

Power bipolar transistors

Selection guide



December 2005

Electronic light ballast design-in guidelines[▲]

| Part number | V _{CEO} [V] | V _{CEES} V _{CEV} [V] | I _c [A] | P _{tot} [W] | Package | Compact fluorescent lamps | Halogen lamps transformer | Industrial lamp ballasts | | |
|---------------------|-------------------------|--|-----------------------|-------------------------|--------------------|---------------------------------|---------------------------------|----------------------------|-----------------|----------------------------|
| | | | | | | | | Push pull | Half bridge | |
| | | | | | | | | | Voltage feed | Current feed |
| STX93003 | -400 | -500 | -1 | 1.5 | TO-92 | Up to 9W/15W* | | | | |
| STL71 | 400 | 700 | 0.6 | 0.95 | TO-92 | Up to 9W/11W* | | | | |
| STL72 | 400 | 700 | 1 | 1 | TO-92 | Up to 11W/15W* | | | | |
| STL73 | 400 | 700 | 1.5 | 1.1 | TO-92 | Up to 13W/18W* | | | | |
| STX13003 | 400 | 700 | 1 | 1.5 | TO-92 | Up to 13W/18W* | | | | |
| STX83003 | 400 | 700 | 1 | 1.5 | TO-92 | Up to 9W/15W* | | | | |
| STX13005 | 400 | 700 | 3 | 2.8 | TO-92 | Up to 15W/20W* | | | | |
| BULT116D | 200 | 400 | 5 | 45 | SOT-32 | Up to 23W [◇] | | | | |
| ST93003 | -400 | -500 | -1.5 | 40 | SOT-32 | Up to 13W/20W* | | | | |
| ST13003 | 400 | 700 | 1.5 | 40 | SOT-32 | Up to 13W/20W* | | | | |
| ST83003 | 400 | 700 | 1.5 | 40 | SOT-32 | Up to 13W/20W* | | | | |
| BULT118 | 400 | 700 | 2 | 45 | SOT-32 | Up to 23W | | | Up to 28W | |
| BULK128D-B | 400 | 700 | 4 | 55 | SOT-82 | Up to 27W | | | Up to 40W/58W* | |
| STD13003-1 | 400 | 700 | 1.5 | 20 | IPAK | Up to 13W/18W* | | | | |
| BULD118D-1 | 400 | 700 | 2 | 20 | IPAK | Up to 20W | | | Up to 20W | |
| STB13005-1 | 400 | 700 | 4 | 75 | I ² PAK | | | | Up to 40W/72W* | |
| BULB39DT4 | 450 | 850 | 4 | 70 | D ² PAK | | Up to 50W | | | |
| BULB49DT4 | 450 | 850 | 5 | 80 | D ² PAK | | Up to 75W | | | |
| BUL116D | 200 | 400 | 5 | 60 | TO-220 | Up to 27W [◇] | | | | |
| BUL85D | 250 | 500 | 8 | 80 | TO-220 | | Up to 100W [◇] | | | |
| BUL118 | 400 | 700 | 3 | 60 | TO-220 | Up to 27W | | | Up to 28W/40W | |
| BUL128 | 400 | 700 | 4 | 70 | TO-220 | Up to 32W | | | Up to 40W/72W* | |
| BUL128D-B | 400 | 700 | 4 | 70 | TO-220 | Up to 27W | | | Up to 40W/72W* | |
| ST13005 | 400 | 700 | 4 | 75 | TO-220 | Up to 27W | | | Up to 40W/72W* | |
| ST13007 | 400 | 700 | 8 | 80 | TO-220 | | | | Up to 120W | |
| ST13007D | 400 | 700 | 8 | 80 | TO-220 | | Up to 120W | | | |
| BUL654 | 400 | 700 | 12 | 80 | TO-220 | | Up to 250W | | | |
| ST13009 | 400 | 700 | 12 | 100 | TO-220 | | Up to 250W | | | |
| BUL138 | 400 | 800 | 5 | 80 | TO-220 | | | | Up to 80W/120W* | Up to 4 x 32W [◇] |
| BUL59 | 400 | 850 | 8 | 90 | TO-220 | | Up to 105W | | | |
| BUL903ED* | 400 | 900 | 5 | 70 | TO-220 | | | Up to 4 x 32W [◇] | | |
| BUL742A | 400 | 950 | 4 | 70 | TO-220 | | | Up to 4 x 32W [◇] | | Up to 4 x 32W |
| BUL742C | 400 | 1050 | 4 | 70 | TO-220 | | | Up to 4 x 32W [◇] | | Up to 4 x 32W |
| BUL38D | 450 | 800 | 5 | 80 | TO-220 | | Up to 75W | | | |
| BUL58D | 450 | 800 | 8 | 85 | TO-220 | | Up to 105W | | | |
| BUL98 | 450 | 800 | 12 | 110 | TO-220 | | Up to 250W | | | |
| BUL39D | 450 | 850 | 4 | 70 | TO-220 | | Up to 50W | | | |
| BUL49D | 450 | 850 | 5 | 80 | TO-220 | | Up to 75W | | | |
| BUL510 | 450 | 1000 | 10 | 100 | TO-220 | | Up to 150W | | | |
| BUL1101E | 450 | 1100 | 3 | 35 | TO-220 | | | Up to 2 x 32W [◇] | | Up to 2 x 32W [△] |
| BUL1102E | 450 | 1100 | 4 | 70 | TO-220 | | | Up to 3 x 32W [◇] | | Up to 4 x 32W [△] |
| BUL303 | 550 | 1100 | 5 | 100 | TO-220 | | | | Up to 4x32W | Up to 4x32W |
| BUL1203E | 550 | 1200 | 5 | 100 | TO-220 | | | Up to 4 x 32W [△] | | Up to 4 x 32W [△] |
| BUL213 | 600 | 1300 | 3 | 60 | TO-220 | | | Up to 4 x 32W [△] | | Up to 4 x 32W [△] |
| BUL1403ED | 650 | 1400 | 3 | 80 | TO-220 | | | Up to 4 x 32W [△] | | |
| BUL7216 | 700 | 1600 | 3 | 80 | TO-220 | | | Up to 4x32W [△] | | Up to 4 x 32W* |
| ST5027 | 800 | 1200 | 3 | 90 | TO-220 | | | | Up to 1x36W | |
| BUL216 | 800 | 1600 | 4 | 90 | TO-220 | | | Up to 4 x 32W [△] | | |
| BUL416 | 800 | 1600 | 6 | 110 | TO-220 | | | Up to 6 x 32W [△] | | |
| BUL810 | 450 | 1000 | 15 | 125 | TO-218 | | Up to 300W | | | |
| BUL3P5 | 400 | 500 | 3 | 60 | TO-220 | Up to 30W | | | Up to 1 x 58W | |
| BUL3N7 | 400 | 700 | 3 | 60 | TO-220 | Up to 30W | | | Up to 1 x 58W | |
| BUL804 [◇] | 450 | 800 | 4 | 70 | TO-220 | | | | Up to 1 x 40W | |

