up to 25"	
BUH1015HI	700	1500	14	70	ISOWATT218	> 25"	17"/Multisync
BUH1015	700	1500	14	160	TO-218	> 25"	17"/Multisync
BUH1215	700	1500	16	200	TO-218	> 25"	21"/Multisync
BUH2M20AP	1200	2000	0.03	40	TO-220	Dynamic Focus	Dynamic Focus

Suffix D, DFI or DHI = integrated free-wheeling diode