

## NPN Darlington transistors

## MPSA13; MPSA14

## FEATURES

- High current (max. 500 mA)
- Low voltage (max. 30 V)
- High DC current gain (min. 10000).

## APPLICATIONS

- High gain amplification.

## DESCRIPTION

NPN Darlington transistor in a TO-92; SOT54 plastic package. PNP complements: MPSA63 and MPSA64.

## PINNING

PIN	DESCRIPTION
1	collector
2	base
3	emitter

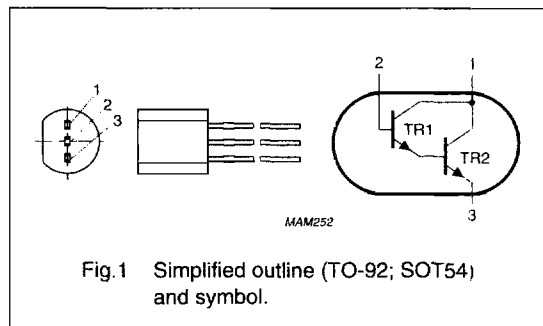


Fig. 1 Simplified outline (TO-92; SOT54) and symbol.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	-	30	V
$V_{CES}$	collector-emitter voltage	$V_{BE} = 0$	-	30	V
$I_C$	collector current (DC)		-	500	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$	-	500	mW
$h_{FE}$	DC current gain	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$			
	MPSA13		5000	-	
	MPSA14		10000	-	
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	125	-	MHz

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**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	30	V
$V_{CES}$	collector-emitter voltage	$V_{BE} = 0$	–	30	V
$V_{EBO}$	emitter-base voltage	open collector	–	10	V
$I_C$	collector current (DC)		–	500	mA
$I_{CM}$	peak collector current		–	1	A
$I_B$	base current (DC)		–	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; note 1	–	500	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**Note**

1. Transistor mounted on an FR4 printed-circuit board.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	50	K/W

**Note**

1. Transistor mounted on an FR4 printed-circuit board.

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## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 30\text{ V}$	–	0.1	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 10\text{ V}$	–	0.1	$\mu\text{A}$
$h_{FE}$	DC current gain MPSA13 MPSA14	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V};$ see Fig.2	5000 10000	– –	
$h_{FE}$	DC current gain MPSA13 MPSA14	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V};$ see Fig.2	10000 20000	– –	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 0.1\text{ mA}$	–	1.5	V
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 0.1\text{ mA}$	–	1.5	V
$V_{BEon}$	base-emitter on-state voltage	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V}$	–	2	V
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	125	–	MHz