▲ Typical application (220V mains unless otherwise specified)

* Integrated antisaturation and protection network

• According to tube impedance

◇ 120V AC mains

△ 277V AC mains

◆ 340V AC mains

◇ As PFC 220V AC mains

Suffix D = Integrated free-wheeling diode

ST preferred products in bold

Devices in green to be used in pairs

Horizontal deflection transistors for conventional TVs (16kHz)

| Part number | V _{CB0} [V] | V _{CE0} [V] | I _C [A] | P _{tot} [W] | Package | Target use |
|-------------|----------------------|----------------------|--------------------|----------------------|--------------|---------------------|
| BUL312FP | 1150 | 500 | 5 | 36 | TO-220FP | Up to 21-inches |
| ST1802FH | 1500 | 600 | 10 | 40 | TO-220FH | Up to 21-inches |
| ST1802FX | 1500 | 600 | 10 | 60 | ISOWATT218FX | Up to 29-inches |
| ST2009DHI | 1500 | 600 | 10 | 55 | ISOWATT218 | Up to 29-inches |
| ST2001FX | 1500 | 600 | 10 | 63 | ISOWATT218FX | Up to 29-inches |
| ST2310DHI | 1500 | 600 | 12 | 55 | ISOWATT218 | Large and real flat |
| MD1803DFH* | 1500 | 700 | 10 | 40 | TO-220FH | Up to 21-inches |
| MD1803DFX* | 1500 | 700 | 10 | 57 | ISOWATT218FX | Up to 29-inches |
| MD2310FX* | 1500 | 700 | 14 | 62 | ISOWATT218FX | Large and real flat |
| ST2317DFX | 1700 | 600 | 12 | 70 | ISOWATT218FX | Large and real flat |

* Pre-production The suffix Dxx indicates built-in free-wheeling diode ST preferred products in bold Blue shaded areas indicate darlington

Horizontal deflection transistors for high-definition TVs (≥32kHz)

| Part number | V _{CB0} [V] | V _{CE0} [V] | I _C [A] | P _{tot} [W] | Package | Target use |
|-------------|----------------------|----------------------|--------------------|----------------------|--------------|--------------------------------|
| HD1520FX | 1500 | 700 | 15 | 64 | ISOWATT218FX | High-definition/super-slim crt |
| HD1530FX* | 1500 | 700 | 26 | 70 | ISOWATT218FX | High-definition/super-slim crt |
| HD1530JL* | 1500 | 700 | 26 | 200 | TO-264 | High-definition/super-slim crt |
| HD1750FX | 1700 | 800 | 24 | 75 | ISOWATT218FX | High-definition/super-slim crt |
| HD1750JL | 1700 | 800 | 24 | 200 | TO-264 | High-definition/super-slim crt |
| BUH2M20AP | 2000 | 1200 | 0.03 | 40 | TO-220 | Dynamic focus |

* Pre-production ST preferred products in bold

Horizontal deflection transistors for monitors

| Part number | V _{CB0} [V] | V _{CE0} [V] | I _C [A] | P _{tot} [W] | Package | Target use |
|-------------|----------------------|----------------------|--------------------|----------------------|--------------|--------------------|
| ST2001FX | 1500 | 600 | 10 | 63 | ISOWATT218FX | 15-inches |
| ST2310FX | 1500 | 600 | 12 | 65 | ISOWATT218FX | 17-inches / 70 kHz |
| HD1520FX | 1500 | 700 | 15 | 64 | ISOWATT218FX | 17-inches / 95 kHz |
| HD1530FX* | 1500 | 700 | 26 | 70 | ISOWATT218FX | 19-inches |
| HD1530JL* | 1500 | 700 | 26 | 200 | TO-264 | 21-inches |
| HD1750FX | 1700 | 800 | 24 | 75 | ISOWATT218FX | 19-inches |
| HD1750JL | 1700 | 800 | 24 | 200 | TO-264 | 21-inches |

* Pre-production ST preferred products in bold

High-voltage transistors for SMPS in TV chassis

| Part number | V _{CB0} [V] | V _{CE0} [V] | I _C [A] | P _{tot} [W] | Package | Target use |
|-------------|----------------------|----------------------|--------------------|----------------------|--------------|-----------------|
| ST8812FP | 1150 | 600 | 7 | 36 | TO-220FP | Up to 21-inches |
| ST1802FH | 1500 | 600 | 10 | 40 | TO-220FH | Up to 21-inches |
| ST1802FX | 1500 | 600 | 10 | 60 | ISOWATT218FX | Up to 21-inches |
| ST2111FX | 1500 | 700 | 12 | 65 | ISOWATT218FX | Up to 29-inches |

ST preferred products in bold

Dynamic focus

| Part number | V _{CB0} [V] | V _{CE0} [V] | I _C [A] | P _{tot} [W] | Package | Target use |
|-------------|----------------------|----------------------|--------------------|----------------------|---------|---------------|
| BUH2M20AP | 2000 | 1200 | 0.03 | 40 | TO-220 | Dynamic focus |

ST preferred products in bold

SOT-223/SOT23-6L/SOT-89

| Device type | | V _{CEO} [V] | V _{CBO} V _{CES} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|-----------|----------------------|--|--------------------|----------------------|--|-----|-----|-----|--|-----|------|-------------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| | STN749* | 25 | 35 | 3 | 1.6 | 100 | 300 | 1 | 2 | 0.6 | 3 | 300 | Consumer |
| | STT818B** | 30 | 30 | 3 | 1.2 | 100 | | 2.5 | 3 | 0.5 | 2 | 20 | Mobile phone |
| | STF724* | 30 | 60 | 3 | 1.4 | 80 | | 1 | 2 | 0.7 | 2 | 100 | Computer |
| | STN724* | 30 | 60 | 3 | 1.6 | 80 | | 1 | 2 | 0.7 | 2 | 100 | Consumer |
| | STN790A* | 30 | 40 | 3 | 1.6 | 100 | 400 | 0.5 | 2 | 0.7 | 3 | 100 | Computer |
| | STN888* | 30 | 45 | 5 | 1.6 | 150 | 300 | 0.5 | 1 | 0.7 | 5 | 2500 | Computer |
| | STN851* | 60 | 150 | 5 | 1.6 | 150 | 350 | 2 | 1 | 0.5 | 5 | 200 | Lighting |
| | 2STN1360* | 60 | 80 | 3 | 1.6 | 160 | 400 | 1 | 2 | 0.5 | 3 | 150 | Consumer/Computer |
| | 2STF1360* | 60 | 80 | 3 | 1.4 | 160 | 400 | 1 | 2 | 0.5 | 3 | 150 | Consumer/Telecom |
| | STN1802* | 60 | 80 | 3 | 1.6 | 100 | | 3 | 2 | 0.4 | 3 | 150 | Computer |
| | STF715* | 80 | 140(-80) | 1.5 | 1.4 | 40 | | 1 | 2 | 0.5 | 1 | 100 | Consumer/Telecom |
| | STN715* | 80 | 140(-80) | 1.5 | 1.6 | 40 | | 1 | 2 | 0.5 | 1 | 100 | Computer |
| | STN817A* | 400 | 700 | 1 | 1.4 | 10 | 30 | 0.4 | 4 | 1 | 0.5 | 125 | SMPS |

