

# 2SD2091

# Transistor NPN, Darlington

### Features

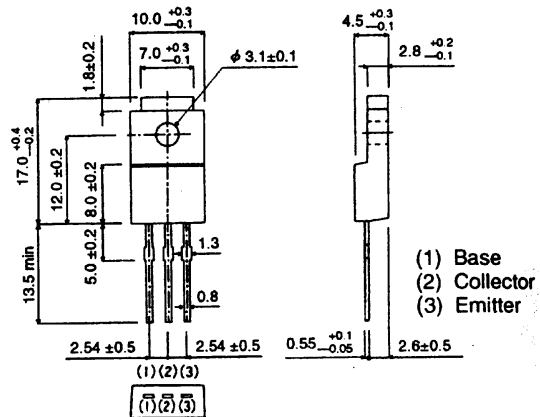
- available in TO-220FP (SC-67) package
- built-in 90 V Zener-diode between collector and base
- highly resistant to surge voltages
- large collector power dissipation:  $P_C = 2 \text{ W}$  at  $T_a = 25^\circ\text{C}$
- damper diode is incorporated
- built-in resistors between base and emitter
- easily insulated from the heat sink as the fin is molded

### Applications

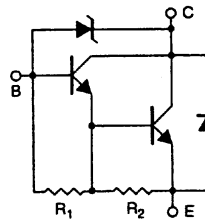
- low frequency power amplifier

### Dimensions (Units : mm)

2SD2091 (TO-220FP)



### Equivalent circuit



$R_1 \cong 3.5 \text{ k}\Omega$   
 $R_2 \cong 300 \Omega$

B: Base  
 C: Collector  
 E: Emitter

### Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

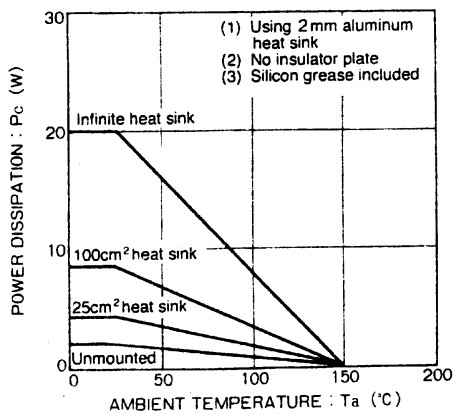
Parameter	Symbol	Limits	Unit	Conditions
Collector-to-base voltage	$V_{CBO}$	$90 \begin{smallmatrix} +20 \\ -10 \end{smallmatrix}$	V	
Collector-to-emitter voltage	$V_{CEO}$	$90 \begin{smallmatrix} +20 \\ -10 \end{smallmatrix}$	V	
Emitter-to-base voltage	$V_{EBO}$	6	V	
Collector current	$I_C$	2	A	Continuous (dc)
		3	A	Single pulse, $P_W = 100 \text{ ms}$
Collector dissipation	$P_C$	2	W	$T_a = 25^\circ\text{C}$
		20	W	$T_C = 25^\circ\text{C}$
Junction temperature	$T_j$	150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	$-55 \sim +150$	$^\circ\text{C}$	

**ROHM**

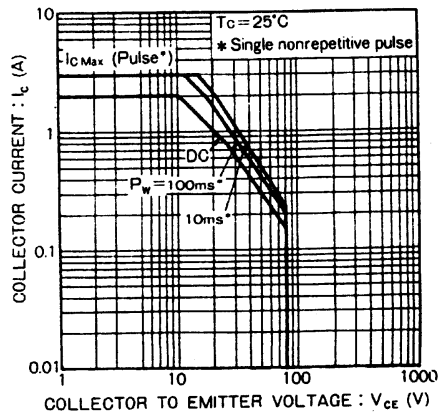
**Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Collector-to-base breakdown voltage	$BV_{CBO}$	80		110	V	$I_C = 50 \mu\text{A}$
Collector-to-emitter breakdown voltage	$BV_{CEO}$	80		110	V	$I_C = 1 \text{ mA}$
Collector cutoff current	$I_{CBO}$			10	$\mu\text{A}$	$V_{CB} = 70 \text{ V}$
Emitter cutoff current	$I_{EBO}$			3	mA	$V_{EB} = 5 \text{ V}$
DC current gain	$h_{FE}$	1000		10000		$V_{CE} = 2 \text{ V}$ , $I_C = 1 \text{ A}$ , single pulse
Collector-to-emitter saturation voltage	$V_{CE(sat)}$			1.5	V	$I_C/I_B = 1 \text{ A}/1 \text{ mA}$
Transition frequency	$f_T$		80		MHz	$V_{CE} = 5 \text{ V}$ , $I_E = -0.1 \text{ A}$ , $f = 30 \text{ MHz}$ , characteristics of built-in transistor
Output capacitance	$C_{ob}$		25		pF	$V_{CB} = 10 \text{ V}$ , $I_E = 0 \text{ A}$ , $f = 1 \text{ MHz}$

