

## Discrete POWER & Signal **Technologies**

2N7052

# 2N7053

# NZT7053







# **NPN Darlington Transistor**

This device is designed for applications requiring extremely high gain at collector currents to 1.0 A and high breakdown voltage. Sourced from Process 06.

## **Absolute Maximum Ratings\***

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units	
$V_{CEO}$	Collector-Emitter Voltage	100	V	
V <sub>CBO</sub>	Collector-Base Voltage	100	V	
V <sub>EBO</sub>	Emitter-Base Voltage	12	V	
I <sub>C</sub>	Collector Current - Continuous	1.5	A	
T <sub>J</sub> , T <sub>stg</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°C	

<sup>\*</sup>These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

## **Thermal Characteristics**

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units	
		2N7052	2N7053	*NZT7053	
P <sub>D</sub>	Total Device Dissipation	625	1,000	1,000	mW
	Derate above 25°C	5.0	8.0	8.0	mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	125		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	50	125	°C/W

<sup>\*</sup>Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm $^2$ .

These ratings are based on a maximum junction temperature of 150 degrees C.
 These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

# **NPN Darlington Transistor**

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Electrical	Cnara	cteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHA	RACTERISTICS				
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	$I_C = 1.0 \text{ mA}, I_B = 0$	100		V
V <sub>(BR)CBO</sub>	Collector-Base Breakdown Voltage	$I_C = 100  \mu A,  I_E = 0$	100		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 1.0 \text{ mA}, I_C = 0$	12		V
I <sub>CBO</sub>	Collector-Cutoff Current	$V_{CB} = 80 \text{ V}, I_{E} = 0$		0.1	μΑ
I <sub>CES</sub>	Collector-Cutoff Current	$V_{CE} = 80 \text{ V}, I_{E} = 0$		0.2	μΑ
I <sub>EBO</sub>	Emitter-Cutoff Current	$V_{EB} = 7.0 \text{ V}, I_{C} = 0$		0.1	μΑ

## ON CHARACTERISTICS\*

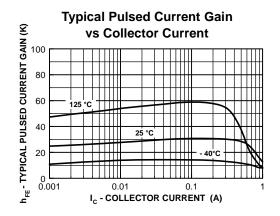
h <sub>FE</sub>	DC Current Gain	$I_C = 100 \text{ mA}, V_{CE} = 5.0 \text{ V}$	10,000		
		$I_C = 1.0 \text{ A}, V_{CE} = 5.0 \text{ V}$	1,000	20,000	
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	$I_C = 100 \text{ mA}, I_B = 0.1 \text{ mA}$		1.5	V
V <sub>BE(on)</sub>	Base-Emitter On Voltage	$I_C = 100 \text{ mA}, V_{BE} = 5.0 \text{ V}$		2.0	V

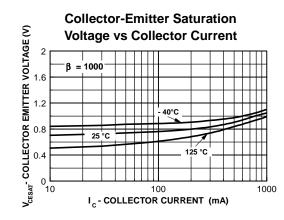
## SMALL SIGNAL CHARACTERISTICS

F <sub>T</sub>	Transition Frequency	$I_C = 100 \text{ mA}, V_{CE} = 5.0 \text{ V},$	200		MHz
C <sub>cb</sub>	Collector-Base Capacitance	V <sub>CB</sub> = 10 V,f = 1.0 MHz <b>2N7052</b>		10	pF
		2N7053		8.0	

<sup>\*</sup>Pulse Test: Pulse Width £ 300 ms, Duty Cycle £ 1.0%

# **Typical Characteristics**

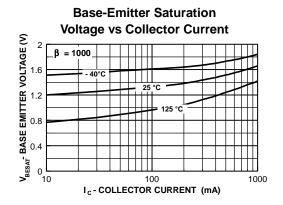


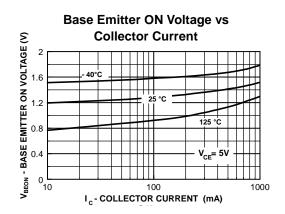


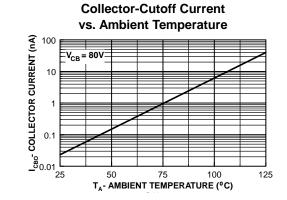
# **NPN Darlington Transistor**

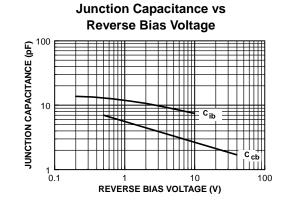
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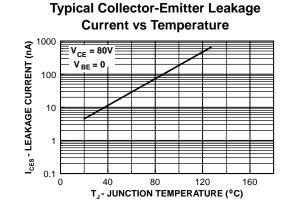
## Typical Characteristics (continued)

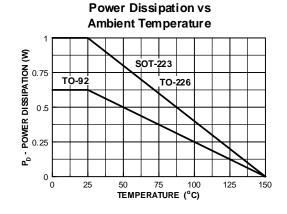












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