



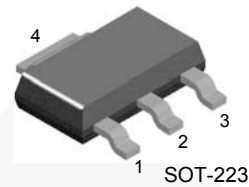
November 2014

NZT651

NPN Current Driver Transistor

Description

This device is designed for power amplifier, regulator and switching circuits where speed is important. Sourced from process 4P.



1. Base 2,4. Collector 3. Emitter

Ordering Information

Part Number	Marking	Package	Packing Method
NZT651	651	SOT-223 4L	Tape and Reel

Absolute Maximum Ratings^{(1),(2)}

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	60	V
V_{CBO}	Collector-Base Voltage	80	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	4.0	A
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Notes:

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

Thermal Characteristics⁽³⁾

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Max.	Unit
P_D	Total Power Dissipation	1.2	W
	Derate Above 25°C	9.7	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	103	$^\circ\text{C}/\text{W}$

Note:

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

Electrical Characteristics

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\text{ mA}, I_B = 0$	60		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\ \mu\text{A}, I_E = 0$	80		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100\ \mu\text{A}, I_C = 0$	5.0		V
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 80\text{ V}, I_E = 0$		100	nA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = 4.0\text{ V}, I_C = 0$		0.1	μA
h_{FE}	DC Current Gain ⁽⁴⁾	$I_C = 50\text{ mA}, V_{CE} = 2.0\text{ V}$	75		
		$I_C = 500\text{ mA}, V_{CE} = 2.0\text{ V}$	75		
		$I_C = 1.0\text{ A}, V_{CE} = 2.0\text{ V}$	75		
		$I_C = 2.0\text{ A}, V_{CE} = 2.0\text{ V}$	40		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ⁽⁴⁾	$I_C = 1.0\text{ A}, I_B = 100\text{ mA}$		0.3	V
		$I_C = 2.0\text{ A}, I_B = 200\text{ mA}$		0.5	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ⁽⁴⁾	$I_C = 1.0\text{ A}, I_B = 100\text{ mA}$		1.2	V
$V_{BE(on)}$	Base-Emitter On Voltage ⁽⁴⁾	$I_C = 1.0\text{ A}, V_{CE} = 2.0\text{ V}$		1.0	V
f_T	Current Gain - Bandwidth Product	$I_C = 50\text{ mA}, V_{CE} = 5.0\text{ V}, f = 100\text{ MHz}$	75		MHz

Note:

4. Pulse test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2.0\%$

Typical Performance Characteristics

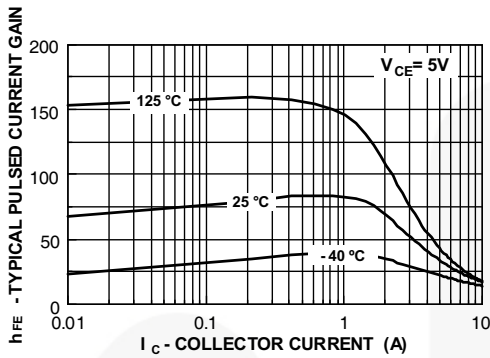


Figure 1. Typical Pulsed Current Gain vs. Collector Current

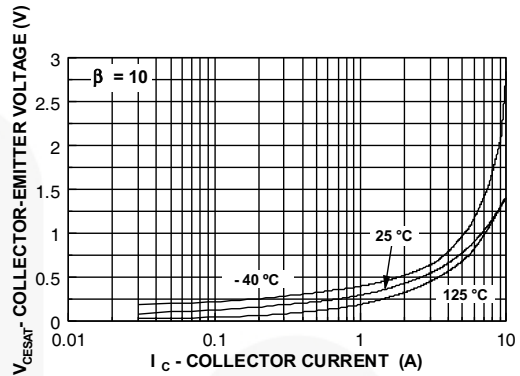


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

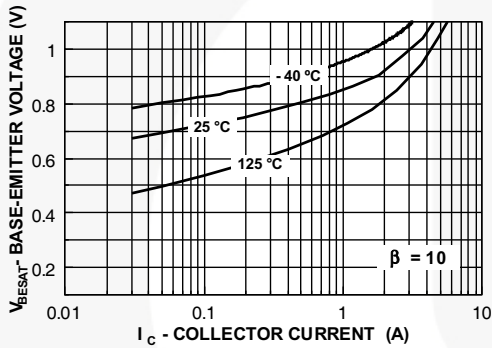


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

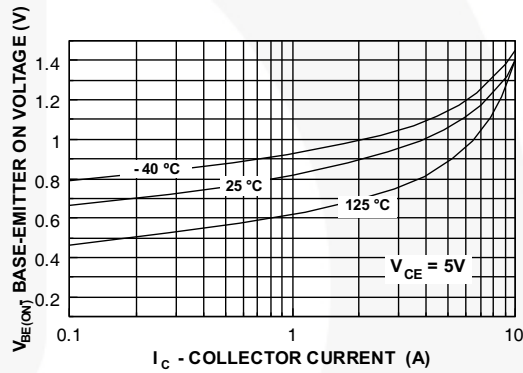


Figure 4. Base-Emitter On Voltage vs. Collector Current

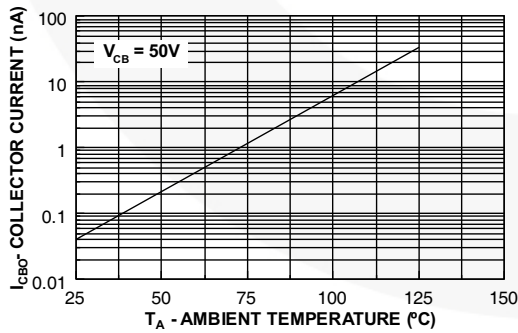


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

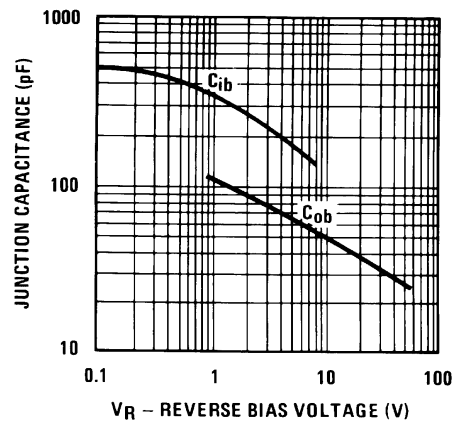


Figure 6. Junction Capacitance vs. Reverse Bias Voltage

Typical Performance Characteristics (Continued)

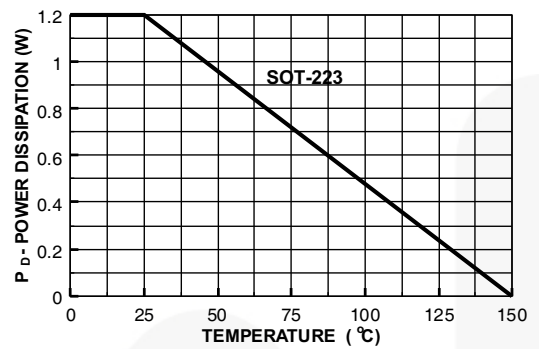


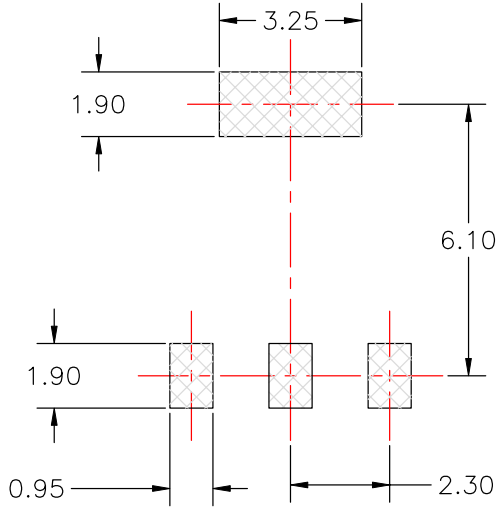
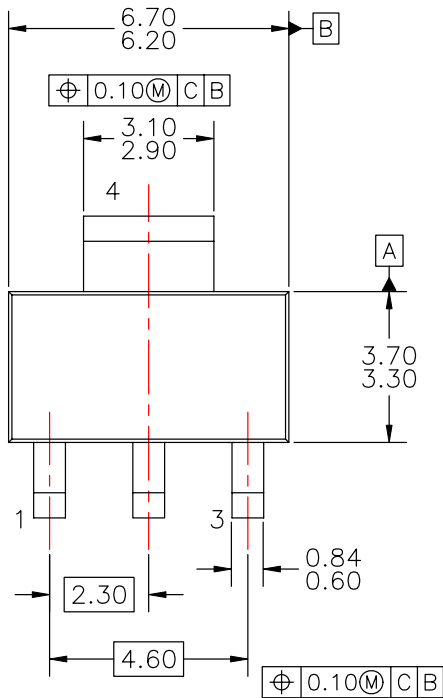
Figure 7. Power Dissipation vs. Ambient Temperature