**Electrical characteristic curves**



**Figure 1**



**Figure 2**

2SD2091 Transistor, NPN, 2SD series

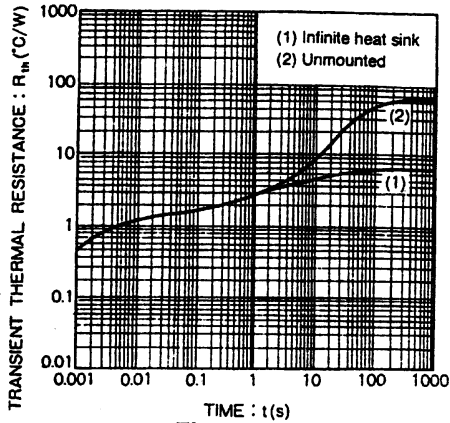


Figure 3

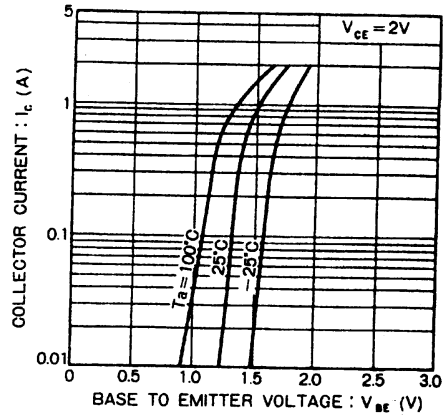


Figure 4

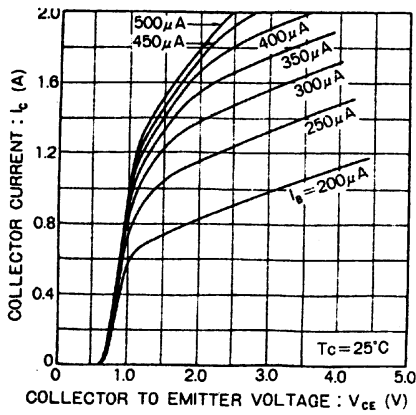


Figure 5

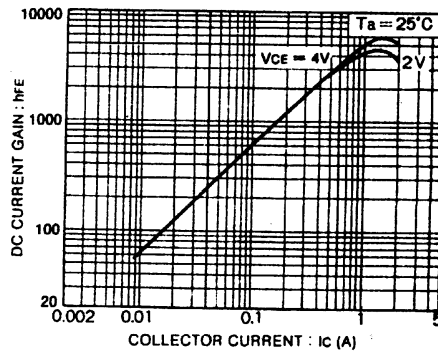


Figure 6

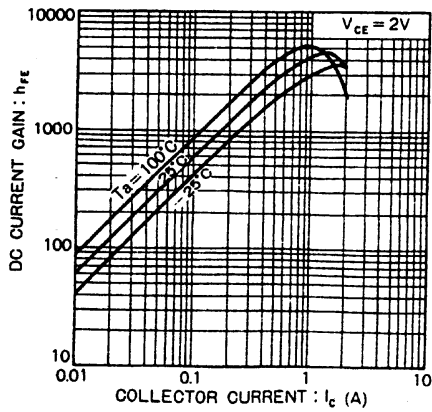


Figure 7

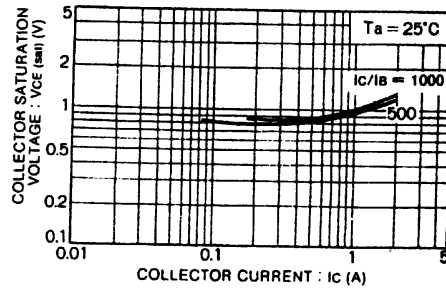


Figure 8

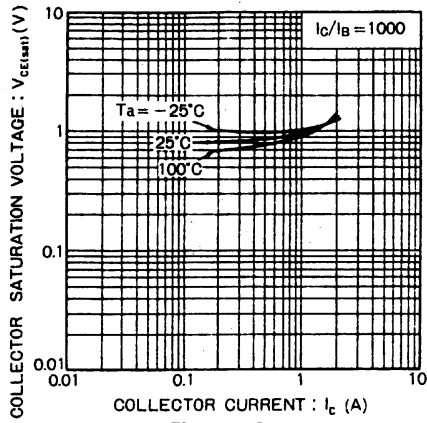


Figure 9

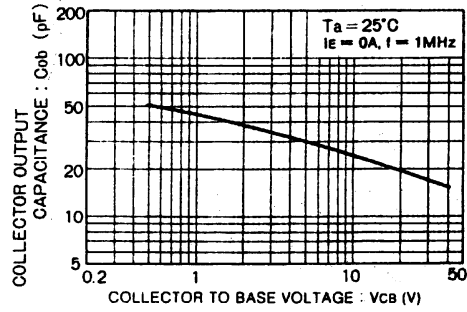


Figure 10

Ordering information

Package	Bulk
Code	
Basic order quantity	500
2SD2091, $h_{FE} = 1\text{ k} - 10\text{ k}$	★
★ = Standard, ☆ = Semi-standard, * = Special order	

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