

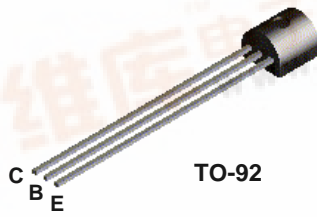


Discrete POWER & Signal Technologies

2N7052

2N7053

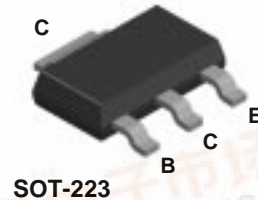
NZT7053



TO-92



TO-226



SOT-223

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 _{CBO}	Collector-Base Voltage	100	V
V _{EBO}	Emitter-Base Voltage	12	V
I _C	Collector Current - Continuous	1.5	A
T _J , T _{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

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

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max			Units
		2N7052	2N7053	*NZT7053	
P _D	Total Device Dissipation	625	1,000	1,000	mW
	Derate above 25°C	5.0	8.0	8.0	mW/°C
R _{θJC}	Thermal Resistance, Junction to Case	83.3	125		°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	200	50	125	°C/W

* Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm².



NPN Darlington Transistor

(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

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

ON CHARACTERISTICS*

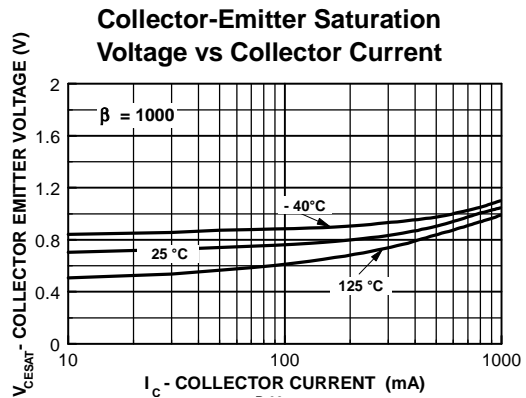
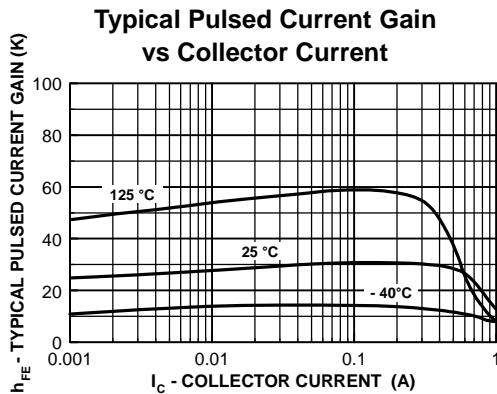
h_{FE}	DC Current Gain	$I_C = 100 \text{ mA}, V_{CE} = 5.0 \text{ V}$ $I_C = 1.0 \text{ A}, V_{CE} = 5.0 \text{ V}$	10,000 1,000	20,000	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 100 \text{ mA}, I_B = 0.1 \text{ mA}$		1.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 100 \text{ mA}, V_{BE}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

SMALL SIGNAL CHARACTERISTICS

F_T	Transition Frequency	$I_C = 100 \text{ mA}, V_{CE} = 5.0 \text{ V},$	200		MHz
C_{cb}	Collector-Base Capacitance	$V_{CB} = 10 \text{ V}, f = 1.0 \text{ MHz}$ 2N7052 2N7053		10 8.0	pF

*Pulse Test: Pulse Width $\leq 300 \text{ } \mu\text{s}$, Duty Cycle $\leq 1.0\%$

Typical Characteristics

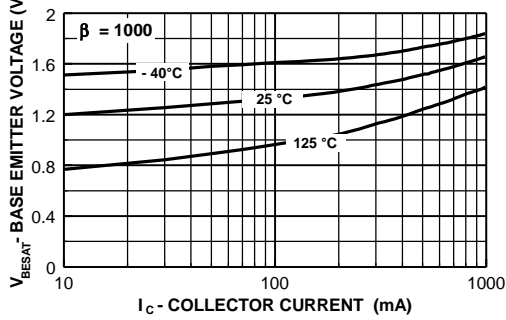


NPN Darlington Transistor

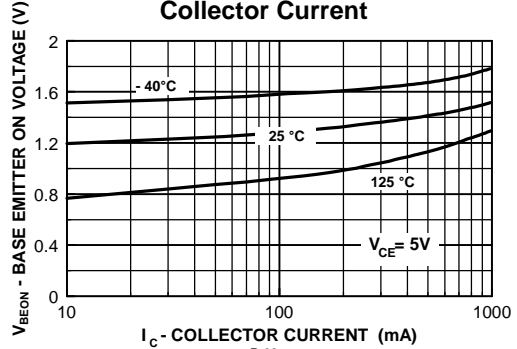
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Typical Characteristics (continued)

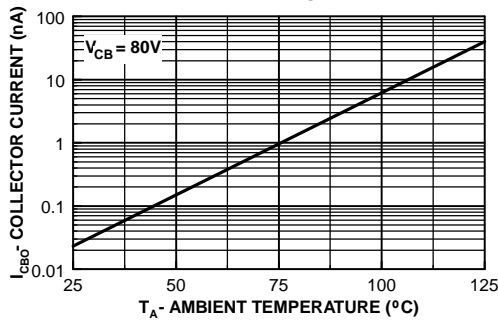
Base-Emitter Saturation Voltage vs Collector Current



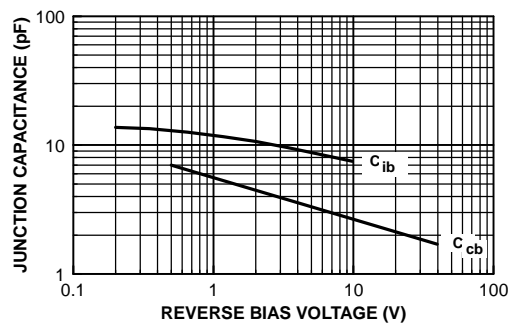
Base Emitter ON Voltage vs Collector Current



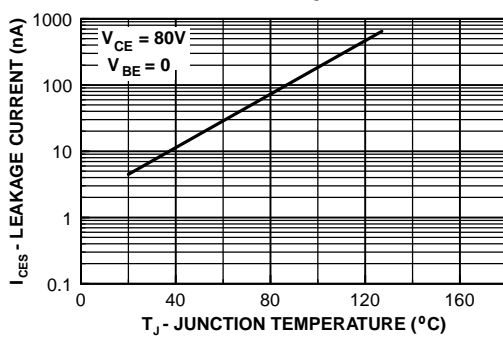
Collector-Cutoff Current vs. Ambient Temperature



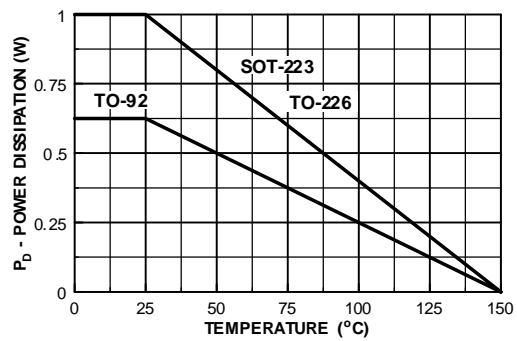
Junction Capacitance vs Reverse Bias Voltage



Typical Collector-Emitter Leakage Current vs Temperature



Power Dissipation vs Ambient Temperature



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