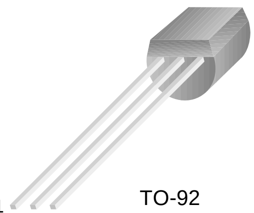
FAIRCHILD SEMICONDUCTOR®

PN4258

PNP Switching Transistor

- This device is designed for very high speed saturated switching at collector currents to 100mA.
- Sourced from process 65.



1 TO-92

1. Emitter 2. Base 3. Collector

Absolute Maximum Ratings* T_A=25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	-12	V
V_{CBO}	Collector-Base Voltage	-12	V
V_{EBO}	Emitter-Base Voltage	-4.5	V
I_C	Collector Current - Continuous	-200	mA
T_J, T_{STG}	Operating and Storage Junction Temperature Range	- 55 ~ 150	°C

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

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

Electrical Characteristics T_A=25°C unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
Off Characteristics					
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage *	I_C = -100μA, V_{BE} = 0	-12		V
$V_{CEO(SUS)}$	Collector-Emitter Sustaining Voltage *	I_C =- 3.0mA, I_B = 0	-12		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = -100μA, I_E = 0	-12		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = -100μA, I_C = 0	-4.5		V
I_{CES}	Collector Cutoff Current	V_{CE} = -6.0V, V_{BE} = 0 V_{CE} = -6.0V, V_{BE} = 0, T_A = 65°C		-0.01 -5.0	μA μA
On Characteristics					
h_{FE}	DC Current Gain	I_C = -1.0mA, V_{CE} = -0.5V I_C = -10mA, V_{CE} = -3.0V I_C = -50mA, V_{CE} = -1.0V	15 30 30	 120 	
V_{CE}(sat)	Collector-Emitter Saturation Voltage	I_C = -10mA, I_B = -1.0mA I_C = -50mA, I_B = -5.0mA		-0.15 -0.5	V V
V_{BE}(sat)	Base-Emitter Saturation Voltage	I_C = -10mA, I_B = -1.0mA I_C = -50mA, I_B = -5.0mA	-0.75	-0.95 -1.5	V V
Small Signal Characteristics					
f_T	Current Gain Bandwidth Product	I_C = -10mA, V_{CE} = -5.0V, f = 100MHz I_C = -10mA, V_{CE} = -10V, f = 100MHz	700 700		MHz MHz
C_{iob}	Input Capacitance	V_{BE} = -0.5V, I_C = 0, f = 1.0MHz		3.5	pF
C_{cb}	Collector-Base Capacitance	V_{BE} = -5.0V, I_E = 0, f = 1.0MHz		3.0	pF

Electrical Characteristics T_A=25°C unless otherwise noted (Continued)

Symbol	Parameter	Test Condition	Min.	Max.	Units
Switching Characteristics					
t_{on}	Turn-on Time	V_{CC} = -1.5V, V_{BE}(off) = 0V I_C = -10mA, I_{B1} = -1.0mA		15	ns
t_d	Delay Time			10	ns
t_r	Rise Time			15	ns
t_{off}	Turn-off Time	V_{CC} = -1.5V, I_C = -10mA, I_{B1} = I_{B2} = -10mA		20	ns
t_s	Storage Time			20	ns
t_f	Fall Time			10	ns
t_s	Storage Time	I_C = -10mA, I_{B1} = I_{B2} = -10mA		20	ns

* Pulse Test: Pulse Width ≤ 300ms, Duty Cycle ≤ 2.0%

Thermal Characteristics T_A=25°C unless otherwise noted

Symbol	Parameter	Max.	Units
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