* SOT-223 package ** SOT23-6L package * SOT-89 package ST preferred products in bold

SOT-82

| Device type | | V _{CEO} [V] | V _{CBO} V _{CES} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|------------|----------------------|--|--------------------|----------------------|--|-----|-----|-----|--|-----|---------------|---------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| | STK13003 | 400 | 700 | 1.5 | 40 | 5 | 25 | 1 | 2 | 1 | 1 | 250 | Lighting/SMPS |
| | BULK118 | 400 | 700 | 2 | 45 | 8 | | 2 | 5 | 1.5 | 2 | 400 | Lighting/SMPS |
| | BULK128 | 400 | 700 | 4 | 55 | 14 | 28 | 2 | 5 | 1.5 | 2.5 | 500 | Lighting/SMPS |
| | BULK128D-B | 400 | 700 | 4 | 55 | 8 | 40 | 2 | 5 | 1.5 | 2.5 | 500 | Lighting/SMPS |
| | BULK38D | 450 | 800 | 5 | 60 | 8 | 2 | 5 | 1.1 | 3 | 750 | Lighting/SMPS | |

T0-39

| Device type | | V _{CEO} [V] | V _{CBO} V _{CES} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|--------|----------------------|--|--------------------|----------------------|--|-----|------|-----|--|------|------|-------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| | BSS44 | 60 | 65 | 5 | 5 | 40 | 70 | 2 | 2 | 1 | 5 | 500 | Gen. purp. |
| | BFX34 | 60 | 120 | 5 | 5 | 40 | 150 | 2 | 2 | 1 | 5 | 500 | Gen. purp. |
| | 2N5415 | 200 | 200 | 1 | 10 | 30 | 150 | 0.05 | 10 | 2.5 | 0.05 | 5 | 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 |

ST preferred products in bold

T0-92

| Device type | | V _{CEO} [V] | V _{CBO} V _{CES} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|----------|----------------------|--|--------------------|----------------------|--|-----|------|-----|--|------|------|---------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| | 2STX1360 | 60 | 80 | 3 | 1 | 160 | 400 | 1 | 2 | 0.5 | 3 | 150 | Consumer |
| | 2STL1360 | 60 | 80 | 3 | 1.2 | 160 | 400 | 1 | 2 | 0.5 | 3 | 150 | Consumer |
| | STX724 | 30 | 40 | 3 | 0.9 | 100 | 400 | 0.5 | 2 | 0.7 | 3 | 100 | Consumer |
| | STX826 | 30 | 60 | 3 | 0.9 | 80 | | 1 | 2 | 0.7 | 2 | 100 | Consumer |
| | STSA1805 | 60 | 150 | 5 | 1.1 | 85 | | 5 | 2 | 0.6 | 5 | 200 | Lighting |
| | STSA851 | 60 | 150 | 5 | 1.1 | 150 | 350 | 2 | 1 | 0.45 | 5 | 200 | Lighting |
| | STX715 | 80 | 140(-80) | 1.5 | 0.9 | 40 | | 1 | 2 | 0.5 | 1 | 100 | Consumer |
| | STX112 | 100 | 100 | 2 | 0.8 | 1000 | | 1 | 4 | 2.5 | 2 | 8 | Gen. purp. |
| | STX93003 | 400 | 500 | 1 | 1.5 | 16 | 32 | 0.35 | 5 | 0.5 | 0.35 | 50 | Lighting |
| | STBV45 | 400 | 600 | 0.75 | 0.95 | 5 | 20 | 0.4 | 5 | 1.5 | 0.4 | 135 | Lighting |
| | STBV42 | 400 | 700 | 1 | 1 | 5 | 20 | 0.8 | 5 | 1.5 | 0.75 | 250 | Lighting |
| | STBV32 | 400 | 700 | 1 | 1.1 | 5 | 25 | 1 | 2 | 1 | 1 | 250 | Lighting |
| | STX13003 | 400 | 700 | 1 | 1.5 | 5 | 25 | 1 | 2 | 1 | 1 | 250 | Lighting |
| | STX83003 | 400 | 700 | 1 | 1.5 | 16 | 32 | 0.35 | 5 | 1 | 0.35 | 50 | Lighting |
| | STX13005 | 400 | 700 | 3 | 2.8 | 8 | 24 | 2 | 5 | 0.6 | 2 | 500 | Lighting/SMPS |
| | STL71 | 400 | 700 | 0.6 | 1.1 | 4 | 10 | 0.6 | 10 | 1 | 0.3 | 60 | Lighting |
| | STL72 | 400 | 700 | 1 | 1.1 | 5 | 15 | 1 | 10 | 0.5 | 0.4 | 80 | Lighting |
| | STL73 | 400 | 700 | 1.5 | 1.1 | 4 | 10 | 1.5 | 5 | 1 | 1 | 250 | Lighting |

