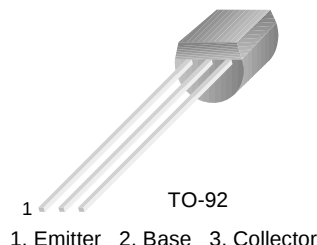


PN4258

PN4258

PNP Switching Transistor

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



Absolute Maximum Ratings* $T_A=25^\circ\text{C}$ 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	$^\circ\text{C}$

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

NOTES:

- 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

Electrical Characteristics $T_A=25^\circ\text{C}$ unless otherwise noted

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

Electrical Characteristics $T_A=25^{\circ}\text{C}$ unless otherwise noted (Continued)

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

* Pulse Test: Pulse Width $\leq 300\text{ms}$, Duty Cycle $\leq 2.0\%$ **Thermal Characteristics** $T_A=25^{\circ}\text{C}$ unless otherwise noted

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

Typical Characteristics

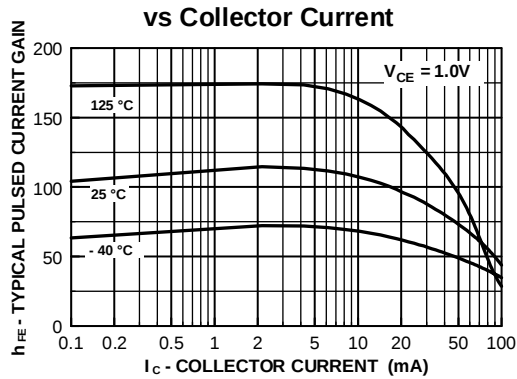


Figure 1. Typical Pulsed Current Gain vs Collector Current

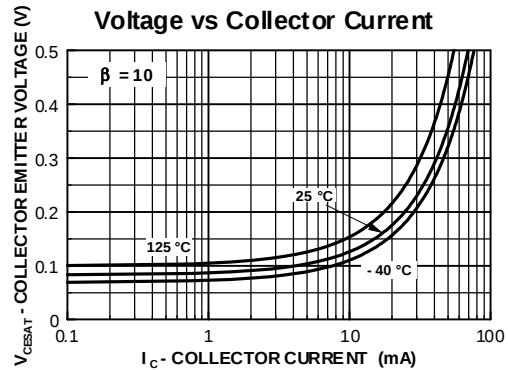


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

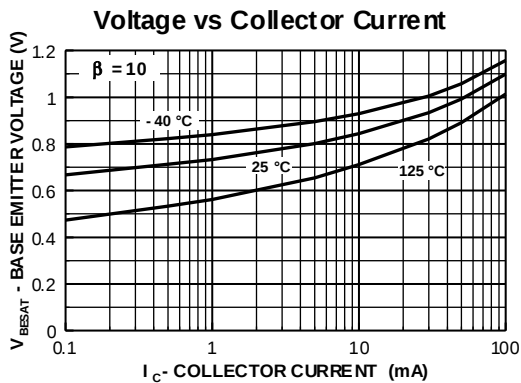


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

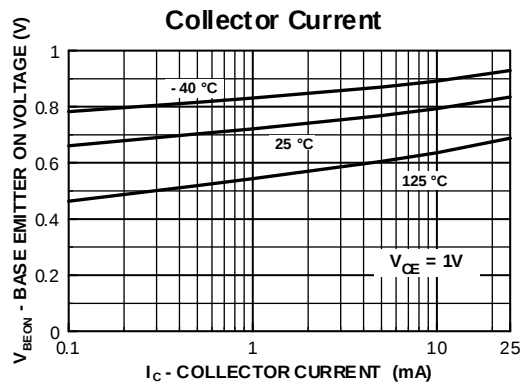


Figure 4. Base-Emitter On Voltage vs Collector Current

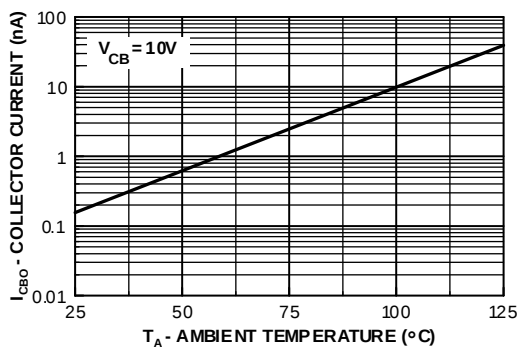


Figure 5. Collector Cutoff Current vs Ambient Temperature

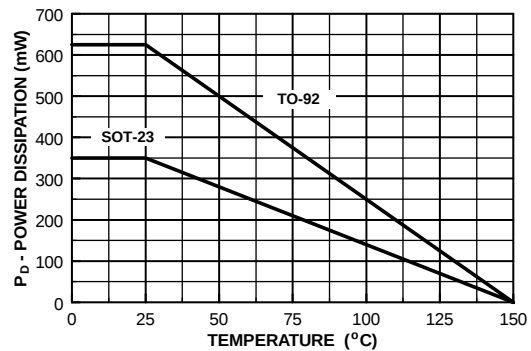


Figure 6. Power Dissipation vs Ambient Temperature

Typical Characteristics (Continued)

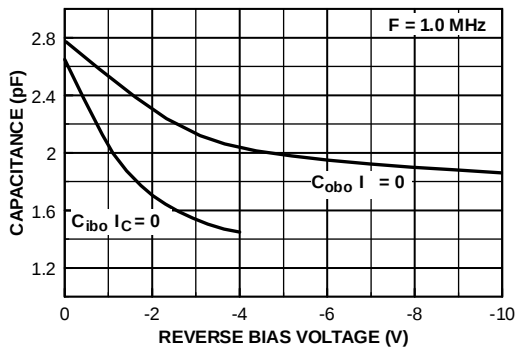


Figure 7. Input/Output Capacitance vs Reverse Bias Voltage

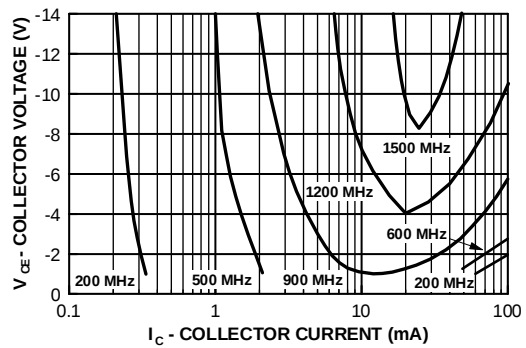


Figure 8. Contours of Constant Gain Bandwidth Product (f_T)