Typical Chracteristics

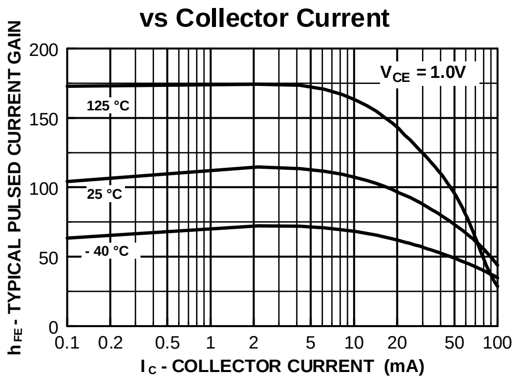


Figure 1. Typical Pulsed Current Gain vs Collector Current

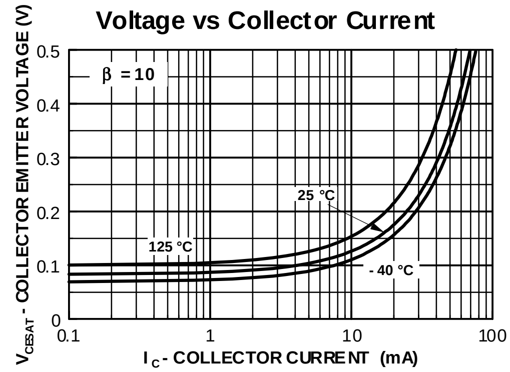


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

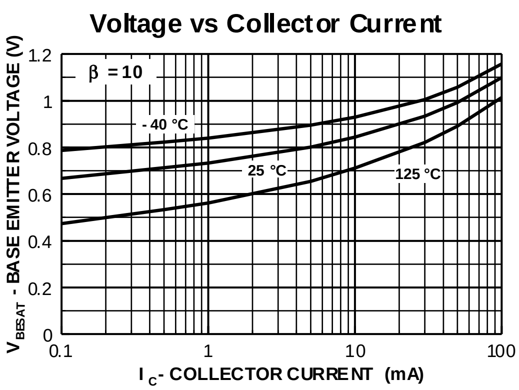


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

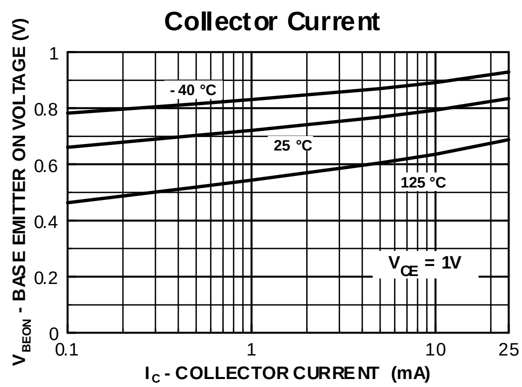


Figure 4. Base-Emitter On Voltage vs Collector Current

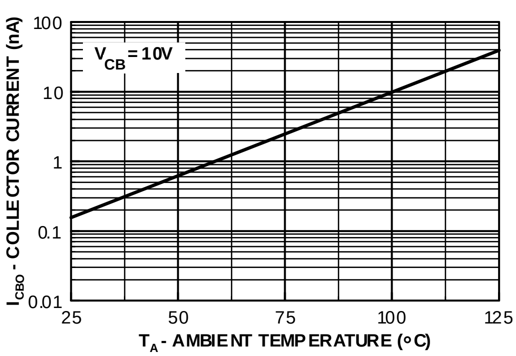


Figure 5. Collector Cutoff Current vs Ambient Temperature

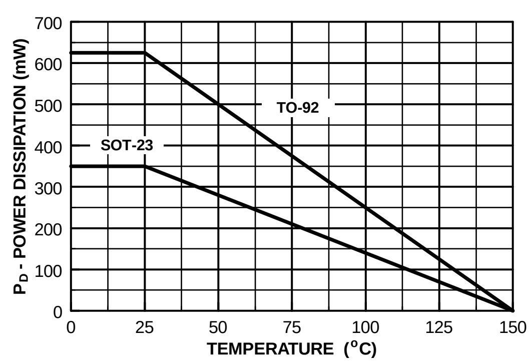


Figure 6. Power Dissipation vs Ambient Temperature

Typical Chracteristics (Continued)