Blue shaded areas indicate darlington

DPAK/IPAK

| Device type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _s | | | Application |
|-------------|------------|-------------------------|---|-----------------------|-------------------------|--|-------|------|-----|--|------|------|---------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| | STD790AT4 | 30 | 40 | 3 | 15 | 100 | 400 | 0.5 | 2 | 0.7 | 3 | 100 | Computer |
| | STD888T4 | 30 | 45 | 5 | 15 | 150 | 300 | 0.5 | 1 | 0.7 | 5 | 250 | Computer |
| STD724T4 | STD826T4 | 30 | 60 | 3 | 15 | 50 | | 1 | 2 | 0.7 | 2 | 100 | Consumer |
| MJD3055T4 | MJD2955T4 | 60 | 70 | 10 | 20 | 20 | 100 | 4 | 4 | 1.1 | 4 | 400 | Gen. purp. |
| STD1802T4 | | 60 | 80 | 3 | 15 | 100 | | 3 | 2 | 0.4 | 3 | 150 | Computer |
| STD1805T4 | | 60 | 150 | 5 | 15 | 85 | | 5 | 2 | 0.06 | 5 | 200 | Consumer |
| STD1805-1 | | 60 | 150 | 5 | 15 | 85 | | 5 | 2 | 0.06 | 5 | 200 | Consumer |
| MJD31BT4 | | 80 | 80 | 3 | 15 | 10 | 50 | 3 | 4 | 1.2 | 3 | 375 | Gen. purp. |
| MJD44H11T4 | MJD45H11T4 | 80 | 80 | 8 | 16 | 40 | | 4 | 1 | 1 | 8 | 400 | Gen. purp. |
| MJD112T4 | MJD117T4 | 100 | 100 | 2 | 20 | 1000 | 12000 | 2 | 3 | 2 | 2 | 8 | Gen. purp. |
| MJD31CT4 | MJD32CT4 | 100 | 100 | 3 | 15 | 10 | 50 | 3 | 4 | 1.2 | 3 | 375 | Gen. purp. |
| MJD122-1 | MJD127-1 | 100 | 100 | 5 | 20 | 1000 | 12000 | 4 | 4 | 2 | 4 | 16 | Gen. purp. |
| MJD122T4 | MJD127T4 | 100 | 100 | 5 | 20 | 1000 | 12000 | 4 | 4 | 2 | 4 | 16 | Gen. purp. |
| BULD116D-1 | | 200 | 400 | 5 | 20 | 8 | 20 | 5 | 5 | 1.2 | 5 | 1 | Lighting/SMPS |
| MJD47T4 | | 250 | 350 | 1 | 15 | 30 | 150 | 0.3 | 10 | 1 | 1 | 200 | Switching |
| MJD340T4 | MJD350T4 | 300 | 300 | 0.5 | 15 | 30 | 240 | 0.05 | 10 | | | | Switching |
| MJD49T4 | | 350 | 450 | 1 | 15 | 30 | 150 | 0.3 | 10 | 1 | 1 | 200 | Switching |
| MJD50T4 | | 400 | 500 | 1 | 15 | 30 | 150 | 0.3 | 10 | 1 | 1 | 200 | Switching |
| | STD93003T4 | 400 | 500 | 1.5 | 20 | 16 | 32 | 0.35 | 5 | 0.5 | 0.35 | 50 | Lighting |
| STD13003-1 | | 400 | 700 | 1.5 | 20 | 5 | 25 | 1 | 2 | 1 | 1 | 250 | Lighting/SMPS |
| STD83003T4 | | 400 | 700 | 1.5 | 20 | 16 | 32 | 0.35 | 5 | 1 | 0.35 | 50 | Lighting/SMPS |
| BULD118D-1 | | 400 | 700 | 2 | 20 | 8 | | 2 | 5 | 1.5 | 2 | 400 | Lighting |
| BUXD87T4 | | 450 | 1000 | 0.5 | 20 | 12 | | 0.04 | 5 | 1 | 0.2 | 20 | SMPS |
| STD616A-1 | | 450 | 1000 | 1.6 | 20 | 4 | | 1.6 | 5 | 0.5 | 0.8 | 250 | SMPS |
| STD616AT4 | | 450 | 1000 | 1.6 | 20 | 4 | | 1.6 | 5 | 0.5 | 0.8 | 250 | SMPS |
| BULD1101ET4 | | 450 | 1100 | 3 | 35 | 6 | 18 | 2 | 5 | 1 | 1 | 200 | Lighting |

Suffix "T4" = DPAK package in tape & reel Suffix "-1" = IPAK package in tubes ST preferred products in bold
Blue shaded areas indicate darlington

TO-218/SOT-93/TO-247

| Device type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _s | | | Application |
|-------------|---------|-------------------------|---|-----------------------|-------------------------|--|-------|-----|-----|--|-----|-------|------------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| | 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. |
| BUW48 | | 60 | 120 | 30 | 150 | | | | | 1.4 | 40 | 4000 | 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 | Gen. purp. |
| 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. |
| BUT70W* | | 125 | 200 | 40 | 200 | | | | | 0.9 | 70 | 7000 | Switching |
| BUTW92* | | 250 | 500 | 60 | 180 | 9 | | 60 | 3 | 1 | 60 | 15000 | Switching |
| BU9412P | | 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 |
| 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 | SMPS/industr. |
| BUX98APW* | | 450 | 1000 | 24 | 200 | | | | | 1.2 | 16 | 3200 | SMPS/industr. |
| BUF420AW* | | 450 | 1000 | 30 | 200 | | | | | 0.5# | 20 | 2000 | SMPS/industr. |
| BUV48C | | 700 | 1200 | 15 | 125 | | | | | 1.5 | 6 | 1500 | SMPS/industr. |
| BU508A | | 700 | 1500 | 8 | 125 | | | | | 1 | 4.5 | 2000 | CTVs |
| BUW1015* | | 700 | 1500 | 14 | 160 | 7 | 14 | 10 | 5 | 1.5 | 10 | 2000 | CTVs/monitors |
| BUW1215* | | 700 | 1500 | 16 | 200 | 7 | | 12 | 5 | 1.5 | 12 | 2400 | CTVs/monitors |

*TO-247 # Typical ST preferred products in bold Blue shaded areas indicate darlington

