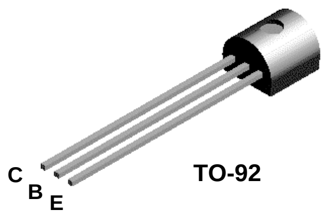
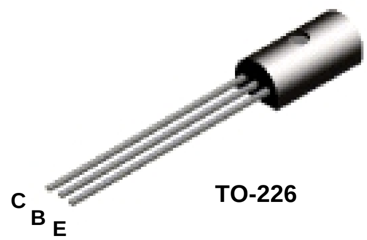
FAIRCHILD SEMICONDUCTOR™

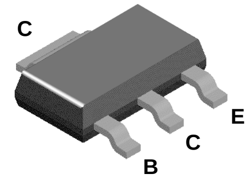
2N7051 2N7053 NZT7053



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
		2N7051	**2N7053**	***NZT7053**	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	1,000 8.0	1,000 8.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	50		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	125	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 cm^2.

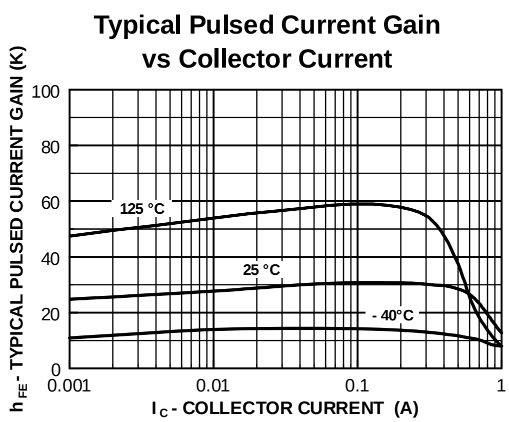
NPN Darlington Transistor
(continued)

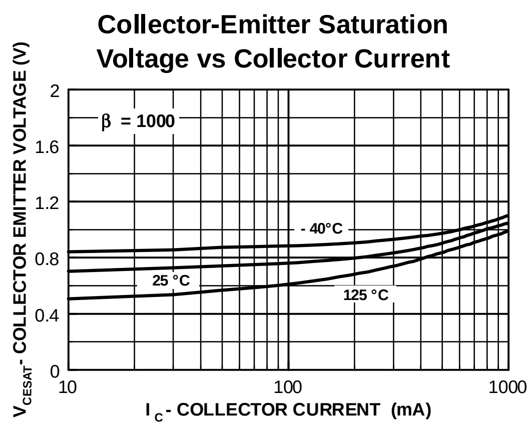
Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	I_C = 1.0 mA, I_B = 0	100		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 100 μA, I_E = 0	100		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 1.0 mA, I_C = 0	12		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 80 V, I_E = 0		0.1	μA
I_{CES}	Collector-Cutoff Current	V_{CE} = 80 V, I_E = 0		0.2	μA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 7.0 V, I_C = 0		0.1	μA
ON CHARACTERISTICS*					
h_{FE}	DC Current Gain	I_C = 100 mA, V_{CE} = 5.0 V I_C = 1.0 A, V_{CE} = 5.0 V	10,000 1,000	 20,000	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 100 mA, I_B = 0.1 mA		1.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 100 mA, V_{BE} = 5.0 V		2.0	V
SMALL SIGNAL CHARACTERISTICS					
F_T	Transition Frequency	I_C = 100 mA, V_{CE} = 5.0 V	200		MHz
C_{cb}	Collector-Base Capacitance	V_{CB}= 10 V,f= 1.0 MHz **2N7053**		8.0	pF
h_{fe}	Small-Signal Current Gain	V_{CE} = 5.0 V, I_C = 100 mA, f = 20 MHz	10	100	