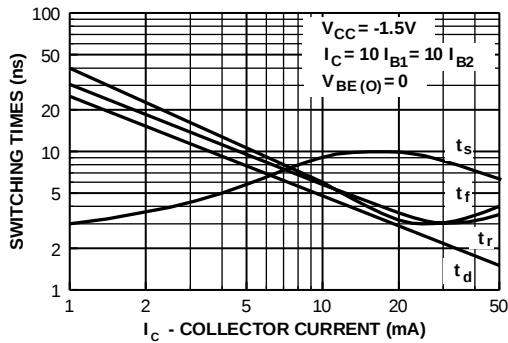


Figure 9. Switching Times vs Collector Current

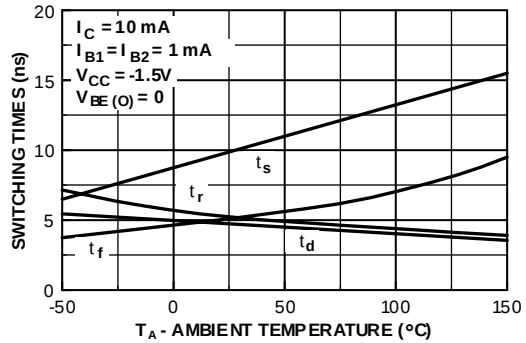


Figure 10. Switching Times vs Ambient Temperature

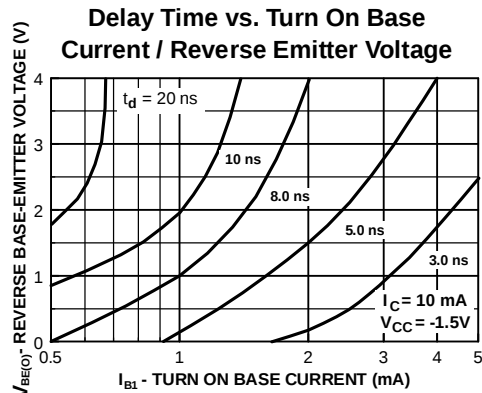


Figure 11. Delay Time vs Turn On Base Current/Reverse Emitter Voltage

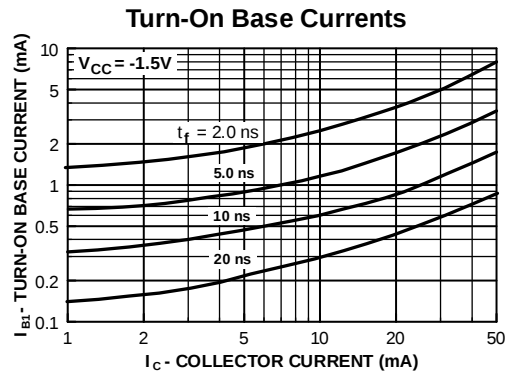


Figure 12. Rise Time vs Collector and Turn-On Base Currents

Typical Characteristics (Continued)

