

# 2SD2399

# Transistor, NPN, Darlington

## Features

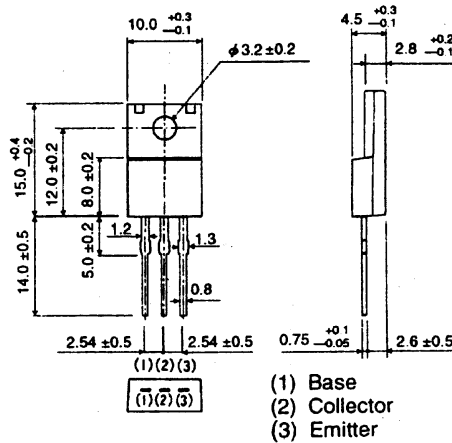
- available in TO-220FN package
- Darlington connection provides high dc current gain ( $h_{FE}$ )
- damper diode is incorporated
- built-in resistors between base and emitter
- 2 mm lower than the TO-220FP package which allows higher density mounting
- complementary pair with 2SB1568

## Applications

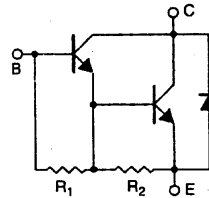
- low frequency power amplifier

## Dimensions (Units : mm)

2SD2399 (TO-220FN)



## Equivalent circuit



$R_1 \cong 3.0 \text{ k}\Omega$   
 $R_2 \cong 300 \Omega$

B: Base  
C: Collector  
E: Emitter

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

Parameter	Symbol	Limits	Unit	Conditions
Collector-to-base voltage	$V_{CBO}$	80	V	
Collector-to-emitter voltage	$V_{CEO}$	80	V	
Emitter-to-base voltage	$V_{EBO}$	7	V	
Collector current	$I_C$	4	A	Continuous (dc)
		6	A	Single pulse, $P_W = 100 \text{ ms}$
Collector dissipation	$P_C$	2	W	
		30	W	$T_C = 25^\circ\text{C}$
Junction temperature	$T_j$	150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	-55 -- +150	$^\circ\text{C}$	

**ROHM**

2SD2399 Transistor, NPN, 2SD series

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			V	$I_C = 50 \mu\text{A}$
Collector-to-emitter breakdown voltage	$BV_{CEO}$	80			V	$I_C = 1 \text{ mA}$
Collector cutoff current	$I_{CBO}$			100	$\mu\text{A}$	$V_{CB} = 80 \text{ V}$
Emitter cutoff current	$I_{EBO}$			3	mA	$V_{EB} = 5 \text{ V}$
DC current gain	$h_{FE}$	1 k		10 k		$V_{CE} = 3 \text{ V}$ , $I_C = 2 \text{ A}$ , single pulse
Collector-to-emitter saturation voltage	$V_{CE(sat)}$			1.5	V	$I_C/I_B = 2 \text{ A}/4 \text{ mA}$ , single pulse
Transition frequency	$f_T$		40		MHz	$V_{CE} = 5 \text{ V}$ , $I_E = -0.2 \text{ A}$ , $f = 10 \text{ MHz}$
Output capacitance	$C_{ob}$		35		pF	$V_{CB} = 10 \text{ V}$ , $I_E = 0 \text{ A}$ , $f = 1 \text{ MHz}$