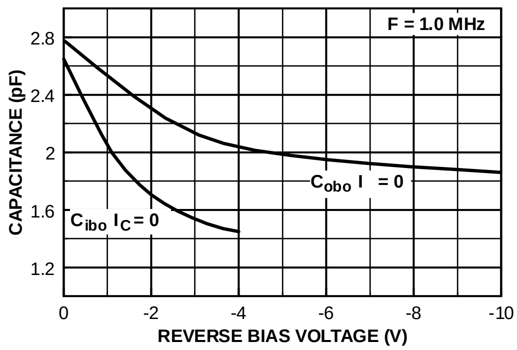


Figure 7. Input/Output Capacitance vs Reverse Bias Voltage

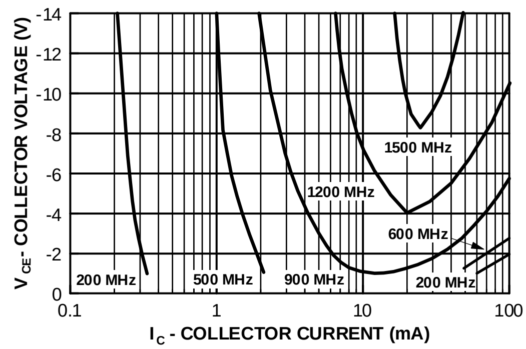


Figure 8. Contours of Constant Gain Bandwidth Produtct (f_T)

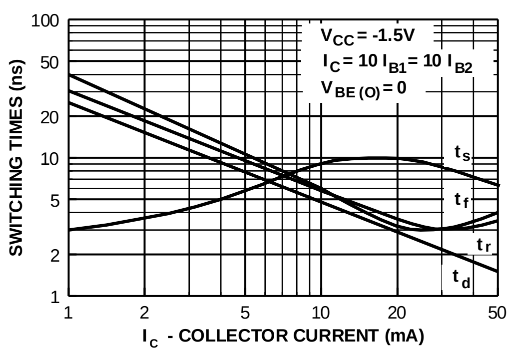


Figure 9. Switching Times vs Collector Current

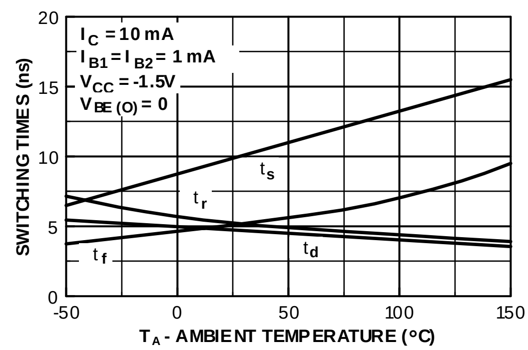


Figure 10. Switching Times vs Ambient Temperature

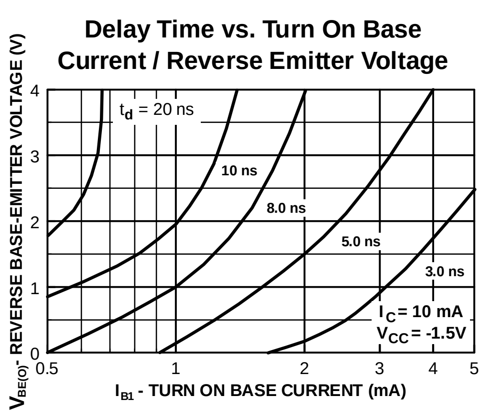


Figure 11. Delay Time vs Turn On Base Current/Reverse Emitter Voltage

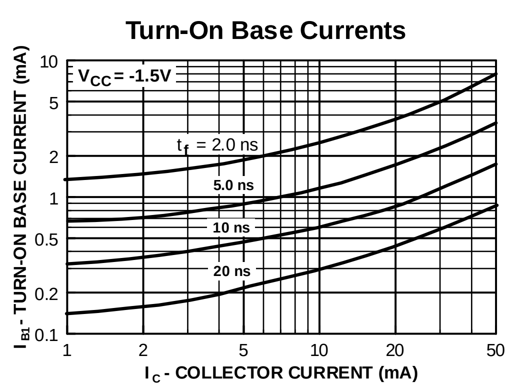


Figure 12. Rise Time vs Collector and Turn-On Base Currents

Typical Chracteristics (Continued)