*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 1.0%

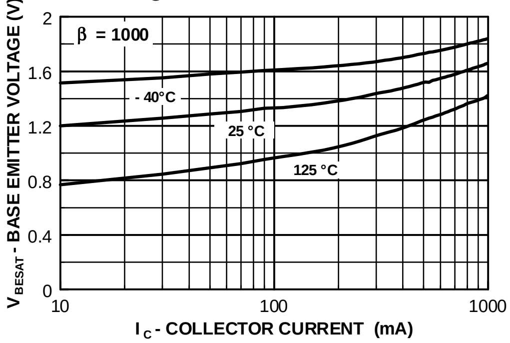
Typical Characteristics



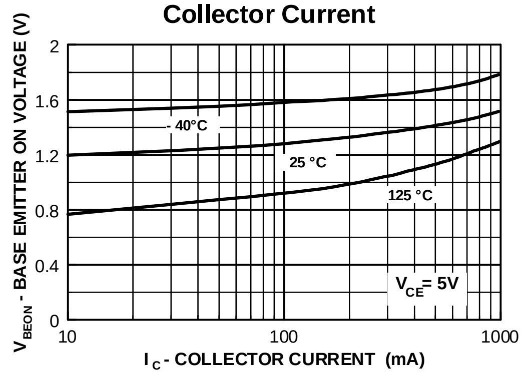


Typical Characteristics (continued)

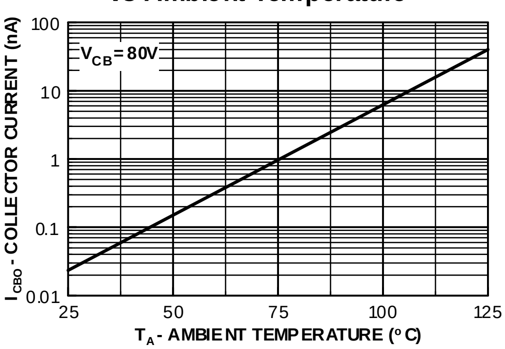
Base-Emitter Saturation Voltage vs Collector Current



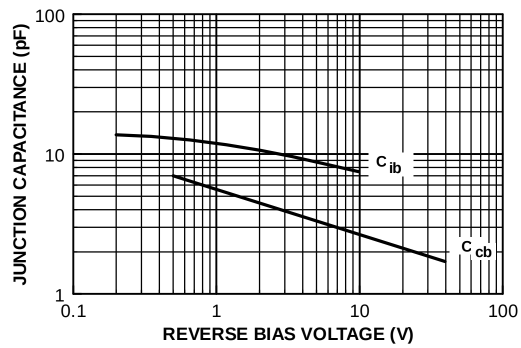
Base Emitter ON Voltage vs Collector Current



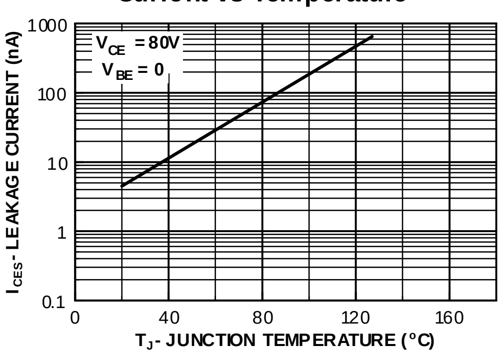
Collector-Cutoff Current vs Ambient Temperature



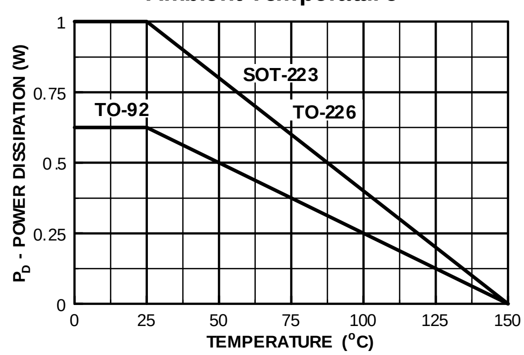
Junction Capacitance vs Reverse Bias Voltage



Typical Collector-Emitter Leakage Current vs Temperature



Power Dissipation vs Ambient Temperature



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