SOT-32/T0-126

| Device Type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|----------|----------------------|--|--------------------|----------------------|--|-------|------|-----|--|------|------|---------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| 2SD882 | 2SB772 | 30 | 60 | 3 | 12.5 | 100 | 300 | 0.1 | 2 | 0.4 | 1 | 50 | Gen. purp. |
| | BD434 | 22 | 22 | 4 | 36 | 50 | | 2 | 1 | 0.5 | 2 | 200 | Gen. purp. |
| | MJE210 | 25 | 40 | 5 | 15 | 45 | 180 | 2 | 1 | 1.8 | 5 | 1000 | Gen. purp. |
| BD435 | BD436 | 32 | 32 | 4 | 36 | 50 | | 2 | 1 | 0.5 | 2 | 200 | Gen. purp. |
| MJE521 | | 40 | 40 | 4 | 40 | 40 | | 1 | 1 | | | | Gen. purp. |
| BD135 | BD136 | 45 | 45 | 1.5 | 12.5 | 40 | 250 | 0.15 | 2 | 0.5 | 0.5 | 50 | Gen. purp. |
| BD135-16 | BD136-16 | 45 | 45 | 1.5 | 12.5 | 100 | 250 | 0.15 | 2 | 0.5 | 0.5 | 50 | Gen. purp. |
| BD437 | BD438 | 45 | 45 | 4 | 36 | 40 | | 2 | 1 | 0.6 | 2 | 200 | Gen. purp. |
| | BD138 | 60 | 60 | 1.5 | 12.5 | 40 | 250 | 0.15 | 2 | 0.5 | 0.5 | 50 | Gen. purp. |
| BD235 | BD236 | 60 | 60 | 2 | 25 | 25 | | 1 | 2 | 0.6 | 1 | 100 | Gen. purp. |
| BD439 | BD440 | 60 | 60 | 4 | 36 | 25 | | 2 | 1 | 0.8 | 2 | 200 | Gen. purp. |
| 2N5191 | | 60 | 60 | 4 | 40 | 25 | 100 | 1.5 | 2 | 1.4 | 4 | 1000 | Gen. purp. |
| BD677 | BD678 | 60 | 60 | 4 | 40 | 750 | | 1.5 | 3 | 2.5 | 1.5 | 30 | Gen. purp. |
| BD677A | BD678A | 60 | 60 | 4 | 40 | 750 | | 2 | 3 | 2.8 | 2 | 40 | Gen. purp. |
| BD139 | BD140 | 80 | 80 | 1.5 | 12.5 | 40 | 250 | 0.15 | 2 | 0.5 | 0.5 | 50 | Gen. purp. |
| BD139-10 | BD140-10 | 80 | 80 | 1.5 | 12.5 | 63 | 160 | 0.15 | 2 | 0.5 | 0.5 | 50 | Gen. purp. |
| BD139-16 | BD140-16 | 80 | 80 | 1.5 | 12.5 | 100 | 250 | 0.15 | 2 | 0.5 | 0.5 | 50 | Gen. purp. |
| BD179 | | 80 | 80 | 3 | 30 | 40 | | 0.15 | 2 | 0.8 | 1 | 100 | Gen. purp. |
| BD441 | BD442 | 80 | 80 | 4 | 36 | 15 | | 2 | 1 | 0.8 | 2 | 200 | Gen. purp. |
| 2N5192 | 2N5195 | 80 | 80 | 4 | 40 | 20 | 80 | 1.5 | 2 | 1.4 | 4 | 1000 | Gen. purp. |
| 2N6039 | 2N6036 | 80 | 80 | 4 | 40 | 750 | 15000 | 2 | 3 | 2 | 2 | 8 | Gen. purp. |
| BD679 | BD680 | 80 | 80 | 4 | 40 | 750 | | 1.5 | 3 | 2.5 | 1.5 | 30 | Gen. purp. |
| BD679A | BD680A | 80 | 80 | 4 | 40 | 750 | | 2 | 3 | 2.8 | 2 | 40 | Gen. purp. |
| MJE802 | | 80 | 80 | 4 | 40 | 750 | | 1.5 | 3 | 3 | 4 | 40 | Gen. purp. |
| BD237 | BD238 | 80 | 100 | 2 | 25 | 25 | | 1 | 2 | 0.6 | 1 | 100 | Gen. purp. |
| MJE182 | MJE172 | 80 | 100 | 3 | 12.5 | 12 | | 1.5 | 1 | 0.9 | 1.5 | 150 | Gen. purp. |
| BD681 | BD682 | 100 | 100 | 4 | 40 | 750 | | 1.5 | 3 | 2.5 | 1.5 | 30 | Gen. purp. |
| BULT116D | | 200 | 400 | 5 | 45 | 8 | 20 | 5 | 5 | 1.2 | 5 | 1000 | Lighting/SMPS |
| MJE3440 | | 250 | 350 | 0.3 | 15 | 50 | 200 | 0.02 | 10 | 0.5 | 0.05 | 4 | Switching |
| MJE340 | MJE350 | 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 | Switching |
| ST600K | ST631K | 120 | 120 | 1 | 12.5 | 50 | | 0.5 | 5 | 0.5 | 0.5 | 50 | Gen. Purp. |
| | ST93003 | 400 | 500 | 1.5 | 40 | 16 | 32 | 0.35 | 5 | 0.5 | 0.35 | 50 | Lighting |
| ST13003 | | 400 | 700 | 1.5 | 40 | 5 | 25 | 1 | 2 | 1 | 1 | 250 | Lighting/SMPS |
| ST83003 | | 400 | 700 | 1.5 | 40 | 16 | 32 | 0.35 | 5 | 1 | 0.35 | 50 | Lighting/SMPS |
| BULT118 | | 400 | 700 | 2 | 45 | 8 | | 2 | 5 | 1.5 | 2 | 400 | Lighting/SMPS |
| BUX87 | | 450 | 1000 | 0.5 | 40 | 12 | | 0.04 | 5 | 1 | 0.2 | 20 | SMPS |

ST preferred products in bold Blue shaded areas indicate darlington

ISOWATT218[▲]/ISOWATT218FX[▲]

| Device type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|-----|----------------------|--|--------------------|----------------------|--|-----|-----|-----|--|-----|------|------------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| BU9412PFI | | 350 | 350 | 15 | 65 | 300 | | 5 | 10 | 1.8 | 10 | 250 | Electr. ignition |
| ST1802FX* | | 600 | 1500 | 10 | 60 | 4 | 9 | 5 | 5 | 1.5 | 4 | 1200 | CTVs/SMPS |
| MD1803DFX* | | 700 | 1500 | 10 | 57 | 5 | 8 | 5 | 5 | 5 | 5 | 1250 | CTVs |
| ST2001FX* | | 600 | 1500 | 10 | 63 | 5 | 9 | 6 | 5 | 1.5 | 5 | 1250 | CTVs/monitors |
| ST2009DHI | | 600 | 1500 | 10 | 55 | 5 | 9 | 5.5 | 5 | 1.5 | 5 | 1250 | CTVs |
| ST2310DHI | | 600 | 1500 | 12 | 55 | 5.5 | 8.5 | 7 | 5 | 3 | 7 | 1750 | CTVs |
| MD2310FX* | | 700 | 1500 | 14 | 62 | 5.5 | 8.5 | 7 | 5 | 3 | 7 | 1750 | CTVs/monitors |
| ST2310DHI | | 600 | 1500 | 12 | 55 | 5.5 | 8.5 | 7 | 5 | 3 | 7 | 1750 | CTVs |
| ST2408HI | | 600 | 1500 | 12 | 55 | 6 | 9 | 8 | 5 | 1.5 | 8 | 2000 | CTVs/monitors |
| BU812DFI | | 700 | 1200 | 8 | 50 | 60 | 230 | 5 | 5 | 1.6 | 5 | 500 | CTVs |
| BU808DFI | | 700 | 1400 | 8 | 52 | 60 | 270 | 5 | 5 | 1.6 | 5 | 500 | CTVs |
| ST2111FX* | | 700 | 1500 | 12 | 65 | 4.5 | 9 | 8 | 5 | 3 | 8 | 2000 | SMPS |
| HD1520FX* | | 700 | 1500 | 15 | 64 | 5.5 | 9.5 | 9 | 5 | 3 | 9 | 1800 | CTVs/monitors |
| HD1530FX* | | 700 | 1500 | 26 | 70 | 5.5 | 9 | 13 | 5 | 2 | 13 | 3250 | CTVs/monitors |
| ST2317DFX* | | 600 | 1700 | 12 | 70 | 6 | 10 | 6 | 5 | 5 | 6 | 1200 | CTVs |
| HD1750FX* | | 800 | 1700 | 24 | 75 | 5.5 | 9.5 | 12 | 5 | 3 | 12 | 3000 | CTVs/monitors |

▲ UL compliant * ISOWATT218FX ST preferred products in bold Blue shaded areas indicate darlington