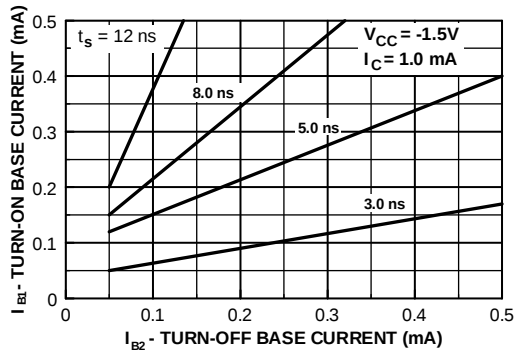


Figure 13. Storage Time vs Turn-On/Turn-Off Base Current

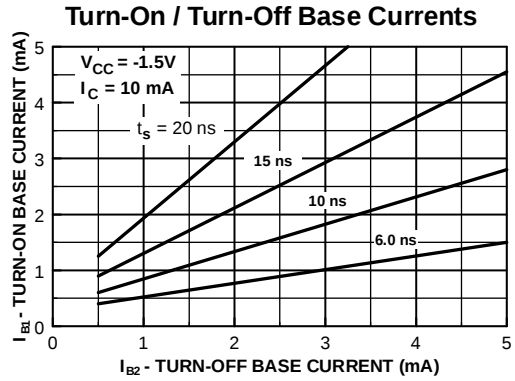


Figure 14. Storage Time vs Turn-On/Turn-Off Base Currents

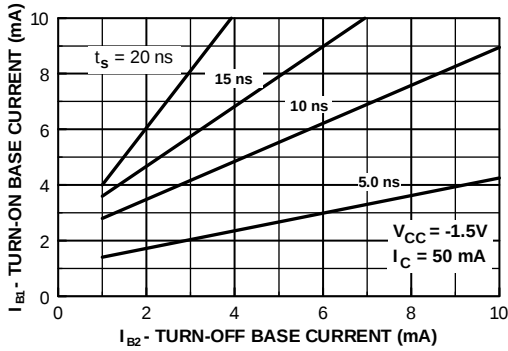


Figure 15. Storage Time vs Turn-On/Turn-Off Base Current

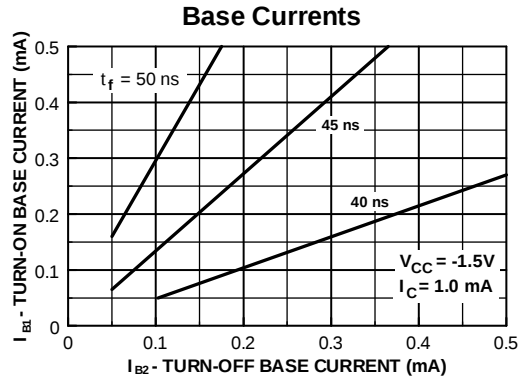


Figure 16. Fall Time vs Turn-On/Turn-Off Base Currents

