*New Jersey Semi-Conductor Products, Inc.*

20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

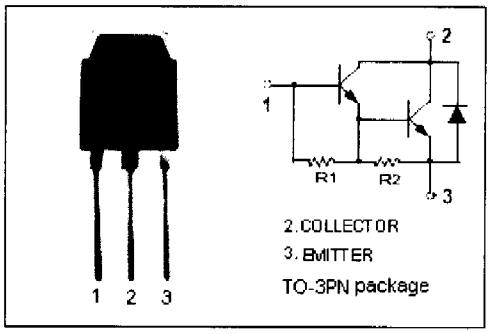
# Silicon Darlington NPN Power Transistor — BU323AP

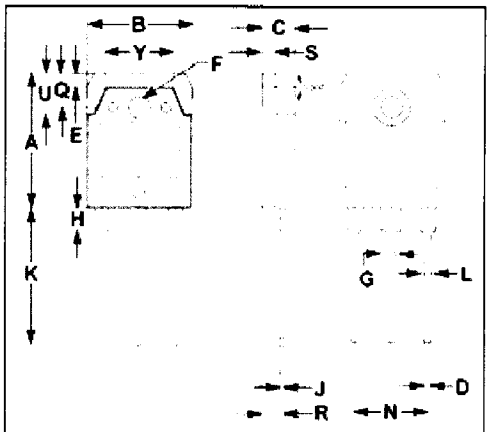
## DESCRIPTION

- Collector-Emitter Sustaining Voltage-
  : $V_{CEO(SUS)}$= 400V(Min.)
- High Reliability

## APPLICATIONS

- Automotive ignition
- Switching regulator
- Motor control applications




| DIM | mm MIN | mm MAX |
|---|---|---|
| A | 19.90 | 20.10 |
| B | 15.50 | 15.70 |
| C | 4.70 | 4.90 |
| D | 0.90 | 1.10 |
| E | 1.90 | 2.10 |
| F | 3.40 | 3.60 |
| G | 2.90 | 3.10 |
| H | 3.20 | 3.40 |
| J | 0.595 | 0.605 |
| K | 20.50 | 20.70 |
| L | 1.90 | 2.10 |
| N | 10.89 | 10.91 |
| Q | 4.90 | 5.10 |
| R | 3.35 | 3.45 |
| S | 1.995 | 2.005 |
| U | 5.90 | 6.10 |
| Y | 9.90 | 10.10 |

## ABSOLUTE MAXIMUM RATINGS ($T_a$=25℃)

| SYMBOL | PARAMETER | VALUE | UNIT |
|---|---|---|---|
| $V_{CER}$ | Collector-Emitter Voltage | 475 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 400 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 6 | V |
| $I_C$ | Collector Current- Continuous | 10 | A |
| $I_{CM}$ | Collector Current-Peak | 16 | A |
| $I_B$ | Base Current | 3 | A |
| $P_C$ | Collector Power Dissipation @$T_C$=25℃ | 125 | W |
| $T_j$ | Junction Temperature | 200 | ℃ |
| $T_{stg}$ | Storage Temperature Range | -65~200 | ℃ |

## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | MAX | UNIT |
|---|---|---|---|
| $R_{th\ j\text{-}c}$ | Thermal Resistance, Junction to Case | 1.0 | ℃/W |

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

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## ELECTRICAL CHARACTERISTICS

**$T_C$=25℃ unless otherwise specified**

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_{CEO(SUS)}$ | Collector-Emitter Sustaining Voltage | $I_C$= 0.2A; $I_B$= 0; L= 10mH; $V_{clamp}$ = Rated $V_{CEO}$ | 400 | | | V |
| $V_{CER(SUS)}$ | Collector-Emitter Sustaining Voltage | $I_C$= 3A; $R_{BE}$= 100Ω; L= 500μH | 475 | | | V |
| $V_{CE(sat)-1}$ | Collector-Emitter Saturation Voltage | $I_C$= 3A; $I_B$= 60mA | | | 1.5 | V |
| $V_{CE(sat)-2}$ | Collector-Emitter Saturation Voltage | $I_C$= 6 A; $I_B$= 120mA | | | 1.7 | V |
| $V_{CE(sat)-3}$ | Collector-Emitter Saturation Voltage | $I_C$= 10 A; $I_B$= 300mA | | | 2.7 | V |
| $V_{BE(sat)-1}$ | Base-Emitter Saturation Voltage | $I_C$= 6 A; $I_B$= 120mA | | | 2.2 | V |
| $V_{BE(sat)-2}$ | Base-Emitter Saturation Voltage | $I_C$= 10 A; $I_B$= 300mA | | | 3.0 | V |
| $V_{BE(on)}$ | Base-Emitter On Voltage | $I_C$= 10A ; $V_{CE}$= 6V | | | 2.5 | V |
| $I_{CER}$ | Collector Cutoff Current | $V_{CER}$= Rated$V_{CER}$;$R_{BE}$= 100Ω | | | 1.0 | mA |
| $I_{CBO}$ | Collector Cutoff Current | $V_{CB}$= Rated$V_{CBO}$; $I_E$= 0 | | | 1.0 | mA |
| $I_{EBO}$ | Emitter Cutoff Current | $V_{EB}$= 6V; $I_C$= 0 | | | 40 | mA |
| $h_{FE-1}$ | DC Current Gain | $I_C$= 3A ; $V_{CE}$= 6V | 300 | | | |
| $h_{FE-2}$ | DC Current Gain | $I_C$= 6A ; $V_{CE}$= 6V | 150 | | 2000 | |
| $h_{FE-3}$ | DC Current Gain | $I_C$= 10A ; $V_{CE}$= 6V | 50 | | | |
| $V_{ECF}$ | C-E Diode Forward Voltage | $I_F$= 10A | | | 3.5 | V |
| $C_{OB}$ | Output Capacitance | $I_E$= 0; $V_{CB}$= 10V; f= 100kHz | | 165 | | pF |

Switching Times

| | | | | | | |
|---|---|---|---|---|---|---|
| $t_s$ | Storage Time | $V_{CC}$= 12V; $I_C$= 6A,$I_{B1}$= -$I_{B2}$= 0.3A | | | 15 | μs |
| $t_f$ | Fall Time | | | | 15 | μs |