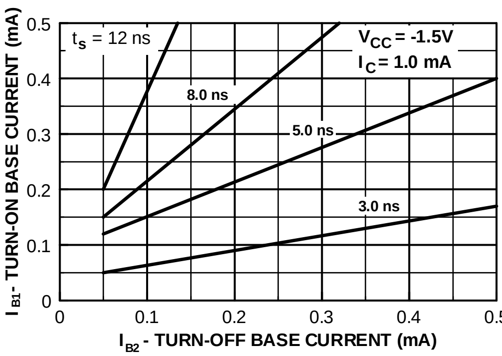


Figure 13. Storage Time vs Turn-On/Turn-Off Base Current

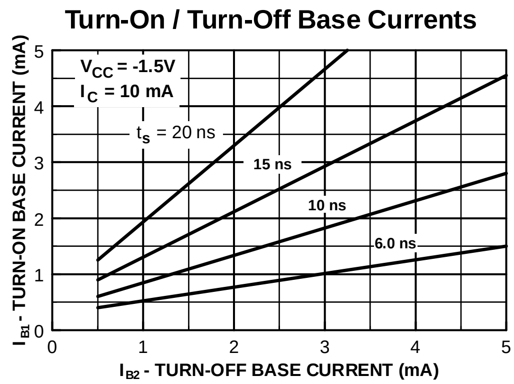


Figure 14. Storage Time vs Turn-On/Turn-Off Base Currents

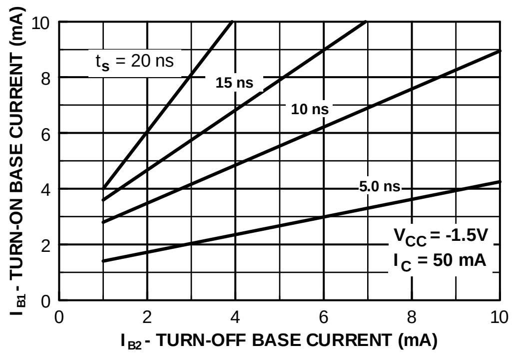


Figure 15. Storage Time vs Turn-On/Turn-Off Base Current

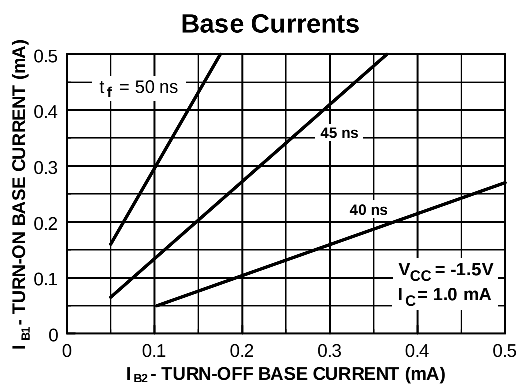


Figure 16. Fall Time vs Turn-On/Turn-Off Base Currents

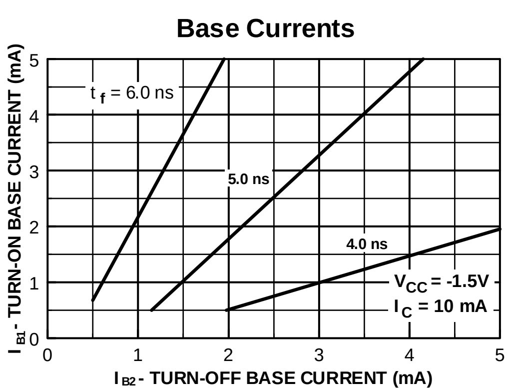


Figure 17. Fall Time vs Turn-On/Turn-Off Base Currents

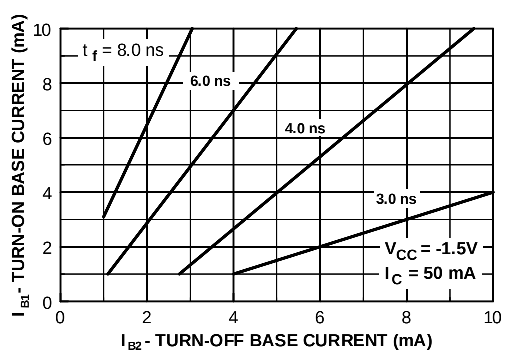
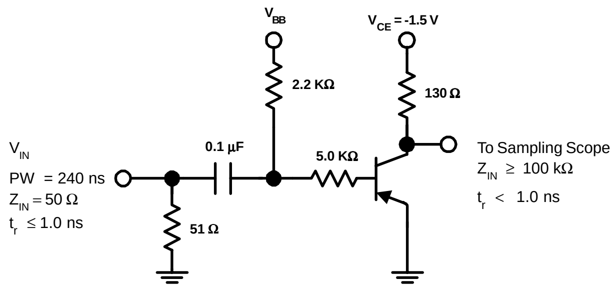


