

## SPTECH Silicon NPN Darlington Power Transistor

2SD1415

## DESCRIPTION

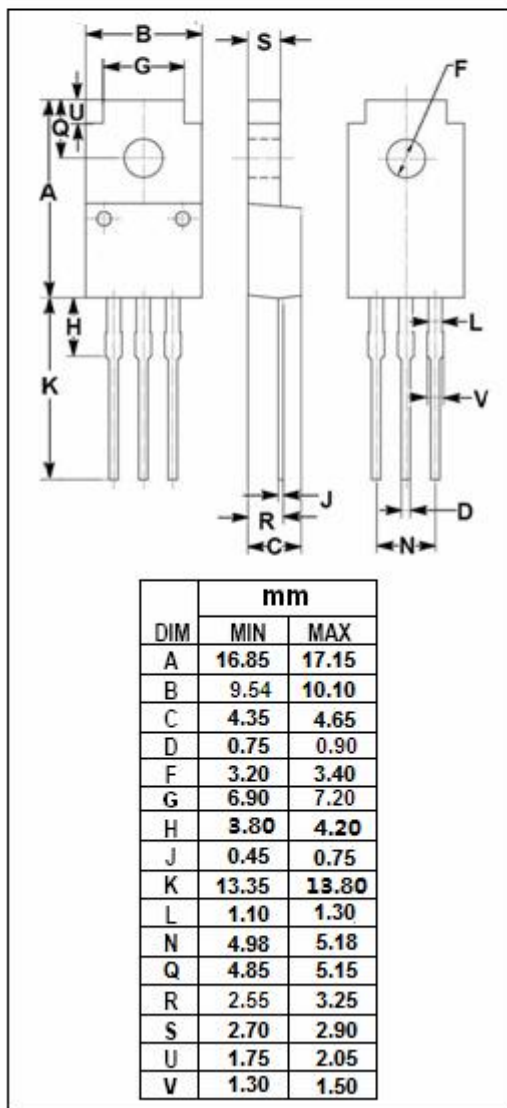
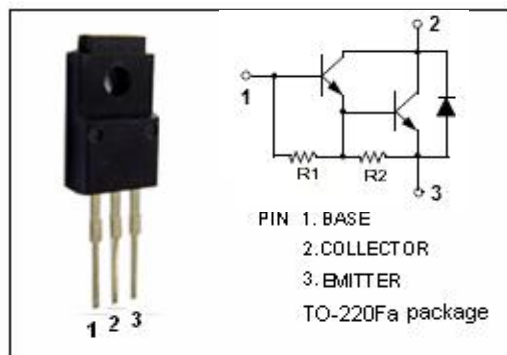
- Collector-Emitter Breakdown Voltage-  
:  $V_{(BR)CEO} = 100V(\text{Min})$
- Collector-Emitter Saturation Voltage-  
:  $V_{CE(sat)} = 1.5V(\text{Max}) @ I_C = 3A$
- High DC Current Gain  
:  $h_{FE} = 2000(\text{Min}) @ I_C = 3A, V_{CE} = 3V$
- Complement to Type 2SB1020

## APPLICATIONS

- High power switching applications
- Hammer driver, pulse motor driver applications

ABSOLUTE MAXIMUM RATINGS( $T_a = 25^\circ\text{C}$ )

| SYMBOL    | PARAMETER                                                 | VALUE   | UNIT             |
|-----------|-----------------------------------------------------------|---------|------------------|
| $V_{CBO}$ | Collector-Base Voltage                                    | 100     | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                                 | 100     | V                |
| $V_{EBO}$ | Emitter-Base Voltage                                      | 5       | V                |
| $I_C$     | Collector Current-Continuous                              | 7       | A                |
| $I_B$     | Base Current-Continuous                                   | 0.2     | A                |
| $P_C$     | Collector Power Dissipation<br>@ $T_C = 25^\circ\text{C}$ | 30      | W                |
| $T_J$     | Junction Temperature                                      | 150     | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature Range                                 | -55~150 | $^\circ\text{C}$ |



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## ELECTRICAL CHARACTERISTICS

$T_c=25^{\circ}\text{C}$  unless otherwise specified

| SYMBOL          | PARAMETER                            | CONDITIONS                               | MIN  | TYP. | MAX   | UNIT          |
|-----------------|--------------------------------------|------------------------------------------|------|------|-------|---------------|
| $V_{(BR)CEO}$   | Collector-Emitter Breakdown Voltage  | $I_C = 30\text{mA}$ ; $I_B = 0$          | 100  |      |       | V             |
| $V_{CE(sat)-1}$ | Collector-Emitter Saturation Voltage | $I_C = 3\text{A}$ ; $I_B = 6\text{mA}$   |      |      | 1.5   | V             |
| $V_{CE(sat)-2}$ | Collector-Emitter Saturation Voltage | $I_C = 7\text{A}$ ; $I_B = 14\text{mA}$  |      |      | 2.0   | V             |
| $V_{BE(sat)}$   | Base-Emitter Saturation Voltage      | $I_C = 3\text{A}$ ; $I_B = 6\text{mA}$   |      |      | 2.5   | V             |
| $I_{CBO}$       | Collector Cutoff Current             | $V_{CB} = 100\text{V}$ ; $I_E = 0$       |      |      | 100   | $\mu\text{A}$ |
| $I_{EBO}$       | Emitter Cutoff Current               | $V_{EB} = 5\text{V}$ ; $I_C = 0$         |      |      | 3.0   | mA            |
| $h_{FE-1}$      | DC Current Gain                      | $I_C = 3\text{A}$ ; $V_{CE} = 3\text{V}$ | 2000 |      | 15000 |               |
| $h_{FE-2}$      | DC Current Gain                      | $I_C = 7\text{A}$ ; $V_{CE} = 3\text{V}$ | 1000 |      |       |               |

## Switching times

|           |              |                                                                                                                                                 |  |     |  |               |
|-----------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--|-----|--|---------------|
| $t_{on}$  | Turn-on Time | $I_C = 3\text{A}$ , $I_{B1} = I_{B2} = 6\text{mA}$<br>$R_L = 15\Omega$ ; $V_{CC} = 45\text{V}$<br>$P_W = 20\mu\text{s}$ ; Duty Cycle $\leq 1\%$ |  | 0.8 |  | $\mu\text{s}$ |
| $t_{stg}$ | Storage Time |                                                                                                                                                 |  | 3.0 |  | $\mu\text{s}$ |
| $t_f$     | Fall Time    |                                                                                                                                                 |  | 2.5 |  | $\mu\text{s}$ |