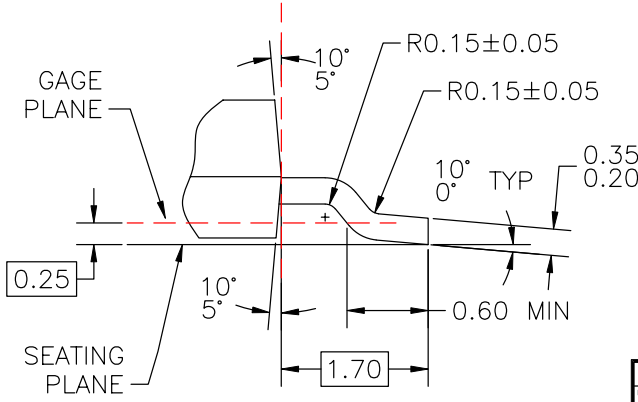
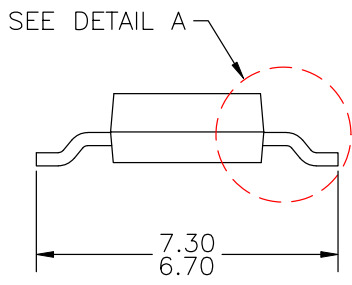
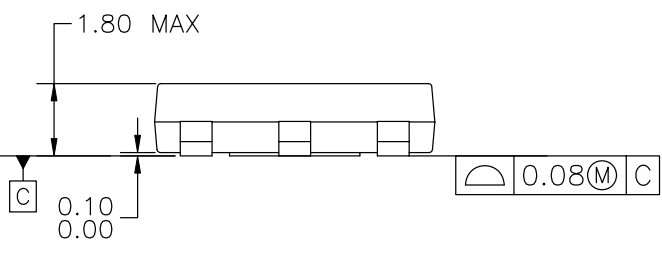
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APPROVED
July-14-2008

REVISIONS			
LTR	DESCRIPTION	DATE	NAME/SITE
A	RELEASE TO DOCUMENT CONTROL	JAN.25,1996	TL/FSCP
2	CHG DWG TEMPLATE FR NATIONAL TO FAIRCHILD; CHG DIM STYLE FR DUAL INCH[MM] TO SINGLE, MM; CHG LD WID FR 0.74 ±0.03 TO 0.60-0.84; REMOVE PKG THICK DIM (1.6); CHG TOTAL PKG HT FR 1.8 ±0.05 TO 1.80 MAX; CHG FOOT LANDING DIM FR 0.91 MIN TO 0.60 MIN; CHG LD THICKNESS FR 0.35 ±0.03 TO 0.20-0.35; ADD DRAFT ANGLE OF MOLDED BODY TOP & BOT; CHG LD LGTH TO PKG EDGE DIM TO BASIC; CHG LD PITCH FR 2.29 BS TO 2.30 BS; CHG BODY WID FR 3.56 ±0.33 TO 3.30; CHG BODY LN FR 6.53 ±0.33 TO 6.30; CHG TOTAL PKG WID FR 6.94 ±0.33 TO 7.30; CHG PAD SIZE FR 0.99 MAX TO 0.95; CHG PAD PITCH FR 2.286 TO 2.30; CHG THERMAL TAB SIZE FR 3.28 MAX TO 3.25; CHG PAD SIZE FR 1.5 TO 1.90; CHG PAD SPACE FR 6.3 TO 6.10; CHG NOTE '2' TO 'A' W/O DATE; DEL NOTE ON LD FINISH; ADD NOTES B, C, D, E & F.	12FEB08	LZSC/FSCP



LAND PATTERN RECOMMENDATION



DETAIL A
SCALE: 2:1

- NOTES: UNLESS OTHERWISE SPECIFIED
- A) DRAWING BASED ON JEDEC REGISTRATION TO-261, VARIATION AA.
 - B) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
 - C) ALL DIMENSIONS ARE IN MILLIMETERS.
 - D) DRAWING CONFORMS TO ASME Y14.5M-1994.
 - E) LANDPATTERN NAME: SOT230P700X180-4BN
 - F) DRAWING FILENAME: MKT-MA04AREV2

APPROVALS	DATE	FAIRCHILD SEMICONDUCTOR™			
DRAWN: J.U. COMPARATIVO JR.	26FEB2008				
CHECKED: L.Z. STA CRUZ					
APPROVED: M.R. GESTOLE					
G.S. BAJE		MOLDED PACKAGE SOT-223, 4 LEAD			
PROJECTION 		SCALE: 1:1	SIZE: A3	DRAWING NUMBER: MKT-MA04A	REV: 2
		FORMERLY: N/A	SHEET: 1 OF 1		



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Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.