T0-3

| Device type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|--------|----------------------|--|--------------------|----------------------|--|-------|-----|-----|--|-----|-------|------------------|
| NPN | PNP | | | | | 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 | 2N5884 | 80 | 80 | 25 | 200 | 20 | 100 | 10 | 4 | 1 | 15 | 1500 | Gen. purp. |
| MJ802 | | 90 | 100 | 30 | 200 | 25 | 100 | 7.5 | 2 | 0.8 | 7.5 | 750 | Gen. purp. |
| 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. |
| FW26025A1 | | 100 | 100 | 20 | 160 | 750 | 18000 | 10 | 3 | 2 | 10 | 40 | Linear/Switching |
| BUX10 | | 125 | 160 | 25 | 150 | 20 | 60 | 10 | 2 | 1.2 | 20 | 2000 | Gen. purp. |
| BUY20 | | 125 | 160 | 50 | 250 | 20 | 60 | 25 | 2 | 1.2 | 50 | 5000 | Gen. purp. |
| BUT90 | | 125 | 200 | 50 | 250 | | | | | 0.9 | 70 | 7000 | Switching |
| BUT100 | | 125 | 200 | 50 | 300 | | | | | 0.9 | 100 | 10000 | Switching |
| BUY61 | | 200 | 300 | 50 | 250 | | | | | 1.2 | 40 | 5000 | 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 |
| 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 |
| 2N6547 | | 400 | 850 | 15 | 175 | 6 | | 10 | 2 | 1.5 | 10 | 2000 | SMPS/industr. |
| BUX48 | | 400 | 850 | 15 | 175 | | | | | 1.5 | 10 | 2000 | SMPS/industr. |
| BUX98 | | 400 | 850 | 30 | 250 | | | | | 1.5 | 20 | 4000 | SMPS/industr. |
| BUY69A | | 400 | 1000 | 10 | 100 | 15 | | 2.5 | 10 | 3.3 | 8 | 2500 | SMPS/industr. |
| BUF420M | | 450 | 850 | 30 | 200 | | | | | 0.5* | 20 | 2000 | SMPS/industr. |
| BUX348 | | 450 | 850 | 45 | 300 | | | | | 0.9 | 30 | 6000 | SMPS/industr. |
| BUX48A | | 450 | 1000 | 15 | 175 | | | | | 1.5 | 10 | 2000 | SMPS/industr. |
| BUX98A | | 450 | 1000 | 30 | 250 | | | | | 1.5 | 16 | 3200 | SMPS/industr. |
| BUX48C | | 700 | 1200 | 15 | 175 | | | | | 1.5 | 6 | 1500 | SMPS/industr. |
| BUX98C | | 700 | 1200 | 30 | 250 | | | | | 1.5 | 12 | 3000 | SMPS/industr. |
| BU208A | | 700 | 1500 | 8 | 150 | | | | | 1 | 4.5 | 2000 | CTVs |

Typical ST preferred products in bold Blue shaded areas indicate darlington

T0-220FP[▲]

| Device type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|----------|----------------------|--|--------------------|----------------------|--|-----|-----|-----|--|-----|------|---------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| 2SD2012 | | 60 | 60 | 3 | 25 | 100 | 320 | 0.5 | 5 | 1 | 2 | 200 | Gen. purp. |
| 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. |
| ST901TFP | | 350 | 500 | 4 | 35 | 1500 | | 2 | 2 | 2 | 2 | 20 | Ignition |
| BUL128FP | | 400 | 700 | 4 | 31 | 15 | | 1 | 5 | 1.5 | 2.5 | 500 | Lighting/SMPS |
| BUL903EDFP | | 400 | 900 | 5 | 70 | 25 | 50 | 0.5 | 5 | 1.2 | 2 | 400 | Lighting |
| BUL1102EFP | | 450 | 1100 | 4 | 30 | 10 | 20 | 2 | 5 | 1.5 | 2 | 400 | Lighting |
| BUL310FP | | 500 | 1000 | 5 | 36 | 10 [#] | | 3 | 2.5 | 1.1 | 3 | 600 | Lighting |
| BUL312FP | | 500 | 1150 | 5 | 36 | 8 | 16 | 3 | 2.5 | 1.1 | 3 | 600 | CTVs |
| ST8812FP | | 600 | 1150 | 7 | 36 | 4.5 | 9 | 5 | 5 | 1.5 | 4 | 1200 | SMPS |

▲ UL compliant # Typical ST preferred products in bold Blue shaded areas indicate darlington

T0-220FH[▲]

| Device type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|-----|----------------------|--|--------------------|----------------------|--|-----|-----|-----|--|-----|------|-------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| ST1802FH | | 600 | 1500 | 10 | 40 | 4 | 9 | 5 | 5 | 1.5 | 4 | 1200 | CTVs / SMPS |
| MD1803DFH | | 700 | 1500 | 10 | 40 | 5 | 8 | 5 | 5 | 5 | 5 | 1250 | CTVs |
| BU812DFH | | 700 | 1200 | 8 | 40 | 60 | 230 | 5 | 5 | 1.6 | 5 | 500 | CTVs |
| BU808DFH | | 700 | 1400 | 8 | 42 | 60 | 270 | 5 | 5 | 1.6 | 5 | 500 | CTVs |

▲ UL compliant # Typical ST preferred products in bold Blue shaded areas indicate darlington

