

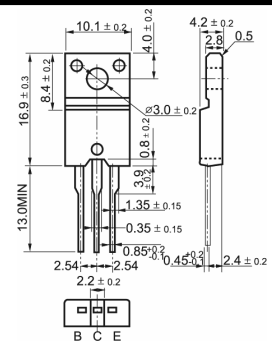
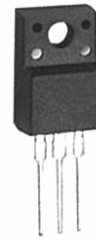


## 2SD1409

## SILICON NPN DARLINGTON TRANSISTOR

### GENERAL DESCRIPTION

Darlington transistor are designed for use as general purpose amplifiers, switching and motor control applications.



TO-220F

### QUICK REFERENCE DATA

| SYMBOL      | PARAMETER                             | CONDITIONS                                    | MIN | MAX | UNIT    |
|-------------|---------------------------------------|---|-----|-----|---------|
| $V_{CESM}$  | Collector-emitter voltage peak value  | $V_{BE} = 0V$                                 | -   | 600 | V       |
| $V_{CEO}$   | Collector-emitter voltage (open base) |   | -   | 400 | V       |
| $I_C$       | Collector current (DC)                |   | -   | 6   | A       |
| $I_{CM}$    | Collector current peak value          |   | -   | 12  | A       |
| $P_{tot}$   | Total power dissipation               | $T_{mb} \leq 25^\circ C$                      | -   | 25  | W       |
| $V_{CEsat}$ | Collector-emitter saturation voltage  | $I_C = 4.0A; I_B = 0.04A$                     | -   | 2.0 | V       |
| $I_{csat}$  | Collector saturation current          | $f=16KHZ$                                     |     |     | A       |
| $V_F$       | Diode forward voltage                 | $I_F=3A$                                      | 2.5 | 5   | V       |
| $t_f$       | Fall time                             | $I_C=4.0A, I_{B1}=-I_{B2}=0.04A, V_{CC}=100V$ |     | 6.0 | $\mu s$ |

### LIMITING VALUES

| SYMBOL     | PARAMETER                             | CONDITIONS               | MIN | MAX | UNIT       |
|------------|---------------------------------------|--------------------------|-----|-----|------------|
| $V_{CESM}$ | Collector-emitter voltage peak value  | $V_{BE} = 0V$            | -   | 600 | V          |
| $V_{CEO}$  | Collector-emitter voltage (open base) |                          | -   | 400 | V          |
| $I_C$      | Collector current (DC)                |                          | -   | 6   | A          |
| $I_{CM}$   | Collector current peak value          |                          | -   | 12  | A          |
| $I_B$      | Base current (DC)                     |                          | -   | 1   | A          |
| $I_{BM}$   | Base current peak value               |                          | -   | 2   | A          |
| $P_{tot}$  | Total power dissipation               | $T_{mb} \leq 25^\circ C$ | -   | 25  | W          |
| $T_{sto}$  | Storage temperature                   |                          | -55 | 150 | $^\circ C$ |
| $T_j$      | Junction temperature                  |                          | -   | 150 | $^\circ C$ |

### ELECTRICAL CHARACTERISTICS

| SYMBOL         | PARAMETER                                     | CONDITIONS   | MIN | MAX | UNIT    |
|----------------|---|--|-----|-----|---------|
| $I_{CE}$       | Collector cut-off current                     | $V_{EB}=0V, V_{CE}=V_{CESMmax}$                      |     | 0.5 | mA      |
| $I_{CES}$      |   | $V_{EB}=0V, V_{CE}=V_{CESMmax}$                      |     | 3.0 | mA      |
| $V_{CEO sust}$ | Collector-emitter sustaining voltage          | $T_j=125^\circ C$<br>$I_B=0A, I_C=100mA$<br>$L=25mH$ |     |     | V       |
| $V_{CEsat}$    | Collector-emitter saturation voltages         | $I_C = 4.0A; I_B = 0.04A$                            |     | 2.0 | V       |
| $V_{BEsat}$    | Base-emitter saturation voltage               | $I_C = 4.0A; I_B = 0.04A$                            |     | 1.5 | V       |
| $h_{FE}$       | DC current gain                               | $I_C = 2A; V_{CE} = 5V$                              | 600 |     |         |
| $V_F$          | Diode forward voltage                         | $I_F=3A$   | 2.5 | 5.0 | V       |
| $f_T$          | Transition frequency at $f = 1MHz$            | $I_C=2A, V_{CE}=10V$                                 | 5   |     | MHZ     |
| $C_c$          | Collector capacitance at $f = 1MHz$           | $V_{CB} = 50V$                                       |     | 50  | pF      |
| $t_s$          | Switching times(16KHz line deflecton circuit) | $I_C=4.0A, I_{B1}=-I_{B2}=0.04A, V_{CC}=100V$        |     | 10  | $\mu s$ |
| $t_f$          | Turn-off storage time Turn-off fall time      | $I_C=4.0A, I_{B1}=-I_{B2}=0.04A, V_{CC}=100V$        |     | 6.0 | $\mu s$ |