Electrical characteristic curves

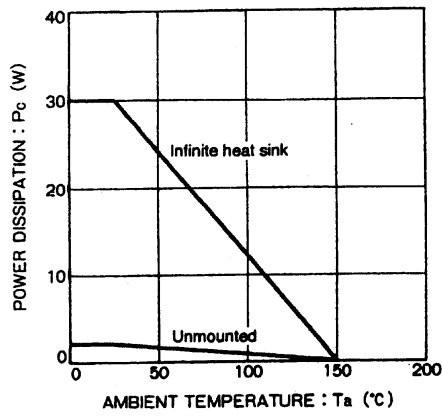


Figure 1

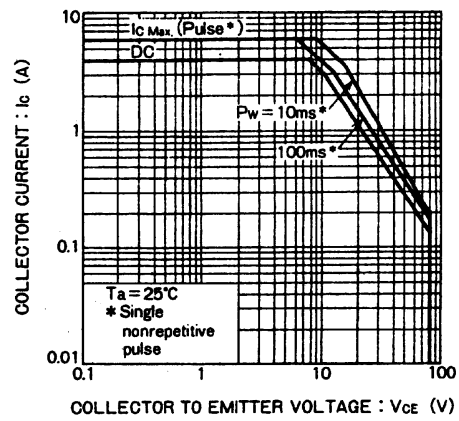


Figure 2

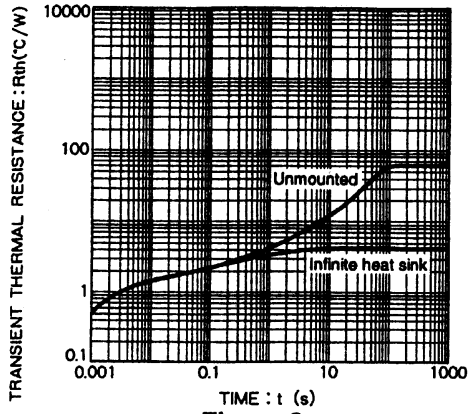


Figure 3

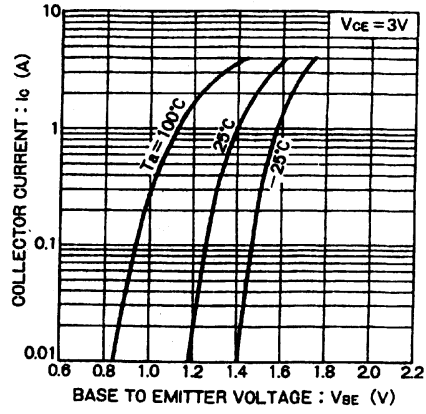


Figure 4

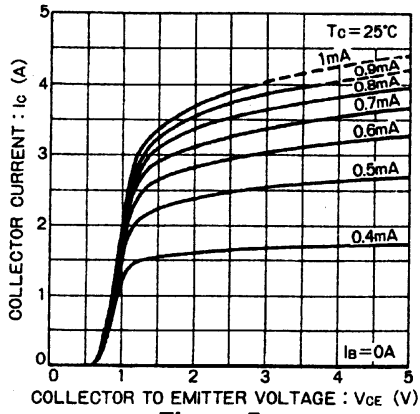


Figure 5

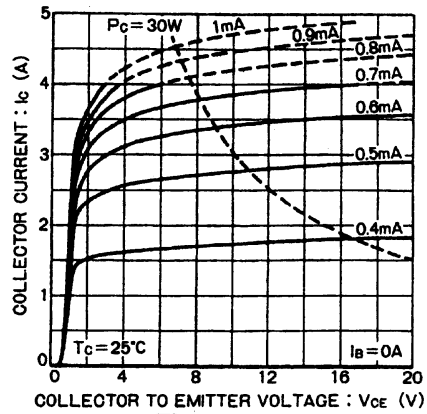


Figure 6

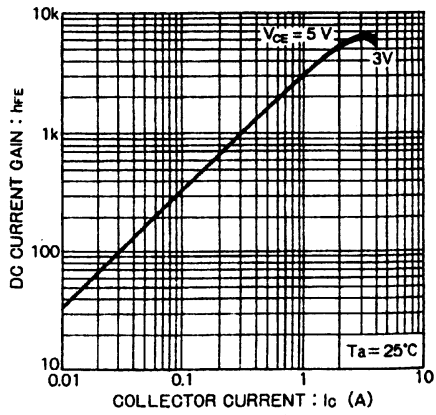


Figure 7

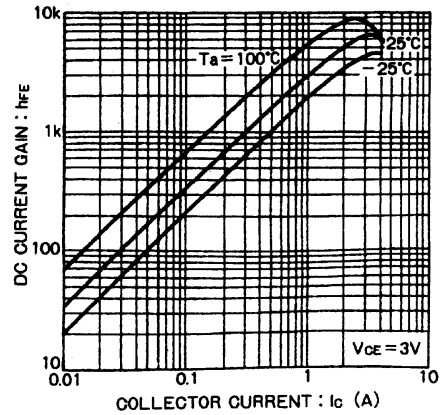


Figure 8

2SD2399 Transistor, NPN, 2SD series

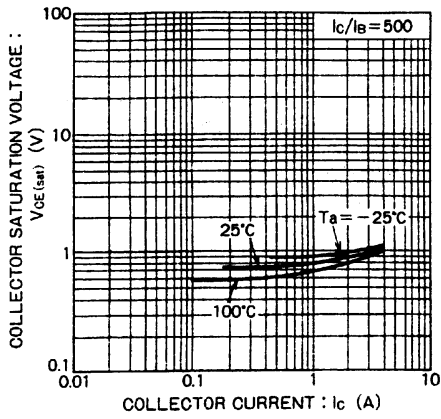


Figure 9

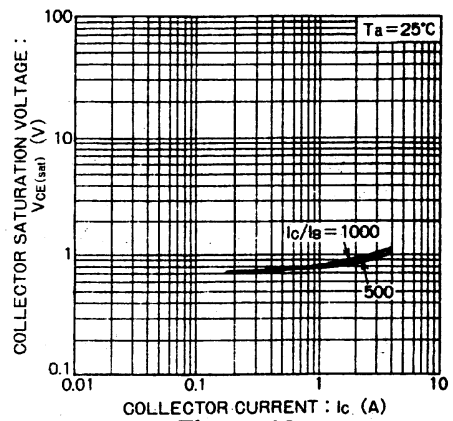


Figure 10

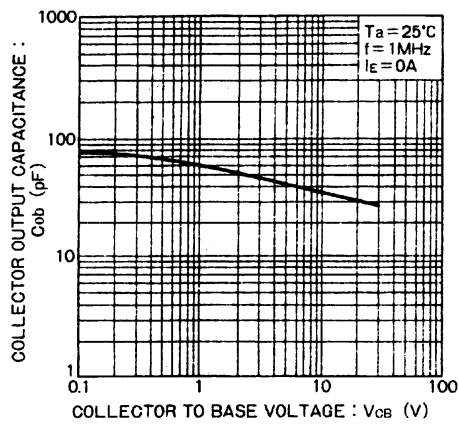


Figure 11

Ordering information

Package	Bulk
Code	
Basic order quantity	500
2SD2399	★
★ = Standard, ☆ = Semi-standard, * = Special order	

### Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document use silicon as a basic material.  
Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

#### About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.