TO-220/D²PAK

| Device type | | V _{CEO} [V] | V _{CB0} V _{CEs} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _s | | | Application |
|--------------|----------|-------------------------|---|-----------------------|-------------------------|--|-------|-----|-----|--|-----|------|------------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| | 2N6111 | 30 | 40 | 7 | 40 | 30 | | 4 | 3 | 1 | 3 | 300 | Gen. purp. |
| BD533 | BD534 | 45 | 45 | 8 | 50 | 25 | | 2 | 2 | 0.8 | 2 | 200 | Gen. purp. |
| | D45H5 | 45 | 45 | 10 | 50 | 40 | | 4 | 1 | 1 | 8 | 400 | Gen. purp. |
| TIP29A | TIP30A | 60 | 60 | 1 | 30 | 15 | 75 | 1 | 4 | 0.7 | 1 | 125 | Gen. purp. |
| TIP110 | TIP115 | 60 | 60 | 2 | 50 | 1000 | | 1 | 4 | 2.5 | 2 | 8 | Gen. purp. |
| TIP31A | TIP32A | 60 | 60 | 3 | 40 | 10 | 50 | 3 | 4 | 1.2 | 3 | 375 | Gen. purp. |
| TIP120 | TIP125 | 60 | 60 | 5 | 65 | 1000 | | 3 | 3 | 2 | 3 | 12 | Gen. purp. |
| TIP41A | TIP42A | 60 | 60 | 6 | 65 | 15 | 75 | 3 | 4 | 1.5 | 6 | 600 | Gen. purp. |
| BD535 | BD536 | 60 | 60 | 8 | 50 | 25 | | 2 | 2 | 0.8 | 2 | 200 | Gen. purp. |
| | TIP135 | 60 | 60 | 8 | 70 | 1000 | 15000 | 4 | 4 | 2 | 4 | 16 | Gen. purp. |
| | TIP105 | 60 | 60 | 8 | 80 | 1000 | 20000 | 3 | 4 | 2 | 3 | 6 | Gen. purp. |
| D44H8 | D45H8 | 60 | 60 | 10 | 50 | 40 | | 4 | 1 | 1 | 8 | 400 | Gen. purp. |
| BD707 | BD708 | 60 | 60 | 12 | 75 | 15 | 150 | 4 | 4 | 1 | 4 | 400 | Gen. purp. |
| MJE3055T | MJE2955T | 60 | 70 | 10 | 75 | 20 | 70 | 4 | 4 | 1.1 | 4 | 400 | Gen. purp. |
| 2N6487 | 2N6490 | 60 | 70 | 15 | 75 | 20 | 150 | 5 | 4 | 1.3 | 5 | 500 | Gen. purp. |
| TIP121 | TIP126 | 80 | 80 | 5 | 65 | 1000 | | 3 | 3 | 2 | 3 | 12 | Gen. purp. |
| BD537 | BD538 | 80 | 80 | 8 | 50 | 15 | | 2 | 2 | 0.8 | 2 | 200 | Gen. purp. |
| BDX53B | BDX54B | 80 | 80 | 8 | 60 | 750 | | 3 | 3 | 2 | 3 | 12 | Gen. purp. |
| D44H11 | D45H11 | 80 | 80 | 10 | 50 | 40 | | 4 | 1 | 1 | 8 | 400 | Gen. purp. |
| 2N6388 | | 80 | 80 | 10 | 65 | 1000 | 20000 | 5 | 3 | 2 | 5 | 10 | Gen. purp. |
| | 2N6668 | 80 | 80 | 10 | 65 | 1000 | 20000 | 5 | 3 | 2 | 5 | 10 | Gen. purp. |
| BDX33B | BDX34B | 80 | 80 | 10 | 70 | 750 | | 3 | 3 | 2.5 | 3 | 6 | Gen. purp. |
| | BDW94B | 80 | 80 | 12 | 80 | 750 | 20000 | 5 | 3 | 2 | 5 | 20 | Gen. purp. |
| | BD910 | 80 | 80 | 15 | 90 | 15 | 150 | 5 | 4 | 1 | 5 | 500 | Gen. purp. |
| BD241B | BD242B | 80 | 90 | 3 | 40 | 25 | | 1 | 4 | 1.2 | 3 | 600 | Gen. purp. |
| 2N6488 | | 80 | 90 | 15 | 75 | 20 | 150 | 5 | 4 | 1.3 | 5 | 500 | Gen. purp. |
| BUV26 | | 90 | 180 | 14 | 85 | | | | | 1.5 | 12 | 1200 | Gen. purp. |
| TIP29C | TIP30C | 100 | 100 | 1 | 30 | 15 | 75 | 1 | 4 | 0.7 | 1 | 125 | Gen. purp. |
| TIP112 | TIP117 | 100 | 100 | 2 | 50 | 1000 | | 1 | 4 | 2.5 | 2 | 8 | Gen. purp. |
| TIP31C | TIP32C | 100 | 100 | 3 | 40 | 10 | 50 | 3 | 4 | 1.2 | 3 | 375 | Gen. purp. |
| TIP122 | TIP127 | 100 | 100 | 5 | 65 | 1000 | | 3 | 3 | 2 | 3 | 12 | Gen. purp. |
| BD243C | BD244C | 100 | 100 | 6 | 65 | 15 | | 3 | 4 | 1.5 | 6 | 1000 | Gen. purp. |
| TIP41C | TIP42C | 100 | 100 | 6 | 65 | 15 | 75 | 3 | 4 | 1.5 | 6 | 600 | Gen. purp. |
| BDX53C | BDX54C | 100 | 100 | 8 | 60 | 750 | | 3 | 3 | 2 | 3 | 12 | Gen. purp. |
| TIP132 | TIP137 | 100 | 100 | 8 | 70 | 1000 | 15000 | 4 | 4 | 2 | 4 | 16 | Gen. purp. |
| TIP102 | TIP107 | 100 | 100 | 8 | 80 | 1000 | 20000 | 3 | 4 | 2 | 3 | 6 | Gen. purp. |
| BDX33C | BDX34C | 100 | 100 | 10 | 70 | 750 | | 3 | 3 | 2.5 | 3 | 6 | Gen. purp. |
| TIP142T | TIP147T | 100 | 100 | 10 | 90 | 1000 | | 5 | 4 | 3 | 10 | 40 | Gen. purp. |
| BD711 | | 100 | 100 | 12 | 75 | 15 | 150 | 4 | 4 | 1 | 4 | 400 | Gen. purp. |
| BDW93C | BDW94C | 100 | 100 | 12 | 80 | 750 | 20000 | 5 | 3 | 2 | 5 | 20 | Gen. purp. |
| BD911 | BD912 | 100 | 100 | 15 | 90 | 15 | 150 | 5 | 4 | 1 | 5 | 500 | Gen. purp. |
| BD239C | | 100 | 115 | 2 | 30 | 15 | | 1 | 4 | 0.7 | 1 | 200 | Gen. purp. |
| BD241C | BD242C | 100 | 115 | 3 | 40 | 25 | | 1 | 4 | 1.2 | 3 | 600 | Gen. purp. |
| BUV27 | | 120 | 240 | 12 | 85 | | | | | 1.5 | 8 | 800 | Switching |
| BU407 | | 150 | 330 | 7 | 60 | | | | | 1 | 5 | 500 | Monochr. TVs |
| BU807 | | 150 | 330 | 8 | 60 | | | | | 1.5 | 5 | 50 | Monochr. TVs |
| BDX53F | BDX54F | 160 | 160 | 8 | 60 | 500 | | 2 | 5 | 2 | 2 | 10 | Gen. purp. |
| BUL116D | | 200 | 400 | 5 | 60 | 8 | 20 | 5 | 5 | 1.2 | 5 | 1000 | Lighting/SMPS |
| 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 |
| BUL85D | | 250 | 500 | 8 | 80 | 4 | 10 | 14 | 10 | 1.2 | 8 | 1600 | Lighting/SMPS |
| BU941ZT | | 350 | 350 | 15 | 150 | 300 | | 5 | 10 | 1.8 | 10 | 250 | Electr. ignition |
| BU941ZTT4 | | 350 | 350 | 15 | 150 | 300 | | 5 | 10 | 1.8 | 10 | 250 | Electr. ignition |
| ST901T | | 350 | 500 | 4 | 100 | 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 |
| BU810 | | 400 | 600 | 7 | 75 | 100 | | 2 | 2 | 2.5 | 4 | 200 | Switching |
| BUL118D | | 400 | 700 | 3 | 60 | 8 | | 2 | 5 | 1.5 | 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 |
| BUL128D-BT4* | | 400 | 700 | 4 | 70 | 8 | 40 | 2 | 5 | 1.5 | 2.5 | 500 | Lighting/SMPS |