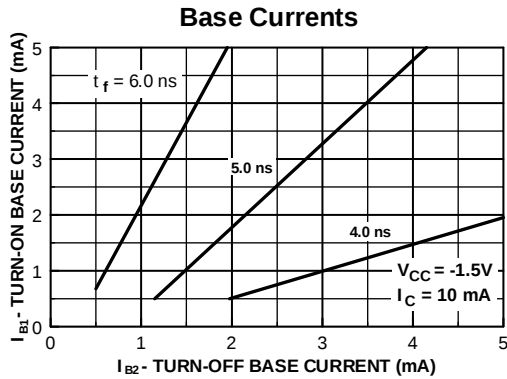


Figure 17. Fall Time vs Turn-On/Turn-Off Base Currents

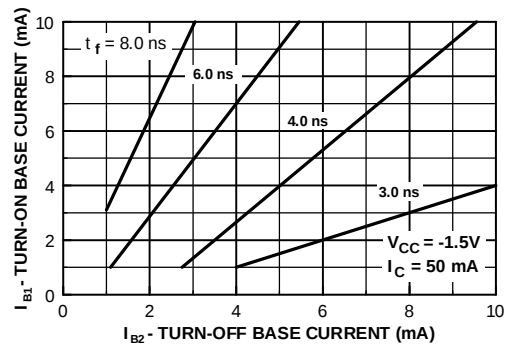


Figure 18. Fall Time vs Turn-On/Turn-Off Base Currents

Test Circuit

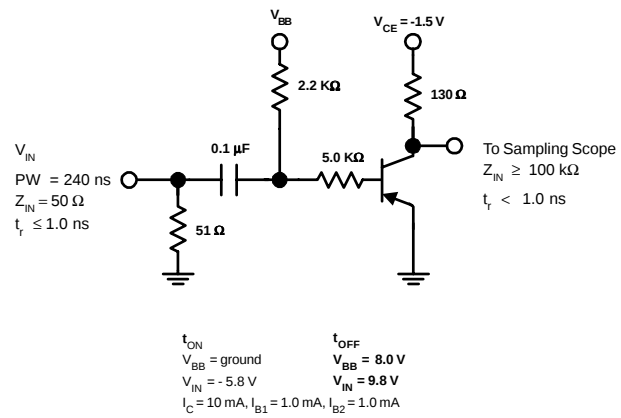
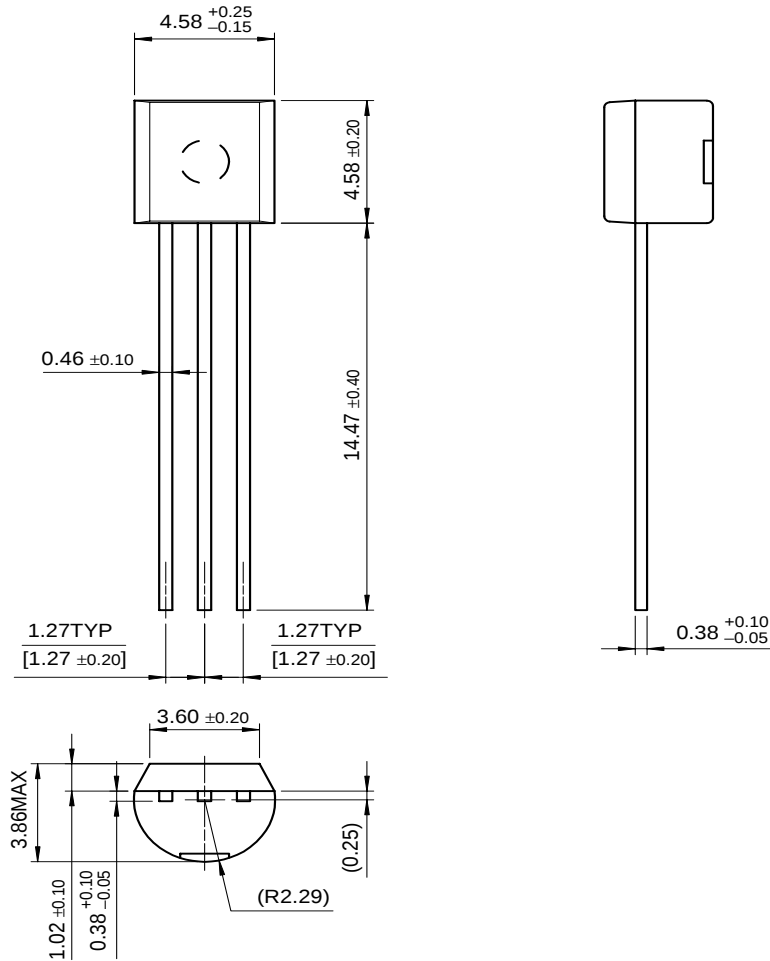


Figure 1. t_{on} , t_{off} Test Circuit

Package Dimensions

TO-92



Dimensions in Millimeters

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