NEC



# DARLINGTON POWER TRANSISTOR

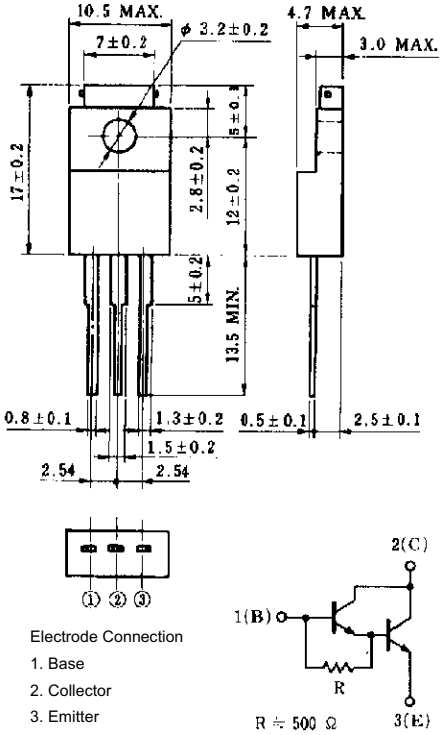
# 2SD1592

## NPN SILICON TRIPLE DIFFUSED TRANSISTOR (DARLINGTON CONNECTION) FOR HIGH-VOLTAGE LOW-SPEED SWITCHING

### FEATURES

- High DC current gain due to Darlington connection
- Low collector saturation
- Reverse deterrence type
- Ideal for use in devices such as pulse motor drivers and relay drivers of PC terminals, and ignitors of general-purpose engines.
- Mold package that does not require an insulating board or insulation bushing

### PACKAGE DRAWING (UNIT: mm)




### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Collector to base voltage | $V_{CBO}$ | 500 | V |
| Collector to emitter voltage | $V_{CEO}$ | +300, −10 | V |
| Emitter to base voltage | $V_{EBO}$ | 10 | V |
| Collector current | $I_{C(DC)}$ | 5.0 | A |
| Collector current | $I_{C(pulse)}$* | 10 | A |
| Base current | $I_{B(DC)}$ | 0.5 | A |
| Total power dissipation | $P_T$ (Tc = 25°C) | 30 | W |
| Total power dissipation | $P_T$ (Ta = 25°C) | 1.5 | W |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature | $T_{stg}$ | −55 to +150 | °C |

* PW ≤ 300 μs, duty cycle ≤ 10%



Document No. D16137EJ1V0DS00
Date Published April 2002 N CP(K)
Printed in Japan

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

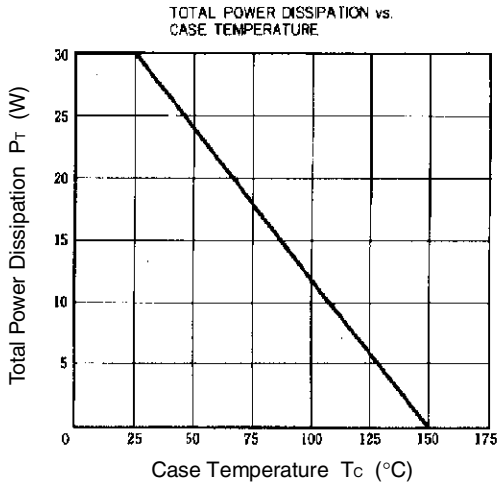
| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 400 V, $I_E$ = 0 | | | 10 | μA |
| DC current gain | $h_{FE1}$* | $V_{CE}$ = 2.0 V, $I_C$ = 2.0 A | 400 | | 3,000 | |
| DC current gain | $h_{FE2}$* | $V_{CE}$ = 2.0 V, $I_C$ = 3.0 A | 100 | | | |
| Collector saturation voltage | $V_{CE(sat)}$* | $I_C$ = 2 A, $I_B$ = 5 mA | | 1.0 | 1.5 | V |
| Base saturation voltage | $V_{BE(sat)}$* | $I_C$ = 2 A, $I_B$ = 5 mA | | 1.6 | 2.0 | V |
| Turn-on time | $t_{on}$ | $I_C$ = 3.0 A, $I_{B1}$ = $-I_{B2}$ = 30 mA<br>$R_L$ = 50 Ω, $V_{CC}$ ≅ 150 V | | 1.0 | | μs |
| Storage time | $t_{stg}$ | | | 12 | | μs |
| Fall time | $t_f$ | | | 6 | | μs |