ST preferred products in bold

Blue shaded areas indicate darlingtonts

TO-220/D²PAK

| Device type | | V _{CEO} [V] | V _{CB0} V _{CE5} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|--------------|--------|----------------------|--|--------------------|----------------------|--|-----|------|-----|--|-------|------|---------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| ST13005 | | 400 | 700 | 4 | 75 | 8 | 40 | 2 | 5 | 1 | 4 | 1000 | Lighting/SMPS |
| STB13005-1** | | 400 | 700 | 4 | 75 | 8 | 40 | 2 | 5 | 1 | 4 | 1000 | Lighting/SMPS |
| ST13007 | | 400 | 700 | 8 | 80 | 5 | 30 | 5 | 5 | 2 | 5 | 1000 | Lighting/SMPS |
| ST13007D | | 400 | 700 | 8 | 80 | 8 | 25 | 5 | 5 | 1.5 | 5 | 1000 | Lighting/SMPS |
| BUL654 | | 400 | 700 | 12 | 80 | 4 | | 12 | 5 | 0.7 | 7 | 1400 | Lighting/SMPS |
| MJE13009 | | 400 | 700 | 12 | 100 | 6 | 30 | 8 | 5 | 1.5 | 8 | 1600 | Switching |
| BUL381D | | 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 |
| BUL89 | | 400 | 850 | 12 | 110 | 10 | 40 | 5 | 5 | 1.5 | 8 | 1600 | Lighting/SMPS |
| BUL903ED | | 400 | 900 | 5 | 70 | 20 | | 0.5 | 3 | 1.2 | 2 | 400 | Lighting |
| BUL742A | | 400 | 950 | 4 | 70 | 16 | 40 | 0.8 | 3 | 1.5 | 3.5 | 1000 | Lighting/SMPS |
| BUL742C | | 400 | 1050 | 4 | 70 | 25 | 50 | 0.8 | 3 | 1.5 | 3.5 | 1000 | Lighting/SMPS |
| 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 |
| BULB39DT4* | | 450 | 850 | 4 | 70 | 4 | | 5 | 10 | 1.1 | 2.5 | 500 | Lighting/SMPS |
| BUL49D | | 450 | 850 | 5 | 80 | 4 | 10 | 7 | 10 | 1.2 | 4 | 800 | Lighting/SMPS |
| BULB49DT4* | | 450 | 850 | 5 | 80 | 4 | 10 | 7 | 10 | 1.2 | 4 | 800 | Lighting/SMPS |
| 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 |
| BUL1101E | | 450 | 1100 | 3 | 70 | 6 | 15 | 2 | 5 | 1 | 1 | 200 | Lighting |
| BUL1102E | | 450 | 1100 | 4 | 70 | 10 | 20 | 2 | 5 | 1.5 | 2 | 400 | Lighting |
| BUL310 | | 500 | 1000 | 5 | 75 | 10 [#] | | 3 | 2.5 | 1.1 | 3 | 600 | Lighting/SMPS |
| BUL1203E | | 550 | 1200 | 5 | 100 | 9 | 28 | 2 | 5 | 1.5 | 3 | 1000 | Lighting |
| 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 | 2.5 | 0.5 | 50 | Lighting |
| BUL1603ED | | 650 | 1600 | 3 | 80 | 15 | 40 | 0.4 | 3 | 1.5 | 1 | 250 | 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 |
| ST13009 | | 400 | 700 | 12 | 100 | 15 | 28 | 5 | 5 | 0.85 | 4 | 0.8 | Switching |
| | BUL3P5 | -400 | -500 | -3 | 60 | 4 | | -2 | -5 | -0.5 | -1 | -0.2 | Lighting |
| BUL3N7 | | 400 | 700 | 3 | 60 | 4 | | 2 | 5 | 0.5 | 1 | 0.2 | Lighting |
| BUL804 | | 450 | 800 | 4 | 70 | 10 | 20 | 2 | 5 | 1.2 | 2.5 | 0.5 | Lighting |

Typical bigger * = D²PAK package in tape & reel (suffix "T4") ** = I²PAK package in tubes (suffix "-1")

ST preferred products in bold Blue shaded areas indicate darlington

ISOTOP[▲]

| Device type | | V _{CEO} [V] | V _{CB0} V _{CE5} V _{CEV} [V] | I _C [A] | P _{tot} [W] | h _{FE} @ I _C V _{CE} | | | | V _{CE(sat)} @ I _C I _B | | | Application |
|-------------|-----|----------------------|--|--------------------|----------------------|--|-----|-----|-----|--|-----|------|-------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| ESM2012DV | | 120 | 150 | 120 | 175 | 1200 [#] | | 100 | 5 | 1.5* | 70 | 0.25 | Industrial |
| BUT30V | | 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 |

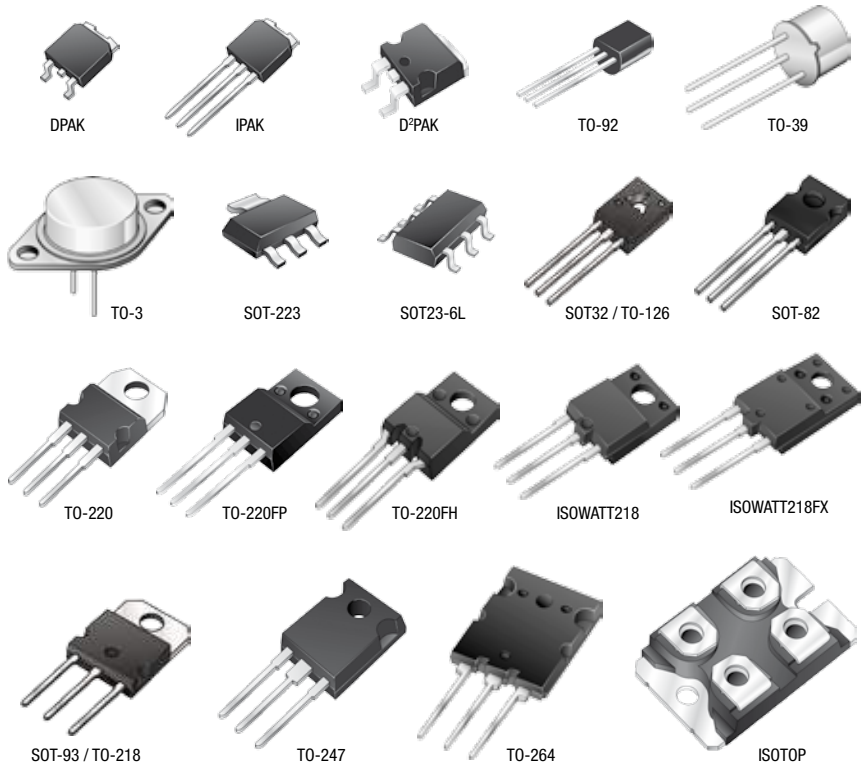
▲ UL compliant # Typical * = 100°C ST preferred products in bold Blue shaded areas indicate darlington

T0-264

| Device type | | V_{CE0} [V] | V_{CE0} V_{CES} V_{CEV} [V] | I_C [A] | P_{tot} [W] | $h_{FE} @ I_C, V_{CE}$ | | | | $V_{CE(sat)} @ I_C, I_B$ | | | Application |
|-------------|-----|------------------|--|--------------|------------------|------------------------|-----|-----|-----|--------------------------|-----|------|---------------|
| NPN | PNP | | | | | Min | Max | [A] | [V] | [V] | [A] | [mA] | |
| HD1530JL* | | 700 | 1500 | 26 | 200 | 5.5 | 9 | 13 | 5 | 2 | 13 | 3250 | CTVs/monitors |
| HD1750JL* | | 800 | 1700 | 24 | 200 | 5.5 | 9.5 | 12 | 5 | 3 | 12 | 3000 | CTVs/monitors |

* Pre-production

Packages



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