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PN3646

NPN Switching Transistor

- Sourced from process 22.



TO-92
1. Emitter 2. Base 3. Collector

Absolute Maximum Ratings * $T_a=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	15	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continued	300	mA
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					
$BV_{(BR)CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = 10\text{mA}, I_B = 0$	15		V
$BV_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$I_C = 100\mu\text{A}, V_{BE} = 0$	40		V
$BV_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}, I_E = 0$	40		V
$BV_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100\mu\text{A}, I_C = 0$	5.0		V
I_{CES}	Collector Cutoff Current	$V_{CE} = 20\text{V}, V_{BE} = 0$ $V_{CE} = 20\text{V}, V_{BE} = 0, T_a = 65^\circ\text{C}$		0.5 3.0	μA μA
On Characteristics *					
h_{FE}	DC Current Gain	$V_{CE} = 0.4\text{V}, I_C = 30\text{mA}$ $V_{CE} = 0.5\text{V}, I_C = 100\text{mA}$ $V_{CE} = 1.0\text{V}, I_C = 300\text{mA}$	30 25 15	120	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 30\text{mA}, I_B = 3.0\text{mA}$ $I_C = 100\text{mA}, I_B = 10\text{mA}$ $I_C = 300\text{mA}, I_B = 3.0\text{mA}$		0.2 0.28 0.5	V V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 30\text{mA}, I_B = 3.0\text{mA}$ $I_C = 100\text{mA}, I_B = 10\text{mA}$ $I_C = 300\text{mA}, I_B = 3.0\text{mA}$	0.73	0.95 1.2 1.7	V V V
Small Signal Characteristics					
C_{cb}	Collector-Base Capacitance	$V_{CB} = 5.0\text{V}, I_E = 0, f = 1\text{MHz}$		5.0	pF
C_{eb}	Emitter-Base Capacitance	$V_{CB} = 5.0\text{V}, I_C = 0, f = 1\text{MHz}$		8.0	pF
h_{fe}	Small-Signal Current Gain	$I_C = 300\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$	3.5		

* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

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

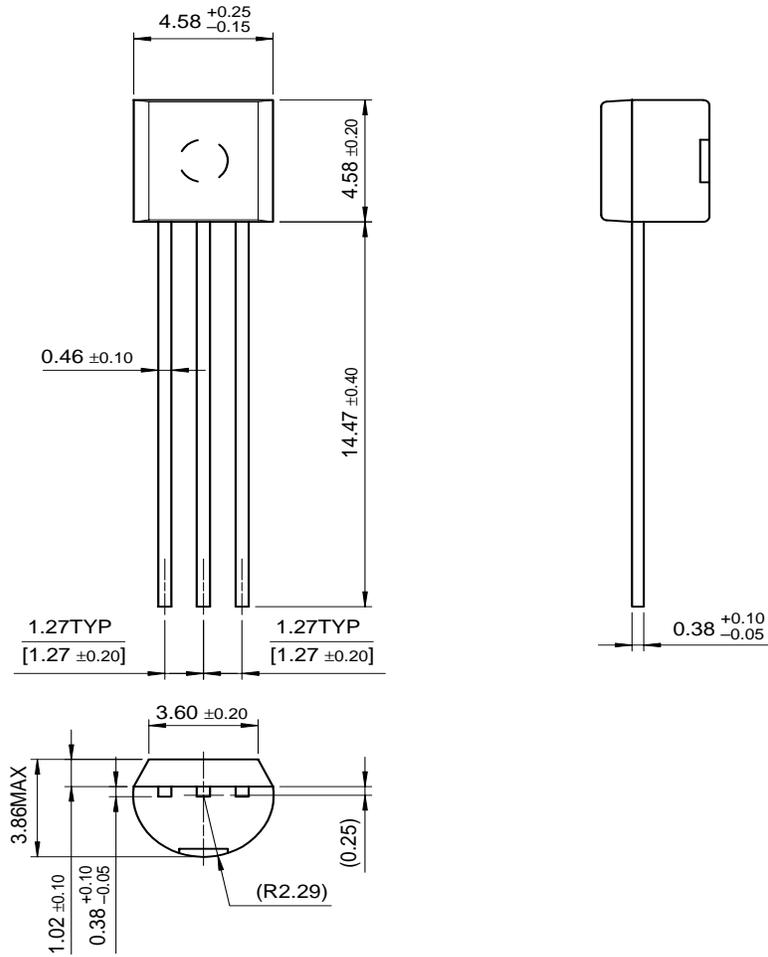
Symbol	Parameter	Test Condition	Min.	Max.	Units
Switching Characteristics					
t_s	Storage Time	$I_C = 300\text{mA}$, $V_{CC} = 10\text{V}$ $I_{B1} = I_{B2} = 30\text{mA}$		20	ns
t_{on}	Turn-On Time			18	ns
t_{off}	Turn-Off Time			28	ns

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/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ\text{C/W}$

Package Dimensions

TO-92



Dimensions in Millimeters

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