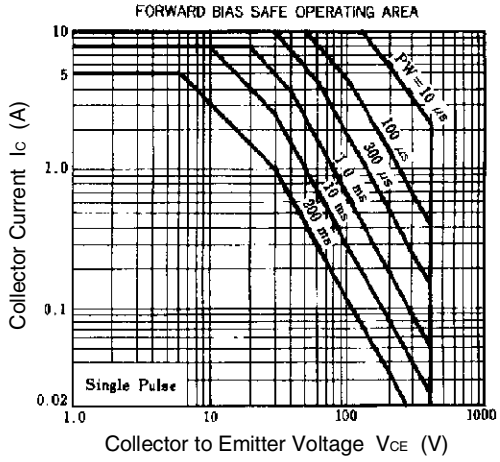
* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

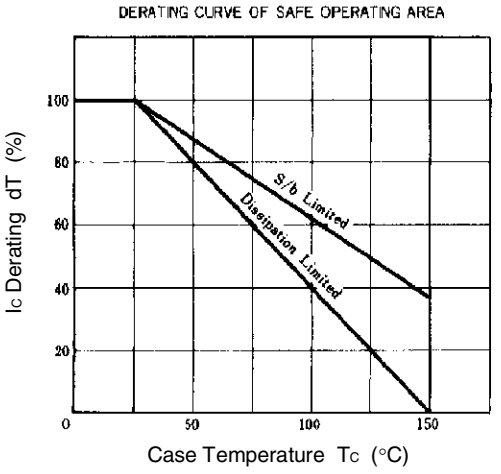
## $h_{FE}$ CLASSIFICATION

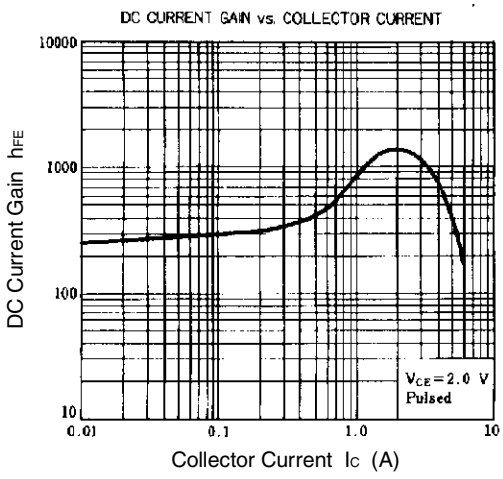
| Marking | M | L | K |
|---|---|---|---|
| $h_{FE}$ | 400 to 800 | 600 to 1,200 | 1,000 to 3,000 |

## TYPICAL CHARACTERISTICS (Ta = 25°C)

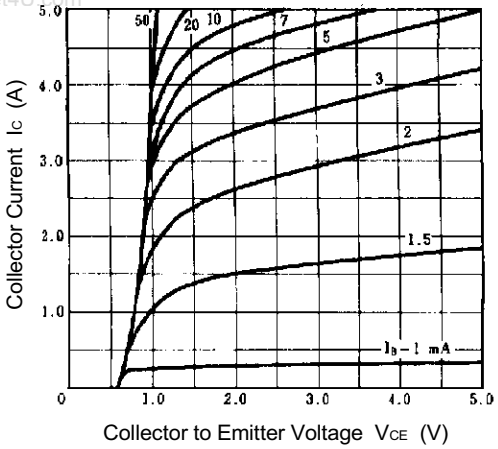


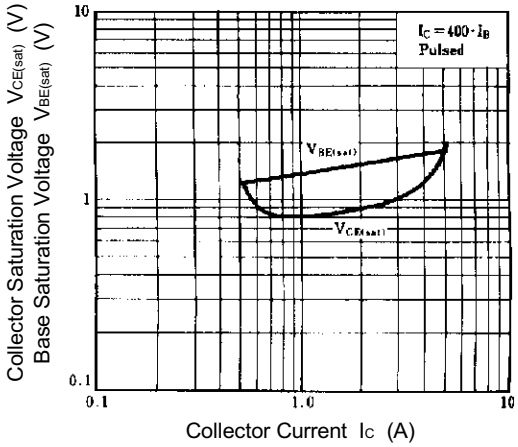



COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE




BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



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