Figure 18. Fall Time vs Turn-On/Turn-Off Base Currents

Test Circut



t_{ON}
V_{BB} = ground
V_{IN} = - 5.8 V

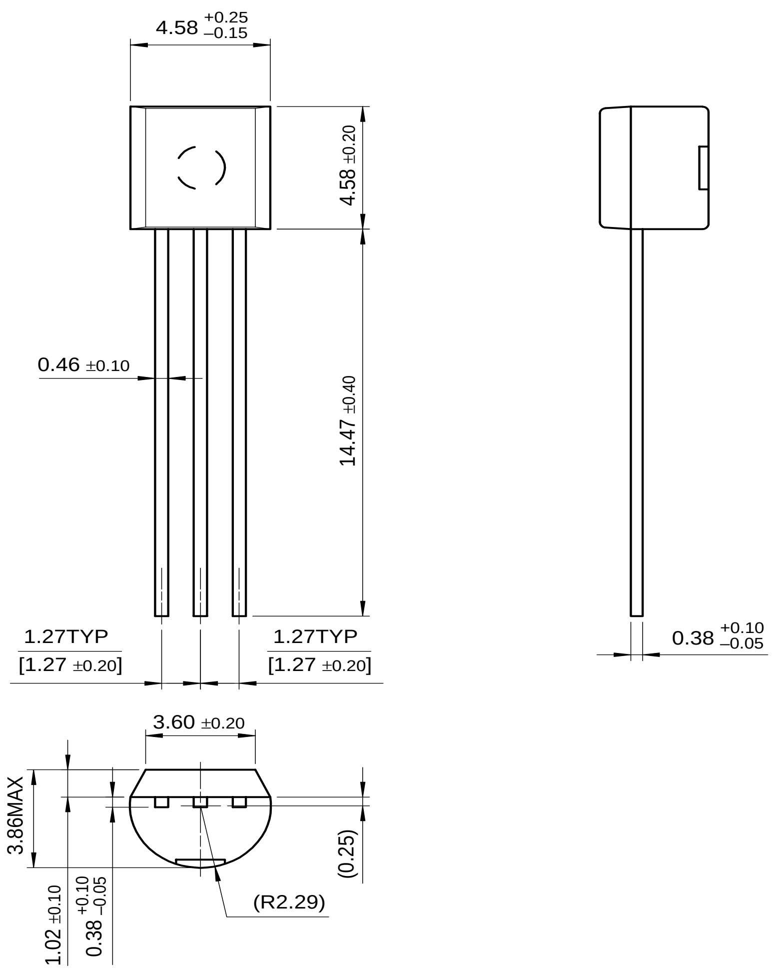
t_{OFF}
V_{BB} = 8.0 V
V_{IN} = 9.8 V

I_C = 10 mA, I_{B1} = 1.0 mA, I_{B2} = 1.0 mA

Figure 1. t_{on}, t_{off} Test Circuit

Package Dimensions

TO-92



Dimensions in Millimeters

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CoolFET™	FASTr™	MicroFET™	PowerTrench®	SuperSOT™-6
CROSSVOLT™	FRFET™	MicroPak™	QFET™	SuperSOT™-8
DOME™	GlobalOptoisolator™	MICROWIRE™	QS™	SyncFET™
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